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Court of Appeals
Division II
State of Washington
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IN THE COURT OF APPEALS
OF THE STATE OF WASHINGTON
DIVISION II

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| IN RE THE PERSONAL |) | NO. 53913-6-II |
| RESTRAINT PETITION OF |) | |
| |) | RESPONSE TO |
| |) | PERSONAL RESTRAINT |
| GREGORY A. SCHIRATO |) | PETITION |

Comes now Jon Tunheim, Prosecuting Attorney in and for Thurston County, State of Washington, by and through Joseph J.A. Jackson, Deputy Prosecuting Attorney, and files its response to petitioner's personal restraint petition pursuant to RAP 16.9.

I. BASIS OF CURRENT RESTRICTIONS ON LIBERTY

The Petitioner, Gregory A. Schirato, is currently serving an indeterminate sentence of 125 months to life following jury verdicts finding him guilty of rape in the second degree and burglary in the first degree in Thurston County cause number 15-1-00520-4. CP 285-297.¹

II. STATEMENT OF PROCEEDINGS

The Petitioner, Gregory A. Schirato, worked at the Department of Fish and Wildlife with the victim AL.² RP 77, 83. AL and Schirato attended an office Christmas party at Mercato's restaurant on

¹ The clerk's papers and verbatim report of proceedings were transferred to this PRP from the direct appeal, No. 51665-9-II. The report of proceedings appears in 7 volumes and will be collectively referenced as RP.

² For consistency with the PRP, this brief will refer to the victim by her initials.

December 17, 2014. RP 77, 83. While at the party, AL consumed two glasses of wine. RP 83.

AL described Schirato's appearance at Mercato's stating he "was wearing a suit with a pink shirt, and he had just purchased brand new shoes." RP 84. Because AL, Schirato and another co-worker all had new shoes on, they took a picture of their shoes in a circle. RP 84. Following the office party, AL and Schirato went to the Brotherhood Tavern in Olympia with Jennifer Quan and Kelly Cunningham, who also worked with them. RP 95. While at the Brotherhood, the group played shuffleboard. RP 95. AL purchased another a hard alcohol drink. RP 95-96. AL stated that she had at least three drinks at the Brotherhood because Schirato purchased at least another two drinks and placed them in her glass. RP 96.

When AL left the Brotherhood, she went home. She admitted at trial that she felt that she had drank too much and should not have been driving. RP 100-101. She estimated that she had consumed "at least six drinks" during the evening and testified that she would rarely drink hard alcohol drinks and would get very intoxicated when she did. RP 99-100.

AL described her home as a 1940's bungalow with a downstairs basement. RP 102. While the exterior windows had been

replaced, she stated that all of the doors had the original 1940's glass except for the front door. RP 103. When she arrived home, AL fed her two cats, changed into her pajamas, and had a glass of water. RP 110. AL described how she feeds her cats by providing them wet food, rinsing the tin can out, and washing her hands. RP 112. When she changed into her pajamas she also changed out of the bra she had been wearing and put on non-wire, non-padded sports bra. RP 112-113. The bra that she put on had never been worn out of her house and had never been seen or touched by Schirato. RP 147.

AL described her cats as a black and white tuxedo cat and a white and orange "ragdoll flame point Siamese mix." RP 116. After feeding her cats and changing clothes, AL went to the bathroom and washed her hands. RP 116-117. AL then went to bed and said she "passed out." RP 136. AL said that means

I drank a lot of alcohol that night, as I had mentioned, and I went to bed and don't remember having any time to fall asleep. There was no thinking, I just went straight to bed and passed out. I fell asleep pretty hard immediately when getting into bed.

RP 136.

The next thing that AL remembered was feeling "somewhat in a dream state, but slightly conscious." RP 136. She stated,

I felt someone's hands on my back, and the hands moved to my breasts, and I felt my bra that I was

wearing get unclasped. An then I felt my pants being pulled down, my underwear and my pajama bottoms.

RP 136-137. AL described the feeling that she was being fondled. RP 139. She then felt that something was being inserted into her vagina. RP 139. She described feeling aroused, and being semiconscious stating, she "thought that it was [her] boyfriend that was there that was touching [her]." RP 139. She did not see who was touching her and her eyes were closed. RP 139.

Later during the night, she felt warm and shoved her pants off and turned out the light. RP 140. She described still being out of it and noted that her underwear were still pulled down past he buttocks. RP 140-141. When she woke up in the morning, she immediately felt that something was wrong. RP 141. She expected to see her boyfriend, Steve Anderson, but he was not there. RP 141. Her bra was still unclasped and her underwear were down. RP 141. She began trying to contact Anderson by text message and then called him to ask if he had been there, to which he responded "no." RP 141. At that point she checked the house and found glass on the floor of the basement area. RP 142. At that point, AL called 911. RP 143.

AL described broken glass in the doorway of the basement. RP 149. The Olympia Police Department responded, and AL was taken to the hospital to have a rape kit done. RP 153. Her boyfriend drove up

from Kelso, WA, and came to the hospital. RP 154. After the events, AL went to Nordstrom's in Seattle and took a picture of shoes that matched the ones that Schirato had been bragging about on the night in question. RP 156-157.

While investigating the offense, Olympia Police Department Detective Corey Johnson applied for and was granted a search warrant for Schirato's residence to search for dress shoes, dress suits, dress shirts and a sample of Schirato's DNA. Search Warrant, Search Warrant Affidavit.³ The search warrant affidavit contained a lengthy description of the substance of the police investigation. Detective Johnson relayed the information that had been provided from AL's, Quan, Schirato, and Cunningham regarding the events of the evening. Search Warrant Affidavit, at 2-3. Detective Johnson indicated that law enforcement found footprints in the flower bed of AL's residence and outside of AL's bedroom window. Id. at 3. Detective Johnson indicated that the shoe prints appeared to have been caused by a male dress shoe. Id. at 3.

Detective Johnson noted the shoes worn by Schirato on the night of the incident and compared the shoe prints of the Nordstrom

³ In support of the personal restraint petition, Petitioner's counsel provided a Declaration of David Allen with several attachments. In this brief, the attachments will be referred to by their description. Attachments to the Declaration of Gregory Schirato will be similarly treated herein.

shoes identified by AL to those found outside of her residence. Id. at 6, 9. The affidavit also included a list of each person who AL had sexual contact with at her residence and a description from AL of prior sexual contact with Schirato that had occurred while she was intoxicated and had been asleep. Id. at 6-9. AL had informed law enforcement that Schirato had come to her residence for lunch and looked at vacation photos of her in a bikini and told her that she is the perfect woman and expressed that he was jealous of AL's boyfriend. Id. at 9.

Detective Johnson also included information provided from AL's neighbor regarding what he described as a suspicious vehicle and indicated that Schirato had stated that he drove a "small silver SUV." Id. at 10. Also included in the search warrant affidavit was a statement from Jennifer Quan indicating that Schirato was staring at AL's legs in the lower thigh area and told Quan "look at that, put your hand in between her legs" during the evening of the events. Id. at 10.⁴

During trial, Officer Nicole Glenn indicated that she located shoe prints when she responded to AL's residence. RP 414. Officer Glenn noted that AL appeared upset when she met with her. RP 418.

⁴ The search warrant affidavit is 11 pages long, for brevity, not every portion of the affidavit is referred to herein, but by reference, the entire affidavit is incorporated into the State's recitation of the Statement of the case.

Detective Johnson took a DNA sample from Schirato. RP 450. While serving the search warrant, Schirato told Johnson that he was willing to show him the suit and pointed out a suit that appeared to have been freshly dry cleaned. RP 455-456. Schirato also stated that he had lost the shoes on a trip to Chicago. RP 455. Schirato indicated that pink shirt had been dry cleaned as well and was smiling at Detective Johnson as he said so. RP 456.

Sexual Assault Nurse Examiner Linda Bigmedicine testified regarding her examination of AL and the rape kit that was collected. RP 484-503. During the examination, Bigmedicine and Officer Brenda Anderson placed the clothing that AL had been wearing, including the bra, into an evidence bag, which was collected by Anderson. RP 497, 504, 521. Detective Rebecca Fayette testified regarding the shoe prints. RP 562-582.

Several items were sent to the Washington State Patrol Crime laboratory for testing. A piece of fiber from a glass fragment recovered at AL's residence was similar to the fiber from Schirato's suit. RP 332, 542. Trace levels of male DNA were found on the waistband of AL's underwear and on swabs taken from the chain lock of the door of her residence. RP 761-762. Trace male DNA was also found on the vaginal swabs in the rape kit. RP 761. The DNA from the vaginal

swabs, chain lock, and underwear were of insufficient quantity to test. RP 776, 785. A mixed DNA profile was obtained from the clasps of AL's bra consistent with the combined DNA profiles of AL and Schirato. The statistical probability was 5.4 quadrillion times more likely that the DNA profile was a result of the combined DNA of AL and Schirato than of an unrelated individual selected at random from the U.S. population. RP 770-771. AL's boyfriend, Steve Anderson was excluded. RP 772.

Glass fragments were located on Schirato's shirt and suit. RP 289, 298-299. After the FBI declined to compare the fragments with glass samples found at AL's residence, Washington State Patrol Forensic Scientist Daniel Van Wyk examined the glass. FBI Report, RP 655-656. Van Wyk utilized refractive index analysis, x-ray fluorescent analysis and a stereomicroscope and concluded that the glass found on Schirato's clothing could not be excluded from having come from the same source as the glass from AL's residence. RP 665, 677, 679, 685.

The defense countered the State's evidence by offering testimony from Terry Lahman who testified regarding cell phone data collected from AL's phone. RP 874. Lahman testified that there was activity on AL's phone at 4:00 AM and again at 6:50 AM, which

defense counsel later used to argue that AL was not passed out. RP 874, 1241. The defense also offered testimony from George Chan, a forensic scientist, who testified regarding the possibility of DNA being transferred from one object to another. RP 1086-1093.

The defense also offered expert testimony from Skip Palenik. Palenik was asked to review the report of the Washington State Patrol and the bench notes from Van Wyk. RP 994-995. He was specifically hired to consult. RP 1035. As requested, Palenik provided a written report as to apparent discrepancies. RP 995. Palenik noted that there were some discrepancies in the report that could be explained by the bench notes. RP 997-998. He indicated that the State Patrol analyst could not locate "original surfaces," and indicated without such surfaces, you cannot tell the shape of the original object. RP 1005.

Palenik further testified as to concerns regarding the color of the glass particles and non-inclusion of certain results in the report. RP 1008. The central theme of Palenik's testimony was the possibility of error and the relatively high standard deviation of some of the tests that Van Wyk ran. RP 1010-1011. Palenik testified, "he's got high relative standard deviations, which means you run the risk of false inclusions because you include many more values for each of the elements that you're looking at than they actually have." RP 1014.

Palenik also indicated that there was no comparison done with known glass to determine how common the results would be. RP 1022-1023.

At the close of the evidence, the jury found Schirato guilty as charged and Schirato was sentenced to a total term of 125 months to life. CP 282, 283, 285-297. Schirato filed a direct appeal, but later voluntarily dismissed the appeal. See, No. 51665-9-II. This Personal Restraint Petition follows. Additional facts are included as necessary in the sections below.

III. RESPONSE TO ISSUES RAISED

A personal restraint petition is not an appeal. It is a collateral challenge to a judgment and sentence, and relief granted in a collateral attack is extraordinary. In re Pers. Restraint of Coats, 173 Wn.2d 123, 132, 267 P.3d (2011). A PRP filed within one year after the judgment and sentence becomes final may raise any grounds for relief, but the petitioner bears a higher burden than on a direct appeal. Id. A petitioner must demonstrate by a preponderance of the evidence that he or she has suffered a constitutional violation which caused actual and substantial prejudice, or that there occurred a nonconstitutional error that inherently resulted in a complete miscarriage of justice. Id.; In re Pers. Restraint of Brett, 142 Wn.2d 868, 874, 16 P.3d 601 (2001).

A petitioner's burden of production was described by the Washington Supreme Court in In re Personal Restraint of Rice, 118 Wn.2d 876, 828 P.2d 1086 (1992), regarding the requirement to make a prima facie showing:

Thus, a mere statement of evidence that the petitioner *believes* will prove his factual allegations is not sufficient. If the petitioner's allegations are based on matters outside the existing record, the petitioner must demonstrate that he has competent, admissible evidence to establish the facts that entitle him to relief. If the petitioner's evidence is based on knowledge in the possession of others, he may not simply state what he thinks those others would say, but must present their affidavits or other corroborative evidence. The affidavits, in turn, must contain matters to which the affiants may competently testify. In short, the petitioner must present evidence showing that his factual allegations are based on more than speculation, conjecture, or inadmissible hearsay.

Rice, 118 Wn.2d at 886.

To prevail on a claim of ineffective assistance of counsel, an appellant must show that (1) counsel's performance was deficient; and (2) the deficient performance prejudiced him. State v. Thomas, 109 Wn.2d 222, 225-26, 743 P.2d 816 (1987). First, deficient performance occurs when counsel's performance falls below an objective standard of reasonableness. State v. Stenson, 132 Wn.2d 668, 705, 940 P.2d 1239 (1997), *cert. denied*, 523 U.S. 1008 (1998). An appellant cannot rely on matters of legitimate trial strategy or

tactics to establish deficient performance. State v. Hendrickson, 129 Wn.2d 61, 77-78, 917 P.2d 563 (1996). For example, "[o]nly in egregious circumstances, on testimony central to the State's case, will the failure to object constitute incompetence of counsel justifying reversal." State v. Neidigh, 78 Wn. App. 71, 77, 895 P.2d 423 (1995) (internal quotation omitted).

While it is easy in retrospect to find fault with tactics and strategies that failed to gain acquittal, the failure of what initially appeared to be a valid approach does not render the action of trial counsel reversible error. State v. Renfro, 96 Wn.2d 902, 909, 639 P.2d 737 (1982). There is great judicial deference to counsel's performance and the analysis begins with a strong presumption that counsel was effective. Strickland v. Washington, 466 U.S. 668, 689, 104 S.Ct. 2052, 80 L. Ed. 2d 674 (1984); State v. McFarland, 127 Wn.2d 332, 335, 899 P.2d 1251 (1995). "A lawyer may properly make the tactical determination of how to run a trial even in the face of his client's incomprehension or even explicit disapproval." Brookhart v. Janis, 384 U.S. 1, 8, 86 S. Ct. 1245, 16 L. Ed. 2d 314 (1966).

Strickland permits counsel to "make a reasonable decision that makes particular investigations unnecessary." Strickland v. Washington, 466 U.S. at 691. There are "countless ways to provide

effective assistance in any given case. Even the best criminal defense attorneys would not defend a particular client in the same way.” Id. at 689. Counsel has the latitude to “formulate a strategy that was reasonable at the time and to balance limited resources in accord with effective trial tactics and strategies.” Harrington v. Richter, 131 S. Ct. 770, 789, 178 L. Ed. 2d 624 (2011). An attorney is not required to conduct an investigation that would be fruitless or harmful to the defense. Strickland, 466 U.S. at 691. Defense counsel is not incompetent just because his strategy did not work out as well as he had hoped.

1. Schirato’s trial counsel was not ineffective for not raising a pretrial suppression motion because such a motion would not have resulted in suppression of evidence.

Probable cause for the issuance of a search warrant exists if the affidavit supporting the search warrant contains sufficient facts and circumstances to establish a reasonable inference that the defendant participated in the criminal activity and that evidence of the crime is at a certain location. State v. Thein, 138 Wn.2d 133, 140, 977 P.2d 582 (1999); State v. Dunn, 186 Wn. App. 889, 895-896, 348 P.3d 791 (2015). “It is only the probability of criminal activity, not a prima facie showing of it, that governs probable cause. The [issuing judge] is entitled to make reasonable inferences from the facts and

circumstances set out in the affidavit.” State v. Emery, 161 Wn. App. 172, 202, 253 P.3d 413 (2011). Whether probable cause exist is evaluated on a case-by case basis. Thein, 138 Wn.2d at 149. “The application for a search warrant must be judged in the light of common sense resolving all doubts in favor of the warrant.” Dunn, 186 Wn. App at 897; *citing*, State v. Partin, 88 Wn.2d 899, 904, 567 P.2d 1136 (1977).

Schirato argues that his trial counsel rendered ineffective assistance of counsel by not filing a suppression motion alleging the search warrant affidavit prepared by Detective Johnson was insufficient to establish probable cause for the issuance of the search warrant and by not requesting a hearing pursuant to Franks v. Delaware, 438 U.S. 154, 155-156, 98 S.Ct. 2674, 57 L.Ed 667 (1978). In order to demonstrate a valid claim of ineffective assistance of counsel based on a failure to request a suppression of evidence, Schirato must demonstrate that a reasonably competent attorney would have made the suppression motion and that the trial court would have granted the motion. State v. Jamison, 105 Wn. App. 572, 590, 20 P.3d 1010 (2001); State v. Contreras, 92 Wn. App. 307, 319, 966 P.2d 915 (1998), *review denied*, 142 Wn.2d 1003 (2000).

Schirato has not and cannot demonstrate that a suppression motion would have resulted in the suppression of evidence.

In Franks, the United States Supreme Court held that after a search warrant has been issued, a defendant is entitled to an evidentiary hearing regarding the veracity of factual allegations in the search warrant affidavit if (1) the defendant makes a “substantial preliminary showing” that the affiant knowingly and intentionally or with reckless disregard for the truth included a false statement in the warrant affidavit or made a material omission, and (2) the allegedly false statement is necessary to the finding of probable cause. 438 U.S. at 155-156; State v. Chenoweth, 160 Wn.2d 454, 469, 158 P.3d 595 (2007); State v. Ollivier, 178 Wn.2d 813, 846, 312 P.3d 1 (2013). If the defendant successfully demonstrates material misstatements or omissions by a preponderance of the evidence, the trial court must strike the misrepresentations and include the omissions and determine whether the affidavit as modified still supports a finding of probable cause. Ollivier. 178 Wn.2d at 847.

Mere negligence or innocent mistakes are insufficient to support a *Franks* hearing. State v. Garrison, 118 Wn.2d 870, 872, 827 P.2d 1388 (1992); State v. Seagull, 95 Wn.2d 898, 908, 632 P.2d 44 (1981). Schirato argues that Detective Johnson’s description of the

suspicious vehicle described by Wesley Kirkpatrick “as a small SUV style,” was false. Search Warrant Affidavit, at 9, PRP at 25. Kirkpatrick was interviewed by Detective Lindros and described a suspicious vehicle as an “outback style.” Statement of Wesley Kirkpatrick, at 7. A Subaru Outback can be categorized as a crossover SUV.⁵ To characterize a description of an “outback style” vehicle as a “small SUV style” vehicle is not a misrepresentation.

Schirato also argues that Detective Johnson’s statement, “During the interview with Schirato he stated he drove a small silver Mazda SUV. I checked Schirato’s name through the Department of Licensing (DOL) and found he was the registered owner of a 2008 Mazda M3S bearing Washington license 948-XYR,” was false and misleading. Search Warrant Affidavit, at 9, PRP at 25. Schirato claims that he did not say that he had an SUV but rather said that he drove a Mazda 3. Declaration of Gregory Schirato at 3. At best, Schirato demonstrates an innocent mistake or misunderstanding. If Detective Johnson were intentionally seeking to mislead the judge regarding the nature of Schirato’s vehicle, he would not have listed the complete description of the vehicle. Search Warrant Affidavit at 25. If Detective

⁵ The 2020 Subaru Outback is ranked #13 on the US News “Best Crossover SUV” list. <https://cars.usnews.com/cars-trucks/rankings/crossover-suvs>.

Johnson was seeking to be deceptive, he simply would have stated "Mazda SUV."

Moreover, it would be easy to mistake a description of a Mazda 3 as an SUV because it is available in a hatchback version.⁶ While Schirato's version of the vehicle might be a sedan, it is unlikely that a trial court would find Detective Johnson's characterization of Schirato's vehicle as similar to the vehicle described as Kirkpatrick was anything other than an innocent misunderstanding. Schirato could not have demonstrated a "reckless disregard for the truth."

Even assuming arguendo that Schirato could make a showing that Detective Johnson's statements in the Search Warrant Affidavit were intentionally false or made with reckless disregard for the truth, the statements regarding the vehicle were not material to the issuance of the warrant. The Search Warrant allowed law enforcement to search for "male dress shoes," "male dress suits," "male dress shirts," and a sample of Schirato's DNA. Search Warrant, at 1. The discussion of Schirato's vehicle and Kirkpatrick's description of a suspicious vehicles added little or nothing to the probable cause to support that search. Even if the trial court concluded the suspicious silver vehicle matched Schirato's that conclusion would not be

⁶ www.kbb.com/mazda3/2008/?bodystyle=hatchback.

material to search warrant because Schirato himself stated that he had lunch at AL's residence. Search Warrant Affidavit at 8. It was of little import that a neighbor saw a similar vehicle at the residence.

Without the information regarding a silver vehicle, the search warrant affidavit indicates that Schirato was one of a small group of people who were with AL prior to the incident, was aware that she had been consuming alcohol, had indicated a desire that another person "put her hand between AL's legs" on the night of the incident, was wearing expensive dress shoes on the night of the incident, and the soles of the dress shoes were consistent with footprints found by law enforcement outside of the area where the break-in of AL's residence occurred. Search Warrant Affidavit at 3, 6, 7, 8, 9, 10.

Detective Johnson "observed several footprints, starting in the front yard flower bed, south side of the residence flower bed, and the flower bed on the east side" of AL's residence. Id. at 3. "The shoe prints appeared to have been caused by a male dress shoe. The better quality prints appeared to have a smooth wide sole and short wide heel," and Detective Johnson was unable to see any tread in the shoe print." Id. AL confirmed that Schirato was wearing a new pair of shoes the night of the incident and took a photo of them. Id. at 6. AL found the same type of shoe at Nordstrom's and Detective Johnson

compared the sole of the Nordstrom shoe to the shoe prints and found that it could make the shoe prints. Id. at 9. This information was far more important to the issuance of the search warrant than any discussion of Schirato's vehicle.

Without the information from Kirkpatrick or the description of Schirato's vehicle, the remainder of the search warrant affidavit contained sufficient facts and circumstances to establish a reasonable inference that the Schirato participated in the criminal activity and that evidence of the crime was at a certain location. Even if Schirato's counsel had filed a suppression motion and proven an intentional misstatement or omission, or reckless disregard for the truth, the motion still would not have resulted in suppression of any evidence. With that knowledge, Schirato's counsel strategically elected to not file a suppression motion. Declaration of Richard Woodrow, Appendix II. Schirato's claim of ineffective assistance must fail.

Schirato was not entitled to a *Franks* hearing. Garrison, 118 Wn.2d at 873. The challenged information was not necessary to the finding of probable cause. Information about AL's past relationships was also not necessary, though, Detective Johnson included a significant amount of information in that regard. Search Warrant Affidavit, at 5, 6. Even if some facts were left out, omitted information

that is potentially relevant but not dispositive is not enough to warrant a *Franks* hearing. Garrison, 118 Wn.2d at 875, *citing*, United States v. Colkley, 899 F.2d 297, 301 (4th Cir. 1990). If this Court disagrees, the Court should remand for an evidentiary hearing to determine whether or not the evidence found in Schirato's residence would have been suppressed if a motion had been made by his trial counsel. As argued above, however, he has not demonstrated that he was entitled to a *Franks* hearing, and has not demonstrated that a reference hearing on this issue is necessary.

2. Schirato's trial counsel was not required to request a *Frye* hearing because the science utilized by Mr. Van Wyk in conducting his analysis is generally accepted in the scientific community as reliable.

Experts may testify on subjects not within the understanding of the average person. ER 702; State v. Petrich, 101 Wn.2d 566, 575-76, 683 P.2d 173 (1984). They may express opinions concerning their fields of expertise if those opinions will assist the trier of fact. ER 702. "Washington has adopted the Frye test for evaluating the admissibility of *new* scientific evidence." State v. Gregory, 158 Wn.2d 758, 829, 147 P.3d 1201 (2006) (emphasis added); United States v. Frye, 293 F.1012 (D.C. Cir. 1923). "Testimony which does not involve new methods of proof or new scientific principles from which conclusions are drawn need not be subjected to the Frye test." Rather, the

admissibility of such testimony is determined under ER 702. State v. Russell, 125 Wn.2d 24, 69, 882 P.2d 747 (1994), cert. denied, 514 U.S. 1129 (1995).

The rationale of the *Frye* standard, which requires general acceptance in the relevant scientific community, is that expert testimony should be presented to the trier of fact only when the scientific community has accepted the reliability of the underlying principles.

State v. Copeland, 130 Wn.2d 244, 255, 922 P.2d 1304 (1996); *citing*, State v. Canaday, 90 Wn.2d 808, 585 P.2d 1185 (1978).

In this case, the glass that was recovered was examined by Mr. Van Wyk using “a refractive index measurement on the called the GRIM,” visual comparisons with a stereomicroscope, and x-ray fluorescence analysis. RP 665, 677, 679. Van Wyk utilized a “rule-out method” in his comparisons. RP 676. None of the witnesses with training in glass comparisons indicated that these are not methods generally accepted as reliable in the scientific community.

Dr. Susan Wilson initially collected the glass from Schirato’s clothing. RP 299. At that time, she was not yet qualified to do comparisons of glass and was working with the State of Oregon to become trained in the area. RP 299-300. Dr. Wilson testified that different jurisdictions have their own standards “for documentation and what they will and will not accept.” RP 301. She described

acceptable methods for comparison, including refractive index, and chemical analysis. RP 301-302. She indicated that different instruments “have orders of magnitude and greater ability to detect ... the presence of certain elements,” and “some are destructive which can become a problem for some labs. RP 302. Dr. Wilson testified that the “FBI uses a different instrument for the elemental profile than what the [Washington] State Patrol does and also what the Oregon State does.” RP 303. She testified,

The difference between the two instruments is the instrument used in Washington State is non-destructive. The one that’s used by the FBI is. The sample size required for the instrument in Washington is smaller.

RP 304.

Dr. Wilson testified that the glass technique used by the Washington State Patrol is generally accepted in the scientific community. RP 304. The defense expert, Samuel Palenik, who testified that he has conducted glass analysis as part of a case “a couple hundred times,” testified that refractive index measurements with the GRIM instrument are utilized in glass comparisons and elemental composition is by either “x-ray fluorescence or by ... laser ablation inductively couple plasma mass spectrometer.” RP 984, 987, 992, 994. Palenik testified that the analysis conducted in this case, “did cover the tests that most any lab that has done glass

examinations would do, and they had the equipment, as far as that goes as well, to carry out these tests.” RP 997.

There is absolutely no indication that the methods used by Van Wyk in analyzing the glass evidence in this case were not conducted using methods generally accepted in the scientific community as reliable. Even the document from the FBI indicated that the general methodology that was employed is the proper methodology for analyzing glass. FBI Report, at 2. The concerns noted by statistician Clifford Spiegelman are primarily rooted in why the FBI did not conduct testing and are speculative at best. Decl. of Clifford Spiegelman. Nothing has been provided which indicates that the testing employed was outside the generally accepted scientific norms. In fact, the methods utilized are the accepted scientific tests for glass comparisons. Declaration of Kris Gates, Appendix I.

None of the scientists who conduct glass comparisons disagreed with the methodology employed by Mr. Van Wyk. The methodology is neither novel nor new.⁷ Schirato has not and cannot demonstrate that the expert opinions by Van Wyk would have been suppressed if his trial counsel had requested a *Frye* hearing. His

⁷ A discussion of similar glass comparisons is contained in the third edition of Moenssens, A, InBau, F., Starrs, J, Scientific Evidence in Criminal Cases, The Foundation Press, (3rd Ed. 1986), at p. 510-514. Refractive index distribution is discussed in the 1971 journal article attached to Schirato's Declaration, at page 298.

defense counsel had consulted two independent experts who confirmed the methodology was accepted in the scientific community. Appendix II. He can demonstrate neither prong of the *Strickland* test. His counsel was not ineffective for not requesting a *Frye* hearing.

3. The defense expert was knowledgeable, prepared, and qualified to testify regarding the glass analysis. Defense counsel was not ineffective in his presentation of Mr. Palenik's testimony.

“Generally, the decision to call a witness will not support a claim of ineffective assistance of counsel.” State v. Thomas, 109 Wn.2d 222, 230, 743 P.2d 816 (1987), *citing*, State v. Wilson, 29 Wn. App. 895, 903, 626 P.2d 998 (1981). Schirato relies on Bloom v. Calderon, 132 F.3d 1267 (9th Cir. 1997) to support his claim that his defense counsel was ineffective in the presentation of defense expert Skip Palenik. PRP, at 40. This case is easily distinguishable from Bloom.

In Bloom, the Ninth Circuit Court of Appeals considered a claim of ineffective assistance of counsel in a death penalty case, where the defense attorney obtained approval from the trial court to hire an expert but did not actually do so until a few weeks prior to the trial. Id. at 1268-1269, 1271. Additionally, the defense attorney left the majority of the preparation of the expert witness to a law student intern, did not discuss the defense theory with the expert, and did not provide the expert with requested documentation. Id. at 1271-1272.

The expert then initially formed the opinion that Bloom had the “capacity to form the specific intent to murder and to deliberate and premeditate.” Id. at 1273.

During trial, the expert interviewed Bloom a second time and concluded that he had a “schizotypal personality disorder.” Counsel called the expert to testify but ignored the first report that had been generated. Id. at 1273. On cross-examination, the prosecutor “brought out” the original opinion, and the Ninth Circuit stated, “this cross-examination not only negated Dr. Kling’s testimony for the defense, it turned that testimony against Bloom with devastating effect.” Id.

Unlike the attorney in Bloom, Schirato’s defense counsel retained Palenik’s testimony for the very specific purpose of arguing that Van Wyk’s work could have been done better. Appendix II. Palenik had 43 years of experience in trace element cases and had conducted glass analysis “a couple of hundred times.” RP 987. Palenik had been teaching forensic scientists regarding glass analysis for “twenty-five years, maybe.” RP 987. He was a good choice for a defense expert.

Palenik was asked to review the report of the Washington State Patrol and the bench notes from Van Wyk. RP 994-995. He was specifically hired to consult. RP 1035. As requested, Palenik provided

a written report as to apparent discrepancies. RP 995. Palenik noted that there were some discrepancies in the report that could be explained by the bench notes. RP 997-998. He indicated that the State Patrol analyst could not locate "original surfaces," and indicated without such surfaces, you cannot tell the shape of the original object. RP 1005. This testimony allowed the defense to assert that the results could not distinguish the glass between a window or a drinking glass. RP 1006, 1242.

Palenik further testified as to concerns regarding the color of the glass particles and non-inclusion of certain results in the report. RP 1008. The central theme of Palenik's testimony was the possibility of error and the relatively high standard deviation of some of the tests that Van Wyk ran. RP 1010-1011. Palenik testified, "he's got high relative standard deviations, which means you run the risk of false inclusions because you include many more values for each of the elements that you're looking at than they actually have." RP 1014. Palenik also indicated that there was no comparison done with known glass to determine how common the results would be. RP 1022-1023.

Palenik indicated that he began work on the case in July of 2017 and completed his report a few weeks before trial on December

28, 2017. RP 1037. He was given plenty of time to prepare for his testimony.

On cross-examination, the prosecutor discussed Van Wyk's earlier testimony that he had disregarded any test with a standard deviation over 15 percent. RP 1044. Palenik responded that disregarding those does address his concerns "in a sense," but "it would have been so easy to fix it," rather than disregarding the results with a high relative standard deviation. RP 1044. Palenik re-emphasized that his objection was to the interpretation of the data, "because you can do it better, you could get further in the State's case with respect to glass if you've got a narrower RSD. You would have – you would have less likelihood of a false inclusion." RP 1050. He stated that throwing out some data can have an effect on the other data as well. RP 1050.

While Palenik admitted that he could not state that Van Wyk was wrong, he maintained that the work could have been done better. RP 1057-1058. He maintained his position that the high relative standard deviations of some of the tests made it more likely that a false inclusion could occur. RP 1058. He testified, "You cannot, though, always reject a piece of data with impunity." RP 1059.

It is clear that Palenik could not conclude that Van Wyk's results were incorrect, rather, the purpose of his testimony was to show that the work could have been done better and therefore there was a risk of false inclusions. He fulfilled that strategic purpose. Defense counsel relied on his testimony in closing arguments. RP 1242, 1243. Palenik's testimony allowed defense counsel to argue that Van Wyk's work was "sloppy," inexperienced, and over inclusive. RP 1243-1244.

Schirato now argues that Palenik was unprepared because he did not conduct any testing. This argument ignores the fact that he was not asked to do so. Palenik repeatedly stated that the work could have been done better. It was strategic to not have him conduct further testing because he may have proven that Van Wyk was right which would have made his testimony useless to the defense. Appendix II. Schirato has not demonstrated that his counsel's performance fell below reasonable professional norms nor has he demonstrated that had his counsel acted differently, the result of the trial would have differed. Schirato's trial counsel presented a prepared expert witness for a strategic purpose. This case is much more like the series of cases which have distinguished themselves from the facts of Bloom than to Bloom itself. See Tucker v. Ozmint, 350 F.3d

433 (4th Cir. 2003); Parkus v. Bowersox, 157 F.3d 1136 (8th Cir. 1998); Raley v. Ylst, 470 F.3d 792 (9th Cir. 2006); In re Pers. Restraint of Gomez, 180 Wn.2d 337, 359-360, 325 P.3d 142 (2013). Schirato has failed to demonstrate ineffective assistance of counsel.

4. It was reasonable for Schirato's defense counsel to not refer to a more than forty-five year old study during cross-examination of the State's expert and direct examination of the defense expert. There was no actual and substantial prejudice caused by not introducing such an article.

Schirato argues that his trial counsel rendered ineffective assistance by not referring to a 1971 article in the Journal of Forensic Sciences.⁸ At the time of trial, the article was more than forty-five years old. It cannot be said that counsel acted outside reasonable professional norms by not referencing such an article. Moreover, a review of the article demonstrates that it would not have had an effect on the outcome of the case.

Contrary to Schirato's assertion, "what this article demonstrates is that glass is prevalent on the majority of pieces of men's outside clothing after they were dry cleaned," the article looked only at a single dry cleaner in Reading and Caversham, England, and examined clothing at random as they were delivered to the laundry,

⁸ The article; Pearson, E.F., May, R.W., Dobbs, M.D.G, "Glass and Paint Fragments Found in Men's Outer Clothing," Journal of Forensic Sciences, Vol. 16, N. 3 July,

not after they were dry cleaned. Id. at 283, 284, 299; PRP at 44. The study looked at 100 suits and 46% of the glass fragments found came from two of the suits. Id. at 286. The study conducted refractive index testing but did not conduct elemental analysis of the particles found.

More recent studies suggest that the results of the 1971 study overestimated the prevalence of glass in the general population. A 1997 study from Vancouver, Canada, found that glass was found in 2% of the outer clothing of 213 high school students.⁹ That article discussed historical studies and indicated a similar study from dry cleaners in Vancouver revealed only 16 garments out of 300 bore glass on their surfaces and only one had more than two glass fragments. Appendix III, at 233. The article also reviewed a study from Ireland, where the authors opined that the population had been exposed to more glass due to a “sustained terrorist campaign.” Id. at 234. The Canadian study included a chart with percentages based on previous studies and demonstrated that more recent studies showed a that the 1971 study is an outlier. Id. at 239.

Other studies support a conclusion that the 1971 study is not definitive. A New Zealand study looked at clothing of private

1971, is attached as Appendix B to the Declaration of Petitioner and will be referred to as “1971 Journal” in this brief.

⁹ Lau, L, Beveridge, A.D, Callowhill, B.C., Connors, N., etc., “The Frequency of Occurrence of Paint and Glass on the Clothing of High School Students,” Can. Soc.

individuals and compared them with known forensic glass cases.¹⁰ That article also included a discussion of past studies and noted, “A wide range of results has been published, which suggest that the geographical location of the survey may have a significant effect on the results.” Appendix IV, at 41. The study found no glass on the surfaces of the clothing of the general population tested and only 7 garments had glass in the pockets. *Id.* at 43. The authors noted that the study “reinforces the significance of finding a large group of matching glass on a suspects clothing and shoes.” *Id.* at 48.

Defense counsel Woodrow asked Skip Palenik, are there studies that have been performed, “to determine how long glass fragments can stay on clothes?” and Palenik responded, noting that studies (with fibers) are “case by case.” RP 1022. While Palenik did not point out any specific articles, his response was consistent with the New Zealand Study which suggested a wide range of results with geographical location being significant. Appendix IV, at 41. None of the available studies looked at the prevalence of glass found on the suits of office workers employed by the State of Washington. Surely,

Forens. Sci. J., vol. 30, No. 4 (1997), herein after referenced as Appendix III.

¹⁰ Coulson, SA, Buckleton, JS; “Glass on clothing and shoes of members of general population and people suspected of breaking crimes,” Science and Justice, Vol. 41, p. 39-48 (2001), hereinafter Appendix IV.

the studies from Vancouver, B.C., could be argued as more significant to this case than a more than forty-five year old study from England.

It was not unreasonable for counsel to elect to not pursue questioning based on an old article that can easily be distinguished by several other studies. This is especially true after experts had informed Woodrow that the article was dated. Appendix II. Moreover, had the article been introduced, it would likely have been pointed out that the study did not address whether it is likely that a person's suit would have glass that is comparable by refractive index and elemental analysis to a 1940's piece of door glass. Even if the article had been introduced by the defense, it would not have changed the outcome of this case. Schirato has demonstrated neither prong of the *Strickland* test.

5. Schirato's counsel acted strategically by not calling the FBI analyst as a witness at trial and Schirato has not demonstrated actual and substantial prejudice caused by not having the FBI analyst testify.

Schirato argues that his trial counsel was deficient because he did not call an FBI analyst who declined to analyze the glass in this case, to testify at trial. FBI Report; PRP at 34, 38. Contrary to Schirato's assertion, the FBI analyst, Jodi Blakely Webb, did not conduct a thorough analysis, rather the analyst simply did not conduct testing on the glass. Id. The record as a whole reveals that the

decision to not pursue Webb as a witness for trial was a valid and strategic tactic. See Appendix II at 9-10.

During trial, defense counsel argued that the glass samples were potentially tainted because the FBI was missing in the chain of custody presented. RP 657-659, 705-707, 1245-1246. Had Webb testified at trial, this argument would likely have been negated. Additionally, defense counsel was able to introduce the conclusion that the particles were too small for testing through several witnesses without Webb having an opportunity to contradict the argument. While cross-examining Van Wyk, defense counsel asked about the fact that the FBI did not test the glass and Van Wyk responded, "Yes, they indicated that they were too small for the analysis on the GRIM." RP 704. Palenik testified that the reason the FBI rejected the glass

is they said they were going to do GRIM on it in the report. I don't know if know if they were going to then follow it, if it came out the same, if they were going to do laser ablation ICP-MS. But the reason they rejected it, actually, surprising to me, is for refractive index determination.

RP 1052. In effect, defense counsel was able to place the conclusion of the FBI report in front of the jury without having the FBI analyst testify.

Important to this inquiry is the fact that Schirato has not demonstrated that the outcome of the proceedings would have been

any different if Webb had been called to testify. Susan Wilson testified that the FBI uses a different instrument when it does elemental testing of glass than the Washington State Patrol and that the FBI would have required a larger sample to complete testing than the instruments used by the State Patrol. RP 346. Experts who Woodrow consulted with confirmed Wilson's testimony. Appendix II, at 8-9. Palenik testified that size does not really matter for refractive index measurements, "where you can use almost the tiniest piece of glass you can see if you're careful," and indicated that the size becomes an issue in trace element composition tests. RP 1005. He confirmed that the FBI uses laser ablation for elemental analysis, which essentially means "obliteration," and is destructive. RP 1033. Senior Forensic Scientist from the Oregon State Patrol indicates that she reviewed Van Wyk's work in this case and did not have any issue with the size of the particles tested. Appendix I.

Schirato has placed nothing in the record that indicates Webb would have disagreed with any of the experts who testified. Rather than demonstrating actual and substantial prejudice, Schirato speculates that the outcome may have been different if the FBI analyst had been called to testify. This is insufficient. In re Pers. Restraint of Brett, 142 Wn.2d at 874. Schirato has demonstrated

neither deficient performance nor prejudice. His claim of ineffective assistance of counsel must fail.

6. The prosecutor's use of the word "matched" during rebuttal closing argument was a reasonable inference from the evidence. Defense counsel's decision to not object was a strategic choice to not emphasize the statement to the jury.

During closing argument, a prosecutor is afforded wide latitude to and express reasonable inferences from the evidence. State v. Reed, 168 Wn. App. 553, 577, 278 P.3d 203, *review denied*, 176 Wn.2d 1009 (2012). "Defense counsel's failure to object to a prosecutor's closing argument will generally not constitute deficient performance because lawyers do not commonly object during closing arguments absent egregious circumstances." In re Personal Rest. of Cross, 180 Wn.2d 664, 721, 327 P.3d 660 (2013) (internal citations omitted).

Schirato argues that his trial counsel should have objected to arguments made by the prosecutor during her rebuttal closing argument that the glass particles found on Schirato's suit matched the glass from the window of AL's residence. RP 1261-1262, 1264. The argument in Schirato's briefing fails to take the statements of the prosecutor in the context of the entire record. During her original closing argument, the prosecutor discussed the testimony of Palenik

regarding glass analysis, stating "he said 'possible' is the best you're going to get, unless you can actually piece the puzzle of glass together." RP 1209-1210. She later explained, "the glass scientist - - neither of the glass scientists wanted to use the word 'match.' They said possible is the best we're going to get. The glass found on the defendant's suit, it's possible it's is [sic] same glass found at Ann AL's house." RP 1221.

The prosecutor discussed some aspects of the analysis that could support an inference that the glass found on Schirato came from the same place as the glass on AL's residence. RP 1221-1222. Defense counsel discussed the glass evidence during his closing argument. Defense counsel stated,

I believe the best the State could prove, if you accept everything that he said, that the glass could have come from the same source. But he also said that he didn't know if the glass fragments, items 34 and 35, they came from a water glass, a bottle or a window pane. He said because there's no original surface, you can't say that.

RP 1242. Defense counsel then meticulously argued that the glass analysis was "sloppy work" and that the particles were "too small." RP 1243. He then argued that the relative standard deviation allowed for false positives. RP 1244. Defense counsel then continued arguing deficiencies with the glass particles at length. RP 1244-1246.

The prosecutor's use of the word "matched" during her rebuttal closing argument was not an egregious misstatement. The state's expert, Mr. Van Wyk, described his analysis, stating,

I'll run through a series of comparisons, and I'm looking for something that will allow me to say the glass from the clothing could not possibly have come from the same thing as the glass from the door. And I'll go through a series of tests, and if at each point I can't find a reason to say the glass from the clothing didn't come from the same place as the glass from the door, then what I'd know is that the glass from the clothing could have come from the same thing as the glass from the door.

RP 675-676.

Van Wyk indicated that he "did not detect zirconium in any of the glass in this case," which he stated

either means my pieces were too small and had so little zirconium that I couldn't detect it, or this was glass made by the older technology when glass ovens were lined with porcelain, which the change of that happened in the 1940's when they went from porcelain brick to zirconium brick.

RP 683. He indicated that if the glass were indeed from an original 1941 window, he "would not expect to see zirconium in it." RP 683.

Van Wyk testified regarding his x-ray fluorescence testing and refractive index testing of the glass, stating, "At no point did I find any difference that would make me say the glass from the clothing could not have possibly come from the same window as the glass that was

from the door.” RP 685. Van Wyk testified that the averages for refractive index from the glass found in the clothing fragments and the fragments taken from the window were nearly identical concluding, “my averages from the glass from the clothing and my average for the glass from the window were the same to four decimal places with only a small difference in the fifth decimal place.” RP 690-691. Van Wyk’s conclusion was “that the glass found on the clothing could have come from the same broken object as the glass from the door.” RP 692.

The defense expert, Mr. Palenik testified as to the importance of original surfaces, stating that

is important since you’re going to say they could be from the same source, they need to have been from the same kind of object. If one came from window glass and one came from a tumbler, for example, you could never say they came from the same source, or you shouldn’t be able to say that, even though their composition might be the same ...

RP 988-989. Palenik also noted that high relative standard deviations causes the “risk of false inclusions because you include many more values for each of the elements.” RP 1014.

Despite his concerns about relative standard deviations, Palenik responded “Yes” when the prosecutor asked “you’re saying that it is possible that it is the same glass in the unknown and the

known.” RP 1051. Palenik later defined “possibly” stating, “because they have characteristics in common.” RP 1064.

Both glass scientists in this case discussed test results of the unknown and known glass particles which were consistent. While the experts did not use the word matched, it was a reasonable inference for the prosecutor to use the word. The average refractive index measurements matched to four decimal points. RP 690-691. It was not unreasonable for defense counsel to forgo an objection to the prosecutor’s rebuttal closing argument. This is especially true where defense counsel had just discussed at length why the defense believed those results could produce false positives. RP 1244-1246. The decision to not object to the prosecutor’s argument was not egregious. The decision to not object was in fact a strategic tactical decision made during trial. Appendix II, at 13.

Moreover, there is absolutely no indication that had an objection been made and the trial court issued a limiting instruction, the result of the proceedings would have been any different. As noted, the jury heard the testimony of both of the experts and the defense attorney had discussed the defense theory on limitations of the evidence at length. The trial court also instructed the jury

The lawyers’ remarks, statements, and arguments are intended to help you understand the evidence and apply

the law. It is important, however, for you to remember that the lawyers' statements are not evidence. The evidence is the testimony and exhibits. The law is contained in my instructions to you. You must disregard any remark, statement, or argument that is not supported by the evidence or the law in my instructions.

CP 260. "Jurors are presumed to follow the court's instructions." State v. Kalebaugh, 183 Wn.2d 578, 587, 355 P.3d 253 (2015).

Schirato has failed to demonstrate either prong of the *Strickland* test. His claim of ineffective assistance of counsel must fail.

7. Schirato fails to demonstrate that his counsel as ineffective with regard to the decision to not make hearsay objection.

Counsel's decisions regarding when and where to object fall firmly within the category of strategic or tactical decisions and therefore cannot form the basis of an ineffective assistance of counsel claim. State v. Johnston, 143 Wn. App. 1, 19, 177 P.3d 1127 (2007). Schirato's argument that his defense counsel rendered ineffective assistance of counsel by not objecting to AL's testimony that she asked Steve Anderson, "Had you been here?" and he said "no," is without merit.

Part of the defense strategy was to argue that AL's phone records indicated that she was alert during the night and therefore not incapable of consent. RP 1241. Moreover, Anderson was excluded as a possible donor of male DNA on AL's bra clasps. RP 772. There was

no strategic reason to object to the statement “no.” Moreover, it may have been strategic not to object and to allow the additional statement from Anderson, “Did you bring someone home last night?” RP 142. Schirato has not overcome the presumption that his trial counsel acted strategically.

Schirato cannot demonstrate that a hearsay objection would have changed the outcome of the case. AL testified that Anderson was not there when she woke up as she thought he would have been if the touching had been done by him. RP 141. There is no indication that the jury would have concluded that Anderson was present without the statement “no.” As he was AL’s boyfriend, he would have had no reason to break the window of her basement door to gain entry, and if he had come over in the middle of the night, a rationale inference would be that he would still be there when AL woke up. Schirato can demonstrate neither deficient performance nor prejudice.

8. The State did not vouch for the credibility of the victim during its rebuttal closing argument and defense counsel acted strategically by not objecting.

It is improper for a prosecutor to personally vouch for a witness’s credibility. State v. Brett, 126 Wn.2d 136, 175, 892 P.2d 29 (1995), *cert. denied*, 516 U.S. 1121 (1996). “Prosecutors may, however, argue an inference from the evidence,” and reviewing

Courts will not find prejudicial error “unless it is clear and unmistakable that counsel is expressing a personal opinion.” Id. Schirato argues that his trial counsel was ineffective by not objecting to the prosecutor’s argument stating

She got up there and told you what happened, told you what she remembered and did so to the best of her ability. She swore to tell the truth and she did so.

RP 1262.

An objection to that statement would likely have been fruitless and would have highlighted the statement to the jury. In State v. Jackson, 150 Wn. App. 877, 884-885, 209 P.3d 553 (2009), this Court considered a similar argument. The prosecutor in that case argued

One of the things that they are trained to do is observe and to report those observations accurately. Every single one of them did so and every single one of them corroborated the other’s testimony.

and later argued,

Four officers all very accurate with the same testimony, all corroborate one another. Yes, only one of them actually saw the vehicle in motion. Does that make a difference though? No. Because his testimony was accurate and true.

Id. at 885. This Court emphasized that a reviewing court looks at the entire argument instead of “highlighted snippets of the argument out of context,” and found that the argument of the prosecutor was not improper vouching. Id. at 885.

The prosecutor's comments in this case came after the prosecutor reminded the jury that they were the "judges of her credibility." RP 1257. The statement at issue was made after a discussion of AL's testimony. RP 1261-1262. The prosecutor was not vouching for her credibility. An objection would likely not have been granted. Moreover, it was strategic for defense counsel to forgo an objection because such an objection would have highlighted the statement of the prosecutor. State v. Crow, 8 Wn. App.2d 480, 508, 438 P.3d 541 (2019), *citing*, In re Personal Rest. of Davis, 152 Wn.2d 647, 7714, 101 P.3d 1 (2004) (Counsel engages in a legitimate trial tactic when forgoing an objection in circumstances when counsel wishes to avoid highlighting certain evidence).

Schirato has not demonstrated deficient performance of his counsel, nor has he shown that an objection would have been granted and the outcome would likely have been different. State v. Saunders, 91 Wn. App. 575, 578, 958 P.2d 364 (1998). Schirato's claim of ineffective assistance of counsel based on a failure to object to the rebuttal closing argument must fail.

9. This Court should disregard the declaration of Wayne Fricke pursuant to ER 702.

"Expert" testimony is governed by ER 702 and generally allows such testimony only as it will assist the trier of fact to understand the

evidence or to determine a fact in issue. This Court knows and understands the Rules of Professional Conduct for Lawyers, the Rules of Evidence, and the law in the State of Washington. In a claim of ineffective assistance of counsel, it is the Court's obligation to consider the issue and the Court shall give great judicial deference to counsel's performance with a strong presumption that counsel was effective. State v. McFarland, 127 Wn.2d 322, 335, 899 P.2d 1251 (1995). Attorney Wayne Fricke does not have specialized knowledge that this Court lacks; therefore, his opinion is improper under ER 702 and irrelevant to this Court's analysis of the issues raised.

The Declaration of Mr. Fricke attempts to place his opinion in the place of that of this Court. The State contends that such an opinion represents exactly the distorting effect of hindsight that the United States Supreme Court indicated should be avoided in Strickland. 466 U.S. at 689. For all of the reasons stated in this brief, the State asks this Court to disregard Mr. Fricke's opinion and find that Schirato has failed to overcome the presumption of effective assistance of counsel.

10. The record as a whole demonstrates that Schirato received a fair trial.

When a claim of ineffective counsel is made the question before the Court is whether counsel made errors so serious that

counsel was not functioning as the 'counsel' guaranteed the defendant by the Sixth Amendment." Strickland v. Washington, 466 U.S. at 687. While it is easy in retrospect to find fault with tactics and strategies that failed to gain acquittal, the failure of what initially appeared to be a valid approach does not render the action of trial counsel reversible error. State v. Renfro, 96 Wn.2d at 909. Thus, the focus must be on whether the verdict is a reliable result of the adversarial process, not merely on the existence of error by defense counsel. Strickland, at 696. In this case, Schirato's trial counsel effectively represented him by calling three separate expert witnesses. The entirety of the record reveals that the trial was a reliable result of the adversarial process. Schirato was convicted based on the facts presented, not because of his trial counsel's performance. Schirato has failed to demonstrate that his attorney's performance fell below an objective standard of reasonableness and has failed to demonstrate that any of the claimed errors would have resulted in a different outcome.

"The temptation to read the one-dimensional record on appeal and unwittingly take up the role of the "Monday morning quarterback" is ever present." Harris v. Reed, 894 F.2d 871, 877 (7th Cir. 1990). In this personal restraint petition, Schirato has done exactly what the

Seventh Circuit warned against. This Court should not. The declaration provided by Mr. Woodrow clearly demonstrates that the decisions that Schirato now claims were ineffective were, in fact, well thought out and strategic. Appendix II. Schirato received a fair trial with competent counsel.

IV. CONCLUSION

For all of the reasons included herein, Schirato has failed to demonstrate that his counsel rendered ineffective assistance. The State respectfully requests that this Court dismiss this personal restraint petition.

RESPECTFULLY SUBMITTED this 25th day of February, 2020.

JON TUNHEIM
Prosecuting Attorney



Joseph J.A. Jackson, WSBA #37306
Deputy Prosecuting Attorney

DECLARATION OF SERVICE

I hereby certify that on the date indicated below I electronically filed the foregoing document with the Clerk of the Court of Appeals using the Appellate Courts' Portal utilized by the Washington State Court of Appeals, Division II, for Washington, which will provide service of this document to the attorneys of record.

I certify (or declare) under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct. Olympia, Washington.

Date: February 25, 2020

Signature: *Lynette L. Olsen*

APPENDIX I

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**IN THE WASHINGTON STATE COURT OF APPEALS
DIVISION II**

In re Personal Restraint of:

GREGORY A. SHIRATO,

CASE NO. 53913-6-II

I, Kris Gates, do solemnly swear and affirm that the following is true and correct::

I am a Senior Forensic Scientist, employed since 2000 by the Oregon State Police at the Portland Metro Forensic Laboratory. I am currently authorized to perform analysis in the following disciplines: Trace Glass, Trace Paint/Polymer, Physical Match, Trace Miscellaneous/Poisons, Controlled Substance Analysis and Clandestine Laboratory Analysis. My academic background includes a Bachelor of Science degree (1991) from Willamette University in Salem, Oregon, with a double major in Chemistry and English, followed by a Masters of Arts in Teaching (1992), also from Willamette University. I was certified to teach Chemistry, Physics and Advanced Mathematics and taught at the high school level 1992-2000 before joining the Forensic Laboratory. I have received training in Glass Analysis through the OSP training program and was authorized for Glass Analysis in 2007. I have also attended external trainings on

DECLARATION- 1

JON TUNHEIM
Thurston County Prosecuting Attorney
2000 Lakeridge Drive S.W.
Olympia, WA 98502
(360) 786-5540 Fax (360) 754-3358

1 forensic glass examination from the FBI Academy (2007) and Elemental Analysis of
2 Forensic Evidence (including XRF of glass) from FIU's International Forensic Research
3 Institute (2014).

4 I was an instructor for Daniel Van Wyk, the Washington State Patrol analyst who
5 conducted glass analysis in this case. Along with two other scientists, I reviewed Mr.
6 Van Wyk's analysis in this case. The procedures used and methodology employed are
7 methods generally accepted within the scientific community as reliable for analytical
8 comparison of glass particles.
9

10 In practice, the Oregon State Police will attempt full glass analysis on particles as
11 small as .1mm and I have no qualms about conducting full statistical analysis of particles
12 in the .3-.5 mm range as Mr. Van Wyk did in this case.
13

14 In my review of Mr. Van Wyk's work in this case, I noted nothing of technical
15 concern.

16 Examination of glass particles utilizing a stereomicroscope, x-ray fluorescent
17 spectrometry and the GRIM 3 instrument is a generally accepted and scientifically
18 reliable method of comparing glass particles.
19

20 A copy of my professional curriculum vitae is attached hereto as Appendix A.

21 I do solemnly swear and affirm, under the penalty of perjury under the laws of the
22 State of Washington, that the above is true and correct.

23 Signed this 3rd day of February, 2020, in Clackamas, Oregon.
24

25 

26 KRIS GATES, SENIOR FORENSIC SCIENTIST, OSP

APPENDIX II

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3
4 IN THE COURT OF APPEALS FOR THE STATE OF WASHINGTON
5 DIVISION TWO

6 In re the Personal Restraint Petition of:
7 GREG SCHIRATO

8 Petitioner,

9 No.

10
11
12 **DECLARATION OF RICHARD
13 WOODROW**

14 I, Richard Woodrow, state the following:

- 15 1. I was the attorney for Schirato. This declaration is in response to a petition
16 filed by Schirato following his withdrawal of his appeal of his conviction.
17 2. I have reviewed the petition and supporting declarations. I do not have my
18 file anymore. Schirato's current attorney has the file. I have been able to
19 review some emails and other documents that I have retained. I have also
20 talked with the private investigator on the case and with my secretary who
21 had a lot of contact with Schirato.
22 3. I will address the issues raised in the petition and give my reasons for the
23 decisions I reached. The first issue raised by Allen was a failure to litigate
24 a suppression motion. The basis of that argument is a declaration filed by
25 Wayne Fricke. I address those arguments below. The other issue is the
testimony of a defense glass expert. Those arguments are addressed below.

Richard Woodrow
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woodrowlaw.net

1 The last issue is a Fyre issue over the examination and analysis of glass
2 particles. Allen submitted a declaration a professor of statistics. There did
3 not appear to be anything submitted by scientists in the field indicating that
4 there are different opinions about the science and theory behind glass
5 testing.

6 4. Fricke submitted a declaration indicating that I was ineffective. The
7 reasoning and conclusions reached by Fricke are flawed.

8 5. Fricke and Allen have stated their basis for the ineffective assistance of
9 counsel. These issues are failure of Counsel to ask the Court for a Frank's
10 hearing to suppress items of evidence and Counsel calling as a witness a
11 defense expert who agreed with the state's expert on glass and failure to
12 ask for a Fyre hearing.

13 6. Counsel will exam the search warrant affidavit below and give my reasons
14 why I didn't litigate.

15 7. Fricke's reasoning and conclusions about the search warrant are defective.
16 It fails to take into account all of the other factors relied upon by the
17 magistrate. The factors would be sufficient for a magistrate to issue a
18 search warrant even if the vehicle identification was redacted from the
19 affidavit. The similarity or dissimilarity of the vehicle Schriato drove and
20 the vehicle described by the neighbor was a small part of the magistrate's
21 decision to issue the warrant. By itself the information about the vehicle
22 would not be enough of a nexus between the crime and Schirato but there
23 was overwhelming evidence showing the nexus between the crime and
24 Schirato and Schirato and the items to be seized.

25 8. The officers at the scene of the crime found shoe imprints of a male dress

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1 shoe in the garden and flower bed and mud surrounding the house and
2 particular in front of the victim's bedroom window. The male dress shoes
3 were facing towards the bedroom window. The shoe prints led from the
4 front porch to the side of the house. The male dress shoe prints appeared to
5 go completely around the house. Schirato was wearing dress shoes that
6 night. The victim found pictures of the shoes that Schirato was wearing
7 that night. She then found the same type of shoes at Nordstrom's. The
8 victim took pictures of the soles of these shoes and they were similar to the
9 shoes worn by Schirato.

10 9. When the victim called the police, she indicated that she awoke to find her
11 clothes partially off and she thought her boyfriend was in bed with her
12 because she remembers being sexually touched. The victim told the police
13 that her bra was unhooked, and her breasts touched. She said her genitals
14 were touched and she was penetrated by a finger or something else. She
15 said after finding out her boyfriend wasn't in bed with her, she went to the
16 basement and found that the window in the door was shattered and a trail of
17 glass shards went up the stairs. The victim called her boyfriend who said
18 he wasn't there. Allen or Fricke indicated that the boyfriend was never
19 investigated, and this should have weakened the probable cause found by
20 the magistrate. Why would a current boyfriend have to break a window to
21 have sexual contact with a current girlfriend? This makes no sense. Allen
22 or Fricke indicate that other prior boyfriends were contacted by the
23 detective and they were excluded as suspects. This is true. The defense
24 also contacted some of these boyfriends and they were either deployed or
25 out of state or gave plausible explanations for not being in the area. Most

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1 of these ex boyfriends indicated that their breakup with Larson was mutual.
2 The probable cause found by the magistrate was based upon reasonable
3 inferences that Schirato was a disgruntled ex-lover who had motive and
4 opportunity to be a suspect. The magistrate found probable cause. The
5 suspect was Schirato and the nexus between Schirato and the crime was
6 evident. If one excludes the car from the affidavit there is more than
7 enough probable cause to issue the warrant.

8 10. The victim said Schirato knew she was drunk. She said Schirato was
9 buying her drinks. She said that he “often pushes her to drink until
10 intoxication”. Others at the bar said the victim appeared to be intoxicated.
11 A magistrate would know that the use of alcohol to lower inhibitions and
12 awareness of one’s surroundings and thereby making a person much more
13 likely to be susceptible to victimization is a tried and true method used by
14 perpetrators of these types of crimes.

15 11. Other people at the social function including Jennifer Quan. Quan indicated
16 that Schirato was making comments such as: “Quan stated it appeared
17 Schirato was staring at Larson legs in the area that they were crossed, lower
18 in the inner thigh area. Quan said Schirato told her look at that, put your
19 hand in between her (Larson’s) legs. Quan told Schirato: “do it your
20 fucking self”. Quan stated once Cunningham left, Schirato took
21 Cunningham’s chair, which was closer to Larson. Schirato told Quan that
22 he wanted to see the victim in a bikini. This is clear evidence of a strong
23 sexual attraction of Schirato for the victim. This is evidence of Schirato
24 expressing his desire for the victim even though that attraction is
25 inappropriate. Quan was a colleague from their workplace. These facts

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1 would compel a magistrate to suspect Schirato and issue a warrant.

2 12. The victim told the police that she had had a prior sexual relationship with
3 Schirato but it had ended. The relationship was in the form of a swinging
4 sexual relationship. These sexual acts involved Schirato's wife in front of
5 Schirato and the victim's boyfriend. On at least two occasions the victim
6 fell asleep at Schirato's house and she woke up to find Schirato performing
7 sexual acts to her. The victim was in bed sleeping when she awoke to find
8 Schirato committing sexual acts upon her. These are the same acts alleged
9 against the person that broke into the victim's home.

10 13. After this sexual relationship ended Schirato persisted in trying to get the
11 victim into sexually compromising situations. She described these
12 situations as Schirato inviting himself over to her house to look at pictures
13 of her in a bikini. Schirato made more comments about her body. Schirato
14 told the victim in a bar that he was too drunk to drive home and he asked to
15 spend the night at her house. The victim declined. The victim was dating
16 someone that she described as a boyfriend. It appears from the affidavit
17 that the victim wanted the sexual relationship to end and Schirato could not
18 accept that. This would compel a magistrate to issue a warrant.

19 14. The victim told her boyfriend at the time that Schirato made her feel
20 uncomfortable and he was a creep. The boyfriend told the detective this
21 information. This is compelling information because the victim told the
22 boyfriend before this crime happened that she thought Schirato was
23 harassing her and stalking her.

24 15. The detective found that Schirato was accused of another sexual crime
25 from Mason County. It was a similar incident in that the victim woke up to

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1 find Schirato fondling her breast.

2 16.Schirato was interviewed by the police and indicated that he did have
3 sexual contact with the victim on a prior occasion. He said: “we play
4 together regularly, and I’ll leave it at that.” This comment could be used by
5 a magistrate to infer that Schirato in his mind thought the sexual
6 relationship was ongoing even though according to the victim it wasn’t.

7 17.The detective indicated that a neighbor said he saw a small silver SUV
8 style vehicle at the victim’s home two or three times. Schirato told the
9 detective that he owns a small silver Mazada SUV. Fricke indicated that
10 Schirato doesn’t own a small silver SUV style vehicle. Schirato owns a
11 small silver Mazda car. Fricke said that if this was brought to the attention
12 of a judge under a Frank’s motion that a judge would throw out the search
13 warrant. This is ridiculous. It doesn’t appear the Fricke read the affidavit
14 in support of the warrant. In the neighbor’s statement he says that it was a
15 small silver Outback style vehicle. In my mind a small silver Outback
16 vehicle looks like a small silver Mazada. The detective wrote in his
17 summary that Schirato drove a similar vehicle as the one described by the
18 neighbor. The detective didn’t say it was identical. If a judge did grant a
19 Franks hearing I don’t think a judge would have suppressed the search and
20 seizure of Schirato’s DNA and clothes. There was ample evidence to
21 support a finding of probable cause to believe Schirato committed the
22 crime and there was a nexus to Schirato’s body and his home to search and
23 seize evidence.

24 18.Counsel reviewed the affidavit in support of the search warrant numerous
25 times with and without the input of Schirato and to this day Counsel

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1 believes there is no basis to bring a frivolous motion to suppress.

2 19. Fricke and Allen indicate that it was ineffective to call a glass expert for the
3 defense. This was a tactical decision made by Counsel and Schirato.
4 Schirato was very involved in his own defense. Schirato was aware of the
5 proposed testimony of the defense expert on glass. Schirato was given a
6 copy of the report. Schirato was informed of Counsel's conversations with
7 the defense expert as shown by the emails. Palenik was the second glass
8 expert that the defense used. The first expert was Chesterene Cwiklik.

9 20. I have used Chesterene Cwiklik in the past and she does excellent work.
10 Attached to this declaration is her estimate for work to be performed and
11 the bill for work performed. I have also attached emails that show that
12 Cwiklik was in contact with Schirato. Schirato was very involved in his
13 own defense. Cwiklik had contact with the state's expert and asked
14 numerous questions. She also had the FBI report and indicated to me and
15 Schirato that the FBI used an older device that couldn't test the smaller
16 glass fragments. Cwiklik opined that she would agree with the results that
17 the state's expert came up with, but she also said that he was very sloppy
18 with his method. She said that the instruments and science behind the
19 testing of glass have been used for decades and was well established in the
20 scientific community. Cwiklik indicated to Counsel in an email which
21 says: "They (WSP) has a new XRF so he was also able to obtain elemental
22 analysis data on a particle that would have been too small for their older
23 instrument." Cwiklik also explained to Counsel how the state's expert
24 thought the particles were too small but after the mounted them he was able
to make a determination. Please see exhibit A.

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1 21. Cwiklik recommended Palenik to the defense. The defense wanted a
2 second opinion after they talked with Chesterene. My office contacted
3 Palenik and the office was retained.

4 22. Microtrace is owned by Skip Palenik. Attached as Exhibit B is the report.
5 Before the report was produced, I was advised by Skip that he wanted to
6 talk with me on the phone. On the phone Skip told me that there were a lot
7 of issues with the methodology of the state's expert, but the conclusion
8 reached were accurate but weak. Skip prepared a bullet point for me to
9 share with Schirato. I shared this information with Schirato. These emails
10 are contained within Exhibit C. The defense decided to have him prepare a
11 report. After the report was prepared Skip wanted to make sure that we
12 were aware that his conclusions if asked were that he concurred with the
13 results from the state's expert. Palenik was not saying that he thought the
14 results were strong or robust. The RSD was too large to make accurate
15 conclusions, but the methods used were sound. This doesn't mean as Allen
16 and Fricke tell the Court that he agreed with the State's expert. An analogy
17 would be a DNA defense expert would agree that the method and science
18 used by the state's DNA expert were accurate, but the conclusions reached
19 may include false positives.

20 23. Schirato tried to communicate with Palenik. This is reflected in an email.
21 The last email indicates that I talked with Schirato about the concerns
22 raised by Palenik and Schirato wanted Palenik to testify. The idea was that
23 we would use the scientist to show that the method used by the state's
24 expert was sloppy and unreliable. Ultimately the glass results could only
25 show that the glass from the suit could have come from the glass from the

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1 victim's home. The glass was similar.

2 24. Schirato had contact with George Chan. Chan also reviewed the glass
3 report from the state's expert. He concurred with Cwiklik.

4 25. Counsel kept Schirato fully informed about the glass particle issues.
5 Counsel talked with the defense experts and shared that information with
6 Schirato.

7 26. Palenik told me that if he tested the same pieces of glass, he would
8 probably come up with the same conclusions. I would then have to turn
9 those results over to the state. I did not wish to do that. It was the defense's
10 decision to not have the glass particles retested.

11 27. Schirato indicated in his declaration that an article from England was not
12 sent to the defense experts. On the contrary I sent the article on the
13 presence of glass particles on clothing to both of our experts. Both experts
14 concluded that the article was dated and no longer valid. Exhibit D
15 indicates the article was sent to Skip. Counsel sent the article to Cwiklik.
16 She said the article wasn't relevant especially after the suit had been dry
17 cleaned. Counsel also asked questions of the state's expert about the
18 article and the presence of glass particles in general on clothing. This article
19 is from England. Those results might not even be transferrable to the
20 United States. The English wear a lot of wool and tweed. These garments
21 much more readily retain glass and other particles. Both defense experts
22 indicated that dry cleaners usually would be cleaning wool garments and
23 wool is much more likely to collect glass. I have included the emails that
24 reflect some of these conclusions. The defense glass expert testified that
there should be glass particles on clothing except if it wasn't just dry

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1 cleaned. Schirato's suit had just been dried cleaned. The articles in
2 question wouldn't even apply.

3 28. The FBI scientist, if called by the defense, would state that she didn't
4 examine the glass particles because they were too small for her instruments
5 to interpret. She would also say that she was careful in her handling of the
6 glass particles. One of the issues at trial was the fact that sent to the lab
7 were a number of pieces of glass and sent back to the state glass expert
8 were a different number of pieces of glass. The defense was going to argue
9 to the jury that there was contamination between the samples of glass from
10 the victim's home and glass particles from the suit. The defense, during
11 trial, tried to exclude the glass particles from evidence.

12 29. Glass is glass. It could come from same source.

13 30. Fricke says that a Frye hearing should have been motion for by the defense.
14 This is ridiculous. Testing by glass experts has been occurring for decades.
15 None of the science of examination or interpretation is new or novel. There
16 is no disagreement among scientist in the field of the science, methods or
17 interpretation of glass examinations.

18 31. Allen submitted a declaration from a professor of statistics. This person
19 made claims that are not supported by his expertise. This professor did not
20 indicate he has tested glass fragments. He did not indicate he ever worked
21 with GRIM3 or XRF spectrometry or RSD values or critical depth of
22 thickness of glass or elemental ratios. This professor of statistics is not
23 qualified to comment of glass analysis. Two glass experts independently of
24 each other opined that the methodology of the state's expert was sound if
25 flawed. Palenik is a true expert in glass analysis. Attached is his resume as

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1 exhibit E. Both indicated that the science is sound and has been used for
2 years within the scientific community. There is no disagreement between
3 scientists. There is nothing to warrant a Frye hearing. Again, Fricke is
4 wrong. The state's expert's testimony goes to weight not admissibility.
5 The professor of statistics report adds nothing.

6 32. Fricke says that there nothing to tie Schirato to the victim's house but the
7 glass. He is wrong. It is as if he didn't read the affidavit. I summarized
8 some of the information about the conclusion that the magistrate would and
9 did draw from the facts regarding Schirato and Larson. This summary is
10 what I relied on:

11 33. They had a prior sexual relationship that involved group sex.

12 34. This relationship ended yet Schirato wanted it to continue. Schirato
13 repeatedly try to maintain the sexual relationship by engaging in stalking
14 behavior. This behavior included trying to spend the night at Larson's,
15 inviting himself over to her house to look at her bikini pictures, making
16 comments to co-workers about Larson's body and asking the co-worker to
17 place her hands in between the victim's thighs the night of the rape, the
18 victim complained about Schirato's behavior to her boyfriend she referred
19 to Schirato as a creep. The boyfriend told the police about this the first
20 time they talked with him. Schirato told the detective that "they play
21 regularly" which was not true. The last sexual act was months before.
22 Schirato was with the victim the night of the rape. He knew she was drunk
23 and bought her drinks. There were dress shoe footprints all around the
24 victim's home. Seeing dress shoe footprints in flower beds and in mud is
25 strange and indicative that someone wearing dress shoes was casing the

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1 house. These areas were not open to the public. The victim described the
2 digital penetration of her vagina as a familiar touch. Larson woke twice
3 before in Schirato's home to Schirato touching her genitals. One time he
4 placed his finger in her vagina. Schirato knew where the victim lived. He
5 knew she lived alone. The victim told the detective she thought it was
6 Schirato. Schirato had a reputation as a swinger and "didn't have a filter"
7 at work. A magistrate would not be doing his job if he or she didn't grant a
8 search warrant.

9 35. Allen and Fricke have made comments that the defense expert agreed with
10 the conclusion of the state's expert. That is not true. The defense expert
11 repeatedly said that there was not a match. That glass testing can never say
12 there is a match unless the broken pieces fit together. That didn't happen.
13 The defense expert said that the state's expert used a relative standard
14 deviation that was too big. This resulted in a margin of error that could
15 include pieces of glass that shouldn't be include. He called this a type II
16 error. The tighter the RSD the better or stronger conclusion you could
17 reach. The best conclusion that could be reached by the state's expert is the
18 glass could have come from the same source. Well as the state's expert
19 said glass is glass.

20 36. The defense expert on cross exam never said he agreed with the state's
21 expert Allen and Fricke are wrong. The defense said he didn't disagree
22 with the procedure used because these types of test have been used for
23 years. Allen is his petition indicates that the defense expert "agreed" with
24 the state's expert that is not entirely correct. If a DNA expert testifies, he
25 or she will probably agree with the testing procedure and instruments used

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1 but that doesn't mean that the conclusion reached mean the same to the
2 experts. The defense expert repeatedly said that the results reached by the
3 state experts was based upon a large RSD and therefore not strong.

4 37.Allen indicates that testing could have been done by the defense expert.
5 That is true but after talking with the defense expert and being advised that
6 the results would be the same or similar the decision was made by the
7 defense not to do this.

8 38.The defense expert on the glass did review the FBI lab report and
9 concluded that the instruments used by the state were newer and therefore
10 better able to pick up and analyze smaller particles. Palenik said he didn't
11 know why the FBI lab didn't test the glass.

12 39.The danger for defense was if the FBI scientist was called as a witness then
13 the defense would lose its ability to attack the foundation via contamination
14 of the glass particles. The FBI scientist would say that their instruments
15 were not able to do a comparison of the glass because of the size of the
16 particles but the scientist would agree with the state's expert as did both
17 defense experts that the procedure was scientifically correct.

18 40.Allen says the state's glass expert had one week of training. This is untrue.
19 He had one week of training in California but did a summer of training in
20 Oregon.

21 41.I agree perhaps I should have objected to the state's closing arguments
22 about the glass but at the time I felt it was a better trial tactic not to. The
23 defense was strong. The issues were not the glass because both experts
24 said glass is glass. This glass could have come from the same source or
25 not. This doesn't mean anything. The suit was worn by Schirato numerous

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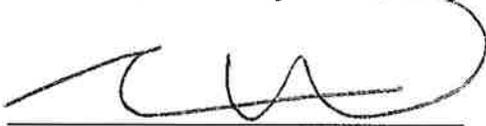
1 times after this event so the glass on the suit doesn't mean the glass came
2 from the victim's house.

3 42. The defense interviewed all of the state's witnesses. The defense
4 interviewed all of the state scientists and reviewed their bench notes. The
5 defense went to the crime scene. The defense interviewed other potential
6 witnesses that were not allowed to testify due to Judge Dixon's ruling to
7 exclude witnesses regarding the prior sexual acts of the alleged victim and
8 Schirato. The defense retained two glass experts. The defense retained a
9 DNA expert. The defense retained two phone experts. One examined the
10 victim's phone in detail and that expert testified. The defense interviewed
11 the victim with her attorney present. The defense participated in Schirato's
12 sexual harassment claim made by Larson against Schirato and Schirato
13 against the victim. The defense tried to get into the victim's work phone,
14 but she had "inadvertently" used the wrong password three times. The
15 defense maintained a close working relationship with Schirato. He sent
16 questions to counsel, his private investigator and these were always
17 answered by either counsel or an expert. Schirato communicated with the
18 defense experts. Schirato reviewed all of the discovery in the case.
19 Counsel defended Schirato at a 404(b) hearing in which 5 or 6 former
20 friends co-workers or relatives testified that Schirato touched them
21 inappropriately. Some while sleeping. The defense won this motion. The
22 defense had a 3.5 hearing. The defense interviewed the prior boyfriends of
23 the victim. The defense interviewed the neighbors of the victim. The
24 defense retained a private investigator. It is unfortunate that Schirato was
convicted by Counsel was not ineffective.

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1 I DECLARE UNDER THE PENALTY OF PERJURY THAT THE
2 FOREGOING IS TRUE AND ACCURATE TO THE BEST OF MY
3 KNOWLEDGE UNDER THE LAWS OF THE STATE OF WASHINGTON.

4 DATED this 3rd day of February 2020

5 

6 Richard Woodrow
7 Attorney at Law WSBA #18680

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(206)-623-3637

A

November 19, 2015

Richard Woodrow, Attorney at Law
3732 Pacific Ave SE
Olympia, WA 98501

Cwiklik & Assoc. File: 15-007

Re: State of Washington v. Gregory A. Schirato
Thurston County Case No. _____

WORK PERFORMED TO DATE:

1.75 hrs. Review of laboratory and selected police reports¹
0.66 hr. Evaluation of reports
0.49 hrs. Client contact and other communications
0.40 hrs. Maintaining and providing laboratory records for this case

3.30 hrs.² Work performed to date: \$ 825.00

ESTIMATE OF WORK YET TO BE DONE:

1.0 hrs. Review of laboratory bench notes, photographs and any video¹
1.5 hrs. Evaluation of reports and assistance with questions for State's expert/s
1.0 hrs. Client contact and other communications
0.5 hrs. Maintaining and providing lab case records including digital photos

4.0 hrs.² Estimate for follow-up work: \$ 1,000.00

-
1. Supporting data for trace evidence reports
 2. \$250 per hour

TOTALS

3.30 hrs.² Work performed to date: \$ 825.00
4.0 hrs.² Estimate for follow-up work: \$ 1,000.00

7.3 hrs. Total expected work: \$ 1,825.00

Respectfully Submitted,

| DATE | TIME | WORK PERFORMED | Sc i | E va l | Di sc | E vi d | C o m | R cr d |
|------|------|----------------|---------|--------------|----------|--------------|-------------|--------------|
|------|------|----------------|---------|--------------|----------|--------------|-------------|--------------|

Chesterene Cwiklik

CWIKLIK & ASSOCIATES

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3100 Airport Way South
Seattle, WA 98134
(206)-623-3637

RECORD OF WORK AND TIME TO DATE

Re: State v. Gregory A. Schirato
CHRONOLOGICAL RECORD OF TIME AND WORK
10/13/2015 through 11/17/15

| DATE | TIME | WORK PERFORMED | Scientific Analysis | Summary and Evaluation | Review of Discovery | Evidence transfer and handling | Conference and Communications | Records |
|---------------------|----------------------|--|---------------------|------------------------|---------------------|--------------------------------|-------------------------------|---------|
| 05-12-15 | no charge | Initial inquiry from Richard Woodrow (emails) | | | | | nch | |
| 10-12-15 | no charge | Email exchange, Richard Woodrow, CLC | | | | | nch | |
| 10-13-15 | 0.67 hr | Email from Megan Kerlee in R. Woodrow's office Review of trace evidence reports CLC | | | 0.67 | | | |
| 10-14-15 | 0.83 hr. 0.25 hr. | Review of add'l WSPCL and police reports CLC Summary and evaluation CLC | | 0.25 | 0.83 | | | |
| 10-15-15 | 0.25 hr. 0.08 hr. | Review of add'l police reports CLC Summary and evaluation CLC | | 0.08 | 0.25 | | | |
| 10-22-15 | 0.08 hr. | Email exchange, Megan Kerlee (RW's office) CLC | | | | | 0.08 | |
| 10-23-15 | | Email exchange, Megan Kerlee CLC | | | | | | |
| 11-05-15 | 0.33 hr. | Reviewed notes pre-conference CLC Summary and evaluation CLC | | 0.33 | | | | |
| 11-06-15 | 0.33 hr. - | Phone conference, Richard Woodrow CLC | | | | | 0.33 | |
| 11-17-15 | 0.08 hr. | Emails, R. Woodrow, Megan Schuyler CLC | | | | | 0.08 | |
| 10/13/16 - 11/17/15 | 0.40 hrs. | Maintaining chronological technical/communications record (est. ave. 3 min. per each day of entry (8)) | | | | | | 0.40 |
| 10/13/16 - 11/17/15 | 3.30 hrs. | TOTAL TIME hrs. | 0.00 | 0.66 | 1.75 | 0.00 | 0.49 | 0.40 |
| 10/13/16 - 11/17/15 | \$ 825.00 | TOTAL AMOUNTS \$ | | | | | | |

| | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|
| 0.08 hr. = 5 minutes | 0.33 hr. = 20 minutes | 0.58 hr. = 35 minutes | 0.83 hr. = 50 minutes |
| 0.17 hr. = 10 minutes | 0.42 hr. = 25 minutes | 0.67 hr. = 40 minutes | 0.92 hr. = 55 minutes |
| 0.25 hr. = 15 minutes | 0.50 hr. = 30 minutes | 0.75 hr. = 45 minutes | |

AUTHORIZATION AND BILLS

Rate: \$250 per hour
Estimate:

eForensicsPro

7829 Center Blvd SE #214
Snoqualmie, WA 98065
425-200-4271 | FAX 425-996-3073
eForensicsPro.com

Richard Woodrow
Attorney at Law
3732 Pacific Ave SE
Olympia, WA 98501

May 5, 2016
Invoice #16050501

STATEMENT FOR SERVICES RENDERED FOR STATE V. SCHIRATO

| Date | Description of Service | Hours | Rate | Extended |
|-------------------|--|-------|--------|----------|
| 4/13/16 | Respond to email | 0.5 | 150.00 | 75.00 |
| 4/14/16 | Phone call with attorney | 0.2 | 150.00 | 30.00 |
| 4/19/16 | Add FB images to report | 1.4 | 150.00 | 210.00 |
| 4/20/16 | Add FB images to report | 1.3 | 150.00 | 195.00 |
| 4/21/16 | Phone call with attorney | 0.2 | 150.00 | 30.00 |
| 4/27/16 | Investigate adding instant message to report | 0.2 | 150.00 | 30.00 |
| ===== | | | | |
| Total Fees | | 3.8 | 150.00 | 570.00 |
| Previous Balance | | | | 1,395.00 |
| Total Fees | | | | 1,965.00 |

ACCOUNT SUMMARY

Account Balance as of May 5, 2016 **\$ 1,965.00**

Payment Terms: upon receipt
Make checks payable to eForensicsPro

From: Chesterene Cwiklik <clcwiklik2@aol.com>
Sent: Tuesday, November 1, 2016 3:27 PM
To: richard@woodrowlaw.net
Subject: Schirato glass questions - got them from George

The email was from Greg S., not from you. George just FWDed it so you do not need to.

I do, however, need the laboratory bench notes. Will explain in my response to the glass questions. Will respond a bit later.

Chesterene

Note: The lab has moved. Address appears below.

Chesterene Cwiklik

Cwiklik & Associates
3100 Airport Way S.
Rainier Commons Box 77
Seattle, WA 98134
Phone: 206-623-3637

From: Richard Woodrow <richard@woodrowlaw.net>
To: 'Chesterene Cwiklik' <clcwiklik2@aol.com>
Cc: gregschirato <gregschirato@yahoo.com>; megankerlee <megankerlee@outlook.com>
Sent: Tue, Feb 21, 2017 08:25 AM
Subject: RE: Schirato: Glass analysis followup

Can you tell me how certain a person can be about the comparisons between the glass samples and glass from the clothes.

How can I attack this.

Is this like hair comparisons.

Why is this type of comparisons disfavored now.

I don't need to understand this science. I need to be able to attack it.

The suit was worn not only for business but for pleasure. How can I show contamination from other sources.

What about contamination from the labs. If they don't call the FBI scientist can I say that there might have been contamination between the samples.

I want to use the FBI lab report to attack the WSP report. How can I do that.

Richard Woodrow
Attorney at Law
3732 Pacific Ave SE
Olympia, WA 98501
P:360-352-9911
F:360-352-9955
[*richard@woodrowlaw.net*](mailto:richard@woodrowlaw.net)

From: Chesterene Cwiklik [<mailto:clcwiklik2@aol.com>]
Sent: Friday, February 17, 2017 5:14 PM
To: richard@woodrowlaw.net
Cc: gregschirato@yahoo.com; megankerlee@outlook.com
Subject: Schirato: Glass analysis followup

Richard:

Below are my computer entries for my initial message for WSPCL-Tulalip/Marysville scientist Daniel VanWyk, and our brief conference this Wednesday. Call if you would like to discuss. I do have some suggestions for cross-examination.

Chesterene

February 6, 2017 Monday

1. 15-007 Emailed Daniel VanWyk, WSPCL-Tulalip, 1-360/654-1201, asking to discuss his report and results and what would be a good time to do so. CLC

- Samples of broken glass collected as reference samples: includes samples from window frame?
- Would having these have helped decide whether the outlier RI and XRF values should be considered?
- Why did he change his mind about the particle he thought were without good edges?
- Differences with FBI report

Email was stuck in my drafts folder. Called the Tulalip lab around 4 p.m. but Daniel VW had just left. Left him a phone message with the case number etc. and the focus of my questions. *CLC*

February 16, 2017 Thursday

1. 15-007 Emailed Daniel VanWyk that I will call him between 10:30 and 11: a.m. later this morning. *CLC*

Called Daniel VanWyk, 1-360/654-1201; discussed the questions I had about the glass analysis and results.

- He does not have a copy of the FBI report, but was aware that they did not think one of the particles in Item 34 is suitable for analysis. When he first looked at the sample, he was of the same thought, then after discussing it, went back to it, mounted it, and found that he was able to make a determination. He scratched out his first remarks about the sample being unsuitable because it actually WAS suitable.
- They have a new XRF so he was also able to obtain elemental analysis data on a particle that would have been too small for their older instrument.
- The reference samples of glass (5 larger shards) are reported to have been removed from the window frame, a single pane in a door.
- He did not receive any shards that fell to the floor. Discussed the outlier values for one fragment in Item 34, and agreed that testing edge samples from whatever would have been in the likely initial break of the window, which were probably on the shards on the floor, would have been the more likely source of shards on the person who broke the window. If this was outside the range of variation exhibited by the shards from the window frame, it may have answered the question about the outlier values.
- He agreed that the margins at the break at the initial impact - which would almost certainly have fallen to the floor - are the most likely to have scattered onto the clothing of the person who broke the window.
- He also agreed that the refractive index (RI), and XRF elemental analysis values of samples from the margins are the most likely to correspond with any such fragments.
- This is especially important to consider in old pre-float-manufacture glass that exhibits greater variation than modern glass (my comment). *CLC*

Note: The lab has moved as of August 2015. Current address appears below.

Chesterene Cwiklik

Cwiklik & Associates
3100 Airport Way S.
Rainier Commons Box 77
Seattle, WA 98134
Phone: 206-623-3637

20 December 2017

Mr. Richard Woodrow
Woodrow Attorney at Law
3732 Pacific Avenue SE
Olympia, WA 98501

RE: MT17-0190 – Washington State v. Greg Schirato (No. 15-1-00520-4)

Dear Mr. Woodrow,

we have reviewed a laboratory report concerned with the comparison of glass as well as other documents submitted to us with respect to the above referenced case. The results of our review were communicated with you via telephone on 29 August 2017 and, as you requested, are detailed in the report that follows.

Tasks

- Review the Washington State Patrol Crime laboratory report, supporting data, and conclusions.
- Review the FBI Laboratory report.

Materials Received for Review

- Washington State Patrol Crime Laboratory Report (Case No: 2014-8123, Laboratory Number: 315-000065) [3 pages]
- WSP Case File (analyst bench notes, spectra, and communications) [102 pages]
- FBI Laboratory report (Case ID No: 95A-HQ-6806430, Lab No: 2016-00132-3) [7 pages]

Review Findings

The following sections address areas from the discovery packet that were flagged as potentially noteworthy during our review. These are followed by our comments, which address each specific issue and its potential significance. Our conclusions are summarized at the end of this report.

Glass Characterization (by WSP)

The following variables represent many of the important points of comparison in forensic glass examinations. Several of these points were incompletely or inadequately addressed in the casefile and report.

Color

The color of the glass fragments from questioned items 34 and 35 are described as colorless (WSP report – p.3). The known glass, item 38, is described as “pale blue” in color (WSP report – p.3). Yet, the conclusion of the report states that, “glass fragments from the shirt (item 34), and two glass fragments from the suit (item 35) are similar in *all examined characteristics* with the known glass sample (item 38)”. The apparent discrepancy in color between the questioned and known glasses appears to contradict the conclusory statement.

Shape and Thickness

A single dimension measurement for each of the glass fragments, both from Items 34 and 35, is recorded (WSP report – p.3). This measurement is reported as the “largest dimension”, and does not appear to be the thickness of the glass fragments. The thickness of a piece of glass is an important comparison characteristic. For this and other reasons, fragments of glass are examined specifically for the presence of original surfaces.

Furthermore, the thickness of a piece of glass usually has the greatest impact on the other analyses that may be performed. For example, thin fragments will have a much smaller path length for light absorption; thus, changing the appearance of their color compared to thicker fragments/pieces of glass of the same composition. Additionally, the size and shape of a sample can have a major impact on peak intensities and peak ratios in elemental analyses.

Without a measurement or mention of thickness and shape, it is not possible to fully evaluate the impact of these variables on the resulting data. This point is further addressed in the Trace Element Analysis section.

Original Surfaces and Surface Contour

The casefile notes that the questioned glass fragments from item 34 have “no apparent original surfaces” (casefile – p. 4), and those from item 35 are noted to have “no original surfaces” (casefile – p. 19); however, the images of the glass fragments provided to us are inadequate to fully review these statements. Furthermore, there is no supporting information discussing how these determinations were made. Original surfaces on glass fragments are not always obvious, therefore, the method used to detect them when they are found (or not found) is of some importance. There is no indication as to how the search for these surfaces was performed.

The preferred method for determining the presence of original surfaces is through examination under incident coaxial illumination. When a suspected original surface is observed, this can then be checked with the aid of an interference microscope, which allows the analyst to visualize the surface contour as interferogram superimposed on the image of the glass fragment’s surface. The interpretation of this interferogram (which is akin to a topographic contour map) allows for a determination of the surface contour under examination. When an original surface is present, this information illustrates whether the fragment originated from a flat or curved object, and when two opposing surfaces are present, this permits measurement of the thickness of the glass object at that point.

Fluorescence

Only the known glass sample was reported to have been examined under ultraviolet light; however, no result of these observations is provided in the report. The case file notes that “both original surfaces look dark”; but the glass has an overall “pale yellow fluorescence”, which is “mostly visible along the long, broken edge” (casefile – p.37).

With no mention of an examination of the questioned fragments for fluorescence under ultraviolet excitation, no comparison of the fluorescence behavior of the questioned fragments can be performed, and the fluorescence observations of the known glass, from a comparison standpoint, are meaningless. The results of such an examination have the potential to alter the significance of the comparison (in either direction).

Trace Element Analysis

Small fragments were broken from the large, known pieces of glass for trace element analysis by means of X-ray fluorescence (XRF) spectrometry. These fragments are specifically noted to be “comparable in size to the questioned fragments” (casefile – p.37). However, this statement does not confirm whether or not the known fragments are comparable in *thickness* with the questioned fragments; and no images of these fragments are available for review.

Thickness is an important consideration in XRF analysis due to the interaction volume of the x-rays with the sample. Thicker samples will have a larger interaction volume (analytical volume) compared to thinner samples and as a result more data is generated from thicker samples compared to thinner ones. Furthermore, elements have different critical depths,¹ and the thickness of the sample will affect the intensity of the detected elements. Therefore, in forensic glass comparisons performed by XRF, questioned fragments should be compared with known fragments of similar thickness.

XRF Data Review

The data obtained from the characterization of the known glass (Item 38) shows poor reproducibility, which results in high relative standard deviations (RSDs).² The %RSD values are provided in the casefile (p. 62), and range from 15.72% (Si) to 45.67% (Fe) for the elements from which net counts were determined. These values demonstrate that there is significant variation in the amount (x-ray counts) of data obtained from the known glass fragments, and strongly suggests that the fragments analyzed range in thickness.

An examination of the element ratios³ for the known glass also shows elevated %RSD values ranging from 1.87% (Ca/K) to 21.4% (Ca/Fe) (casefile – p. 64). Each detected element is ratioed

¹ Critical depth is the thickness of the matrix/sample from which x-ray of a particular energy can escape to be recorded by the detector.

² The RSD value provides an assessment of the spread of data points and illustrates the precision or repeatability of a measurement. The smaller the number, the more tightly clustered the data and more precise/repeatable the measurement.

³ Evaluating the peak intensity ratios of elements is a commonly accepted method for comparing XRF spectra of glasses.

to calcium (Ca), for the comparison done by WSP. It is noteworthy that the ratios for the elements displayed on the spectrum closest to calcium, potassium (K) and titanium (Ti), have the lowest %RSD values: 1.87 and 2.71 respectively, and iron (Fe) the heaviest element included in the list has the highest %RSD value, 21.4%. This trend in the data further supports the conclusion that the analyzed fragments are variable in thickness, as the elements closest to calcium have comparable critical depths and yield peak intensities similar to each other, and iron, the heaviest element, which correspondingly has the greatest critical depth, results in the largest intensity variation as a function of changes in thickness.

The large %RSD values present in this data result in a wider tolerance, which may allow for more type 2 errors (false inclusion). In the forensic glass literature, precision data for XRF analyses are on the order of <10% RSD,⁴ with several of the commonly used elemental ratios below 5% RSD.⁵ The analysis of additional known fragments of measured and uniform thickness, which are comparable to the thickness of the questioned fragments, should provide lower %RSD values and result in a more rigorous comparison.

FBI Laboratory Report

The FBI laboratory did not conduct analysis on the questioned or known glass fragments submitted to them for analysis, stating: "No glass suitable for refractive index analysis and comparison by GRIM3 was detected...therefore, no comparisons were conducted" (FBI Report -- p.3). Therefore, there is no data which can be reviewed or commented upon from this report.

⁴ Trejos, T. et al, "Forensic Analysis of Glass by μ XRF, SN-ICP-MS, LA-ICP-MS, and LA-ICP-OES: Evaluation of the Performance of Different Criteria for Comparing Elemental Composition" *J. Anal. At. Spectrom.*, Vol. 28. (2013):1270-1282.

⁵ ASTM Standard E2926, 2013, "Standard Test Method for Forensic Comparison of Glass Using Micro X-ray Fluorescence Spectrometry," ASTM International, West Conshohocken, PA 2013.

Summary and Conclusions

A review of the glass comparison data and conclusions drawn from them indicate that certain points of association exist between the questioned and known glasses. However, the analytical results recorded in the notes and the incomplete and contradictory nature of the report do not meet the level of rigor required of a scientific glass comparison performed to support legal proceedings. It is possible that additional, perhaps more detailed, analyses of these glass fragments could be performed to obtain a glass comparison result that meets the higher demand of rigor required from a forensic analysis.

If you have any questions concerning this report, or if we may be of further assistance, please do not hesitate to contact either of us directly. Thank you for consulting Microtrace.

Sincerely,



Ethan Groves
Research Microscopist



Skip Palenik
Senior Research Microscopist

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Analyses performed at Microtrace are accredited under ISO/IEC 17025.
See certificate #AT-1932 issued by the ANSI-ASQ National Accreditation Board.*

Microtrace LLC

From: Megan Schuyler <megankerlee@outlook.com>
Sent: Wednesday, December 20, 2017 10:14 AM
To: greg schirato; 'Richard Woodrow (richard@woodrowlaw.net)'
Subject: FW: Schirato glass review report
Attachments: MT17-0190 - review report.pdf

Hi Greg,
Please see attached Glass Report.

Megan Kerlee

Legal Assistant

3732 Pacific Ave SE

Olympia, WA 98501

P: 360-352-9911

F: 360-352-9955

Megankerlee@outlook.com

From: Ethan Groves [mailto:egroves@microtracellc.com]
Sent: Wednesday, December 20, 2017 9:49 AM
To: megankerlee@outlook.com; richard@woodrowlaw.net
Cc: Skip Palenik <SPalenik@microtracellc.com>
Subject: Schirato glass review report

Good morning Megan and Rich,

Attached please find our report discussing the review of the Schirato glass case. Once you've had a chance to read through it, please feel free to give us a call with any questions you may have.

Regards,

Ethan Groves
Research Microscopist

Microtrace LLC

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Hi Skip,

We were referred by Chesterene, Mr. Woodrow asked me to email you this crime lab report to find out if you think these conclusions are warranted. Any time that you have spent on this issue you can send me a bill and I will make sure it gets paid.

Thank you,
Megan
360-352-9911

-----Original Message-----

From: copier [mailto:cbmcofier@gmail.com]
Sent: Thursday, June 22, 2017 12:55 PM
To: megankerlee@outlook.com
Subject: Scanned image from Richard Woodrow

Reply to: copier <copier>
Device Name: Richard Woodrow
Device Model: MX-4110N
Location: Not Set

File Format: PDF MMR(G4)
Resolution: 200dpi x 200dpi

Attached file is scanned image in PDF format.

Use Acrobat(R)Reader(R) or Adobe(R)Reader(R) of Adobe Systems Incorporated to view the document.

Adobe(R)Reader(R) can be downloaded from the following URL:

Adobe, the Adobe logo, Acrobat, the Adobe PDF logo, and Reader are registered trademarks or trademarks of Adobe Systems Incorporated in the United States and other countries.

<http://www.adobe.com/>

Richard Woodrow

From: Richard Woodrow <richard@woodrowlaw.net>
Sent: Thursday, July 6, 2017 11:29 AM
To: 'greg schirato'
Cc: 'Megan Schuyler'
Subject: FW: GREG SCHIRATO GLASS

Send me your input and then I will call and get a quote on how much to answer more questions and testify. I will have Megan send them the FBI report. The FBI probably kept bench notes that we can get.

Richard Woodrow
Attorney at Law
3732 Pacific Ave SE
Olympia, WA 98501
P:360-352-9911
F:360-352-9955
richard@woodrowlaw.net

-----Original Message-----

From: Skip Palenik [mailto:SPalenik@microtracellc.com]
Sent: Thursday, July 6, 2017 10:23 AM
To: Richard Woodrow <richard@woodrowlaw.net>
Cc: Jeff Palenik <jpalenik@microtracellc.com>
Subject: RE: GREG SCHIRATO GLASS

Dear Mr. Woodrow,

I received the glass comparison report that arrived last night after hours. I've have had a chance to look through it this morning and can tell you the following, so far:

1. It is incomplete. For example, according to the last sentence of the last page, there were previous examinations performed on this evidence, which "have been discussed in other reports." We would need to see these reports in order to review the full extent of these examinations.

2. There is grossly insufficient data presented in support of any of the statements made regarding the examinations performed. No photographs, no photomicrographs, no indication of what the ultraviolet examination revealed, no XRF spectra, no value for the refractive indices measured by GRIM, etc. All of these would have been provided in a complete report.

3. Dimensional measurements of the questioned (Q) glass pieces are only the "largest dimensions". There is no indication as to which, if any, of these are the thickness measurements, which are the only important ones.

4. The statement is made in the Results and Conclusions section on the first page that the Q samples "could have come from the same source as item 38, or from another broken glass object with the same measured properties." On page 3 it is stated that the glass fragments from items 34 and 35 "are colorless" but that the known (K) glass "is pale blue in color." There is a serious disconnect here since both of these statements cannot be true. If it is believed that the Q pieces are too small to show their color this should have been stated in the report.

If your request is to have a serious review of this work performed, there are many documents that will be required, including copies of the laboratory notes relating to this comparison as well as the missing data listed in the second paragraph of this basic evaluation.

From: Megan Schuyler <megankerlee@outlook.com>
Sent: Thursday, December 21, 2017 3:58 PM
To: Skip Palenik
Cc: Richard Woodrow
Subject: RE: GREG SCHIRATO

Hi Skip,
That would be great, lets set up a phone appointment for 11:30 our time if that works for you?

Megan Kerlee
Legal Assistant
3732 Pacific Ave SE
Olympia, WA 98501
P: 360-352-9911
F: 360-352-9955
Megankerlee@outlook.com

From: Skip Palenik [mailto:SPalenik@microtracellc.com]
Sent: Thursday, December 21, 2017 3:50 PM
To: Megan Schuyler <megankerlee@outlook.com>
Cc: Richard Woodrow <richard@woodrowlaw.net>
Subject: RE: GREG SCHIRATO

Hi Megan,

I'm happy to provide this information but I think it would really be of value if I could speak with Richard before we confirm my travel to Washington. If he has read our report, I would be available to speak with him tomorrow. I could do this almost anytime with a little notice.

Best regards,
Skip

Skip Palenik
President and Senior Research Microscopist

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From: Megan Schuyler [mailto:megankerlee@outlook.com]
Sent: Thursday, December 21, 2017 5:45 PM
To: Skip Palenik <SPalenik@microtracellc.com>; 'Richard Woodrow (richard@woodrowlaw.net)' <richard@woodrowlaw.net>

Subject: GREG SCHIRATO

Importance: High

Hi Skip,

Can you tell me how much we will need to send you to have you come to Washington and testify.

Thank you,

Megan Kerlee

Legal Assistant

3732 Pacific Ave SE

Olympia, WA 98501

P: 360-352-9911

F: 360-352-9955

Megankerlee@outlook.com

From: Ethan Groves <egroves@microtracellc.com>
Sent: Wednesday, December 20, 2017 9:49 AM
To: megankerlee@outlook.com; richard@woodrowlaw.net
Cc: Skip Palenik
Subject: Schirato glass review report
Attachments: MT17-0190 - review report.pdf

Good morning Megan and Rich,

Attached please find our report discussing the review of the Schirato glass case. Once you've had a chance to read through it, please feel free to give us a call with any questions you may have.

Regards,

Ethan Groves
Research Microscopist

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From: Skip Palenik <SPalenik@microtracellc.com>
Sent: Friday, August 25, 2017 11:49 AM
To: Megan Schuyler; Richard Woodrow
Cc: Ethan Groves
Subject: RE: Schirato

Hi Megan,

I just wanted to let you know that we have completed our review of the information and data we received and are at the point where we should talk to Richard and/or you about the results we have to report. I will be out with a client this afternoon but hoping that perhaps he would be available for a chat on Monday at some point. Can you set that up on your end and let us know when it would be convenient to have a telecon? Thanks.

Regards,

Skip

Skip Palenik
President and Senior Research Microscopist

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MT17-0190 – WA State v. Greg Shirato - Glass analysis review – talking points:

- General glass examinations
 - No measurement of thickness for any Q fragment or the K fragments which were broken for comparison
 - No UV examination of Q fragments (yet, K was examined with UV light)
 - Notes indicate “no original surface” on Q frags – how was this determined?
 - Colorless vs. colored
 - K glass is, for all intents and purposes, colorless, but has a pale blue color when viewed on edge (i.e., down a long pathlength)
- XRF data
 - Poor reproducibility in characterization of known sample (i.e., high RSD values)
 - This results in high RSD in ratios, which leads to a wider tolerance for comparison
 - Ultimately, this may allow for more type I errors (false inclusions)
 - Recommend better characterization of Known sample and reevaluation.
 - Important to measure Q thickness and have K samples of comparable thickness for analysis

From: Ethan Groves <egroves@microtracellc.com>
Sent: Tuesday, August 29, 2017 12:26 PM
To: richard@woodrowlaw.net
Cc: megankerlee@outlook.com; Skip Palenik
Subject: Phone call discussion notes
Attachments: MT17-0190 - review discussion points.pdf

Good afternoon Mr. Woodrow,

Attached please find the bullet list from the glass review that we discussed recently over the phone. Please let us know if you need this expanded into a full report.

Regarding the examination of other potential glass panes from your client's garage, it would be helpful to acquire a sample of the known glass from the victim's home to include for comparison.

If we may be any further assistance, please let me know.

Regards,

Ethan Groves
Research Microscopist

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From: Skip Palenik [<mailto:SPalenik@microtracellc.com>]
Sent: Wednesday, November 1, 2017 9:19 AM
To: Megan Schuyler <megankerlee@outlook.com>
Subject: RE: Greg Schirato

Hi Megan,

Sorry, for my slow response when you called a little while ago. As I said, I was so deeply involved in our Northern Ireland case that I forgot your case at the moment. As soon as I hung up it came back to me. It is our case MT17-0190 and we will prepare a report. We can get a report to Mr. Woodrow by the later part of next week. Since we exceeded our initial budget by a little over an hour there will be an additional charge for this.

As usual please feel free to contact me with any questions you may have.

Best regards,

Skip

Skip Palenik
President and Senior Research Microscopist

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From: Megan Schuyler [<mailto:megankerlee@outlook.com>]
Sent: Wednesday, November 1, 2017 10:46 AM
To: Skip Palenik <SPalenik@microtracellc.com>; 'Richard Woodrow (richard@woodrowlaw.net)' <richard@woodrowlaw.net>
Subject: Greg Schirato

Hi Skip,
We just got off the phone and Woodrow is needing a report on Greg Schirato case.

Thank you,
If you have any questions please feel free to give me a call.

Megan Kerlee
Legal Assistant
3732 Pacific Ave SE
Olympia, WA 98501
P: 360-352-9911
F: 360-352-9955
Megankerlee@outlook.com

From: Skip Palenik [<mailto:SPalenik@microtracellc.com>]
Sent: Tuesday, August 29, 2017 8:30 AM

From: Skip Palenik <SPalenik@microtracellc.com>
Sent: Wednesday, November 1, 2017 3:26 PM
To: Megan Schuyler
Cc: Richard Woodrow
Subject: RE: Greg Schirato

I am writing to inform you that we received an e-mail from your client, Greg Schirato, this afternoon. We have a strict policy of not working directly with individuals on any legal cases, whether criminal or civil. If we are contacted by an individual for consultation or analysis, we always inform them of this policy by letting them know that we only work on such cases through a lawyer, and if they want to make use of our services they must retain counsel and we will work through them.

I am making you aware of this so that you can pass this information directly on to Mr. Schirato and ask that you inform him that we mean no disrespect by not acknowledging or responding to his e-mail directly.

Sincerely,

Skip Palenik
President and Senior Research Microscopist

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From: Megan Schuyler [mailto:megankerlee@outlook.com]
Sent: Wednesday, November 1, 2017 1:14 PM
To: Skip Palenik <SPalenik@microtracellc.com>; 'Richard Woodrow (richard@woodrowlaw.net)' <richard@woodrowlaw.net>
Subject: RE: Greg Schirato

Ok, thank you Skip, i just spoke with Greg to let him know that there would be additional charges and he is okay with that. Let me know how much more and I will have him send a check out to you.

Thank you Skip,

Megan Kerlee
Legal Assistant
3732 Pacific Ave SE
Olympia, WA 98501
P: 360-352-9911
F: 360-352-9955
Megankerlee@outlook.com

From: Megan Schuyler <megankerlee@outlook.com>
Sent: Friday, December 22, 2017 2:57 PM
To: Skip Palenik; 'Richard Woodrow (richard@woodrowlaw.net)'
Subject: GREGS TRIAL

Hi Skip,

Mr. Woodrow spoke to Greg and he would like you to come to testify, can you please send me your rates and we will get a check out to you.

Thank you,
Happy Holidays

Megan Kerlee

Legal Assistant

3732 Pacific Ave SE

Olympia, WA 98501

P: 360-352-9911

F: 360-352-9955

Megankerlee@outlook.com

Richard Woodrow

From: Richard Woodrow <richard@woodrowlaw.net>
Sent: Tuesday, January 16, 2018 10:08 AM
To: Skip Palenik
Cc: Ethan Groves
Subject: Re: Schirato

Thanks

Sent from my iPhone

On Jan 16, 2018, at 8:37 AM, Skip Palenik <SPalenik@microtracellc.com> wrote:

This characteristic is commonly invoked in glass testimony. It sounds good and to a layperson it makes sense that recently broken glass is more likely to be associated with an event than a particle that was broken long before the event. The rationale is that glass edges are sharp when broken (This is the way that microtome knives are made for cutting thin sections of human tissue for histology and pathology) and that they become rounded or pitted after time and weathering when exposed to the elements. Both of these take time. How much? Depends but not in days or weeks and more likely under normal weathering conditions months to years.

The best way to counter this is to ask him questions that force him to be specific. For example, something like these:

You say the glass particles are freshly broken. Can you explain the criteria for determining that a particle of glass is freshly broken?

Can you demonstrate these characteristics on an image of the questioned glass particles. Get him to show you what criteria he used to determine it is freshly broken by showing you the features on a photo of the actual glass.

Where did you learn to determine if glass is freshly broken or not? Can you cite an article in a scientific journal? Is it based on your own experience? If so how specifically did you obtain this experience and expertise?

Freshly broken seems to be a relative term. From a piece of broken glass can you tell how long ago it was broken. When you see the features you described does it mean the glass was broken yesterday? Last week? A month ago? Six months ago? A year ago?

Does weathering play a role in changing the characteristics of freshly broken glass? How?

Is an scanning electron microscope (SEM) ever used to evaluate the weathering of a particle of glass? Why (or why not)? What features would it show in an SEM to confirm that it was a fresh break or an old one? Did you use an SEM to determine if this glass was freshly broken?

How fast does glass loose the characteristics associated with being freshly broken?

I think you get the idea by now. Glass that hasn't been weathered by exposure to heat and water (physical and chemical degradation) will keep its sharp edges and surface texture for a very long time (a relative term, I know) but we're talking at least months and in most cases years if not exposed to the "elements".

Skip

Skip Palenik
President and Senior Research Microscopist

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Microtrace LLC is an ISO/IEC 17025 accredited laboratory

From: Richard Woodrow [<mailto:richard@woodrowlaw.net>]
Sent: Tuesday, January 16, 2018 9:49 AM
To: Skip Palenik <SPalenik@microtracellc.com>
Subject: Schirato

Couple of things came up in court.

What can you say about "freshly" broken glass fragments. How long would the fragments stay freshly broken, etc. Wilson said the glass fragments appeared fresh.

How about the incidents of glass on garments.

The WSP glass expert will testify today. I will let you know what he says. Thanks,

Richard Woodrow
Attorney at Law
3732 Pacific Ave SE
Olympia, WA 98501
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richard@woodrowlaw.net

Richard Woodrow

From: Skip Palenik <SPalenik@microtracellc.com>
Sent: Tuesday, January 16, 2018 8:41 AM
To: Richard Woodrow
Subject: RE: Schirato

Just re-read your email and the question about incidence of glass fragments on garments. There have been studies of this in the forensic literature. It's been a long time since I've read any of them. Most people will carry a few small pieces of glass, if you look small enough and the subject's clothes have not been recently laundered.
S.

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What can you say about "freshly" broken glass fragments. How long would the fragments stay freshly broken, etc. Wilson said the glass fragments appeared fresh.

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Olympia, WA 98501
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richard@woodrowlaw.net

From: Richard Woodrow <richard@woodrowlaw.net>
Sent: Friday, December 22, 2017 10:40 AM
To: 'Skip Palenik'
Subject: schirato

Are you ok testifying about this article.

53.Pearson E., May R., Dabbs M. (1971). Glass and paint fragments found in men's outer clothing. Report of a survey. *Journal of Forensic Sciences* 16:283-300.53.Pearson E., May R., Dabbs M. (1971). Glass and paint fragments found in men's outer clothing. Report of a survey. *Journal of Forensic Sciences* 16:283-300.

[53] examined 100 suits submitted to a dry-cleaning establishment, and found glass fragments in 63 of them. A total of 551 fragments was recovered from the 100 suits. The greatest number of fragments (291) were found in trouser pockets, with the second greatest number (182) found in the jacket pockets. Seventy-eight fragments were found in the trouser cuffs (turn-ups), but only 70 per cent of the suits had cuffs on the trousers. Eighteen fragments were longer than 1mm and 128 were longer than 0.5mm. The mode of the size distribution was about 0.3mm. The distribution of particles within the population of 100 suits is of considerable interest, however. Two suits contained 46 per cent of all of the glass recovered, and 50 per cent of the suits contained from one to five fragments.

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Richard Woodrow

From: Richard Woodrow <richard@woodrowlaw.net>
Sent: Saturday, December 23, 2017 10:08 AM
To: greg schirato
Subject: Re: glass cross examination options

I bounced this off if skip and he said very old but he will read it.
Wsp scientist said the same. He limited it to only dry cleaned clothes mainly wools.

Sent from my iPhone

On Dec 22, 2017, at 10:04 AM, greg schirato <gregschirato@yahoo.com> wrote:

[REDACTED] think is right.
[REDACTED] but you definitely want to make sure George or whoever will testify to it is familiar with
[REDACTED] his article.

53.Pearson E., May R., Dabbs M. (1971). Glass and paint fragments found in men’s outer clothing.Report of a survey. *Journal of Forensic Sciences* 16:283–300.53.Pearson E., May R., Dabbs M. (1971). Glass and paint fragments found in men’s outer clothing.Report of a survey. *Journal of Forensic Sciences* 16:283–300.

[53] examined 100 suits submitted to a dry-cleaning establish-ment, and found glass fragments in 63 of them. A total of 551 fragments was recovered from the 100 suits. The greatest number of fragments (291) were found in trouser pockets, with the second greatest number (182) found in the jacket pockets. Seventy-eight frag-ments were found in the trouser cuffs (turn-ups), but only 70 per cent of the suits had cuffs on the trousers. Eighteen fragments were longer than 1mm and 128 were longer than0.5mm. The mode of the size distribution was about 0.3mm. The distribution of particles within the population of 100 suits is of considerable interest, however. Two suits contained 46 per cent of all of the glass recovered, and 50 per cent of the suits contained from one to five fragments.

<Glass questioning for Trial.docx>

F

Curriculum Vitae

of

Skip Palenik

(spalenik@microtracellc.com)

Current as of 1/7/2016

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Educational History

- University of Illinois at Chicago, Bachelor of Science – Chemistry (ACS) with emphasis on analytical methods.
- McCrone Research Institute, Chicago. Courses in photomicrography, applied polarized light microscopy, identification of small particles, advanced crystallography and scanning electron microscopy.
- Courses in hair microscopy, species identification of paper fibers, paper fiber analysis, pollen identification, microscopy of soil minerals, cement microscopy, pharmacognosy, micro-techniques, wood identification, thin layer chromatography and vegetable fiber identification.

Employment

- Founder, President and Senior Research Microscopist, Microtrace (1992 – present)
- Senior Research Associate, McCrone Associates (1987 – 1992)
- Senior Research Microscopist, McCrone Associates (1979 – 1992)
 - Supervise light microscopy section. Application of polarized light microscopy and microchemical methods to the identification of single particles. Research in new methods to aid in the identification of microscopic particles of minerals, industrial dusts, combustion products, botanical fragments, hairs, fibers and crystals; application of these methods to forensic science, contamination control and airborne particulate studies. Court qualified expert (State, Federal and Foreign courts) in forensic microscopy and chemistry.
- Research Microscopist, McCrone Associates (1974 – 1979)
- Research Assistant, Department of Criminal Justice, University of Illinois at Chicago (1972 – 1974)
 - Analytical chemistry and microscopy applied to criminalistics.
- Research Assistant, Department of Chemistry, University of Illinois at Chicago (1970 – 1972)
 - Coordination compound chemistry and crystallography.
- Intelligence Analyst, United States Army Intelligence, Stuttgart, Federal Republic of Germany (1966 – 1969)

Professional Affiliations

- McCrone Research Institute, Chicago, Board of Directors
- American Chemical Society, Member
- American Academy of Forensic Sciences, Fellow
- Scientific Working Group for the analysis of Geological Materials (SWGCEO), founding member
- American Society of Trace Evidence Examiners (ASTEE), Charter Member

- American Association of Feed Microscopists, Member
- American Association of Textile Chemists and Colorists, Member
 - Appointed to the American Association of Textile Chemists and Colorists (AATCC) Research Committees on Fiber Analysis Methods and Spectroscopic Technologies (2014)
- American Association of Stratigraphic Palynologists, Member
- American Association of Feed Microscopists, sub-division of American Oil Chemists Society, Member.
- California Association of Criminalistics, Member
- Canadian Society of Forensic Science, Member
- Chicago Society for Coatings Technology, Member
- International Association of Wood Anatomists, Member
- Midwestern Association of Forensic Scientists, Member
- State Microscopical Society of Illinois, Member, past President, past Curator
- Queckett Microscopical Club, United Kingdom, Member
- Royal Microscopical Society, United Kingdom, Fellow

Honors and Appointments

- Chemistry/Instrumental Analysis Scientific Area Committee's (SAC's) Materials (Trace) Subcommittee within the Organization of Scientific Area Committees (OSAC), appointed by Mark Stolorow of the National Institute of Standards (NIST) (2014-present)
- 2013 Recipient of the "Edmond Locard Award for Excellence in Trace Evidence" presented by the American Society of Trace Evidence Examiners
- 2012 Recipient of the "Ernst Abbe Memorial Award" presented by the New York Microscopical Society
- 2010 Recipient of the "Chamot" Award presented by the State Microscopical Society of Illinois
- 2009 Recipient of the "Paul L. Kirk" Award the highest honor bestowed by the Criminalistics Section of the American Academy of Forensic Sciences
- 2004 Distinguished Scientist Award, Midwestern Academy of Forensic Sciences
- Listed in American Men and Women in Science

Expert Testimony and Deposition

- List can be provided upon request.

Teaching Experience

- Instructor, McCrone Research Institute, Chicago (1975 – present). One to three week short courses in chemical microscopy, applied polarized light microscopy, microchemical analysis, crystallography, hairs, fibers, polymers, food contaminants, botanical fragments and pollens.
- Adjunct Lecturer, University of Illinois at Chicago, School of Pharmacy, Department of Pharmacokinetics (1989 – 1992)
- Adjunct Lecturer, University of Illinois at Chicago, Department of Criminal Justice (1986 – 1989). Quarter courses in Chemical Microscopy and Applied Analytical Chemistry.
- Instructor, Illinois Institute of Technology, Chicago (1975 – 1979). Semester courses in Chemical Microscopy.

Research Grants

Advanced research in Microspectrophotometry of Fibers: Analysis and Interpretation (National Institute of Justice, 2012-DN-BX-K040) – Role: Principal Investigator

Development of a Turnkey Analytical System for the Forensic Comparison and Identification of Fiber Dyes on Casework-sized Fibers (National Institute of Justice, 2012-DN-BX-K42) – Role: Co-Principal Investigator

Raman spectroscopy of automotive and architectural pigments: in situ identification and evidentiary Significance (National Institute of Justice, 2011-DN-BX-K557) – Role: Co-Principal Investigator

Fundamentals of Forensic Pigment Identification by Raman microspectroscopy: A practical identification guide and spectral library (National Institute of Justice, 2010-DN-BX-K236) – Role: Co-Principal Investigator

Publications and Teaching

Courses and Workshops Taught

- US Army Criminal Investigation Laboratory
 - Forensic Soil Examination
- Washington State Police
 - Advanced Topics in Trace Evidence Analysis (2 weeks)
- Royal Canadian Mounted Police (Canada)
 - Forensic Microscopy
- Pitcon Conference
 - Microscopy & Microanalysis
- Texas Department of Public Safety
 - Forensic Microscopy
 - Forensic Examination of Fibers
- State of North Carolina Crime Laboratory

- Forensic Microscopy
- New York City Crime Laboratory
 - Special Techniques of Forensic Microscopy
- State of Louisiana Crime Laboratory
 - Forensic Fiber Microscopy
- State of Illinois Crime Laboratory
 - Vegetable Fibers
- California Criminalistics Institute
 - Identification of Animal Hair
 - Forensic Soil Microscopy
- Forensic Science Service (United Kingdom)
 - Human Hair Comparison
- Linear Health Care
 - Introduction to Pharmacognosy
- State Microscopical Society of Illinois
 - General Microscopy, Forensic Paper Identification
- Forensic Science Foundation
 - Basic Forensic Microscopy
 - Forensic Microscopy of Soils
 - Forensic Microscopy of Botanical Materials
 - Forensic Analysis of Fibers
- United States Customs
 - Analytical Microscopy
 - Identification of Dog and Cat Hairs to Enforce New U.S. Regulations
- Royal Canadian Mounted Police
 - Forensic Fiber Microscopy
- Louisiana State Crime Laboratories
 - Forensic Hair Microscopy
- 3M Research Laboratories
 - Microchemical Analysis
- Campbell Center for Historic Conservation (Museum Conservators)
 - Identification of Plant Fibers of Ethno-botanical Interest
 - Microchemistry for Objects Conservators

Publications (Select)

Ballou, S., Houck, M., Siegel, J.A., Crouse, C.A., Lentini, J.J., and Palenik, S. (2013) "Criminalistics: the bedrock of forensic science" in Forensic Science: Current Issues, Future Directions, Ubelaker, D.H. (ed.) Wiley-Blackwell.

Palenik, S.J. (2007) Heavy Minerals in Forensic Science, in Heavy Minerals in Use, ed. M. Mange: Elsevier.

- Palenik, C.S. and Palenik, S.J. (2004) Forensic Science and Academic Science: Comment on Forensic Science: Oxymoron?. *Science*, 303, 1136.
- Bartick, E.G. and Palenik, S.J. (2004) Forensic Analysis, in *Encyclopedia of Polymer Science and Technology*, John Wiley and Sons, DOI: 10.1002/0471440264.pst140
- Palenik, C.S. and Palenik, S.J. (2004) Forensic Microscopy, in *Encyclopedia of Analytical Sciences*, 2nd Ed., eds. Worsfold, P., Townshend, A and Poole, C. Elsevier, NY.
- Palenik, SJ, Dust. *Encyclopedia of Forensic Science*, Academic Press (2000).
- Palenik, SJ, Microchemistry. [Encyclopedia of Forensic Science](#), Academic Press (In Press).
- Palenik, SJ, Microscopy. [Encyclopedia of Forensic Science](#), Academic Press (2000).
- Palenik, SJ, Wood Identification. [Encyclopedia of Forensic Science](#), Academic Press (2000).
- Palenik, SJ, Fiber Microscopy. In: [Forensic Examination of Fibers](#), 2nd Ed., Grieve, M, Ed. John Wiley & Sons, 1999.
- Palenik, SJ, Isolation and Identification of Paint Pigments by Sublimation. *Crime Laboratory Digest*, Vol. 23, 1, 1996.
- Palenik, SJ and Fitzsimons, CA, Fiber Cross-Sections, Part I. *The Microscope*, Vol. 38, 187-195, 1990.
- Palenik, SJ and Fitzsimons, CA, Fiber Cross-Sections, A New Method for Preparing Sections, Part II. *The Microscope*, Vol. 38, 313-320, 1990.
- Palenik, SJ, Microscopy and Microchemistry of Physical Evidence. In: [Forensic Science Handbook](#), Vol. 2, Richard Saferstein, Ed., Prentice Hall, 1988.
- Palenik, SJ, Forensic Aspects of Polymer Analysis. [Encyclopedia of Polymer Science and Engineering](#), 2nd ed., Vol. 7, John Wiley & Sons, 279-289, 1987.
- Palenik, SJ, Light Microscopy of Medullary Micro-structures in Hair Identification, *The Microscope*, Vol. 30, 129-138, 1982.
- Palenik, SJ, Microscopic Trace Evidence – The Overlooked Clue, Part I, Albert Schneider Looks at Some String. *The Microscope*, Vol. 30, 93-100 1982.
- Palenik, SJ, Microscopic Trace Evidence – The Overlooked Clue, Part II, Max Frei – Sherlock Holmes with a Microscope. *The Microscope*, Vol. 30, 163-170, 1982.
- Palenik, SJ, Microscopic Trace Evidence – The Overlooked Clue, Part III, E.O. Heinrich – “The Wizard of Berkeley”. Traps a Left-Handed Lumberjack. *The Microscope*, Vol. 30, 281-290, 1982.
- Palenik, SJ, Microscopic Trace Evidence – The Overlooked Clue, Part IV, Arthur Koehler – Wood Detective. *The Microscope*, Vol. 31, 1-14, 1983.
- Palenik, SJ and McCrone WC, The Solids We Breathe. *Industrial Research*, April 1977.
- Palenik, SJ, Microscopy and the Law. *Industrial Research and Development*, March 1979.
- Palenik, SJ, Microchemical Tests in Particle Identification. [The Particle Atlas](#), Vol. 5, Ann Arbor Publishers, 1979.
- Palenik, SJ, Microscopical Examination of Air Pollutants. [The Particle Atlas](#), Vol. 5, Ann Arbor Publishers, 1979.
- Palenik, SJ, The determination of Geographical Origin of Dust Samples. [The Particle Atlas](#), Vol. 5, Ann Arbor Publishers, 1979.

Palenik, SJ and Delly, JG, Is it Jade? The Microscope in Art and Archaeology. *Industrial Research*, May 1976.

Abstracts and Talks (Selected)

Over 200 papers presented at professional meetings and seminars.

Palenik, C.S. and Palenik, S.J. (2015) Microtrace to Nanotrace: Extracting information at increasingly smaller length scales. American Academy of Forensic Sciences Annual Meeting, Orlando, FL.

Applications of Forensic Microanalytical Methods to the Identification and Sourcing of Particulate Matter in Pharmaceutical Products. Invited presentation at Microscopy & Microanalysis 2013 sponsored by the Microscopy Society of America, Indianapolis, IN.

Forensic Microscopy. Invited presentation at Cambridge University, England, June 2008.

Trace Evidence and the Law. Presentation during "Short Course for Prosecutors and Defense Attorneys" at Northwestern University, August, 2005.

Forensic Microscopy. Lawrence Livermore National Laboratory, April 14, 2004.

Microscopic Trace Evidence: The Overlooked Clue, Wesleyan University, Middleton, CT, February 25, 2004

Practical aspects of electron microscopy in the trace evidence laboratory, Forensic Microscopy- Spreading best practice, Royal Microscopical Society, Oxfordshire, England. June 20, 2003

Casework examples illustrating the integration of polarized light microscopy and scanning electron microscopy in the study of microscopic trace evidence, Scanning 2003, May 3, 2003

Forensic Soil Examination, Forensic Geoscience: Principles, Techniques and Applications, The Geological Society, Burlington House, London. March 3-4, 2003

Just say it ain't so, Joe: Analysis of Joe DiMaggio signed jerseys, Inter/Micro-02, Chicago, IL. June 24-29, 2002

Microscopy in the Pharmaceutical Industry, The Procter and Gamble Co., September, 2002.

Microscopy and Terrorism, State Microscopical Society of Illinois, May 11, 2002

Light and electron microscopy in soil investigation, Inter/Micro-01, Chicago, IL. June 25-28, 2001

Accessories and components for the microscopist, Inter/Micro-00, Chicago, IL. June 26-29, 2000

Contribution of chemical microscopy to trace evidence analysis, 219th Annual American Chemical Society Meeting - Division of Analytical Chemistry. March 26-30, 2000

Fundamental of forensic microscopy, Federation of Analytical Chemistry and Spectroscopy Societies, 2000

Splitting hairs: for fun and (intellectual) profit, Inter/Micro-99, Chicago, IL. June 28-July 1, 1999

Putting chemistry back into chemical microscopy, Inter/Micro-98, Chicago, IL. August 10-12, 1998

Let's take a dip - Lecture/demonstration on immersion microscopy, Inter/Micro-97, Chicago, IL. July 21-23, 1997

Compensators for all seasons - Lecture/demonstration on compensators, Inter/Micro-95, Chicago, IL. July 11-13, 1995

The forensic examination of particles recovered from surfaces, Microbeam Analysis Society, June 1-4, 1993

Methods for the Identification of Vegetable Fibers, Forensic Microscopy Session: Skip Palenik, Chairman. Inter/Micro-93, Chicago, IL, 1993.

Micro-FTIR Spectroscopy of Acrylic Fibers, American Academy of Forensic Sciences, 42nd Annual meeting, Cincinnati, OH, 1990.

Forensic Microscopy as an Investigative Tool, Crime Scene Investigation Seminar, California Association of Criminalists, Santa Ana, CA, 1988.

The Microscope – The Most Versatile Diagnostic and Analytical Tool in the Materials Sciences. Carl Zeiss Annual Dealer Symposium, Phoenix, AZ, 1988.

Evidential Value of Cotton Fibers. Trace Evidence Analysis: Skip Palenik, Chairman. Eastern Analytical Symposium, Silver Jubilee, New York City, NY, 1986.

Light Microscopy: Chemistry at the Picogram Level. Pharmaceutical Applications of Microscopy, American Pharmaceutical Association Meeting, Minneapolis, MN, 1985.

FTIR Spectroscopy Coupled with Microscopy – A New Tool for the Forensic Scientist. American Chemical Society Meeting, Miami, FL, 1985.

Advances in Solution of Crimes. Press Conference, American Chemical Society Meeting, Miami, FL, 1985.

Microscopical Techniques for the Examination of Soil in Criminal Cases. International Association of Forensic Sciences, Oxford, 1984.

Parmacognosy as a Tool for the Analytical Microscopist. Inter/Micro-84, Chicago, IL 1984.

1 Richard Woodrow
2 Attorney at Law WSBA #18680

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~~Tried to buy as per sent
pts to explain
James~~

25 Richard Woodrow
Attorney at Law
3732 Pacific Ave. SE
Olympia, WA 98501
360 352 9911
360 352 9955 fax
richard@woodrowlaw.net
woodrowlaw.net

Richard Woodrow

From: gregschirato@yahoo.com
Sent: Saturday, October 29, 2016 12:50 PM
To: Richard Woodrow
Subject: Re: State v. Schirato - Glass Analysis Report

Can you resend the report. It is not showing up as an attachment. Thank you.

Connected by DROID on Verizon Wireless

-----Original message-----

From: Richard Woodrow <richard@woodrowlaw.net>
To: greg schirato <gregschirato@yahoo.com>
Sent: Sat, Oct 29, 2016 16:56:16 GMT+00:00
Subject: Fwd: State v. Schirato - Glass Analysis Report

Sent from my iPhone

Begin forwarded message:

From: George Chan <dnaaudit2006@gmail.com>
Date: October 27, 2016 at 8:58:25 AM PDT
To: Richard Woodrow <richard@woodrowlaw.net>
Subject: Re: FW: State v. Schirato - Glass Analysis Report

As I remember they cannot do any testing due to the nature of the glass particle. I can go back to check on the report later in the afternoon.

On Thursday, October 27, 2016, Richard Woodrow <richard@woodrowlaw.net> wrote:

What do you guys think. I thought this was sent to the FBI and they said that the particles were too small. I don't remember what was in the report.

Richard Woodrow

Attorney at Law

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Olympia, WA 98501

P:360-352-9911

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richard@woodrowlaw.net

APPENDIX III

THE FREQUENCY OF OCCURRENCE OF PAINT AND GLASS ON THE CLOTHING OF HIGH SCHOOL STUDENTS

L. LAU¹, A.D. BEVERIDGE¹, B.C. CALLOWHILL¹, N. CONNERS², K. FOSTER³,
R.J. GROVES¹, K.N. OHASHI¹, A.M. SUMNER¹ AND H. WONG¹

ABSTRACT

The frequency of occurrence of paint chips and glass fragments on the outer clothing and footwear of 213 high school students from different areas of the city of Vancouver was determined. Paint and glass respectively were found on ca. 14% and 2% of the outer clothing items, and on ca. 24% and 5% of footwear. These figures are significantly lower than figures reported in similar studies in the last 25 years.

RÉSUMÉ

La fréquence avec laquelle des écailles de peinture et des fragments de verre se retrouvent sur les vêtements extérieurs et les chaussures de 213 étudiants du secondaire de différents quartiers de la ville de Vancouver a été déterminée. De la peinture et du verre ont respectivement été trouvés sur environ 14% et 2% des articles vestimentaires extérieurs, et sur environ 24% et 5% des chaussures. Ces chiffres sont plus bas, et ce, de manière significative que les chiffres rapportés dans des études semblables lors des 25 dernières années.

INTRODUCTION

In criminal investigations, forensic chemists are often asked to examine clothing items for traces of physical evidence such as paint chips and glass fragments which could have originated from a crime scene. If such material is recovered, then the significance of finding it and of it matching to a control sample must be determined. This is typically achieved by surveys to determine the frequency of occurrence of the material in the environment and on the substrate from which it was recovered, and by testing the efficiency and effectiveness of analytical methods to distinguish samples from different sources.

One of the first studies of the frequency of occurrence of paint and glass on clothing was published in 1971 by Pearson, May and Dabbs (1) who examined 100 suits delivered to dry cleaners for cleaning. They found 1077 samples of paint comprising a total of 3358 "fragments" of paint on the 100 suits searched. Sixty-three of the suits (63%) bore glass fragments on the surface of the garments and 32% of the suit pockets contained glass fragments. Seventy of these suits had trousers with cuffs and glass fragments were found in 40% of the cuffs. Two of these suits bore 46% of all the glass fragments recovered. In a similar study (2), 300 clothing articles, including some suits, from dry cleaners in Vancouver within a 10 km radius of the laboratory were sampled. A total of five paint chips were found on five garments. Only 16 garments (5%) bore glass on their surfaces and of these, 15 bore one fragment and only one bore two glass fragments. However, suits,

1. Royal Canadian Mounted Police Forensic Laboratory, Chemistry Section, 5201 Heather Street, Vancouver, BC, Canada, V5Z 3L7.
2. Cooperative education student, Dept. of Chemistry, Simon Fraser University, Burnaby, BC.
3. Cooperative education student, Dept. of Chemistry, University of Victoria, Victoria, BC.

dress pants and blouses received at dry cleaners are not representative of clothing worn by people committing crimes such as "break and enter" which commonly give rise to paint and glass evidence. A more representative sample was surveyed by McQuillan and Edgar (3): clothing from members of a local youth club and selected groups of recruits from the Royal Ulster Constabulary and the Ulster Defence Regiment. They found glass on 29% of the pants, 42% of the jackets and 44% of the pullovers. It was unusual to recover more than six fragments on any garment and 95% of the fragments recovered were smaller than 1 mm in size. However, the authors commented that the population in Ireland was exposed to a high level of broken glass because of the sustained terrorist campaign and constant redevelopment of the city where old houses were being demolished and replaced. They also stated that had the survey been taken in a less turbulent part of the world, the result could show a lower exposure to glass and hence a lower glass recovery rate. Lambert et al (4) took a different approach by reviewing operational case files and found that non-matching glass fragments were often found on the clothing of individuals suspected of criminal activity.

The present study was undertaken to provide a baseline for our own service area and to compare these data with the existing surveys. To answer the question "How common is it to find glass on outer clothing?", an ideal survey would be of people not involved in crime. As an approximation to the ideal, we considered high school student volunteers to be a reasonably representative sample of the population, discounting age and professional background. This group is close to ideal because they have different financial, sociological and ethnic backgrounds, and typically have an active lifestyle. We made primary contacts through school liaison police officers, and targeted student volunteers ranging in age from 14 to 18 years.

PROCEDURE

Permission

We approached school principals primarily through police liaison officers, who explained the object of the study and the nature of the collection process (see below). They stressed that we would assure the anonymity of the participants and sought only volunteers. If a school or teacher required that parents sign a waiver form, an appropriate document describing the project was supplied and completed.

Collection

Collection was performed under the supervision of a member of the Chemistry section in a pre-cleaned area of the classroom. Each student was asked to stand on a fresh piece of brown paper and to brush down his or her lower clothing with a metal spatula. The student then similarly brushed down their upper clothing over another piece of brown paper. Pant pockets were turned out by the student and contents were collected on yet another piece of brown paper. All the papers from each student were individually folded and placed in one unmarked evidence bag. The bag was subsequently given a sequential number. Since it was not the intent of this study to determine the retention ability of different fabrics, fabric construction of each article was not recorded. The students were also asked to remove their shoes and these were examined on site under a Leitz stereo microscope with 10X and 40X magnification. This examination was more time-consuming, hence fewer pairs of footwear were examined compared to the number of clothing articles surveyed.

Laboratory Examination

Each sheet of brown paper was opened over a 30 inch diameter stainless steel funnel and all shed material was collected in a petri dish under the funnel and examined with a Zeiss

TABLE 1
Summary of All Paint Fragments Recovered from Upper Body Garments
(including multiple paint fragments per garment)

| Paint Colour | Sweater | Shirt | Jacket |
|--------------|---------|-------------------|--------|
| blue | | 1 1 (1 × 4 mm) | 1 |
| brown | | 3 | |
| green | | 2 | |
| orange | | 3 | |
| pink | | 7 | |
| red | | 5 | 1 |
| white | | 3 | |
| yellow | 2 | 10 | |

stereo microscope at 16X or 40X magnification. Particle size was determined using an eyepiece equipped with a measuring scale.

Paint layers were mounted between high pressure diamond anvils with a 1 × 1 mm surface area manufactured by High Pressure Diamond Optics. Infrared spectra were collected using a Biorad FTS-40 Fourier Transform Infrared Spectrophotometer with a Triglycine Sulfate detector equipped with a 6X beam condenser (Harrick Ltd.) 256 scans of each sample were collected between 1800 and 250 cm⁻¹.

Glass was distinguished from quartz and other minerals by determining that it was isotropic when viewed with a polarising light microscope under crossed polarisers. Glass refractive index was measured using a GRIM 2 (Glass Refractive Index Measurement) instrument manufactured by Foster + Freeman Ltd. with a Leitz Diaplan phase contrast microscope at 100X magnification and a Mettler hot stage.

RESULTS

This survey examined 216 upper body garments, 213 lower body garments and 164 pairs of footwear from 213 students.

Recovery from Upper Body Garments – Surface

We searched 216 upper body garments (17 sweaters and sweatshirts, 166 shirts (including T-shirts), 33 jackets) for paint and glass fragments and found that:

- 30 (14%) bore paint fragments;
- 2 (1%) bore glass fragments.

Paint Fragments

One of the 17 sweaters bore two paint fragments. Twenty seven of the 166 shirts examined bore paint, and of these one bore two paint fragments, two bore three fragments and the other 23 bore one fragment. Two of the 33 jackets bore one paint fragment each. All except one paint fragment were smaller than 1 × 1 mm. Colours of the recovered paint fragments are summarised in Table 1.

Glass Fragments

Two shirts bore glass fragments. These fragments were smaller than 1 × 1 mm.

TABLE 2
Summary of All Paint Fragments Recovered from Lower Body Garments
(including multiple paint chips per garment)

| | |
|------------------------|--------------|
| black | 1 |
| blue | 1 |
| blue/yellow/blue/blue* | 1 (3 × 5 mm) |
| brown | 1 |
| clear/metallic silver* | 2 |
| green | 1 |
| grey | 1 |
| orange | 1 |
| pink | 8 |
| red | 1 |
| red/green | 1 |
| white | 3 |
| yellow | 10 |
| yellow/grey/white* | 1 |

*multi-layer paint, denoting the layer sequence.

TABLE 3
Colours of Paint Fragments Recovered from Pant Pockets

| | |
|-------------|---|
| blue/white* | 1 |
| orange | 1 |
| yellow | 2 |

*multi-layer paint, denoting the layer sequence.

Recovery from Lower Body Garments – Surface

We examined 209 pairs of pants and 4 skirts for the presence of paint fragments and glass particles and found that:

- 26 (12%) bore paint fragments on the surface;
- 6 (3%) bore glass fragments on the surface.

Paint Fragments

All but one paint fragment were smaller than 1 × 1 mm; the exception measured 3 × 5 mm. Of the 26 garments bearing paint, 21 bore one paint fragment, four bore two paint fragments and one bore three paint fragments. Two of the five garments which bore more than one paint fragment bore more than one type of paint. The colours and layer sequences of the recovered paint fragments are summarised in Table 2.

Glass Fragments

Five out of six garments only bore one glass fragment; the sixth garment had two glass fragments. All the glass fragments found were smaller than 1 × 1 mm.

Recovery from Pant Pockets

The contents of 54 pockets were searched.

Paint Fragments

Three pockets yielded paint fragments as shown in Table 3.

TABLE 4
Summary of All Paint Fragments Recovered from Footwear
(including multiple paint fragments per pair of footwear)

| Paint Colour | [A] Smooth Leather Sole | [B] Soft Treaded Sole | [C] Hard Treaded Sole |
|--------------|----------------------------|--------------------------|--------------------------|
| black | | 11 | |
| blue | 1 | 3 | 1 |
| green | | 1 | |
| green/white* | | 1 | |
| grey | 1 | | |
| metallic red | >12** | >35** | |
| orange | 1 | 1 | 1 |
| red | | 12 | 3 |
| white | 1 | 15 | 4 |
| yellow | | 6 | 3 |
| unrecorded | | | 3 |

*multi-layer paint, denoting the layer sequence.

**tiny fragments, where more than 12 fragments were found on each pair.

TABLE 5
Frequency of Paint Recovery on Footwear

| Fragments Per Pair | [A] | [B] | [C] | Total |
|--------------------|-----|-----|-----|-------|
| 0 | 30 | 75 | 21 | 126 |
| 1 | 1 | 10 | 6 | 17 |
| 2 | | 4 | 2 | 6 |
| 3 | 1 | 2 | 1 | 4 |
| 4 | | 4 | 1 | 5 |
| 5 | | 1 | | 1 |
| 6 | | 1 | | 1 |
| 7 | | 1 | | 1 |
| 8 | | | | |
| 9 | | | | |
| 10 | | | | |
| 11 | | | | |
| 12 | | 1 | | 1 |
| >12 | 1* | 1* | | 2 |

*tiny fragments, where more than 12 fragments were found on each pair.

Glass Fragments

One pocket yielded a single glass fragment.

Recovery from Footwear

Footwear encompassed styles and functions ranging from extremely expensive to no-name brands. The construction of the soles permitted division into the following classes:

- (A) smooth leather sole (33 pairs), e.g. dress shoes, cowboy boots
- (B) soft treaded sole (100 pairs), e.g. runners, sandals, soft crepe sole casuals
- (C) hard treaded sole (31 pairs), e.g. "Doc Martens" style casual shoes or boots, work boots and hiking boots

Paint Fragments

One hundred and sixty-four pairs of footwear were examined. Two of the 33 pairs of smooth leather soled footwear examined bore one type of paint fragment each and one pair

TABLE 6
Number of Glass Fragments Found on Footwear with Different Sole Construction

| Number of Fragments | [A] | [B] | [C] |
|---------------------|-----|-----|-----|
| 0 | 32 | 96 | 28 |
| 1 | 0 | 3 | 2 |
| 2 | 1 | 1 | 1 |

had more than one type of paint. Twenty-five of the 100 pairs of soft soled shoes bore paint and nine of these 25 pairs had more than one type of paint fragment on each pair. Paint fragments were found on ten of the 31 pairs of hard soled footwear and four of these ten pairs had more than one type of paint fragment. A summary of the paint fragment colours is shown in Table 4.

All the paint fragments found were smaller than 1×1 mm. Table 5 is a summary of the frequency of finding paint fragments on the footwear examined.

Glass Fragments

The incidence of finding glass on footwear is not high and the findings are summarised in Table 6. Glass fragments found on the footwear were smaller than 1×1 mm. Glass fragments were only found on the soles of eight of the 164 pairs of footwear examined and in no case on the upper surface of the shoes. This is less than 4.8% of the footwear examined in this survey.

DISCUSSION

Paint Fragments

Paint fragments were found on less than 14% of the outer garments and less than 23% of the footwear in this survey. Sixteen percent of the paint-bearing outer garments bore more than one fragment whereas approximately half of the footwear bearing paint had more than one fragment. It was unusual to find large paint fragments; most paint fragments recovered were smaller than 1×1 mm.

Fifteen fluorescent pink paint fragments were found on the upper and lower body garments (Tables 1 and 2). This colour is not typical of the more common paint colours encountered. These paint fragments, all of which had the same chemical composition (i.e. acrylic binder and talc filler) (see Appendix), were found on the upper and lower body garments of individuals from the same school. This suggests the students from this school came into contact with the same fluorescent pink-painted source in the school or on the school grounds and demonstrates the care which must be given to ascribing significance to the commonness of paint colours.

Glass Fragments

It is commonly believed that people frequently step on broken glass. Consequently, chances of finding glass on the soles of footwear should be high. However, this was not supported by the results of this study as the frequency of finding glass on the soles of footwear was less than 4.8%, while glass was found on less than 1% and 2% of all upper and lower body garments respectively. None of the glass fragments found was embedded in the soles or on the upper surface of the footwear. In contrast, a study by Davis and

TABLE 7
Comparison of Glass Recovery from Previous Studies

| Study | Clothing Surface | Clothing Pocket | Pant Cuffs | Shoes |
|----------------------|------------------|-----------------|------------|-------|
| Pearson, May & Dabbs | 63% | 32% | 40% | N/A |
| McQuillan & Edgar | 36% | N/A | N/A | N/A |
| Lau & Campbell | 5% | N/A | N/A | N/A |
| Current Study | 1.9% | 1.8% | N/A | 4.8% |

N/A not applicable.

TABLE 8
Chemical Composition of Paint Fragments on Clothing

| Paint | Frequency | ACR | MEL | CAR | TIO | ALK | NCL | TAL | STY |
|---------------|-----------|-----|-----|-----|-----|-----|-----|-----|-----|
| white | | x | x | | | | | | |
| white | x2 | x | | | | | | | |
| white | | x | | x | x | | | | |
| white | | | | | x | x | | | |
| black | x2 | | | | | | | | x |
| blue | | x | | x | | | | | |
| blue grey | | x | | x | | | | | |
| blue/white* | | | | x | | x | | | |
| blue | | x | | | x | | | | |
| green | | | | | x | x | | | |
| green, olive | | | x | | x | x | | | |
| grey | | | | | x | x | | | |
| grey | | | | | | x | | | |
| pink | x11 | x | | | | | | | x |
| orange | | | | | | | x | | |
| orange | | | | | | x | | | |
| red/grey* | | | | | | x | | | |
| red | | | | | | | | | x |
| pink, red | | | | | | x | | | x |
| yellow/green* | x2 | | | x | x | x | | | |
| yellow | x2 | | | x | x | x | | | |
| yellow | | | | x | | x | | | x |
| yellow | | | | | | | x | x | |
| yellow | | | | | | x | | | |
| yellow | x3 | | | x | | x | | | x |
| yellow | | | | x | | | | | |

*paint fragments too minute; FTIR of combined layers.

DeHaan (5) examined 1300 shoes (650 matched pairs) donated to the Goodwill Industries. Twenty percent of the 1300 shoes were found to bear colourless glass fragments. A comparison of the DeHaan study with the current study was not feasible due to the difference in how the results were reported. Chances of finding glass in pockets was even less than 1.8%. Typically, only one glass fragment was recovered from an article, and no more than two glass fragments were recovered from any one article of clothing. All fragments recovered were smaller than 1 × 1 mm.

SUMMARY

The frequency of both paint and glass found on the clothing and footwear of the students surveyed in this study is lower than has been reported in previous studies (Table 7), and if reproducible, does indicate that the presence of paint and glass fragments on the surface

of garments and shoes is relatively uncommon in our service area. Thus the mere finding of paint and glass on clothing and footwear can be assigned some level of significance, and if such fragments match a known source by standard forensic tests, then their significance is enhanced by the number and location of the particles found.

APPENDIX

Paint Fragments

Where possible, paint fragments found on the clothing items were analysed using Fourier Transform Infrared Spectrophotometry (FTIR). Minute fragments of the same colour found on the same clothing item were combined for analysis. Most of the paint fragments can be distinguished by colour. FTIR further differentiated some of the physically indistinguishable paint fragments. Table 8 lists the chemical composition of paint fragments by colour. An 'x' in the column indicates the presence of the component in the paint fragment.

Paint component abbreviations used in Table 8 are:

| | |
|-----|------------------|
| ACR | acrylic |
| MEL | melamine |
| CAR | carbonate |
| TIO | titanium dioxide |
| ALK | alkyd |
| NCL | nitrocellulose |
| TAL | talc |
| STY | styrene |

Glass Analysis

Most glass fragments recovered were very much smaller than 1×1 mm, and although readily determined to be glass by their physical appearance and isotropy it was not feasible to determine refractive index due to the manipulation required. The refractive index (n_D) of two larger fragments was less than 1.50000, suggesting that these were borosilicate headlamp glass.

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APPENDIX IV

Glass on clothing and shoes of members of the general population and people suspected of breaking crimes

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The outer clothing and footwear of 122 people attending a university gymnasium and a private gymnasium were searched for fragments of glass. Both the surfaces and the pockets of the clothing and the uppers and soles of the footwear were searched. New Zealand forensic glass cases have been reviewed to determine the amount of non-matching glass present on the clothing of people who are suspected of breaking crimes. Data from 114 suspects who had no matching glass on their clothing and shoes were accumulated. Statistical modelling techniques have been applied to the data collected.

Les vêtements externes et les chaussures de 122 personnes qui utilisaient une salle de gymnastique d'une université et d'une société privée ont été étudiés pour la présence de fragments de verre. Aussi bien les surfaces que les poches des habits ainsi que les parties supérieures et les semelles des chaussures ont fait l'objet de l'investigation. Des cas de verre retrouvés sur les habits de gens suspectés d'avoir commis des crimes avec débris de verre en Nouvelle-Zélande ont été passés en revue pour déterminer la quantité de verre non concordant présent. Les données concernant 114 suspects sur les habits et les souliers desquels aucun verre concordant n'a été retrouvé ont été accumulés. Des modèles statistiques ont été appliqués aux données récoltées pour leur interprétation.

Die Oberbekleidung und Schuhe von 122 Personen eines universitären und eines privaten Fitnesszentrums wurden auf Glasfragmente hin untersucht. Sowohl die Oberflächen als auch die Taschen der Bekleidung sowie die Sohlen und das Obermaterial der Schuhe sind in die Suche einbezogen worden. Es erfolgte eine Überprüfung der in Neuseeland bearbeiteten Fälle, bei denen Glasfragmente als Spuren auftraten. Dabei wurde die Anzahl der nicht übereinstimmenden Glaspartikel auf der Bekleidung jener Personen bestimmt, die Einbruchsdelikten verdächtigt werden. Die Auswertung der Daten von 114 Verdächtigen, bei denen sich weder auf der Kleidung noch auf den Schuhen übereinstimmende Glasfragmente befanden, erfolgte mit statistischen Modellberechnungen.

Se investigan los fragmentos de vidrio en las ropas externas y el calzado de 122 personas que asistían a un gimnasio de la universidad y a uno privado. La investigación se realizó tanto en los exteriores y bolsillos de la ropa como en las partes externas y en las suelas del calzado. Se han revisado los casos forenses de vidrios en Nueva Zelanda para determinar la cantidad de vidrios dispares que aparecen en la ropa de la gente sospechosa de algún delito. Se acumulan datos de 114 sospechosos que tenían en su ropa y calzado vidrios dispares. Se han aplicado técnicas de modelos estadísticos a los datos recopilados.

Introduction

One of the major areas of work for criminalistic laboratories is the comparison of glass fragments recovered from a suspect's clothing and footwear with glass samples taken from a broken glass object, such as a window. A number of methods are available for this comparison. In New Zealand the measurement of refractive index (RI) and the examination of surface features of individual fragments by interferometry are used [1,2].

Once these analyses have been completed, an assessment of the evidence must be carried out. Since the late 1980s New Zealand has implemented an assessment method based on the presentation of a likelihood ratio [3] and, more recently, incorporating the continuous method [4].

This approach weighs the probability of the evidence under each of two (or more) alternative hypotheses. The first, typically, being that the suspect is the person who broke the window in question, and the second being that the suspect is not the person who broke the window in question. In most cases to facilitate the calculation of the probability given the second hypothesis it is assumed that the suspect is a person picked at random from some relevant population. This leads to the question of "what population should be surveyed" in order to model the relevant probabilities [5].

Published surveys may be roughly divided into those on members of the general population and those on persons

suspected of crime. We review here some of the previously published work, adding this work and discussing the merits of the relative approaches. We also propose statistical models to predict P and S values for casework.

General population surveys

A number of surveys of glass on clothing and shoes of members of the general population have been published. These surveys are designed to answer the question, "How much glass is on a member of the general population?"

In 1971 Pearson, May and Dabbs [6] published their results of a survey of 100 men's suits submitted to a dry cleaners in Reading, England. No grouping analysis was carried out on the refractive index values so we are unable to determine how many different groups of glass were present on each suit. This survey only examined debris collected from the pockets and turn-ups of the suits. The surfaces of these garments were not examined.

McQuillan and Edgar [7] (ME) examined jackets, pullovers and trousers from members of a youth club, part-time members of the Ulster Defence Regiment and recruits into the Royal Ulster Constabulary. A summary of the findings for this survey are presented in Tables 1 and 2. They concluded that it was unusual to find more than six fragments of glass from the same source on clothing and that when a large number of glass fragments was found they tended to originate from multiple sources.

TABLE 1 The number of groups of glass found for different search strategies from the McQuillan and Edgar [7] survey. Data have been grouped using the Evett and Lambert [13] grouping algorithm. This data was reworked by Buckleton and Pinchin (pers comm) from the raw data and differs slightly from the published set.

| No. of groups of glass | Upper garments surface only | Upper garments surface & pockets | Upper & lower garments surface only | Upper & lower garments surface & pockets |
|------------------------|-----------------------------|----------------------------------|-------------------------------------|--|
| P0 | 0.811 | 0.641 | 0.636 | 0.403 |
| P1 | 0.146 | 0.180 | 0.238 | 0.272 |
| P2 | 0.029 | 0.053 | 0.087 | 0.087 |
| P3 | 0.000 | 0.063 | 0.010 | 0.053 |
| P4 | 0.010 | 0.024 | 0.010 | 0.092 |
| P5 | 0.005 | 0.015 | 0.005 | 0.015 |
| P6 | 0.000 | 0.000 | 0.000 | 0.019 |
| P7 | 0.000 | 0.000 | 0.005 | 0.005 |
| P8 | 0.000 | 0.015 | 0.000 | 0.019 |
| P9 | 0.000 | 0.005 | 0.000 | 0.015 |

TABLE 2 The size of groups of glass found for different search strategies from the McQuillan and Edgar [7] survey. Data have been grouped using the Evett and Lambert [13] grouping algorithm. This data was reworked by Buckleton and Pinchin (pers comm) from the raw data and differs slightly from the published set.

| Size of groups of glass | Upper garments surface only | Upper garments surface & pockets | Upper & lower garments surface only | Upper & lower garments surface & pockets |
|-------------------------|-----------------------------|----------------------------------|-------------------------------------|--|
| 1 or 2 fragments | 0.980 | 0.958 | 0.971 | 0.965 |
| 3 or more | 0.020 | 0.042 | 0.029 | 0.035 |

Examination of the data in Tables 1 and 2 shows that the probability of finding a certain number of groups is dependent on the search strategy used. For example, one is more likely to find a group of glass on clothing if the surfaces and pockets are searched compared to searching only the surface of the garment(s). The probability of finding a certain number of groups of glass on clothing has been called the P term [3] where P refers to the Presence of glass.

The P values can be used to compare the results of different surveys. However, for a meaningful comparison it is important to compare P values based on the same search strategy. Additionally, when these values are used to interpret casework, it is vital that the P value mirrors the search strategy used in the case.

The data presented by McQuillan and Edgar [7] has also been used to calculate the S term. S was chosen by Evett and Buckleton [3] to represent the Size of the group(s) of glass. The S term is less dependent on the search strategy used. In fact, regardless of the search procedure used, if glass is found the size of the group is likely to be 1.

Lau *et al.* [8] surveyed the outer clothing and footwear of 213 high school students in Vancouver. They argued that this portion of the population approximated the ideal survey of people who were not involved in crime, while still representing a range of financial, sociological and ethnic backgrounds.

Another general population survey was carried out by Petteerd *et al.* [9] who searched the upper outer garments of 2008 people at a shopping centre in Canberra, Australia. They found that six garments bore one fragment of glass

TABLE 3 The number and size of groups found for different categories from the LSH survey. The data has been read from the graphs published.

| | <i>Surfaces</i> | <i>Pocket</i> | <i>Shoe</i> | <i>Individual</i> |
|------------------|-----------------|---------------|-------------|-------------------|
| P ₀ | 0.40 | 0.48 | 0.450 | 0.250 |
| P ₁ | 0.26 | 0.28 | 0.190 | 0.220 |
| P ₂ | 0.12 | 0.14 | 0.100 | 0.140 |
| P ₃ | 0.09 | 0.02 | 0.090 | 0.140 |
| P ₄ | 0.05 | 0.04 | 0.050 | 0.069 |
| P ₅ | 0.03 | 0.01 | 0.030 | 0.064 |
| P ₆ | 0.02 | 0.02 | 0.040 | 0.033 |
| P ₇ | 0.01 | 0.01 | 0.010 | 0.033 |
| P ₈ | 0.02 | 0.00 | 0.030 | 0.022 |
| P ₉ | 0.00 | 0.00 | 0.005 | 0.020 |
| P ₁₀₊ | 0.00 | 0.00 | 0.005 | 0.013 |
| S ₁ | 0.82 | 0.80 | 0.83 | 0.71 |
| S ₂ | 0.10 | 0.13 | 0.12 | 0.15 |
| S ₃ | 0.03 | 0.03 | 0.02 | 0.07 |
| S ₄ | 0.03 | 0.02 | 0.01 | 0.02 |
| S ₅₊ | 0.03 | 0.02 | 0.02 | 0.05 |

each. The authors concluded that the prevalence of glass on members of the general population in Canberra was of a similar order of magnitude to the Canadian survey, but was significantly less than the Northern Ireland survey.

In summary, a number of researchers have tackled the problem of "how much glass is on the clothing and footwear of members of the general population?" A wide range of results has been published, which suggest that the geographical location of the survey may have a significant effect on the results, as well as the search methodology and strategy used.

Surveys of suspects' clothing and shoes

McQuillan and Edgar [7] argued that "persons suspected of a crime involving breaking glass may recently have been associated with other similar incidents, and consequently the background levels of glass on their clothing could be disproportionately high" compared to members of the general population. Using this argument they decided to survey members of the general population.

However, this same argument can be used to justify surveying people who have come to the police's attention as suspects for breaking incidents. Without making any contentious assumptions about the guilt or innocence of the casework subjects, it is indisputable that they are people who have come to the police's notice in connection with the investigation of breaking offences. It can be convincingly argued that this is the relevant population to be considered when treating the suspect as an innocent person.

Several researchers have already addressed the question of how much background glass is present on the clothing and footwear of people who are suspected by the police of involvement in crime [10].

Lambert, Satterthwaite and Harrison (LSH) [11] presented a large study collating the results of 405 glass cases, involving 589 individuals.

Grouping analysis of the data was carried out. The paper reported P values (in graphical form) for non-matching glass found in three different locations, those being the surfaces, the pockets and the shoes and also per individual. They also reported S values for the same categories. These values are shown in Table 3.

They concluded that "it is not unusual to find large numbers of non-matching glass fragments on the clothing of an individual suspected of criminal activity, although it is unusual to find more than three fragments of non-matching glass from a single source on the clothing of an individual".

Ross and Nguyen [12] surveyed 87 garments (excluding footwear) from non-glass casework from the Victoria Forensic Science Centre in Australia. Only one fragment of glass was recovered from each of two garments. No glass

TABLE 4 P and S values for a search of the upper garment surface only.

| Target Pop. | Case - Suspects | Community | Community | Community |
|-----------------|-----------------|----------------|------------|---------------|
| | Ross & Nguyen | Petterd et al. | Lau et al. | ME from graph |
| P ₀ | 0.977 | 0.997 | 0.991 | 0.811 |
| P ₁ | 0.023 | 0.003 | 0.009 | 0.146 |
| P ₂ | 0.000 | 0.000 | 0.000 | 0.029 |
| P ₃ | 0.000 | 0.000 | 0.000 | 0.000 |
| P ₄ | 0.000 | 0.000 | 0.000 | 0.010 |
| P ₅ | 0.000 | 0.000 | 0.000 | 0.005 |
| P ₆ | 0.000 | 0.000 | 0.000 | 0.000 |
| P ₇ | 0.000 | 0.000 | 0.000 | 0.000 |
| P ₈ | 0.000 | 0.000 | 0.000 | 0.000 |
| P ₉ | 0.000 | 0.000 | 0.000 | 0.000 |
| P ₁₀ | 0.000 | 0.000 | 0.000 | 0.000 |
| S ₁ | 1.000 | 1.000 | 1.000 | 0.900 |
| S ₂ | 0.000 | 0.000 | 0.000 | 0.080 |
| S ₃ | 0.000 | 0.000 | 0.000 | 0.020 |
| S ₄ | 0.000 | 0.000 | 0.000 | 0.000 |
| S ₅ | 0.000 | 0.000 | 0.000 | 0.000 |

was found on any of the other items of clothing. This result would suggest that people suspected of crimes that do not involve a breaking offence have considerably less background glass on their clothing than people suspected of breaking crimes.

Comparison of published surveys

Next a comparison of some of these surveys is considered. This is hampered by the different search strategies employed and the summary nature of some of the reporting. However, it does seem possible to compare the P and S values for some of the published research.

Table 4 shows the results for glass found on the surfaces of the upper clothing. Three of the surveys targeted members of the general population while the fourth survey looked at people suspected of non-breaking crimes. All of these surveys show similar amounts of glass on the upper surfaces. In fact there is very little glass on the upper clothing in any of these surveys, with the McQuillan and Edgar survey displaying the largest amount of glass.

Table 5 compares the glass found on the surfaces of the upper and lower clothing. Unfortunately data from only three surveys can be arranged in this way for comparison. The obvious difference from this comparison is that the glass suspects (LSH) appear to have more glass on them than members of the general population.

From our experience in performing surveys based on case-work data there is considerable difficulty in processing the information. Both the UK and NZ have "stopping rules". This means that the search of a suspect's clothing is

TABLE 5 P and S values for a search of the upper and lower garments.

| Target Pop. | Community | Community | Glass suspects |
|-----------------|------------|-----------|----------------|
| | Lau et al. | ME | LSH from graph |
| P ₀ | 0.920 | 0.636 | 0.400 |
| P ₁ | 0.033 | 0.238 | 0.260 |
| P ₂ | 0.014 | 0.087 | 0.120 |
| P ₃ | 0.000 | 0.010 | 0.090 |
| P ₄ | 0.000 | 0.010 | 0.050 |
| P ₅ | 0.000 | 0.005 | 0.030 |
| P ₆ | 0.000 | 0.000 | 0.020 |
| P ₇ | 0.000 | 0.005 | 0.010 |
| P ₈ | 0.000 | 0.000 | 0.020 |
| P ₉ | 0.000 | 0.000 | 0.000 |
| P ₁₀ | 0.000 | 0.000 | 0.000 |
| S ₁ | 0.357 | - | 0.810 |
| S ₂ | 0.500 | - | 0.100 |
| S ₃ | 0.143 | - | 0.050 |
| S ₄ | 0.000 | - | 0.020 |
| S ₅ | 0.000 | - | 0.000 |

terminated if certain criteria are met. For instance, if a large amount of matching glass is found on an upper garment then no further search is made. This suggests that any non-matching glass on lower garments may never be searched for. Other possible systematic editing includes the possibility that an incomplete set of clothing may be submitted. If, for instance, only a pair of shoes is submitted, then it is impossible to determine how much glass may, or may not, have been on that individual's clothing.

Notwithstanding these concerns we are of the opinion that the advantage of surveying the relevant population (that is the population of glass suspects) outweighs these disadvantages.

It was therefore proposed to perform both a survey of the general population and a survey of people suspected of breaking crimes in New Zealand.

Experimental

General Population Survey

Two Auckland gymnasias were approached to assist in this survey. In total, 112 males and 10 females participated.

Each participant was asked to package their upper clothing, lower clothing and footwear (including socks) into three appropriately labelled plastic bags. A team of "shakers" then processed each garment while the participant was attending the gymnasium. This gave the team of shakers approximately one hour to collect debris from the clothing and footwear. The surfaces of each garment, with the pockets taped shut, were shaken over clean paper and the debris collected. The debris from any pockets was then collected.

The surfaces of the footwear were brushed with a stiff brush to remove debris which was collected separately. The soles of the footwear were then examined using a stereomicroscope (x7 magnification). Any embedded glass fragments were collected. For each set of clothing and footwear a maximum of six debris samples were collected: surfaces of upper and lower clothing and footwear (inc. socks); pockets of upper and lower clothing; and, soles of footwear.

Each participant was asked to complete a brief questionnaire, which recorded sex, age, race, occupation and whether the participant was aware of recent contact with a source of broken glass in the clothing and footwear that they were wearing.

While searching the clothing and shoes a note was made of the types of garments submitted and their qualities with respect to glass retention.

The debris samples were subsequently searched under a stereomicroscope (x7 magnification) and the number of glass fragments found noted. Glass fragments that showed an original surface were examined using an interferometer to determine whether the fragment had come from a flat, patterned or curved source of glass. Where the fragment was of a sufficient size the colour was also noted. The refractive index of recovered glass fragments was determined using GRIM with the silicon oil, Locke B. Of the 141 fragments found, one fragment was too small to successfully measure the refractive index. Grouping of the individual fragments was carried out by plotting the results and grouping by eye.

Survey of suspects from casework

Glass case files for the years July 1996 to March 1999 were reviewed. Only cases where the glass found did not match the control glass submitted were included. This allowed examination of glass on the clothing of individuals who had come to the police's attention in relation to a breaking incident, but who did not have any matching glass on them.

This resulted in casework data from 114 suspects. The following information was recorded for each person; the garments examined, the number of fragments found on each

garment, the number and size of groups of glass on each garment and the cumulative total of the number and size of groups of glass.

For each suspect as many relevant categories as possible were filled in (Table 6). In cases where not all of the clothing was submitted not every category was filled in. For example, for a case where only a jumper and a pair of shoes were submitted and examined, the categories involving lower surfaces and pockets were not relevant.

Problems were also encountered where not all of the clothing and shoes that had been submitted were examined. This was normally due to enactment of stopping rules. For example, it was common that if no matching glass was found on the surfaces of the clothing and the shoes then any pockets and the soles of the shoes would not be examined. This has had the effect of reducing the number of garment pockets and shoe soles data recorded.

Results and Discussion

General population survey

The number of garments examined and the number of glass fragments found is shown in Table 7. Of note is that no fragments of glass were found on the surfaces of the upper or lower clothing and that only seven of the total fragments were found in the pockets of the clothing. By far the majority of glass fragments (87%) were found in the soles of the footwear.

Twenty-three of the 141 recovered fragments contained original surfaces which were examined using an interferometer. These results are shown in Table 8. It is interesting to note that the majority of fragments (91%) containing an original surface have not come from a source of flat glass. In the McQuillan and Edgar [7] survey 51 of 631 fragments were reported as having an original surface and of these 34 (67%) were flat. This contrasts with our finding. However, as only a small portion of the recovered fragments had original surfaces only limited conclusions can be drawn from this observation.

TABLE 7 Number of garments examined and number of glass fragments found for general population survey (gym survey).

| <i>Garment</i> | <i>No. of garments examined</i> | <i>No. of glass frags found</i> |
|------------------------------------|---------------------------------|---------------------------------|
| Surfaces of upper clothing | 120 | 0 |
| Pockets of upper clothing | 61 | 2 |
| Surfaces of lower clothing | 113 | 0 |
| Pockets of lower clothing | 107 | 5 |
| Surfaces of footwear (incl. socks) | 81 | 12 |
| Soles of footwear | 79 | 122 |
| Total | 314 | 141 |

TABLE 6 Cumulative categories used to group data from suspects survey.

| |
|--|
| Upper surface |
| Upper surface and pockets |
| Upper and lower surfaces |
| Upper and lower surfaces and pockets |
| Clothing and shoe surfaces |
| Upper and lower surfaces and pockets and shoe surfaces |
| Upper and lower surfaces, pockets, shoe surfaces and soles |
| Per person (regardless of clothing items) |

TABLE 8 Colour and Original Surfaces of recovered fragments from gym survey.

| Original surface only | Colour only | Original surface & colour |
|-----------------------|-----------------|---------------------------|
| Flat 2 | Yellow/brown 18 | Curved & Green 3 |
| Curved 12 | Green 4 | Curved & Yellow 1 |
| Patterned 5 | | |

Twenty six (18%) fragments in this work were large enough for their colour to be determined (Table 8). The majority of coloured glass was yellow. Comparing these results to those of McQuillan and Edgar, we found slightly more coloured glass, compared to their finding of 7%. However, yellow (amber) appears to dominate amongst the coloured fragments in both countries.

Grouping by eye was carried out on the RI values to determine how many different groups of glass were present on the clothing and footwear of each individual. Grouping by eye, rather than using a grouping algorithm, was used as it allows accommodation of issues such as the presence of original surfaces on recovered fragments. At present, the casework approach used by this laboratory is to group by eye, while using grouping algorithms for guidance.

Grouping of the fragments enabled calculation of the probability of finding x groups of glass on a person's clothing (P) and the probability of the size of these groups (S) (Figures 1 and 2). Figures 1 and 2 also show the P and S values for this data if only the glass found on the clothing is considered.

As there are only seven fragments of glass recovered from the clothing, all of which were from the pockets, the values (other than P_0) are not well determined. Therefore, whilst this general population survey, and others, show that the other P values are typically small, these values are approximate.

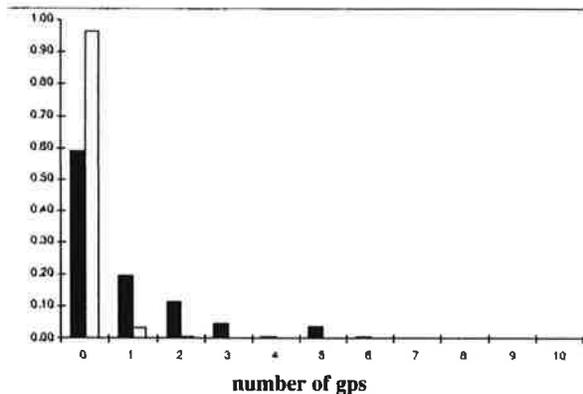


FIGURE 1 P values for glass on members of the general population (gym survey). ■ Clothing and shoes per person □ Clothing only per person.

Survey of suspects from casework

A total of 114 suspects were identified as having no glass that matched the control glass submitted on their clothing. Fifty one of the suspects had no glass on the items examined. The distribution of where the fragments of glass were found and the total number of garments examined is shown in Table 9. The category of "clothing combined" relates to cases where both the upper and lower garments have been submitted in the same package and therefore any glass found on the surfaces of these items cannot be related back to a specific item. Similarly, the category of "clothing and shoe surfaces combined" relates to cases where all of the clothing and the shoes have been submitted in the same package.

TABLE 9 Survey of glass on clothing from suspects taken from casework.

| | No. of garments examined | No. of frags per item |
|-----------------------------------|--------------------------|-----------------------|
| Upper surface | 86 | 92 |
| Upper pockets | 28 | 21 |
| Lower surface | 65 | 36 |
| Lower pockets | 36 | 15 |
| Shoe surface | 67 | 26 |
| Shoe sole | 45 | 43 |
| Clothing combined | 9 | 15 |
| Clothing & shoe surfaces combined | 6 | 2 |
| Total number frags | | 250 |

Table 9 indicates that upper garments constitute the most commonly recorded item. This is because upper garments are always searched first and it is therefore a result of the search strategy used in casework, rather than a reflection of the types of garments usually submitted. Therefore, more information relating to the amount of glass on the surface of upper garments was found than for any other type of

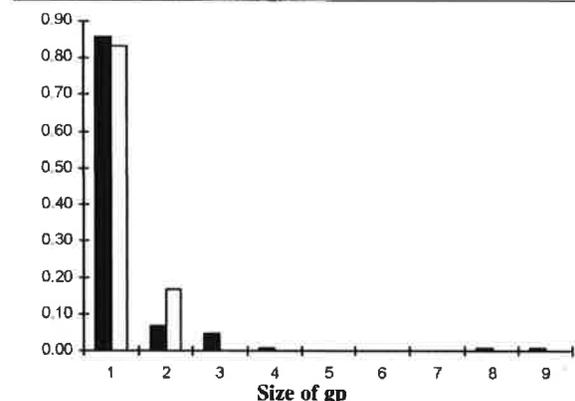


FIGURE 2 S values for glass on members of the general population (gym survey). ■ Clothing and shoes per person □ Clothing only per person.

garment. Conversely, the stopping rules enacted in case-work meant that shoes were the last item to be examined, resulting in less data in this category.

After the data was assigned to cumulative categories, including garments where no glass fragments had been found, the raw values for P and S for each category could be calculated (Tables 10 and 11). These tables are specifically constructed to facilitate a likelihood ratio interpretation.

Comparison of Survey Data

A comparison of the general population survey and the suspects' survey show that there is considerably more glass present on the clothing of people who are suspected of breaking crimes. Of particular note is the high number of fragments present on the surfaces of suspects' garments compared to the finding of no fragments of glass on either the upper or lower surfaces of garments from members of the general population.

However, even for the suspects' survey, when fragments of glass are found, the majority of these fragments fall into group sizes of only one or two fragments, regardless of

which items are examined. This data supports the conclusion drawn by Lambert *et al.* and reinforces the high significance of finding a large group of glass on the clothing of a suspect [11].

A comparison of the results for glass on upper surfaces for the gym survey, the suspects' survey and previously published surveys is shown in Table 12. As can be seen the gym survey showed comparable results to Lau *et al.* and Petterd *et al.*'s surveys [8,9]. Whereas, the suspects' survey showed considerably more glass than Ross and Nguyen's non-glass case suspects' survey and approximately the same amount of glass as the McQuillan and Edgar survey [7,12].

In fact, comparison of the surveys for other search strategies shows that the amount of glass found in the general population gym survey is comparable to both the Canadian and Australian general population surveys and has significantly less glass than the McQuillan and Edgar [7] survey.

The suspects' survey has similar amounts of glass to the McQuillan and Edgar survey and less glass than the Lambert *et al.* work [11].

TABLE 10 P values for survey of suspects from casework.

| Cumulative Number of Groups | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | >10 |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Upper surface | 0.721 | 0.151 | 0.070 | 0.047 | 0.012 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Upper surface and pockets | 0.536 | 0.179 | 0.107 | 0.036 | 0.107 | 0.036 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Upper and lower surfaces | 0.639 | 0.208 | 0.083 | 0.042 | 0.014 | 0.014 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Upper and lower surfaces and pockets | 0.429 | 0.286 | 0.114 | 0.086 | 0.057 | 0.029 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Clothing and shoe surfaces | 0.625 | 0.264 | 0.056 | 0.014 | 0.014 | 0.014 | 0.014 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Upper and lower surfaces and pockets and shoe surface | 0.510 | 0.306 | 0.122 | 0.020 | 0.020 | 0.000 | 0.000 | 0.020 | 0.000 | 0.000 | 0.000 | 0.000 |
| Upper and lower surfaces and pockets and shoe surfaces and soles | 0.409 | 0.159 | 0.205 | 0.159 | 0.000 | 0.023 | 0.023 | 0.023 | 0.000 | 0.000 | 0.000 | 0.000 |
| Per Person (regardless of clothing items) | 0.451 | 0.221 | 0.150 | 0.106 | 0.027 | 0.018 | 0.009 | 0.018 | 0.000 | 0.000 | 0.000 | 0.000 |

TABLE 11 S values for survey of suspects from casework.

| Cumulative Size of Groups | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | >10 |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Upper surface | 0.659 | 0.171 | 0.073 | 0.000 | 0.000 | 0.049 | 0.000 | 0.000 | 0.000 | 0.000 | 0.049 |
| Upper surface and pockets | 0.774 | 0.097 | 0.065 | 0.032 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.032 |
| Upper and lower surfaces | 0.689 | 0.156 | 0.044 | 0.022 | 0.000 | 0.022 | 0.022 | 0.000 | 0.000 | 0.000 | 0.044 |
| Upper and lower surfaces and pockets | 0.795 | 0.128 | 0.000 | 0.000 | 0.000 | 0.026 | 0.026 | 0.000 | 0.000 | 0.000 | 0.026 |
| Clothing and shoe surfaces | 0.711 | 0.156 | 0.044 | 0.022 | 0.000 | 0.000 | 0.000 | 0.022 | 0.000 | 0.000 | 0.044 |
| Upper and lower surfaces and pockets and shoe surfaces | 0.732 | 0.146 | 0.000 | 0.049 | 0.000 | 0.024 | 0.000 | 0.024 | 0.000 | 0.000 | 0.024 |
| Upper and lower surfaces and pockets and shoe surfaces and soles | 0.766 | 0.141 | 0.031 | 0.016 | 0.016 | 0.000 | 0.016 | 0.016 | 0.000 | 0.000 | 0.000 |
| Per Person (regardless of clothing items) | 0.737 | 0.146 | 0.044 | 0.015 | 0.007 | 0.015 | 0.007 | 0.007 | 0.000 | 0.000 | 0.022 |

TABLE 12 Comparison of P and S values with published surveys.

| Target Population | Community | Glass suspects | Case suspects | Community | Community | Community |
|---------------------|---------------------|----------------------------|---------------|----------------|------------|-----------|
| | Auckland Gym Survey | Auckland casework suspects | Ross & Nguyen | Petterd et al. | Lau et al. | ME |
| P ₀ | 1.000 | 0.721 | 0.977 | 0.997 | 0.991 | 0.811 |
| P ₁ | 0.000 | 0.151 | 0.023 | 0.003 | 0.009 | 0.146 |
| P ₂ | 0.000 | 0.070 | 0.000 | 0.000 | 0.000 | 0.029 |
| P ₃ | 0.000 | 0.047 | 0.000 | 0.000 | 0.000 | 0.000 |
| P ₄ | 0.000 | 0.012 | 0.000 | 0.000 | 0.000 | 0.010 |
| P ₅ | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.005 |
| P ₆ | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| P ₇ | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| P ₈ | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| P ₉ | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| P ₁₀ | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| S ₁ | - | 0.659 | 1.000 | 1.000 | 1.000 | - |
| S ₂ | - | 0.171 | 0.000 | 0.000 | 0.000 | - |
| S ₃ | - | 0.073 | 0.000 | 0.000 | 0.000 | - |
| S ₄ | - | 0.000 | 0.000 | 0.000 | 0.000 | - |
| S ₅ | - | 0.000 | 0.000 | 0.000 | 0.000 | - |
| S ₆ | - | 0.049 | 0.000 | 0.000 | 0.000 | - |
| S ₇ | - | 0.000 | 0.000 | 0.000 | 0.000 | - |
| S ₈ | - | 0.000 | 0.000 | 0.000 | 0.000 | - |
| S ₉ | - | 0.000 | 0.000 | 0.000 | 0.000 | - |
| S ₁₀ | - | 0.000 | 0.000 | 0.000 | 0.000 | - |
| S _{>10} | - | 0.049 | 0.000 | 0.000 | 0.000 | - |

The differing amounts of glass found depending on the population surveyed appears intuitively correct. It does however highlight the need to consider the ideal population to survey when using these results to interpret glass cases.

Using a likelihood ratio approach, the use of general population surveys would produce significantly stronger evidence than if a population of suspects' survey was used.

We are convinced that the survey of choice is that of background glass on people suspected of breaking crimes. To provide data for interpreting casework we have used our suspects' survey data to produce models to predict P and S values for different casework search strategies.

Statistical modelling of P values

The data collected is expected to be subject to sampling error. This has at least two implications. First each estimate has some error. This has the greatest consequence for those values that are small as the likelihood ratio is very sensitive to any variation in these numbers. Second, many of the parameters of interest are unobserved. This suggests that some modelling of these terms is desirable. It does, however, seem plausible to assume that the data are either monotonically decreasing (decrease in a smooth manner) or

are unimodal. It was therefore decided that any model used should fit these criteria. The model used was the maximum likelihood estimation (MLE) of a power series.

The estimation statistic was:

$$-\frac{\zeta(\hat{\alpha})}{\zeta(\alpha)} = \frac{1}{N} \sum_{n=1}^{\infty} r_n \log(n+1)$$

This was calculated and the power α and normalising constant $\frac{1}{\zeta(\alpha)}$

were estimated by interpolation from a table of values of the estimation function $-\frac{\zeta(\hat{\alpha})}{\zeta(\alpha)}$

for $1 < \alpha < 6$.

This gave raw values for α and $\frac{1}{\zeta(\alpha)}$ (Table 13).

The steeper the line of best fit, the faster the graph tails off. For example, we would expect the graphs for P_x values of glass found on upper surfaces to be steeper than for glass found on the surfaces and in the pockets.

TABLE 13 Statistical modelling of P values.

| | α raw | $\frac{1}{\zeta(\hat{\alpha})}$ raw | α altered | $\frac{1}{\zeta(\hat{\alpha})}$ altered |
|--|--------------|-------------------------------------|------------------|---|
| Upper surfaces | 2.5768 | 0.7615 | 2.5768 | 0.7615 |
| Upper surfaces and pockets | 2.0597 | 0.6277 | 2.0597 | 0.6277 |
| Upper and lower surfaces | 2.3751 | 0.7169 | 2.3751 | 0.7169 |
| Upper and lower surfaces and pockets | 1.9919 | 0.6049 | 1.9919 | 0.6049 |
| Clothing and shoe surfaces | 2.3824 | 0.7187 | 2.3000 | 0.6983 |
| Upper and lower surfaces and pockets and shoe surfaces | 2.1673 | 0.6610 | 1.9500 | 0.5897 |
| Upper and lower surfaces and pockets and shoe surfaces and soles | 1.8919 | 0.5681 | 1.8919 | 0.5681 |

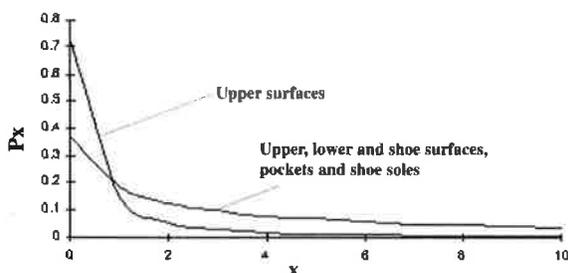


FIGURE 3 Calculated P_x values from modelled line fitting.

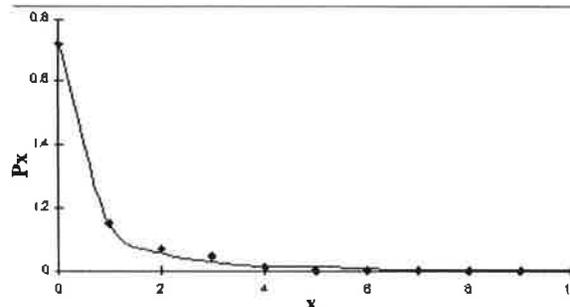


FIGURE 4 Comparison of survey and predicted values for P_x for upper surfaces. — Predicted; ♦ Casework survey.

This trend was observed in the raw data for ‘upper surfaces’ which was steeper than ‘upper and lower surfaces’ which was steeper than ‘upper surfaces and pockets’.

The other four categories gave slope values of approximately the right magnitude, however, they did not show the decrease in slopes as expected. These lines have the least observations and therefore it was decided to “subjectively impose” a more reasonable slope upon them to ensure that they decrease down the categories (Table 13).

It is of interest to observe that all likelihood ratios contain a P term in both the numerator and denominator. For instance, for y matching groups and z non-matching groups the term P_z appears in the numerator and P_{z+y} in the denominator. Substituting the modelled values into the LR suggests that the ratio of P values will be:

$$LR \propto \left(\frac{z + y + 1}{z + 1} \right)^b$$

This exercise informs us that LR is not proportional in any way to the normalising constant and that lowering the value of b (as was done when we subjectively intervened) is always conservative (since y is always non-negative).

Figure 3 illustrates the proportions that these equations will produce for different P_x values for ‘upper surfaces’ and for ‘upper and lower surfaces and pockets and shoe surfaces

and soles’. Figure 4 shows a comparison of the raw data for ‘upper surfaces’ from the suspects, survey and the values predicted using the equation.

Statistical modelling of S values

As for P values, the method of maximum likelihood estimation (MLE) of the power series was used to model the S data. As can be seen from Table 11, the S values were reasonably consistent across the different search categories. It was therefore decided to only model the size of groups on the per person category, since this was the category containing the most observations.

The estimation statistic:

$$-\frac{\zeta(\hat{\alpha})}{\zeta(\hat{\alpha})} = \frac{1}{N} \sum_{n=1}^{\infty} r_n \log n$$

was calculated and the power α and normalising constant were estimated as before.

This gave values of 2.4880 for α and 0.7430 for $\frac{1}{\zeta(\hat{\alpha})}$

Estimation using the MLE gives a better fit visually to S_1 but appears to have less density in the tail than the raw data. Simulation of 1000 samples of size 137 from a power law distribution with exponent 2.5 gave a very good fit to the data and therefore the MLE model was accepted.

The final equation (from MLE) to predict S_x values is:

$$S_x = \frac{0.7430}{x^{2.488}}$$

Figure 5 shows a comparison of the raw data from the suspects' survey and the values predicted using this equation. As S terms appear exclusively in the denominator both the intercept and slope affect the likelihood ratio (LR). There is no clear intervention that is always "conservative".

Conclusion

The majority of glass found on the clothing and shoes of people unconnected with breaking crimes was found on the footwear, and more specifically in the soles. No glass fragments were found on the surfaces of the clothing and only a few fragments of glass were found in the pockets of the clothing.

In comparison, considerably more fragments of glass were found on the clothing and shoes of people suspected of breaking crimes, who in fact had no glass on their garments that matched the control glass submitted. However, the group size of this background glass present on suspects' clothing and shoes is small, with most of the fragments being of group size 1 or 2, regardless of where the fragments of glass were found. This reinforces the significance of finding a large group of matching glass on a suspect's clothing and shoes.

Statistical modelling of the data has produced equations to predict both P_x and S_x terms. The evidential value of the presence of glass can be described by the slope of the modelled line and the evidential value of the size of the group of glass can be described by the slope and intercept of the modelled line.

The authors recommend interpretation using a likelihood ratio approach with these modelled values.

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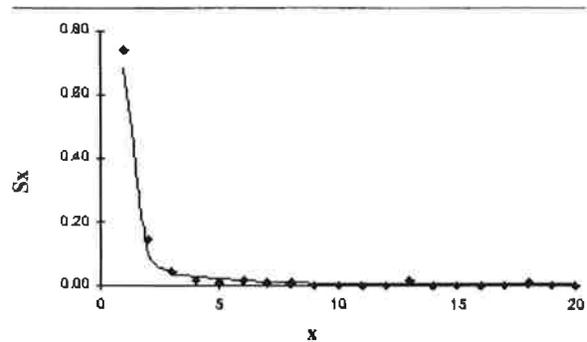


FIGURE 5 Comparison of survey and predicted values for S_x . — Predicted; ♦ Casework survey.

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