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APPROVAL OF THE APPELLATE DIVISION

SUPERIOR COURT OF NEW JERSEY
APPELLATE DIVISION
DOCKET NO. A-2062-03T3

STATE OF NEW JERSEY,

Plaintiff-Respondent,
v.

MICHAEL S. BEHN,

Defendant-Appellant.

Argued October 12, 2004 - Decided March 7, 2005

Before Judges A. A. Rodríguez, Weissbard
and Hoens.

On appeal from Superior Court of New Jersey,
Law Division, Middlesex County, No. 1202-09-05.

Paul Casteleiro argued the cause for appellant.

Simon Louis Rosenbach argued the cause for respondent
(Bruce J. Kaplan, Middlesex County Prosecutor, attorney;
Mr. Rosenbach, of counsel and on the brief).

The opinion of the court was delivered by

WEISSBARD, J.A.D.

Defendant Michael S. Behn was convicted of murder and armed
robbery based in part on expert testimony concerning composition

bullet lead analysis (CBLA)¹. He appeals from an order dismissing his petition for post conviction relief (PCR), which challenged the validity of the CBLA testimony based upon scientific developments which took place after his trial. We conclude that the expert testimony was based on erroneous scientific foundations and its admission met the requirements for granting a new trial on the ground of newly discovered evidence.

In September 1995, defendant was charged in a three-count indictment with the following offenses: murder, N.J.S.A. 2C:11-3a(1),(2) (count one); felony murder, N.J.S.A. 2C:11-3a(3) (count two); and armed robbery, N.J.S.A. 2C:15-1 (count three). On the same date the indictment was returned, the State served notice that it would seek the death penalty by filing a Notice of Aggravating Factors, as follows: (a) that Robert Rose was murdered during the commission of an attempt to commit a robbery, and (b) that Rose's murder was committed for the purpose of escaping detection, apprehension, trial and punishment or confinement for the robbery, N.J.S.A. 2C:11-3c(4)(f) and (g). After extensive pre-trial proceedings, some of which we will describe in greater detail later in this

¹ The field is sometimes abbreviated as CABL (composition analysis of bullet lead). We will adhere to the CBLA abbreviation.

opinion, trial began on April 7, 1997. On May 5, 1997, defendant was found guilty on all three counts, but the jury was deadlocked on whether defendant had committed the murder by his own conduct. After denial of a post-trial motion for judgment of acquittal, R. 3:18-2, and for a new trial, R. 3:20-1, on June 23, 1997, defendant was sentenced to life imprisonment with thirty years parole ineligibility on count one and a consecutive fifteen-year term on count three. Count two was merged into count one.

On direct appeal, we affirmed defendant's conviction, directing only a minor adjustment to a statutory penalty. On May 19, 1997, defendant's petition for certification was denied. State v. Behn, 164 N.J. 561 (2000). Defendant filed the present petition on June 20, 2002 and it was denied on September 5, 2003. A motion for reconsideration was denied on March 20, 2003. On appeal, defendant challenges the denial of his petition without an evidentiary hearing.

As a preliminary matter, we address the nature of defendant's application. Although the application was entitled "Verified Petition For Post Conviction Relief," it is clear, as the State suggests, that defendant is seeking a new trial on the basis of newly discovered evidence. Indeed, defendant's brief addresses the issues in terms of newly discovered evidence.

Accordingly, we will treat the proceeding under review as a motion for a new trial on the ground of newly discovered evidence.

We see no need to recount the facts in detail. It suffices to quote the trial judge, in rejecting defendant's post-trial motions, when he said, "[t]his was a highly circumstantial case" We echoed that thought in our opinion on the direct appeal, noting that "the evidence, though circumstantial and subject to differing views by reasonable jurors, was sufficient to prove guilt beyond a reasonable doubt if the jury drew all the available inferences in favor of the prosecution."

Rose, the victim, was a coin dealer who was negotiating a sale of \$30,000 to \$40,000 worth of coins to defendant. Rose was shot and killed at his place of business on July 19, 1995, between 9:25 p.m. and 10:30 p.m. Four shots, not fired from close range, struck Rose in the head, causing his death. The medical examiner also found bruising on both of decedent's wrists. There was evidence that Rose planned to meet someone named "Mike" at his office that evening. It was the State's theory that defendant appeared at the office, killed Rose and took only the coins he had been negotiating to purchase.

Defendant, on the other hand, testified that he met with Rose at about 5:30 p.m., paid \$40,000 cash for the coins and

left. It was after this completed transaction that Rose went home for dinner and then returned to his office at 7:45 p.m. for his appointment with "Mike," who, according to decedent's wife, was a new client coming in to sell coins. Rose's son suggested that his father returned to the office to meet someone other than "Mike" in reference to buying or selling coins. Two people who had been in the office with Rose that afternoon corroborated the son's testimony about his father's meeting with another individual.

Defendant presented an alibi defense and offered testimony designed to establish that, contrary to the State's contention, he did have access to sufficient funds to purchase the coins that he claimed to have bought from Rose and which were found in his possession.

To bolster its case, the State presented three experts to tie defendant to the offense. Peter DeForest, a forensic scientist, offered an opinion that marks on the decedent's wrists were consistent with having been made by handcuffs of the same general design as ones found in defendant's possession. Defendant presented an opposing forensic scientist, Nicholas Petraco, to opine that the marks on decedent's wrists were made either by handcuffs or some other type of ligature, such as

wire, electrical cord or rope. In addition, Petraco testified that defendant's handcuffs did not cause the marks.

The State also presented ballistics experts in an effort to link the bullets which killed Rose to a rifle which defendant purchased but which he claimed had been stolen from his car on November 18, 1994, the day after its purchase. It was the State's theory that defendant falsely reported the gun stolen and then used it in the murder, seven months later. Randall Toth, the State's expert, opined that four of the six lead fragments recovered from the decedent during his autopsy were .22 caliber long rifle bullets, that two of the four fragments were fired from the same weapon, but that he could not determine whether the other two identifiable fragments were fired from the same weapon. Toth concluded, however, contrary to the State's theory, that the murder weapon was either a .22 caliber Marlin rifle or a .22 caliber Jennings semi-automatic pistol. He also concluded that two of the fragments were of no evidential use for purposes of identification. His conclusion that four of the fragments were .22 caliber long rifle bullets was based on a comparison of the markings on the fragments to known samples, and he stated that although the bullets are called .22 caliber long rifle they can be used in either a rifle or a pistol.

A second ballistics expert, George Krivosta, also testified that two of the bullets fragments were fired from the same weapon and that they and two other bullets fragments were .22 caliber long rifle bullets. Krivosta, unlike Toth, concluded that two fragments were fired from the same weapon. However, he could not determine if they were fired from the same weapon as the other two fragments. Based upon his inability to determine if all four fragments were fired from the same gun, he testified he could not say that only one weapon was used to commit the crime, but only that the four bullets were fired from weapons that shared the same class characteristics of sixteen lands and sixteen grooves with a right hand twist. He opined that bullets recovered from the decedent were consistent with having been fired from a weapon manufactured by Marlin as opposed to one of the automatic pistols manufactured by other companies, because the markings on the fragments were narrower than those made by other manufacturers.

The defense also presented a ballistics expert, William E. Conrad, who disagreed with Krivosta's conclusion that only a Marlin manufactured weapon could have fired the evidence bullets based upon (1) heavy damage to the bullets which distorted the lands and grooves; (2) variations within the measurements of the lands and grooves on the evidence bullets; and (3) his knowledge

that Jennings and Phoenix Arms produce weapons which have the same general rifling characteristics as those he found on the evidence bullets. Conrad testified, based upon the damage to the evidence bullets that there was no way to conclude that any particular type of gun fired the bullets recovered from the decedent, and that the recovered bullets could have been fired from a Marlin rifle, a Jennings pistol, a Phoenix Arms pistol, a Bryco pistol or some other firearm for which there existed no data regarding land and groove measurements.

Thus, every expert presented by the State was countered by a defense expert, with one exception, Charles Peters, an expert on bullet lead analysis. The sparring which preceded Peters' entry into the case is significant.

On February 20, 1996, the court ordered the State to supply the defense with all experts' reports connecting handcuffs found in the defendant's possession to marks or impressions discovered on the decedent's wrists during his autopsy and connecting the Marlin 70 Papoose .22 caliber long rifle the defendant reported as stolen eight months before the incident to the murder of the decedent. The State failed to provide the defense with any experts' reports and on May 10, 1996, defendant submitted a motion seeking to bar all State expert testimony based upon the

State's failure to comply with the court's order of February 20, 1996.

On July 2, 1996, an order was once again entered by the court compelling the State to provide the defense with the written report of its expert, Dr. Peter DeForest, concerning "a comparison of the marks on the wrists of the decedent . . . to the handcuffs seized from the defendant . . . [by] August 30, 1996."

Despite the court's orders, Dr. DeForest's final report, dated January 15, 1997, was not received by the defense until January 24, 1997. On February 6, 1997, the defense provided the State with a report from its forensic science expert, Nicholas Petraco.

On February 7, 1997, the State moved for a continuance of the February 10, 1997 trial dates, arguing it needed additional time to prepare for trial based upon its receipt of the Petraco report. Petraco's report responded to the report of DeForest, who opined that impressions found on the decedent's wrists during the autopsy were made by handcuffs. Petraco offered the following opinions: (a) the impressions discovered on the wrists of the decedent may or may not have been made by handcuffs; (b) that the handcuffs the defendant possessed did not make the impressions on the decedent's wrists; (c) it was

more likely than not that a handgun, as opposed to a rifle, was the weapon the perpetrator used to shoot the decedent four times in the head; and (d) the robbery and murder of the decedent was committed by two people as opposed to a lone gunman. In opposing the State's motion for a continuance, the defense argued that Petraco's report was not completed earlier because the State did not provide the defense with DeForest's final report until January 24, 1997, and Randall Toth, the ballistics expert for the State, did not agree to submit to an interview until February 4, 1997. The State's motion for a continuance was granted and a trial date of April 7, 1997 was set.

The trial having been adjourned, the State secured the services of two additional experts, Krivosta, a ballistics and tool mark identification expert, and Charles Peters of the Federal Bureau of Investigation (FBI), an expert in bullet lead composition analysis. We have discussed Krivosta's opinion above. Peters opined that the lead in the fragments recovered from the decedent and the lead in bullets the defendant possessed were analytically indistinguishable, that both the lead fragments recovered from the decedent's body and the defendant's bullets came from the same source of lead, and both the fragments recovered from the decedent's body and the

defendant's bullets came from the same box or boxes and were packaged on the same date by the manufacturer.

In response to the receipt of the reports of Krivosta and Peters, the defense filed a motion to bar their testimony or, in the alternative, for a continuance. In support of the motion, the defense argued it was incapable of rebutting the testimony of Peters in time for the trial. The motion was denied as was the request for a further adjournment of the trial date. In a letter opinion, the trial judge expressed his view that "[t]here is no reason why the defense cannot quickly obtain an expert in this field, should they so desire, and have that person available for testimony by the time the issue comes up in the trial. In the meantime, the conclusions of Peters would not be put before the jury in openings." Defendant then sought leave to appeal. We denied leave, noting that defendant had received Peters' report on March 27, 1997, and being "satisfied that the trial judge has recognized that the offense will have a reasonable opportunity to deal with the Peters report . . .," which would not be referred to in opening statements.

Contrary to the optimism expressed in our April 4 order, the defense apparently was not able to obtain an expert to refute the opinions of Peters, and ultimately Peters' trial

testimony stood unrebutted. We will later advert to the efforts defendant made to find an expert to counter Peters.

At trial, Peters testified that each source of lead used by a bullet manufacturer is unique and that there are millions of different sources of lead. Thus, he stated, the following:

A. The basis of bullet lead analysis is that when bullets are manufactured they start out with a molten pot of lead and this molten pot of lead will have elements added to the lead to make the lead hard and then sometimes they'll even take out elements, trace -- trace elements if they don't want it in there, but basically you would have this large pot of lead and everything in that large pot of lead is mixed and it has its own unique composition, so every time they make up this batch it will be unique. And how do we know that? Because over the years we've analyzed tens of thousands of bullets. These are single bullets, partial boxes of bullets, full boxes of bullets. And every box of bullets that comes from different sources of lead has its own unique composition, that is, if you can characterize enough of the trace elements that are in there, and we look at things like copper, antimony, arsenic, tin and bismuth in the lead and if we get enough of these elements we can actually source it to the source of lead. And we know from our analysis at the F.B.I. over -- we've been doing this over 30 years, that there's millions of these compositions out there.

[Emphasis added.]

Peters testified that the manufacturer of the bullets possessed by the defendant would receive from the smelter large batches of lead, referred to as billets, ranging in weight

between seventy and eighty pounds. On cross-examination, when asked how big a "batch" of lead might be, he repeatedly said he did not know about that part of the manufacturing process. He testified as follows:

Q. Now, with regard to manufacturers of lead, if a lead manufacturer makes a batch of lead it will sell lead from this batch over a period of time, isn't that correct?

A. State it again. I'm sure you said it right. I just need to follow you.

Q. If a lead manufacturer makes a batch of lead it can sell lead from the same batch over a period of time? That's what we're talking -

A. I really don't know. I really don't know. I'm not -- I've never seen that end of the manufacturing process.

Q. So you don't know if a manufacturer of ammunition could order lead in April and order it again in May and receive lead from the same batch as long as that batch wasn't sold out?

A. I don't know.

Q. You don't know that?

A. No. A person from Federal may be able to tell you that.

Q. And a lead manufacturer can sell the same lead to different ammunition companies, isn't that correct?

A. There again I don't have firsthand knowledge. I don't see why not. They say they don't.

Q. They say they don't, but you don't know if that's true or not?

A. Yes. I have no way of knowing it.

[Emphasis added.]

According to Peters, comparison of the bullet fragments recovered from decedent's body with a sampling of bullets from those found in defendant's possession revealed that they were "all analytically, indistinguishable [which means] they match the composition. . . . Also, they came from the same source of lead of the manufacturer, so they were manufactured on or about the same date at Federal." In fact, he was able to say that the bullets (the fragments and the samples from defendant) were manufactured on April 1, 1988, based on a code stamped on defendant's box of bullets. On redirect, Peters testified that the fragments either came from the same box of bullets as those found in defendant's possession or other boxes that were manufactured on "the same day" from the "same source" of lead.

In his June 21, 2002 verified PCR petition, defendant set out the following:

Erik Randich, a metallurgist at the Lawrence Livermore National Laboratories, a nuclear weapons laboratory, in Livermore, California, with a PhD [sic] in metallurgy and material science from Lehigh University is an expert in forensic metallurgy and bullet lead analysis. Beginning in late 1999 and early 2000 Dr. Randich began studying the bullet manufacturing process in

the course of researching the "possible misinterpretation and/or misuse of the metallurgical data obtained in the bullet lead analysis procedure," in response to concerns raised to him by William A. Tobin, a retired Chief Metallurgist with the FBI. At the request of the petitioner's sister Jacqueline Behn, Dr. Randich reviewed the testimony of Charles Peters in this case, and based upon his research concluded that Peters and the FBI's assumption that each lot of lead, supplied to the manufacturer of the bullets the petitioner possessed, Federal Cartridge Company, is homogenous or in the words of Mr. Peters "unique," is false. Furthermore, Dr. Randich concluded that Peters' conclusion that the bullets possessed by the petitioner and the lead fragments recovered from the decedent were all manufactured on the same day and came from the same source of lead was also false.

Dr. Randich can show that based upon data he has collected that multiple indistinguishable shipments of lead alloy are sent to Federal Cartridge Company, that each shipment of lead received by Federal is not a homogenous source but that Federal receives multiple lots of lead that are compositionally indistinguishable from one another. As a result bullets that are compositionally indistinguishable does not mean they came from the same source of lead and/or were packaged on the same day. Furthermore, Dr. Randich has found examples of bullets having the same composition despite being produced more than ten years apart. In sum, Dr. Randich's research demonstrates the invalidity of Mr. Peters' testimony that each batch of lead received by the manufacturer is unique, and that bullets which are compositionally indistinguishable, come from the same lead source and were packaged on the same day.

In addition to presenting Dr. Randich's conclusions, the petitioner is prepared to present the testimony of Alicia L.

Carriquiry, a statistician in the Department of Statistics at Iowa state University, who conducted a study, commissioned by the FBI, to determine whether it was possible to assess statistical probability that two bullets came from the same source. Ms. Carriquiry will testify in accord with her study, that the FBI did not have sufficient data to determine the likelihood that two bullets having the same composition came from the same source of lead.

More specifically, the Carriquiry study concluded, the following:

The results of our analysis suggest some difficulty in reliably measuring the quality of bullet lead evidence. The likelihood ratio approach is developed, but only for a special case that is likely to be rare. There are some computational difficulties in extending the likelihood ratio approach to more realistic scenarios. The empirical test that is developed appears to have good properties. There is, however, still no reliable measure of the probability of a coincidental match for the test. Our results serve primarily to highlight the importance of the manufacturing process in assessing bullet evidence. The data made available to us have [sic] collected after the manufacturing process is complete, from bullets purchased at stores or found during the course of investigations. Our results clearly demonstrate that there would be a benefit to data collected from the manufacturer prior to the packaging of bullets into boxes.

In sum, the testimony of Dr. Randich and Ms. Alicia Carriquiry will demonstrate the falsity of Peters' conclusions connecting the bullets the petitioner owned to the bullets which killed the decedent. Certainly, Dr. Randich's and Ms. Carriquiry's testimony would have been "material" in the prosecution and probably would have affected the verdict.

[Emphasis added.]

The allegations concerning the work of Dr. Randich were supported by a letter from him to PCR counsel dated May 3, 2001, as follows:

The following is a short history of my research examining the FBI's interpretation of the data generated in their bullet lead analysis method. I was contacted in 1999 by Mr. William A. Tobin, a retired chief metallurgist at the FBI because of concerns that he had regarding the possible misinterpretation and/or misuse of the metallurgical data obtained in the bullet lead analysis procedure. I agreed with his concerns so I began the study. I made first contact with several secondary lead smelters (refiners) in the fall of 1999. I acquired data and information on bullet lead alloy compositions and their variability from about December, 1999 through March, 2001. My review of this data confirmed my suspicions that the method could not be used to make a positive association between a crime scene and a suspect as the FBI was doing. At most the method is inconclusive but if the data warranted it, the method could be used to say that the bullets at the crime scene and those in the possession of the suspect could (emphasis in original) have come from the same molten "source" of lead but never that they did (emphasis in

original) come from the same "source." We began writing our technical article on the subject in August, 2000. Our co-authors are the chief metallurgists from two major secondary lead smelters supplying the ammunition industry. Our first draft is written and the second draft is imminent. We plan to submit our findings to the Journal of Forensic Science.

I contacted Dr. Vincent Guinn in 2000 about my findings and he verified that no one to his knowledge had ever checked with the lead smelters to see if the "sources" were unique and homogeneous as the method requires to make a positive association between crime scene bullets and a suspect's bullets. The nuclear chemists who developed the method and the analytical chemistry technicians at the FBI who use the method just assumed that there could never be non-unique melts of lead alloy when characterized by the FBI method and that each "source" was homogeneous. My metallurgical data clearly show, as is well known in the metallurgy community, that these are not valid assumptions.

None of this information was available to the general forensic community until last year. Since the forensic community consists mostly of chemists, the metallurgy community was unaware that such conclusions were being used to positively associate a suspect with a crime. I trust that the FBI will be ethical enough to reexamine their interpretations and current use of this method when testifying in a court of law.

[Emphasis added.]

In denying defendant's petition without a hearing, the PCR judge stated:

The issue presented by this application at its core is whether the fact that since the time this matter was tried to conclusion in 1997 a body of information, argument, evidence has developed which would serve to contradict or question the information presented by the State's expert witness Peters on the issue of comparative bullet lead analysis warrants an evidentiary hearing. This information is and this claim is not based on any claim that the development of any new equipment or equipment technology which did heretofore not exist has come to light since the conviction in this matter, but it is based primarily upon the argument that a body of thought, belief or analysis refuting the opinion of the State's expert Peters on comparative bullet lead analysis has evolved which would serve to disprove the certainty of Peters' conclusions at trial.

With respect to the issue of bullet fragments coming from the victim's body and bullets found at the defendant's residence and the issue of their analytical indistinguishability and the opinion that the items were from the same batch or source of molten lead, the disciplines I find with respect to the arguments concerning comparative bullet lead analysis were in existence at the time and what it appears is really being argued at the heart of this application is more accurately classified as newly assembled argument as opposed to newly discovered evidence, [a] newly assembled argument that would have served to impeach or contradict the expert's testimony at the time of the trial. The fact that the efforts made at the time of the trial to obtain an expert to refute the State's report is not dispositive of the demonstration that at the time as set forth in the case law, State [v.] Ware, State [v.] Grube, the Iowa and Idaho cases, demonstrate that individuals with requisite knowledge

were in existence and that the area and discussion surrounding bullet lead analysis was not a new discipline. Even were the Court to conclude that the information should be properly determined to be newly discovered evidence it would also have to be satisfied with respect to the third prong set forth in State v. Carter that a retrial would probably result in a different outcome, in this case obviously an acquittal. I do not so conclude. Notwithstanding the fact that the nature of the State's case was a case based upon circumstantial evidence, the proofs, did demonstrate this weapon capable of discharging the bullets found in the victim's head had been owned by the defendant, that the handcuffs capable of leaving the marks on the victim were of a type owned by the defendant, that valuable coins worth \$40,000 that were the victim's were found in the defendant's apartment without a receipt or identifiable source of purchase, that there were inconsistent statements made by the defendant and weaknesses presented as to his alibi.

The argument made here today attacks only a part of a link in the chain of circumstantial evidence presented in the State's case and its strength or weakness as dispositive of the end result in light of the totality of the evidence presented. Based upon that I cannot conclude [that the new evidence] was of the sort that would probably change the jury's verdict if a new trial were granted. The proffered evidence does not disprove the issue that the bullet fragments could have come from the box of bullets and it's clear that that's not the claim of this new evidence application. I stated only in contrast to an understanding that the claim as presented is directed to a quantitative weight accorded to the evidence that the jury heard, and, therefore, the proffered evidence I find to be impeachment

or contradictory evidence not coming within the confines of newly discovered evidence and further that based upon the totality of the proofs presented would not have affected the outcome of the trial. Therefore, based upon these findings the request with respect to this PCR application is denied.

On September 5, 2003, the same date the petition was denied, William A. Tobin signed an affidavit, which was presented to the PCR court on a motion for reconsideration. Tobin's affidavit stated in full:

1. I am providing this affidavit pro bono, and I submit it in support of defendant Michael Behn's motion for reconsideration of the denial of his petition for post-conviction relief.
2. I am the retired de facto Chief Forensic Metallurgist of the FBI Laboratory and presently a metallurgical consultant for civil, criminal and non-litigious matters. My curriculum vitae is attached as Exhibit A.
3. It is my understanding and belief that the FBI Laboratory is the only forensic laboratory in the United States offering the forensic service of comparative bullet lead analysis, hereinafter CBLA.
4. While employed by the FBI, I was contacted by Jacqueline Behn and requested to provide expert witness assistance for her brother, defendant MICHAEL S. BEHN, during his trial. I was constrained from providing such assistance as requested because of my position at the time and of the fact that the FBI Laboratory is precluded from offering assistance to other than duly authorized law enforcement entities.
5. I retired in March 1998 and commenced collaborative research efforts regarding the practice of CBLA because of unreconciled scientific contradictions of CBLA practice from a cross-discipline perspective.

6. During the research of my colleagues and I (known in legal and scientific circles as the Randich, et al., study), of the practice of CBLA, we found no meaningful or comprehensive studies validating inferences rendered by bullet lead examiners in criminal trials relating to "same melt", "same box", "same source", or other conclusions as to common origins regarding allegedly analytically indistinguishable bullet lead.

7. During my studies of CBLA and for subsequent publication, I defined three phases of the practice for clarity and ease of lay understanding: Phase I, the analytical phase (bullet lead compositional analysis and related data-generation); Phase II, data "grouping," where compositional data generated from Phase I are sorted into "analytically indistinguishable" or "analytically distinguishable" groups; and Phase III, the inference (conclusions) phase.

8. Our studies revealed the compositional data association phase (Phase II) and the inference phase (Phase III) of the practice, and all three of the assumptions required to support conclusions rendered at trials, to be flawed and scientifically invalid.

9. In 1997, independent practitioners of CBLA outside the FBI Laboratory who were in a position to properly evaluate the practice were nonexistent.

10. It is my understanding that in denying the defendant's petition for post conviction relief, the court indicated that experts existed at the time of the defendant's trial capable of disputing the State's CBLA evidence offered through Charles Peters of the FBI, citing State v. Grube, 883 P.2d 1069 (Idaho 1994), cert. denied, 514 U.S. 1098, 115 S. Ct. 1828, 131 L. Ed. 2d 749 (1995) and State v. Ware, 338 N.W.2d 707 (Iowa 1983). In Grube, supra, the proposed expert was Walter Reuter, and in Ware, supra, the proposed expert was Terry Baxter.

As part of my research in the field of CBLA, I have read over one hundred trial testimonies relating to CBLA dating back to 1989, read every article dealing with the issue of CBLA, and attempted to familiarize myself with any and all individuals represented as experts in the field of CBLA. I am not aware that Walter Reuter or Terry Baxter has ever been qualified as an expert in CBLA in any court of law.

11. Even with the relatively rare appropriate academic and experiential backgrounds of my colleagues and I, acquiring appropriate knowledge of bullet lead smelting and detecting the flaws in the forensic practice of CBLA, to include grouping of the compositional data into "analytically indistinguishable" groups and assessing the validity of consequent inferences, required approximately three years.

12. My colleagues and collaborators are aware of no other civilian scientist who studied the complex practice of CBLA prior to 1998.

13. Written protocol defining the compositional "match" criterion for the FBI Laboratory practice was not available until June 1998. Civilian experts, therefore, were not in a position to assess what was represented to constitute "analytically indistinguishable" until June 1998.

14. The FBI Laboratory "database", purportedly used by FBI expert witnesses to imply forensic significance of bullet lead "matches", was not available for review by civilian experts until approximately 2000, when it was determined by several of the Randich, et al., researchers in subsequent studies to be flawed and not valid for meaningful inference.

15. The results of the Randich, et al., studies were not published until September 2002. ["A Metallurgical Review of the Interpretation of Bullet Lead Compositional Analysis", E. Randich, W. Duerfeldt, W.

McClendon, W. Tobin, Forensic Science International, Vol. 127, Issue 3 (Sept.2, 2002), Elsevier Science Publishing].

16. Of the published articles on comparative bullet lead analysis existing prior to publication of the Randich, et al., study, all were focused on the analytical technique used to generate data regarding composition, Phase I of the three-phase practice.

17. Phase I of the forensic practice of CBLA, data generation, was not challenged by the Randich, et al., or subsequent studies.

18. Of numerous barriers to feasible scientific involvement and peer review by civilian (non-law enforcement) scientists is the fact that the technique of compositional analysis for CBLA, until approximately 1993, was by neutron activation analysis (NAA), which required access to a nuclear reactor.

19. Access to a nuclear reactor was not feasible for most civilian scientists.

20. In 1993, the technique of FBI choice was changed to inductively coupled plasma, atomic emission spectroscopy (ICP).

21. It was not known until late 2002 that there existed no valid and relevant database of bullet compositions, nor any meaningful or comprehensive studies, to permit interpretation of the forensic significance of an alleged "match" of bullet compositions.

22. Studies I have conducted of retail distribution and regional bullet composition concentration [currently underway and yet unpublished] reveal a 100% chance of purchase of similar compositions by innocent purchasers in the same local area, and an unquantified but realistic chance of similar purchases in more distant areas. In one study, all innocent purchasers in a local area during the same period of time had no choice but to purchase similar composition bullets.

23. It is the opinion of my colleagues and I, based on our studies from 1998, that the

only scientifically supportable inference that can be rendered regarding an alleged "match" of bullet compositions is that it is more likely than not that someone within the local area [where unspent bullets submitted for comparison were purchased] committed a shooting in question.

24. That opinion is published in "How Probative Is Comparative Bullet Lead Analysis?", W. A. Tobin, W. Duerfeldt, Criminal Justice, Vol. 17, No. 3 (Fall 2002), pp. 26-34, American Bar Association, Defendant's Supplementary Appendix S-5a to S-22a.

25. My work, and the work of my colleagues, is all original research. It does not represent a reassembling of known information and knowledge.

[Emphasis added.]

The affidavit was accompanied by an impressive and extensive listing of Tobin's qualifications, including his co-authorship with Randich, McClendon and Duerfeldt of "A Metallurgical Review of the Interpretation of Bullet Lead Compositional Analysis" published in September 2002, and co-authorship with Duerfeldt of an article, also published in the fall of 2002, entitled, "How Probative is Comparative Bullet Lead Analysis?" Nevertheless, upon reconsideration, the PCR court was not moved by Tobin's affidavit, finding that it did not "shed any different perspective on the issues which were presented" and constituted merely "an effort to obtain a second bite at the apple. . . ."

Both parties agree that the legal test governing motions for a new trial on the ground of newly discovered evidence is

that set forth in State v. Carter, 85 N.J. 300, 314 (1981) (Carter III), which requires a defendant to show that the newly discovered evidence: (1) was discovered after the trial and was not discoverable by reasonable diligence at the time of trial; (2) is material to the issue and not merely cumulative, impeaching or contradictory; and (3) would probably change the jury's verdict (if a new trial were granted). See also State v. Carter, 91 N.J. 86, 121 (1982) (Carter IV); State v. Bey, 161 N.J. 233, 287 (1999), cert. denied, 530 U.S. 1245, 120 S. Ct. 2693, 147 L. Ed. 2d 964 (2000). Significantly, there is no time limit for making such motions. R. 3:20-2.

Addressing the first requirement, defendant submitted an affidavit from his sister, Jacqueline Behn, concerning the efforts made to find an expert to oppose Peters. The affidavit stated:

1. I am the sister of the defendant Michael Behn, and during his trial I assisted the attorneys whenever they asked me to do something on the case.
2. I am a sociology/criminology Professor at Bergen Community College and a capable researcher.
3. Several days before the trial was scheduled to begin the defense received from the prosecution Charles Peters' report on bullet lead composition analysis of the lead bullets recovered from the decedent and lead from the bullets my brother possessed.

4. Jack Venturi, Esq., my brother's attorney, in response to Peters' report, asked me to research the issue to see if we could locate an expert to refute the Peters anticipated testimony.

5. As part of my research I attempted to locate any and all published articles on the subject of -- bullet lead composition analysis. With much difficulty, because many of the articles were published in publications not disseminated to the public, e.g., FBI publications, and/or otherwise obscure publications, I located all available articles on the subject of bullet lead composition analysis.

6. Many if not most of the articles were written by members of the FBI, and as a result, in my naivete [sic], I called the FBI looking for an expert and spoke to William A. Tobin who told me because of his position as the FBI's Chief Metallurgist he could not help me.

7. Despite my exhaustive research I was not able to locate any expert with the present capacity to testify on the issue of bullet lead composition analysis.

8. I would estimate I conservatively spent from 150 to 200 hours researching the issue prior to and during my brother's trial.

The PCR judge's conclusion on this issue was simply that there appeared to be other experts available to counter Peters, as reflected in State v. Grube, supra, and State v. Ware, supra. While it is true that each case provided the name of an expert who was proposed by the defense to counter testimony of FBI experts on bullet lead composition, that fact does not provide a

ready answer to the question before the PCR court, whether due diligence was exercised in the efforts to obtain an expert in this case under the time constraints imposed by the impending trial, the late submission of Peters' report, and the denial of defendant's request for an adjournment. Thus, we do not know if defendant, acting through his sister, was aware of the Grube or Ware cases and, if so, made any effort to contact the named individuals and if not, why not. We cannot ignore that the test requires the exercise of "reasonable diligence," not totally exhaustive or superhuman effort. If believed, Behn's affidavit would appear to satisfy the standard.

However, there is a more fundamental reason why the PCR judge's reasonable diligence determination cannot stand. There is no doubt that the information at issue, the results of the studies by Randich, Tobin and others, was newly discovered since it was not developed until after defendant's trial. Clearly, such new scientific evidence may constitute newly discovered evidence. State v. Halsey, 329 N.J. Super. 553, 559 (App. Div.), certif. denied, 165 N.J. 491 (2000). ("R. 3:20-2 presents a viable means by which a defendant can seek a new trial if he can now show that recently improved scientific methodology, not available at the time of trial, would probably have changed the result.") For example, it is well-known by now

that the use of DNA testing has upset many convictions which took place before that technique was developed. See State v. Thomas, 245 N.J. Super. 428, 433-35 (App. Div. 1991), appeal dismissed, 130 N.J. 588 (1992).

As a result, no amount of reasonable diligence could have uncovered this information, since it did not exist previously. Whatever any other experts, including those mentioned in the Grube or Ware cases, might have been able to say on the subject,² none could have refuted Peters' testimony in the way that Randich and his colleagues could, since the basis for the impeachment did not exist in April 1995 when defendant's trial was conducted. Science moves inexorably forward and hypotheses or methodologies once considered sacrosanct are modified or discarded. The judicial system, with its search for the closest approximation to the "truth," must accommodate this ever-changing scientific landscape.

Under these circumstances, dealing with new scientific techniques or analyses developed since the trial, we conclude that defendant has satisfied that first prong of the Carter analysis. Indeed, under such circumstances, the first prong is

² In his affidavit, quoted above, Tobin states that in all his research he never came across the name of either Baxter (Ware case) or Reuter (Grube case) as an expert qualified to testify concerning comparative bullet lead analysis.

rendered inapplicable. As a result, we see no need for an evidentiary hearing to further explore the issue of reasonable diligence.

In its brief, in addition to Grube and Ware, the State refers to the many cases cited by this court and the Supreme Court in State v. Noel, 303 N.J. Super. 435, 444 (App. Div. 1997), rev'd, 157 N.J. 141, 148-49 (1999), in which testimony similar to that of Peters was admitted in trials throughout the country. However, Noel, which itself sanctioned the admissibility of Peters' testimony in New Jersey, does not assist the State in this case. The issue that divided the Appellate Division and the Supreme Court in Noel was not that which we now confront. Both opinions took as a given that aspect of Peters' testimony concerning the "uniqueness" of the batches of lead from which the billets are poured and from which the bullets are eventually formed. See Noel, supra, 157 N.J. at 144-45, 149, 153; Noel supra, 303 N.J. Super. at 442, 444-45, 453. As Judge Humphreys put it, summarizing Peters' testimony in this regard, "Bullets from the same billet would have the same composition, i.e., the same amount of trace metals." Noel, supra, 303 N.J. Super. at 453 (Humphreys, J.A.D., dissenting). Similarly, as stated by Justice Pollock for the majority in the Supreme Court, "the chemical composition of a bullet from one

batch may match that of another bullet from the same batch, but not the composition of a bullet from another batch." Noel, supra, 157 N.J. at 144-45. It is this underlying assumption that has now been called into question, if not totally undermined, by the new research studies discussed above.³

We now turn to an assessment of the impact of the Peters' testimony on the outcome of defendant's trial. The second prong of the Carter test is whether the evidence is "material to the issue and not merely cumulative, impeaching or contradictory." Carter, supra, 85 N.J. at 314. At the outset, there is little doubt as to the materiality of the new evidence. "Material facts are those that have some bearing on the claims being advanced." State v. Henries, 306 N.J. Super. 512, 531 (App. Div. 1997) (quoting Korostynski v. Div. of Gaming Enforcement, 266 N.J. Super. 549, 555 (App. Div. 1993)). The bullet comparison evidence was a "focal issue of the trial and must be considered material." Ibid. The new evidence, if available in

³ We note that there have been additional developments in this field since the PCR denial. At the request of the FBI, the National Research Council of the National Academy of Sciences formed a committee to investigate the scientific underpinnings of CBLA. After meetings during 2003, the committee released a comprehensive report. National Research Council of the National Academy of Sciences, Forensic Analysis - Weighing Bullet Lead Evidence, (2004). Because that report was never placed before the PCR court, and is not referenced much less discussed in the briefs before us, it would not be appropriate to address its conclusions, and we decline to do so.

1997, would certainly have been admissible at defendant's trial. "There is no reason to consider such evidence as any less relevant and material in the context of a newly discovered evidence motion simply because it may be cast in terms of impeachment evidence." Ibid.

However, is this evidence "merely" cumulative or impeaching? It is clearly not cumulative since no comparable evidence was offered at trial. It certainly is impeaching, but is it "merely" impeaching? In Henries, supra, 306 N.J. Super. at 531-35, we examined for the first time in any depth the meaning of the phrase "merely impeaching" as used in the context of newly discovered evidence applications. Evidence that is "merely impeaching," or cumulative, is evidence of a "quality [that] would not ordinarily make a difference in the jury's verdict." Id. at 531 (citing State v. Carter, supra, 91 N.J. at 114). We viewed the proper test of what is "merely impeaching" as analogous to the test concerning materiality of non-disclosed exculpatory evidence established in Brady v. Maryland, 373 U.S. 83, 83 S. Ct. 1194, 10 L. Ed. 2d 215 (1963). Henries, supra, 306 N.J. Super. at 533. Under the Brady standard, "withheld evidence that is material may be that which impeaches a witness where the issue of the witness' reliability and credibility is crucial." Id. at 534. As a result, we concluded that the

critical issue is "whether the additional [newly discovered] evidence probably would have affected the outcome, regardless of whether it is characterized as impeachment evidence." Id. at 535. This approach to understanding the meaning of what does or does not constitute "merely impeaching" evidence was expressly adopted in State v. Ways, 180 N.J. 171, 188-92 (2004). As the court recognized, this analysis of newly discovered evidence essentially merges the first and third prongs of the Carter test.

Determining whether evidence is "merely cumulative, or impeaching, or contradictory," and, therefore, insufficient to justify the grant of a new trial requires an evaluation of the probable impact such evidence would have on a jury verdict. Therefore, the focus properly turns to prong three of the Carter test, whether the evidence is "of the sort that would probably change the jury's verdict if a new trial were granted." Carter, supra, 85 N.J. at 314; see also Henries, supra, 306 N.J. Super. at 535. The characterization of evidence as "merely cumulative, or impeaching, or contradictory" is a judgment that such evidence is not of great significance and would probably not alter the outcome of a verdict. However, evidence that would have the probable effect of raising a reasonable doubt as to the defendant's guilt would not be considered merely cumulative, impeaching, or contradictory. See Henries, supra, 306 N.J. Super. at 535.

[Ways, supra, 180 N.J. at 188-89.]

"The power of the newly discovered evidence to alter the verdict is the critical issue, not the label to be placed on that evidence." Id. at 191-92.

It is against this backdrop that we evaluate the role of CBLA in defendant's trial. In doing so, we conclude that the PCR judge, not having presided over the trial, was in no better position to make this analysis than we. In our view, the third prong of Carter presents a mixed question of law and fact, requiring that we give deference to "supported factual findings of the trial court, but review de novo the lower court's application of any legal rules to such factual findings." State v. Harris, 181 N.J. 391, 416 (2004) (citing State v. Marshall, 148 N.J. 89, 185 (1997)). In this instance, we conclude that the PCR judge's conclusion on the third Carter prong did not involve any underlying factual findings but only a legal conclusion, whether the newly discovered evidence probably would have affected the jury's verdict. As such, we exercise de novo review. See Harris, supra, 181 N.J. at 419-21.

We conclude that the newly discovered evidence, which would have effectively neutralized the testimony of Agent Peters, is of such caliber, in the context of this trial, that it possessed, to "a probability -- not a certainty," Ways, supra, 180 N.J. at 197, the capacity to change the jury's verdict.

While the State's case, although circumstantial, was strong, it was "far from overwhelming," id. at 195, when all the proofs were taken into account, including the defense witnesses, both lay and expert. It is not without significance that the Assistant Prosecutor went over Peters' testimony as one of the final items in his summation, arguing that the bullets found in defendant's possession came from the "same compositional group" as the bullets that killed Rose, and suggesting that there was a 99.9987% likelihood that the bullets "came from the same lot." Indeed, in its appellate brief, the State candidly concedes that "if the State could establish in some fashion that the bullet fragments in Rose's head and the 450 bullets in defendant's apartment were chemically identical, then the odds that defendant shot Rose would increase dramatically." Having offered these proofs and argued their significance, the State should not be permitted to now "walk away" from its evidence and demean its importance.

Thus, we are satisfied that defendant met the Carter test for newly discovered evidence. As Judge Baime said in a related context (concerning DNA evidence),

We recognize the importance of finality. However, the objective of the criminal justice system is the fair conviction of the guilty and the protection of the innocent. The system fails if an innocent person is convicted. We offer no view on that

subject. We merely note that post-conviction relief remedies were designed to provide one last avenue of review to assure that no mistake was made. Our decision does no more than seek to implement that mandate.

[State v. Velez, 329 N.J. Super. 128, 137 (App. Div. 2000).]

In addition, we note that the integrity of the criminal justice system is ill-served by allowing a conviction based on evidence of this quality, whether described as false, unproven or unreliable, to stand. Cf. State v. Gookins, 135 N.J. 42, 48-51 (1994). Given the nature of our analysis, set out above, we see no need for an evidentiary hearing.

Reversed and remanded for a new trial.⁴

⁴ We do not suggest that Peters, or another qualified expert, would not be permitted to testify at a new trial or that CBLA testimony in some form could not be admissible. The trial judge is best suited to make decisions about the proper scope of CBLA evidence if it is proffered again. The judge can conduct a hearing in limine, N.J.R.E. 104(a), if a dispute arises with respect to such matters.