

COURT OF APPEALS OF VIRGINIA

Present: Chief Judge Moon, Judges Coleman and Willis
Argued at Salem, Virginia

DAVID ALAN KEEN

v. Record No. 0226-96-3

OPINION BY
CHIEF JUDGE NORMAN K. MOON

COMMONWEALTH OF VIRGINIA

FROM THE CIRCUIT COURT OF TAZEWELL COUNTY
Donald R. Mullins, Judge

Jerry C. Lyell (H. Shannon Cooke, on brief),
for appellant.

John C. McLees, Jr., Assistant Attorney
General (James S. Gilmore, III, Attorney
General, on brief), for appellee.

David Alan Keen appeals his convictions of rape, sodomy, and statutory burglary. Keen asserts that the trial court erred in: (1) denying his motion for production of proficiency test data and results from the Virginia DNA laboratory ("state laboratory"); (2) allowing the Commonwealth's DNA expert to consider the results of DQ-alpha DNA analysis of the rapist's sperm in calculating the frequency with which a person of the rapist's genetic profile would be found in the caucasian population ("random-match" calculation); and (3) denying his request that cautionary DNA instructions be given to the jury.

We hold that: (1) the trial court erred in denying Keen's request that he be provided with proficiency testing data of the state laboratory where the Commonwealth's analysis was conducted and where the Commonwealth's DNA expert was employed, but that

the error was harmless; (2) the random match frequency offered by the Commonwealth's expert properly included the DQ-alpha analysis testified to by the Commonwealth's expert; and (3) that because the proffered jury instructions were statements of scientific knowledge and did not pertain to the law of the case, the trial court did not err in refusing the instructions. Accordingly, we affirm.

At approximately midnight on December 13, 1994, sixty-four year old Nancy Greer, who lived alone in her trailer, awoke and found a naked man kneeling over her. The man hit her repeatedly in the face, raped her, and anally sodomized her, causing injuries to her vagina and rectum. Greer struggled with her assailant and scratched his neck. Because she was not wearing her glasses, Greer was unable to see the man very well, but she could tell that he was tall and that he was freshly shaven. After assaulting Greer, the assailant fled.

A neighbor, awakened by Greer's screams, testified that she looked out her window and saw a man riding a bicycle toward Keen's home, which was located approximately one-half mile from Greer's trailer. Greer ran to a neighbor's home and told them that she had been raped. The neighbor telephoned the police and, based on Greer's description of the assailant, directed the police to Keen's residence.

Keen was questioned at his home and denied knowledge of the incident. The investigating officer noticed scratch marks on

Keen's neck and inquired about them. Keen responded that he did not know how he had received the scratches. One of Keen's neighbors, who had seen him the morning of the incident, testified that she had not seen any scratches on his neck at that time.

A police bloodhound was brought to the scene shortly after the attack, and it followed a scent from the crime scene to Keen's residence. A forensics team also investigated the crime scene and determined that the intruder had broken a window pane in order to enter Greer's trailer. A latent palm print was discovered on one of the broken panes of glass found inside Greer's trailer. A state fingerprint examiner testified that the palm print matched Keen's right palm print.

Greer later identified Keen's photograph when it was shown to her in a photographic line-up at the Sheriff's Department. Keen was arrested and taken to the station where he admitted having broken into Greer's trailer, but stated that he had not seen Greer inside and that he had only intended to steal money and pills.

Keen was charged with rape, sodomy, and statutory burglary. During Keen's jury trial the Commonwealth presented DNA evidence based on an analysis of a vaginal cervical swab taken from Greer. Evidence from RFLP and PCR analysis, two methods for testing DNA, was presented during trial.

Discovery Request

Pursuant to Rule 3A:11, Keen requested "records of proficiency testing of personnel in the laboratories where RFLP and PCR analyses were performed in these cases" and "records of laboratory error rates resulting from external blind forensic DNA analyses or any other studies pertaining to error rates." The state laboratory and the Commonwealth provided Keen a memorandum detailing the three proficiency tests the Commonwealth's DNA expert, Jean Hamilton, a forensic scientist at the state laboratory, had performed. The memorandum provided details on proficiency tests 93Q, 940Q, and 9415, and indicated that Hamilton had passed all three tests.

Keen was not satisfied with the memorandum and produced two reports published by the Collaborative Testing Services, Inc. ("CTS"), detailing results from laboratories nationwide. One report addressed proficiency test 93Q and the other addressed 1992 results of test 92-15. The results of the 93Q test were published using anonymous identification numbers for each person taking the test at each lab so that it was not possible for either Keen or Hamilton to identify which results were hers. However, the state laboratory program manager indicated in the memorandum detailing Hamilton's performance on the three proficiency tests that Hamilton had successfully passed the test.

Although the state laboratory had participated in the 92-15 test, Hamilton had not. The laboratory results were published using anonymous identification numbers for each laboratory. The

results indicated that two of the participating laboratories had produced inaccurate results. Keen requested that he be provided with the Virginia state laboratory identification number so he could determine if the Virginia laboratory had been one of the two laboratories to make erroneous findings. The trial court, finding that Keen was entitled only to test results concerning Hamilton and that such information had been provided, denied Keen's objection that the Commonwealth's failure to provide the requested information rendered Keen's counsel unable to effectively cross-examine Hamilton.

Keen asserts that the trial court's denial of his discovery request was error. Specifically, Keen asserts that he was entitled to the state laboratory's and Hamilton's anonymous identification numbers so he could make use of CTS's nationwide test results in presenting his defense. Rule 3A:11(b)(2) provides that "[u]pon written motion of an accused a court shall permit the accused to inspect designated books, paper, [and] documents . . . upon a showing that the items sought may be material to the preparation of his defense" We read the trial court's ruling denying Keen's request as a finding that Keen failed to meet his burden of proving that the requested information was "material."

Here, the record reflects that evidence, gathered from the crime scene, was examined by an employee at one of the laboratories reported on by CTS. The record also establishes

that although Hamilton individually performed the analysis of the evidence, her training and her work facilities were provided by the state laboratory. The evidence supports Keen's assertion that the state laboratory's proficiency ratings were probative of Hamilton's skills as an expert and of the laboratory's results generally. Thus, for purposes of this opinion we will assume that the trial court abused its discretion in denying Keen's discovery request.

However, assuming that the trial court erred in failing to find the requested proficiency test results to be material, we nevertheless hold that such error was harmless.

"[N]on-constitutional error is harmless "[w]hen it plainly appears from the record and the evidence given at the trial that the parties have had a fair trial on the merits and substantial justice has been reached.'" Shurbaji v. Commonwealth, 18 Va. App. 415, 419, 444 S.E.2d 549, 551 (1994) (citations omitted). A criminal conviction need not be reversed if "it plainly appears from the record and the evidence . . . that' the error did not affect the verdict. An error does not affect a verdict if a reviewing court can conclude without usurping the jury's fact finding function, that, had the error not occurred, the verdict would have been same." Id. at 419-20, 444 S.E.2d at 551-52.

Here, the record contains overwhelming evidence of Keen's guilt. A bicyclist was seen by a neighbor, who was awakened by Greer's screams, riding in the direction of Keen's home, one-half

mile from Greer's trailer. Keen's palm print was found on a broken piece of glass inside Greer's trailer. A blood hound traced Keen's scent from the trailer to his residence. Greer testified to having scratched her assailant and Keen had scratch marks on his neck that were not present earlier in the day. Finally, Keen lied to the police and ultimately admitted breaking into Greer's home with the alleged purpose of only stealing money and pills. Considering the magnitude of the evidence against Keen, even assuming arguendo that no DNA evidence had been introduced at trial, it plainly appears that the verdict would have been the same. Further, even if the information sought had been admitted and could have been used by Keen to establish that the state laboratory had previously made erroneous findings, this information would not have affected the admissibility of the DNA evidence, but rather, would have only affected the weight the fact finder accorded the DNA evidence. Accordingly, we hold that even assuming that trial court's denial of Keen's request was error, such error was harmless.¹

¹ We also note that the record does not support Keen's counsel's complaints that the trial court's refusal to permit discovery of the identification numbers seriously impaired presentation of Keen's defense. Keen complained that he was unable to effectively cross-examine Hamilton because he did not have her identification number for the 93Q test. However, the record establishes that the state laboratory program manager provided Keen, via the Commonwealth, a complete history of Hamilton's proficiency testing, including information indicating that she had passed the 93Q test.

Similarly, Keen's assertion that there was some discrepancy in the 93Q test results, which Hamilton could not explain, appears to reflect a failure by Keen to recognize that eleven laboratories participating in the report performed only DQ-alpha

Random-Match Calculation

During trial, Hamilton testified about her analysis of evidence gathered from the crime scene. Hamilton had been provided with a vaginal cervical sample from Greer that contained both cervical material and seminal fluid. Hamilton separated the material into a "sperm sample," containing the sperm material, and a "non-sperm sample," containing all other material. She was also supplied with blood samples from Greer and Keen. Hamilton testified that she performed two tests on all four samples, using what is known as PCR (polymerase chain reaction) testing.²

analysis. Consequently, while the results of those eleven laboratories differed from the other participants results, who performed additional testing, the results were nevertheless accurate.

² PCR analysis

is employed to amplify small quantities of deoxyribonucleic acid (DNA), the molecule that carries genetic information unique to each individual. The process proceeds in three steps. In the first step, DNA is extracted from samples of blood, sperm, hair, or other body tissue, by the use of solvents, filtration, chemical cleaning, and separation of unwanted fractions in a centrifuge. This first stage is essentially the same as that used for the isolation of DNA in the DNA printing process.

In the second stage, the small quantity of isolated DNA is added to a buffer solution containing chemical primers and an enzyme called "TAQ polymerase." That solution is then placed in a heating device, controlled by a microprocessor, which cycles the solution through several successive temperature plateaus. After 30 or 40 of these cycles, the DNA will have been denatured, the primers will have annealed to the DNA, identifying a "gene of interest," and that gene will have been replicated or amplified by the enzyme billions of times.

The third stage is the typing of the amplified gene. Nine "allele-specific probes" are attached to a

Hamilton explained that she first conducted PCR DQ-alpha testing, involving a process whereby a piece of DNA is extracted from a sample and a particular area of the chromosome, identified as the DQ-alpha locus, is examined. At the DQ-alpha locus, humans display any two of six different types of alleles (gene types or "traits") identified as 1.1, 1.2, 1.3, 2, 3, and 4. One allele at the DQ-alpha locus is inherited from each parent so that every individual will have either two alleles of the same type or two different alleles. The pairings of alleles are known as the "genotype." Based on her analysis of Greer's and Keen's blood samples, Hamilton determined that they both had the same DQ-alpha genotype, that is, both had two type 3 alleles at the DQ-alpha locus.

Hamilton's DQ-alpha analysis of the sperm sample also revealed a DQ-alpha genotype of 3,3. Based on this analysis,

nylon membrane, and the amplified DNA is flooded over it. The probes are designed to recognize each of the variants of the "gene of interest" The probes "light up" in the presence of the variants for which they are specific. [For example, the DQ-alpha] . . . genetic marker system has six "traits," designated, respectively, as 1.1, 1.2, 1.3, 2, 3 and 4. These traits are combined in pairs in each individual, because one trait is received from each parent. There are . . . 21 possible combinations of these traits. These pairings are called "genotypes." The purpose of the typing is to identify the genotype present in the amplified DNA.

Spencer v. Commonwealth, 240 Va. 78, 96, 393 S.E.2d 609, 620 (1990).

Hamilton concluded that Keen could not be eliminated as contributing the sperm sample found in Greer because the DQ-alpha of the sperm and Keen's DNA were the same.

Hamilton then performed a second PCR test known as polymarker analysis, which examines five additional areas of the DNA, respectively identified as LDLR, GYPA, HBGG, D7S8, and GC. As with the DQ-alpha locus, Hamilton explained that the alleles at these five locations can differ from one person to another.³

Hamilton determined the following profiles for the four samples:

	Greer Blood Sample	Keen Blood Sample	Vaginal Swab: Sperm Sample	Vaginal Swab: Non-sperm Sample
LDLR	BB	AB	AB	BB
GYPA	BB	AA	AA	BB
HBGG	AA	BB	BB	AA
D7S8	AA	BB	BB	AA
GC	AC	CC	CC	AC

Based on this analysis, Hamilton concluded that because the profile of the DNA extracted from the sperm sample was the same as Keen's profile, Keen could not be eliminated as the contributor of the sperm.

Hamilton then calculated the frequency, or random-match probability, of an individual in the caucasian population

³ At LDLR, GYPA, and D7S8 there are three different possible combinations any person could have. At HBGG and GC, there are six possible combinations.

displaying Keen's profile as determined by the DQ-alpha and polymarker analysis. By multiplying together the individual frequencies of the five areas analyzed with the polymarker test, and then multiplying this result by the frequency in the caucasian population of people displaying a 3,3 genotype at the DQ-alpha locus, Hamilton determined that such a combination of genetic factors, or "genetic profile," would be found in only one of 15,000 people in the caucasian population.⁴

Keen objected to Hamilton's use of the DQ-alpha analysis in calculating the frequency of Keen's genetic profile in the caucasian population. Keen asserted that because he and Greer had the same genotype (3,3) at the DQ-alpha locus, Hamilton could not say with any scientific certainty whether the 3,3 alleles she detected in the "crime scene materials" were contributed by Greer or by Keen. The trial court overruled the objection and

⁴ Because she had been unable to exclude Keen through either the DQ-alpha or polymarker tests, Hamilton conducted further analysis using the RFLP testing procedure.

Restriction Fragment Length Polymorphism (RFLP) is the most established and widely used DNA test to date. It has been endorsed by the Office of Technology Assessment of the United States Congress as well as the National Research Council. Like PCR testing, RFLP produces genetic band patterns that technicians compare to the sample given by the test subject.

Paul B. Tyler, The Kelly-Frye "general acceptance" standard remains the rule for admissibility of novel scientific evidence: People v. Leahy, 22 PEPP. L. REV. 1274, 1291-92 (1995) (citations omitted). However, Hamilton testified that she was unable to obtain conclusive results from the RFLP analysis.

permitted Hamilton to include the DQ-alpha frequency in her random-match calculation. Keen also asserted that the DQ-alpha analysis should not have been used because the amplifications of the DNA used for the DQ-alpha analysis were performed separately in the laboratory, "giving rise to the potential for sample mix-ups or laboratory error."

Keen's first argument fails to acknowledge that the vaginal cervical sample was separated into two portions, a sperm sample and a non-sperm sample. At oral argument, Keen's counsel argued that Hamilton failed to conduct the proper tests to separate sperm material from the non-sperm material and that based on evidence he had obtained from other cases, he was aware that the state laboratory improperly performed such tests. It is axiomatic that Keen's counsel's alleged knowledge of evidence from other cases is wholly irrelevant to the merits of this case.

Further, assuming arguendo, that all possible tests were not performed to distinguish the sperm material from the non-sperm material, ultimately, Hamilton's analysis clearly established that her separations were accurate. Hamilton testified that after separating the material from the vaginal cervical sample she first conducted the DQ-alpha analysis, which resulted in findings of identical genotypes at the DQ-alpha locus. She then performed the polymarker test, which revealed that the two samples differed in all five locations examined in the polymarker test. Comparison with analysis of DNA taken from Greer's blood

sample allowed Hamilton to determine conclusively that the sperm sample was not contributed by Greer, as the genetic profiles did not match. Consequently, the evidence supported Hamilton's use of the DQ-alpha analysis in her random-match calculation, as the polymarker test allowed her to determine that the 3,3 genotype was present in the material that was not contributed by Greer, e.g., the sperm material.

Keen's second argument regarding separate amplification of the genetic material was not raised at trial and consequently is barred by Rule 5A:18. Assuming, arguendo, that the matter had been properly preserved for appeal, it is nevertheless without merit. The record indicates that, although the samples used for the DQ-alpha and polymarker testing were separately amplified, both were obtained from the same extract of the sperm sample.

Jury Instructions

In light of the substantial testimony regarding DNA evidence, Keen proposed the following six cautionary jury instructions pertaining to DNA evidence:

A given DNA profile may be shared by two or more people.

The random match probability statistic is not the equivalent of a statistic that tells the jury the likelihood of whether the defendant committed the alleged crimes.

The random match probability statistic is the likelihood that the DNA profile of a random person in the population would match the DNA characteristics that were found in the crime scene evidence.

An allele is one of two or more alternative forms of a gene.

An allele frequency is the proportion of a particular allele among the chromosomes carried by individuals in a

population.

Where the known DNA sample from the defendant matches the unknown sample obtained from the crime scene, it does not necessarily mean the defendant is the source of the sample found at the crime scene.

The trial court declined to give any of the six instructions and consequently the first and fourth of the proposed instructions were proffered as refused instructions.

Keen argues that because the jury had no prior experience with DNA evidence and no exposure to the application of forensic DNA, the cautionary jury instructions, containing "generic" information applicable "in any case where DNA evidence [was] offered," should have been given. Keen further argues that "[j]urors cannot perform their legal duty of fully and fairly deliberating the evidence if portions of it, i.e., the DNA evidence, is not understood by them."

The purpose of any jury instruction is to inform the jury of the law guiding their deliberations and verdict. See Cooper v. Commonwealth, 2 Va. App. 497, 345 S.E.2d 775 (1986). The instructions proposed by Keen and rejected by the trial court were statements concerning scientific knowledge, not legal principle. The substance of the proposed instructions was information which was properly imparted to the jury through the testimony of expert witnesses. Thus, Keen's proposed instructions would have impermissibly commented upon the evidence. Levasseur v. Commonwealth, 225 Va. 564, 595, 304

S.E.2d 644, 661 (1983). Accordingly, we hold the trial court did not err in refusing Keen's proposed instructions.

Holding that the trial court's error in denying Keen's discovery request was harmless, that the random-match frequency was properly calculated using the DQ-Alpha analysis, and that the trial court did not err in refusing Keen's proffered instructions, we affirm.

Affirmed.