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IN THE SUPREME COURT OF FLORIDA

WILLIAM THOMAS ZEIGLER, JR.,

Appellant,

CASE NUMBER NO. 84,066

vs.

STATE OF FLORIDA,

Appellee.

Appellant hereby replies to the State's Answer Brief in this appeal from the summary denial of a motion for post-conviction relief, pursuant to Fla. R. Crim. P. 3.850, challenging appellant's sentence of death imposed. Contrary to the jury's recommendation of life imprisonment, in a resentencing proceeding in 1989, and from the denial of a motion for release of evidence and appointment of expert submitted in connection therewith.

The issues addressed in this Reply Brief are confined to those raised in the first point of appellant's Initial Brief, which sets forth the Circuit Court's error in denying the motion for release of evidence and appointment of expert. Appellant submits the remaining issues on the basis of the Initial Brief.

Argument

I.

**THE DECISION TO PERMIT DISCOVERY IS SEPARATE AND
DISTINCT FROM PROCEDURAL ISSUES ASSOCIATED WITH
ANY CLAIMS**

This appeal raises an issue of extraordinary importance: whether the State can deprive a convicted defendant of access to the evidence upon which his conviction was based.

As appellant set forth in the Initial Brief, due process demands that a convicted person gain access to physical evidence for purposes of submitting it to forms of scientific testing not available at trial where a potential for developing exculpatory evidence exists. Although this Court has not previously decided this precise question, a number of courts in other states have. E.g., State v. Hammond, 604 A.2d 793 (Conn. 1992); Sewell v. State, 592 N.E.2d 705 (Ind. App. 1992); State v. Thomas, 586 A.2d 250 (N.J. Super. A.D. 1991); Dobbs v. Vergari, 570 N.Y.S.2d 765 (N.Y. Sup. Ct. Westchester Co. 1990). The State has not disputed the sound reasoning of the cases -- all of which rest on fundamental principles accepted by this Court -- and instead dismisses them as "authority which is not binding on this court". (Ans. Brf. at 14.) Appellant has not suggested otherwise.

The question is not whether this Court is compelled by stare decisis to follow the uncontradicted line of authority from its sister states, but rather whether the reasoning of those cases, derived from the same United States Constitution and similar state constitutions, persuades this Court to decide this case of first impression consistently with those cases. The State certainly has not made any cogent argument that this widely-followed rule should not be followed in Florida.

Consideration of appellant's evidentiary motion has three logical parts: (1) Should appellant have access to the evidence? (2) Who should bear the cost of the testing? (3) What

should be done with the results? The State has only addressed the last question, and only answered it in part.

The State's lengthy argument concerning appellant's timeliness -- the merits of which are addressed infra Point III -- and its portrayal of the evidence as "open and shut" are simply irrelevant to the question of whether appellant is entitled to access to the evidence. Appellant has, we submit, an absolute right (subject to reasonable limits) to inspect and test the evidence previously presented against him. The State's attempt to lock the exhibit vault and throw away the key must be rejected: if the evidence supports the State's position, that will be apparent from the results, and this Court will have satisfied its obligation to avoid the execution of an innocent person -- with no delay. If, on the other hand, the vault contains exculpatory evidence, it is difficult to imagine a more compelling case of injustice.

Appellant is the only person who testified at trial who was in the furniture store at the time of the homicides. Either he told the truth and he is innocent or he lied and he is not. The only evidence that tests the truthfulness of appellant's testimony is the physical evidence collected at the crime scene; the limitations of that evidence were apparent in 1976 but perversely contributed to appellant's conviction because the defense lacked information necessary to challenge seemingly scientific conclusions.

DNA typing tests offer the opportunity to overcome the limitations of 1976 and find the truth. Why does the State run from this opportunity to learn the truth? Is it the fear that an innocent man has sat on death row for nearly 19 years? Surely it is not a satisfactory alternative to execute Mr. Zeigler.

The State erroneously urges that appellant has not suggested how the testing could affect the outcome of the case. (Ans. Brf. at 17-18.) To the contrary, appellant described how DNA typing tests of the evidence could be exculpatory on pages 11 and 12 of the Initial Brief. The State suggests that identity was not an issue at appellant's trial because appellant admitted to being in the store and his blood is present with that of the homicide victims. This is truly disingenuous, since appellant's presence in the store is not what is at issue; rather, the issue is whether the physical evidence reasonably supports a finding that he committed the crimes.

At trial, extensive blood type evidence and blood splatter evidence (from which inferences were made based on identification of blood types) was introduced -- without the benefit of subtyping to distinguish among the blood stains the blood of persons with common types, or to identify the presence of any other persons who were in the store who shared the relevant blood type. Taking advantage of the ambiguity created by the failure to subtype, the State argued repeatedly in closing that it was this evidence that made appellant's testimony implausible. (See TT at 2552-54, 2564-65.) The more definitive

results now possible through DNA techniques pose the potential of exculpating appellant (or, if the State is correct, providing unimpeachable evidence of guilt).

The Circuit Court and the State appear to accuse appellant of practicing tactics of delay. The record of prior proceedings -- what the State calls "a matter of historical fact" (Ans. Brf. at 14) -- clearly shows that the time from conviction to today is filled by a long initial appeal (1976 to 1981) and the litigation of postconviction claims, including several successful petitions and a resentencing proceeding. Appellant has neither sought nor occasioned delay for the sake of delay.¹ He asks only to have his claims of innocence fully heard and determined on their merits, whether in the courts or before the executive.

Moreover, "delay" in itself cannot be enough to foreclose appellant's pursuit of proof of his innocence. Last month, the Fourth District Court of Appeal, in State v. Trummert, 19 F.L.W. D2566 (Fla. 4th DCA Dec. 9, 1994), refused to preclude DNA evidence because of a delay by the State in obtaining it. The court held that "the interests of the citizens of Florida should not be jeopardized . . . where the only prejudice . . . is

¹ In 1992 appellant was granted an evidentiary hearing on an issue involving a piece of physical evidence. The total elapsed time from the order granting the hearing to the hearing itself was 60 days. There is no reason to suppose that the present request will take more than 60 to 90 days to move from authorization of testing to a hearing. Thus, "delay" should not be an issue and the notion that this request is for the purpose of "delay" does not comport with reality.

a slight additional delay" by excluding such evidence. Those interests in unearthing the truth apply no less to DNA evidence proffered by the defendant.

II.

ANY RULING ON PROCEDURAL DEFAULT OF CLAIMS IS PREMATURE AND WITHOUT FACTUAL BASIS

The Circuit Court ruled on procedural default as a matter decided on judicial notice, not a factual record. It refused to permit discovery using DNA typing methods because it viewed the claim as forfeited when it was not included in the Rule 3.850 adjudicated in 1991. It reasoned that the claim became available in 1988 with the decision in Andrews v. State, 533 So. 2d 841 (Fla. 5th DCA 1988). The State defends the Circuit Court's decision on an additional basis, a purported failure to raise the claim within two years after it might first have been raised. (Ans. Brf. at 16-17.)

The timeliness argument is a red herring. The two year limitation of Rule 3.850 is not a floating statute of limitations applied to individual claims as they arise, and it does not apply to appellant. The sole timeliness question for any post-conviction motion brought by appellant is whether the grounds were available before January 1, 1987, since (as the State points out) appellant's conviction was final before January 1, 1985. No one -- not even the State -- has suggested that appellant had DNA typing methods available to him in 1986 or earlier. Andrews --

the first decision on the admissibility of such tests -- suggests otherwise.

The procedural question posed by the Circuit Court is a successive motion issue, for which the standard is stated in Rule 3.850(f). Pursuant to that subsection, a motion alleging new or different grounds may be dismissed if "the judge finds that the failure of the movant or the attorney to assert those grounds in a prior motion constituted an abuse of procedure governed by these rules."

The Circuit Court's ruling cannot be sustained under the successive motion standard because there is no record to support its conclusion. It focused on the Andrews decision apparently on the premise that a claim for post-conviction relief using DNA typing evidence is available to a defendant at the time that such evidence is first ruled admissible by an appellate court of this State. Andrews, however, decided the admissibility of only one, early form of DNA typing tests. That method -- RFLP testing -- is unlikely to be useful to appellant. A more advanced test -- PCR analysis -- is needed for older, degraded or small samples. (See Initial Brf. at 12.) A ruling regarding RFLP tests does not provide guidance on the admissibility of PCR tests. In a vivid illustration, the Indiana Supreme Court earlier this month distinguished its initial ruling on DNA testing, Hopkins v. State, 479 N.E.2d 1297 (Ind. 1991), on precisely this basis:

Hopkins involved the restriction fragment length polymorphism (RFLP) testing

methodology. However, the DNA test at issue here employed the new methodology, polymerase chain reaction (PCR). The words "DNA test results" are not magic words which, once uttered, cause the doors of admissibility to open. Expert scientific testimony is admissible in Indiana only if the court is satisfied that the scientific principles upon which the expert testimony rests are reliable. There was no effort by the trial court here to satisfy itself in this regard as to the new PCR type of DNA testing.

Harrison v. State, No. 65500-9105-DP-380, 1995 Ind. Lexis 7, at *18 (Ind. Jan. 4, 1995) (emphasis added) (citations omitted) (copy attached to this brief as App. A).²

Thus, there is a clear issue of fact requiring an evidentiary hearing to resolve this claim: was the type of DNA evidence which is submitted by appellant available at the time of appellants prior motion? If testing yields evidence only because the PCR method is used, the question of the availability of such evidence is drastically different from RFLP-produced evidence.³

² A number of courts follow this principle, that a decision on the admissibility of RFLP tests results does not control a decision on the admissibility of PCR tests results. See, e.g., Serritt v. State, No. CR-92-1550, 1994 WL 128967, at *3 (Ala. Crim. App. Apr. 15, 1994); State v. Moore, No. 93-369, 1994 WL 663527, at *8-16 (Mont. Nov. 22, 1994); State v. Carter, No. S-93-777, 1994 WL 671344, at *11 (Neb. Dec. 2, 1994); State v. Lyons, 863 P.2d 1303, 1306-10 (Ore. App. 1993), rev. granted, 879 P.2d 1284 (Ore. 1994); State v. Russell, 882 P.2d 747, 761-68 (Wash. 1994); see also People v. Morales, N.Y.L.J., Oct. 26, 1994, at 34, col. 6 (Rockland Co. Ct.) (holding that because "forensic DNA analysis is still in its infancy" the admissibility of each new technique must be separately determined). (copy attached to this brief as App. B). According to Russell, it is the first appellate court to consider the admissibility of PCR evidence under the Frye standard. See 882 P.2d at 768 n.7.

³ If appellant is correct that the PCR method must be used, he will surely prevail on this issue. Testimony recounted in Morales states that the PCR method gained its scientific

The trial court's failure to recognize the difference, and to permit appellant to develop the DNA typing evidence before a ruling concerning its previous availability, was error.

The proper course would have been for the Circuit Court to follow its procedure for hearing the claim arising from the allegations concerning the citrus grove bullet. Discovery should have been authorized, evidence presented to the Court, and any ruling on the procedural issues deferred until the evidence was fully presented and evaluated. (Indeed, if appellant realizes his anticipated goal of building a case of innocence out of the DNA typing evidence, the Circuit Court or the State may elect to waive otherwise applicable procedural bars.) This Court should remand this case to the Circuit Court with directions to permit discovery using DNA typing techniques, to hear any claims arising from the evidence created thereby, and to decide the procedural issues, if any, consistent with the testimony adduced to explain the techniques used to develop the evidence.

III.

ANDREWS IS THE WRONG STANDARD FOR MEASURING THE AVAILABILITY OF DNA TYPING TECHNOLOGY

Appellant's Initial Brief presents a cogent analysis why Andrews rapidly lost its authoritative status on the admissibility of DNA typing evidence. (Initial Brf. at 21-27.) The State's sole response states that Andrews was good law.

validation after the release of the NAS/NRC report on forensic DNA testing in 1992. (App. B, pp. 4-5.)

(Ans. Brf. at 16.) To the contrary, in addition to the arguments in the Initial Brief, appellant suggests that Washington v. State, 19 F.L.W. S647 (Fla. Dec. 8, 1994), and Ramirez v. State, No. 78,386, 1995 WL 2417 (Fla. Jan. 5, 1995), support his argument. In Washington this Court held the standard for admissibility of DNA evidence is found in the Frye test, citing Robinson v. State, 610 So. 2d 1288 (Fla. 1992). See 19 F.L.W. at S648. In Ramirez this Court mentioned Bundy v. State, 471 So. 2d 9 (Fla. 1985), and Stokes v. State, 548 So. 2d 188 (Fla. 1989), as cases expressly adopting the Frye test. Andrews, despite falling between Bundy and Stokes, rejected the Frye test in favor a more lenient standard of admissibility.⁴ The unmistakable adoption of Frye in Stokes, and subsequent cases, reopened the question of the admissibility of DNA typing technique evidence. See, e.g., Note, The Admissibility of Scientific Evidence: DNA Print Identifications, 19 Stetson L. Rev. 245, 266 (1989) (casenote on Andrews arguing that evidence would not have been admissible if Frye was applied).

Accordingly, the value of Andrews must be viewed through the lens of what reasonable counsel would have concluded in 1991 concerning the likelihood of obtaining court endorsement of DNA typing tests.⁵ As fully explained on pages 25-27 of the

⁴ The Andrews court erroneously thought Bundy did not expressly adopt Frye. See 533 So.2d at 845.

⁵ The State's suggestion that appellant should have run out to test evidence in 1988 after Andrews was decided is absurd. The limitations of the RFLP method for use on a then-12-year-old sample were apparent even at that date, so appellant would have

Initial Brief, the controversy surrounding DNA typing technology had created uncertainty in 1991 and even the Department of Justice questioned whether such evidence would survive a strict application of Frye. Appellant has the burden in presenting such evidence of proving general acceptance of both the underlying scientific principle and the testing procedures used in the case at hand. Martinez, 1995 WL 2417, at *3. The turning point in scientific acceptance -- the cornerstone of Frye -- was a report in 1992 issued by the National Academy of Sciences/National Research Council. Further, the PCR method gained its validation after that report was released. In short, the circumstances show that counsel was justified in waiting for the science and the law governing genetic typing evidence to develop past the uncertainties of 1991.

The proposition that Andrews decided these issues is laid to rest by Robinson and Washington. If Andrews were conclusive then this Court in Robinson -- after mentioning the lower court's apparent reliance on Andrews -- would not have given such a tepid endorsement to DNA technology in 1992, restricted to "the facts of this case" and Robinson's failure "to produce anything that questioned the general scientific acceptance of the testing." 610 So. 2d at 1291. In contrast, Washington, decided only last month, treated the admissibility of DNA evidence authoritatively. Like appellant, this Court has moved from cautious consideration of DNA typing evidence to

only succeeded in consuming evidence in a futile gesture.

acceptance and endorsement -- all after the date on which appellant's 1991 post-conviction motion was adjudicated.

IV.

ALTERNATIVELY, APPELLANT'S DISCOVERY REQUEST SHOULD BE RESUBMITTED TO THE CIRCUIT COURT TO BE EVALUATED IN LIGHT OF STATE V. LEWIS

Since appellant submitted his Initial Brief this Court decided State v. Lewis, 19 F.L.W. S545 (Fla. Oct. 27, 1994).

That case states:

In this vein, we find the procedures established in Davis [v. State, 624 So. 2d 282 (Fla. 3d DCA 1993),] persuasive and adopt the following paragraph as our own:

In most cases any grounds for post-conviction relief will appear on the face of the record. On a motion which sets forth good reason, however, the court may allow limited discovery into matters which are relevant and material, and where the discovery is permitted the court may place limitations on the sources and scope. On review of an order denying or limiting discovery it will be the [moving party's] burden to show that the discretion has been abused.

624 So. 2d at 284. The trial judge, in deciding whether to allow this limited form of discovery, shall consider the issues presented, the elapsed time between the conviction and the post-conviction hearing, any burdens placed on the opposing party and witnesses, alternative means of securing the evidence, and any other relevant facts."

Id. at S546. Consistent with Lewis, appellant submits that his 3.850 motion sets forth good reason -- the potential to develop exculpatory evidence and the State's role in foreclosing such

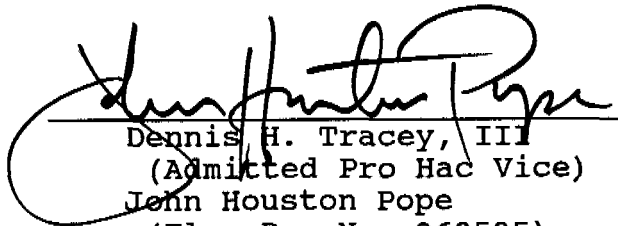
discovery at trial -- to justify the limited discovery in the form of DNA typing tests on physical evidence, clearly relevant and material matters. The Circuit Court should be required to consider the factors outlined in Lewis and exercise discretion (subject to review for its abuse thereof) to decide whether appellant's request is warranted under those factors. Appellant submits that the arguments set forth in this brief and in the Initial Brief demonstrate that his request is so warranted and should be granted.

CONCLUSION

For the reasons stated herein and in appellant's Initial Brief, relief should be granted in the forms stated in the conclusion to the Initial Brief.

Dated: January 15, 1995

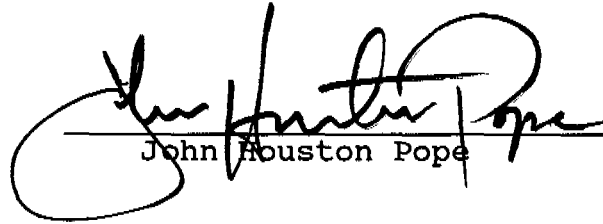
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CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing Appellant's Reply Brief has been furnished by United States Mail to Jeff Ashton, Esq., Assistant State Attorney, 250 North Orange Avenue - 7th Floor, Orlando, FL 32801 and Kenneth S. Nunnelley, Esq., Assistant Attorney General, 444 Seabreeze Blvd., 5th Fl., Daytona Beach, FL 32118, this 16th day of January, 1995.


John Houston Pope

Appendix A

5TH CASE of Level 1 printed in FULL format.

JAMES P. HARRISON, Appellant, (Defendant Below), v. STATE OF INDIANA, Appellee, (Plaintiff Below).

HARRISON v. STATE

Supreme Court No., 65S00-9105-DP-380

SUPREME COURT OF INDIANA

1995 Ind. LEXIS 7

January 4, 1995, Filed

PRIOR HISTORY: [*1] APPEAL FROM THE POSEY CIRCUIT COURT. The Honorable James M. Redwine, Judge. Cause No. 65001-9104-CF-00008.

COUNSEL: For Appellant, Defendant Below: WILLIAM H. BENDER, Allyn, Givens & Bender, Poseyville, IN 47633.

For Appellee, Plaintiff Below: PAMELA CARTER, Attorney General of Indiana, ARTHUR THADDEUS PERRY, Deputy Attorney General, Indianapolis, IN 46204.

JUDGES: SULLIVAN, Justice; DeBRULER, GIVAN, and DICKSON, J.J., concur. SHEPARD, C.J., concurs in result with separate opinion.

OPINIONBY: SULLIVAN

OPINION: DIRECT APPEAL

SULLIVAN, Justice.

We review and affirm the murder convictions of defendant James P. Harrison. We remand for a more specific sentencing order by the trial court.

In 1988, the defendant met Stacy Forsee at church in Mount Vernon, Indiana. On January 17, 1989, about 3:45 a.m., firemen were called to a fire at her home in Mount Vernon. The dead bodies of Stacy Forsee and her two children, daughter Tia Forsee, age 3 1/2, and son Jordan Hanmore, age 21 months, were found in the home. Autopsies showed that Stacy Forsee had been stabbed to death prior to the fire breaking out. Semen was found in her mouth. Tia Forsee died from burns suffered during the fire. Jordan Hanmore died from smoke inhalation. [*2]

Charges were not filed until over two years later, and defendant was then arrested in Baltimore, Maryland. He was charged with Arson, n1 the knowing Murder n2 of Stacy Forsee, the knowing Murder n3 of Tia Forsee, and the Felony Murder n4 of Jordan Hanmore. The State also charged defendant with being an Habitual Offender n5 and sought the death penalty. n6 As the aggravating circumstances justifying the death penalty, the State charged that two of the victims, Tia Forsee and Jordan Hanmore, were less than twelve years of age, n7 that Jordan Hanmore had been intentionally killed during the commission of arson, n8 and that defendant had previously been convicted in 1973 of another murder in Virginia. n9

- - - - -Footnotes- - - - -

n1 Ind. Code @ 35-43-1-1(a)(1) (1988).

n2 Ind. Code @ 35-42-1-1(1) (1988).

n3 Id.

n4 Ind. Code @ 35-42-1-1(2) (1988).

n5 Ind. Code @ 35-50-2-8 (1988).

n6 Ind. Code @ 35-50-2-9 (1988).

n7 Ind. Code @ 35-50-2-9(b)(12) (1988) (currently Ind. Code @ 35-50-2-9(b)(11) (1993)).

n8 Ind. Code @ 35-50-2-9(b)(1) (1988) (currently Ind. Code @ 35-50-2-9(b)(1)(A) (1993)).

n9 Ind. Code @ 35-50-2-9(b)(7) (1988).

- - - - -End Footnotes- - - - -
[*3]

At trial, evidence was presented that: (i) defendant regularly carried a hunting knife (although no knife was introduced into evidence); (ii) defendant was observed near the fire scene on the night of the murders before fire trucks arrived; (iii) defendant had purchased kerosene several days before the murders; (iv) the fire had been started by a flammable liquid; and (v) defendant had told fellow inmates in a Maryland jail that he had committed the crimes. During trial, the court admitted into evidence the results of DNA analysis performed by two separate laboratories using swabs taken from Stacy Forsee's mouth and defendant's blood.

A jury convicted defendant of Arson, the knowing Murder of Tia Forsee, and the Felony Murder of Jordan Hanmore. It acquitted defendant of the knowing Murder of their mother, Stacy Forsee. During the subsequent habitual offender phase of the trial, the jury convicted defendant of being an Habitual Offender. Following the death penalty phase of the trial, the jury recommended that defendant be sentenced to death for each of the murders of Tia Forsee and Jordan Hanmore.

At a subsequent sentencing hearing, the trial court sentenced defendant to death for [*4] each of the murders of Tia Forsee and Jordan Hanmore. Defendant appeals his convictions for Murder and his death sentences. He does not appeal his conviction for Arson.

We shall provide additional facts as necessary.

Issues On Appeal

- 1. Inconsister Verdicts.

Defendant argues that because the jury acquitted him of the murder of Stacy Forsee, reasonable doubt exists as a matter of law that he possessed the required mens rea to be guilty of the murder of her children. The defendant claims, therefore, that there was insufficient evidence to convict him of the murders of Tia Forsee and Jordan Hanmore. Br. of Appellant at 14. It is true that a mens rea of either knowledge or intent is an essential element constituting the crime of Murder in Indiana. Ind. Code § 35-42-1-1(1) (1988); Vance v. State (1993), Ind., 620 N.E.2d 687, 690; Abdul-Wadood v. State (1988), Ind., 521 N.E.2d 1299, 1300, reh'g denied. "The Due Process Clause [of the Fourteenth Amendment] protects the accused against conviction except upon proof beyond a reasonable doubt of every fact necessary to constitute the crime with which he [*5] is charged." In re Winship, 397 U.S. 358, 364, 25 L. Ed. 2d 368, 90 S. Ct. 1068 (1970); Bellmore v. State (1992), Ind., 602 N.E.2d 111, 126, reh'g denied; Smith v. State (1984), Ind., 459 N.E.2d 355, 357. But defendant cites no authority for his specific argument here that the fact of the acquittal of the murder of Stacy Forsee means that the State failed to meet its burden of proof of the required mens rea to convict defendant of the murders of Tia Forsee and Jordan Hanmore.

We reject defendant's contention for several reasons.

First, proof of the intent necessary to convict defendant of the murders of the children was in no way dependant upon the intent necessary to convict him of the murder of their mother. Stacy Forsee died from multiple stab wounds. The children, however, died from the fire defendant was convicted of setting, a conviction the sufficiency of the evidence with respect to which the defendant does not contest. There was substantial physical evidence with the respect to the place where the fire started from which the jury could infer that [*6] defendant knowingly killed Tia Forsee. A pathologist and State Fire Marshall investigators testified that the fire started in Tia Forsee's bedroom. As to Jordan Hanmore, because the charge was felony murder, no intent beyond the intent to commit the underlying felony of arson need be proven. Martinez Chavez v. State (1989), Ind., 534 N.E.2d 731, 738, reh'g denied (1989), Ind., 539 N.E.2d 4. As noted, defendant does not contest the sufficiency of the evidence with respect to the arson charge. Thus, irrespective of whether defendant knowingly or intentionally killed Stacy Forsee, there was sufficient evidence from which a jury could infer the required mens rea to convict defendant of the murders of the children.

Second, defendant's argument assumes that the acquittal of defendant on the charge of murdering Stacy Forsee implies as a matter of law that the State did not prove the required mens rea beyond a reasonable doubt. Such is, of course, not the case. The jury's verdict on this charge could have resulted from the failure of the State to meet its burden of proof on any element of the offense, not just on the [*7] mens rea element. As the State observes, defendant's argument is essentially that the verdicts are inherently and impermissibly inconsistent. While this court does review verdicts to determine whether they are consistent, perfect logical consistency is not demanded and only extremely contradictory and irreconcilable verdicts warrant corrective action by this court. Hoskins v. State (1990), Ind., 563 N.E.2d 571, 577; Townsend v. State (1986), Ind., 498 N.E.2d 1198; see also United States v. Powell, 469 U.S. 57, 67, 83 L. Ed. 2d 461, 105 S. Ct. 471 (1984) (holding that sufficiency of evidence review should be independent of jury's determination that evidence on another count was insufficient). Here we cannot conclude that the verdicts are inconsistent. The verdict in the mother's death can be reconciled with the

verdicts in the children's deaths on the basis that the jury may have found a failure of proof as to stabbing while finding the proof related to the fire sufficient. n10

-Footnotes-

n10 The State concedes that the evidence that defendant killed Stacy Forsee by stabbing her was not as strong as the evidence that he set the fire.

The State presented evidence that Defendant had a hunting knife which disappeared around the time of the crimes, and attempted by DNA analysis to show that it was Defendant's semen in swabs taken from Stacy Forsee's mouth. The jury, however, could have felt that they could not be certain beyond a reasonable doubt that it was Defendant--and not someone else--who stabbed Stacy Forsee to death.

Br. of Appellee at 13.

-End Footnotes-

[*8]

2. Denial of Motion for Change of Venue.

Defendant contends that the trial court abused its discretion in denying his motion for a change of venue from the county, asserting that extensive pre-trial publicity precluded his opportunity to receive a fair and impartial trial. In support of this motion, defendant filed videotapes from the news media, audio cassettes from a local radio station, and certain other exhibits.

To prevail on appeal, defendant must show, in addition to the existence of prejudicial pre-trial publicity, that the jurors were unable to set aside their preconceived notions of guilt and render a verdict based upon the evidence. *Burdine v. State* (1987), Ind., 515 N.E.2d 1085, reh'g denied. A review of the record of the voir dire proceedings shows that every juror who indicated an inability to put aside prior knowledge of the case, gained through the media, from discussions with other persons, or from any other source, was excused. Defendant has not specified any juror as being unable to put aside any prior knowledge of the case and did not seek to challenge any juror for cause on this basis. It also appears from the record [*9] that defendant did not use all of his peremptory challenges during the jury selection process. See *Kappos v. State* (1984), Ind., 465 N.E.2d 1092. No showing has been made, therefore, that the jurors were unable to set aside any preconceived notions of guilt and render a verdict based upon the evidence.

3. Denial of Motion for Change of Judge.

Defendant contends that he was denied a fair and impartial trial because of the denial of his motion for a change of venue from judge. A ruling for a change of judge in a criminal proceeding is within the trial court's discretion. We review such a ruling only for a clear abuse of discretion. *Stidham v. State* (1994), Ind., 637 N.E.2d 140, 142; *Harrington v. State* (1992), Ind., 584 N.E.2d 558, 561 (per curiam). Here, defendant states no facts in his brief before this court, nor can we find any in the record, that indicate that there was an undisputed claim of prejudice or that the trial court expressed an opinion on the merits of the controversy. Moreover, defendant makes no argument and

points to no authority on this issue in his brief before this court. [*10] He says simply that the issue is "raised for purposes of preserving [it] for further appeal." Under these circumstances, we cannot say that the trial court abused its discretion in denying defendant's motion for change of venue from judge.

4. Refusal to Ask Voir Dire Questions.

During voir dire the trial court limited each side to twenty minutes of questioning for each configuration of fourteen jurors, in addition to the court's general voir dire questioning. When defendant submitted a list of tendered questions for voir dire, the court declined to ask those questions.

We first observe that this court has frequently upheld limitations of twenty minutes per side during voir dire examinations. n11 However, since 1987 the trial court's conduct in this regard has been governed by Indiana Trial Rule 47(D):

-----Footnotes-----

n11 E.g., *Gossmeier v. State* (1985), Ind., 482 N.E.2d 239, 241; *Wickliffe v. State* (1981), Ind., 424 N.E.2d 1007, 1008; *Lynn v. State* (1979), 271 Ind. 297, 298-99, 392 N.E.2d 449, 451; *Hart v. State* (1976), 265 Ind. 145, 151, 352 N.E.2d 712, 716; see also *Linder v. State* (1985), Ind., 485 N.E.2d 73, 77 (upholding a 35 minute per side limitation in a death penalty case in the same trial court), post-conviction relief granted on other grounds (1992), Ind.App., 589 N.E.2d 1188.

-----End Footnotes-----

[*11]

Examination of Jurors. The court shall permit the parties or their attorneys to conduct the examination of prospective jurors, and may conduct the examination itself. The court's examination may include questions, if any, submitted in writing by any party or attorney. If the court conducts the examination, it shall permit the parties or their attorneys to supplement the examination by further inquiry. The court may impose an advance time limitation upon such examination by the parties or their attorneys. At the expiration of said limitation, the court shall liberally grant additional reasonable time upon a showing of good cause related to the nature of the case, the quantity of prospective jurors examined and juror vacancies remaining, and the manner and content of the inquiries and responses given by the prospective jurors. The court may prohibit the parties and their attorneys from examination which is repetitive, argumentative, or otherwise improper but shall permit reasonable inquiry of the panel and individual jurors.

As we understand what happened in this case, defendant tendered a list of questions to the trial court for the court to ask because defendant found the twenty [*12] minute limit too restrictive. While Trial Rule 47(D) certainly permits this approach, defendant was also entitled to a liberal grant of additional time for questioning upon making the showings required by the rule. Because the State was seeking the death penalty and because the trial court refused to ask defendant's tendered questions, defendant would have been entitled to more than twenty minutes of voir dire per configuration had he requested more time in accordance with Trial Rule 47(D). However, defendant does not contend that Trial Rule 47(D) was violated and so has shown no error.

5. Denial of Motions Regarding DNA Testing.

Defendant contends that the trial court committed reversible error by denying several motions regarding the admission of DNA testing results.

Investigators submitted oral and vaginal swabbings taken from Stacy Forsee to Cellmark Laboratories for DNA "fingerprinting." The State hoped that genetic coding material (DNA) derived from semen in these swabbings could be used to identify the perpetrator. Cellmark used a testing procedure called restriction fragment length polymorphism (RFLP). However, Cellmark was unable to identify any male DNA from the samples; [*13] the only DNA identified was that of the victim.

Near the date of trial, Cellmark personnel advised the State of a different type of DNA test called polymerase chain reaction (PCR) which Cellmark felt might be able to be performed on the samples. Cellmark itself did not perform PCR tests and referred the State to two laboratories, including Genescreen in Dallas, Texas.

At a pre-trial hearing on October 21, 1991, the State advised the court and the defense of its desire to have the new test performed. It was highly uncertain at this point whether the results could be obtained before trial. The record suggests that at this hearing the State agreed that it would dismiss charges against the defendant if the test excluded him (although the record can be read to the effect that the State only agreed to dismiss if DNA fingerprinting specifically excluded him), that the defense wanted the new test performed and agreed to the admissibility of the results (although the record can be read to the effect that the defense only agreed to have the tests conducted), and that the trial court overruled a defense request for an expert to interpret the results, holding that Genescreen personnel were sufficiently [*14] neutral to provide the defense with any expert assistance it required.

On November 4, 1991, the State reported to the trial court that Genescreen had been successful in extracting male DNA from the sample sent it, and that defendant's "blood matched the sperm that was found on the swab excluding 90.2 percent of the population." Contemporaneously, defendant moved for a continuance, renewed its motion for an expert to permit it to analyze the DNA test results independently, and filed a motion in limine to prohibit reference to the PCR tests "until a Frye hearing [could] be conducted to assess the reliability of this novel scientific evidence." n12 Even though the State specifically said it had no objections to the Frye hearing, the trial court summarily denied all these motions, agreeing with the State that defendant had agreed on October 21 to the admission of this evidence.

- - - - -Footnotes- - - - -

n12 A "Frye" hearing is named after the pre-trial hearing required in Frye v. United States, 54 App. D.C. 46, 293 F. 1013 (D.C. Cir. 1923), to determine whether the scientific methodology supporting proffered expert testimony is "sufficiently established to have gained acceptance in the particular field in which it belongs" and whether expert testimony based on that methodology is therefore admissible. Id. at 1015. The term "Frye hearing" is used by defendant, and we use it in this opinion, to refer to a generic hearing on the reliability of the proffered scientific evidence rather than to the legal standard to be applied in evaluating reliability. See note 15, infra.

- - - - -End Footnotes- - - - -

[*15]

At trial, immediately before the Genescreen and Cellmark personnel testified, defendant renewed his motions for continuance and appointment of expert. A lengthy colloquy followed during which the October 21 and November 4 discussions were reviewed and the defendant requested either to depose the DNA witnesses or conduct a "Frye-like" hearing where the witnesses would be under oath in the courtroom. The trial court refused: "As I understand the current case and the statutory law of Indiana, Frye hearings are not required. The fact is, they are not recommended." The trial court ultimately denied the motions, ruling that the defendant had requested the evidence and that the State had no advantage because it was relying on the same experts as the defendant. The trial court did order that the DNA witnesses be available to the defense for questioning during an approximately three hour lunch break.

At trial, Dr. Lisa Forman from Cellmark testified that its analysis had been unable to link defendant to the swabbings taken from Stacy Forsee. Analyst Judy Floyd from Genescreen testified that although its test had been able to exclude 92.6% of all white males as the source of the specimen, [*16] defendant had not been excluded. However, she acknowledged that of any 13,000 white men, the specimen could have come from any 1,000 of them.

As noted, defendant on October 21 and November 4 moved for appointment of an expert to assist him in analyzing the DNA test results. On November 4, the defendant also moved for a continuance to allow him more time to analyze the test results and filed a motion in limine to exclude the test results, at least until the trial court could conduct a "Frye" hearing on the admissibility of the test results. At trial, defendant renewed his motions for a continuance and appointment of expert and again raised the issue of holding a Frye hearing. While we believe the trial court should have conducted a Frye hearing, we ultimately conclude that any error in this regard does not require reversal.

Starting with *Hopkins v. State* (1991), Ind., 579 N.E.2d 1297, 1302, this court has regularly approved the admission of DNA identification evidence in criminal prosecutions. n13 But these cases do not stand for the proposition that any proffered DNA evidence is automatically admissible. n14 Rather, they reflect this [*17] court's conclusion that in each case, the trial court either properly applied the applicable rules of evidence in admitting the test results or did not commit error that was reversible. By summarily denying all defense motions without conducting any pre-trial inquiry into the admissibility of the DNA tests, the trial court here ran serious risks of violating important evidentiary principles.

- - - - -Footnotes- - - - -

n13 *Jenkins v. State* (1993), Ind., 627 N.E.2d 789, reh'g denied, cert.denied, 130 L. Ed. 2d 21, 115 S. Ct. 64 (1994); *Lockhart v. State* (1993), Ind., 609 N.E.2d 1093, 1098; *Woodcox v. State* (1992), Ind., 591 N.E.2d 1019, 1026-27; *Davidson v. State* (1991), Ind., 580 N.E.2d 238, 243, reh'g denied..

n14 This is so notwithstanding Indiana Code @ 35-37-4-13 (1991 Supp.). Rules of procedure, including rules of evidence, established by this court prevail over any statute. Ind. Code @ 34-5-2-1 (1988); *Hawkins v. Auto Owners (Mutual)*

Ins. Co. (1993), Ind., 608 N.E.2d 1358, 1359, overruled on other grounds, Kimberlin v. DeLong (1994), Ind., 637 N.E.2d 121, reh'g denied.

- - - - -End Footnotes- - - - -

[*18]

First, Hopkins involved the restriction fragment length polymorphism (RFLP) testing methodology. However, the DNA test at issue here employed the new methodology, polymerase chain reaction (PCR). The words "DNA test results" are not magic words which, once uttered, cause the doors of admissibility to open. Expert scientific testimony is admissible in Indiana only if the court is satisfied that the scientific principles upon which the expert testimony rests are reliable. Cornett (1983), Ind., 450 N.E.2d 498, 503; Hopkins, 579 N.E.2d at 1303. Cf. Ind.Evidence Rule 702(b). There was no effort by the trial court here to satisfy itself in this regard as to the new PCR type of DNA testing. n15

- - - - -Footnotes- - - - -

n15 The standard to be used by Indiana courts in making such a determination in the past has been the subject of debate. See Hopkins, 579 N.E.2d at 1305 (Dickson, J., concurring with separate opinion in which Krahulik, J., concurs). Effective January 1, 1994, Indiana Evidence Rule 702 and related principles control.

- - - - -End Footnotes- - - - -

[*19]

Second, by summarily dismissing the defense motions we believe the trial court failed to give proper attention to its obligation to determine that the expert witnesses were properly qualified. Our decision in Hopkins best illustrates this point. There we left for the factfinder the duty of evaluating the weight of expert testimony and resolving "any battle of qualified experts . . . or other conflict as to the reliability of evidence." Hopkins, 579 N.E.2d at 1303. But we also clearly said that before any such testimony is to be presented to the jury, the trial court must rule "the witness qualified as a matter of law to give expert testimony regarding DNA analysis." Id. There was no such ruling here.

Third, no evidence is admissible if the danger of unfair prejudice to the defendant substantially outweighs the probative value of the evidence. Hardin v. State (1993), Ind., 611 N.E.2d 123, 126 (quoting Warner v. State (1991), Ind., 579 N.E.2d 1307, 1310, and Hansford v. State (1986), Ind., 490 N.E.2d 1083). This rule is now embodied in Indiana Evidence [*20] Rule 403. n16 This court has clearly recognized that scientific evidence presents special risks of "potential harm and prejudice to the parties involved." Cornett, 450 N.E.2d at 503. We agree with the recent pronouncement of the United States Supreme Court construing Federal Rule of Evidence 403: "'Expert evidence can be both powerful and quite misleading because of the difficulty in evaluating it. Because of this risk, the judge in weighing possible prejudice against probative force under Rule 403 . . . exercises more control over experts than over lay witnesses.'" Daubert v. Merrell Dow Pharmaceuticals, Inc., 125 L. Ed. 2d 469, 113 S.Ct. 2786, 2798 (1993) (quoting Weinstein, Rule 702 of the Federal Rules of Evidence is Sound; It Should Not Be Amended, 138 F.R.D. 631, 632 (1991)). n17 There is no evidence in this record that the trial court engaged in any such weighing.

-Footnotes-

n16 Indiana Evidence Rule 403, effective January 1, 1994, provides: "Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence." [*21]

n17 Cf. In re: Paoli Railroad Yard PCB Litigation, No. 92-1995, slip op. at 50 (3d Cir. August 31, 1994) (indicating that the language quoted from Daubert "does not change our opinion that in order for a district court to exclude scientific evidence, there must be something particularly confusing about the scientific evidence at issue--something other than the general complexity of scientific evidence").

-End Footnotes-

Before expert scientific evidence may be admitted in Indiana, the trial court must be satisfied that the scientific principles upon which the expert testimony rests are reliable, that the witness is qualified, and that the testimony's probative value is not substantially outweighed by the dangers of unfair prejudice. By summarily denying defendant's motions without conducting any kind of hearing or making any kind of record on these issues, we have no basis for concluding that the trial court was satisfied in any of these respects.

As to the trial court's denial of defendant's motion for appointment of an expert and for a continuance to evaluate the DNA test results, we believe the trial [*22] court's rulings were within its discretion for the reasons to be discussed in a moment. However, we think that because the defense was forced by these rulings to begin trial within only a few days of receiving the DNA test results and to rely on Genescreen personnel as its own experts, the trial court should have set aside time to permit the defense an in-depth inquiry into the tests. A pre-trial hearing could have been used for this purpose as well and presents an additional reason why the trial court should have conducted a pre-trial hearing on the admissibility of the test results.

We believe the trial court was within its discretion in denying the defendant's request for appointment of an expert to assist in analyzing the DNA tests. In a recent death penalty case we reviewed the standards for court-appointed experts for criminal defendants:

In Indiana, a criminal defendant is not constitutionally entitled, at public expense, to any type or number of expert witnesses he desires to support his case. *Kennedy v. State* (1991), Ind., 578 N.E.2d 633, 640, cert. denied

U.S. , 112 S.Ct. 1299, 117 L. Ed. 2d 521 [*23] [1992]. A defendant who requests funds for an expert witness has the burden of demonstrating the need for that expert. *Id.* The appointment of experts is left to the sound discretion of the trial court, and only an abuse of that discretion will result in a reversal, but a trial court must provide a defendant access to experts where it is clear that prejudice will otherwise result. *Id.* Issues which the trial court should consider in determining whether a defendant is entitled to funds for an expert include (1) whether defense counsel already possesses the skills to cross-examine the expert adequately or could prepare to do so by studying published writings, *Id.*; (2) whether the purpose of the expert is exploratory only, *Hough v. State* (1990), Ind., 560 N.E.2d 511, 516; and (3) whether the

nature of the expert testimony involves precise physical measurements and chemical testing, the results of which were not subject to dispute. Schultz v. State (1986), Ind., 497 N.E.2d 531, 533-34. In cases where a defendant faces the death penalty, we also have held that the failure to allow the defendant appropriate resources [*24] to retain an expert who would give an opinion concerning the statutory mitigator, may require reversal of the death penalty. Castor v. State (1992), Ind., 587 N.E.2d 1281, 1288[, reh'g denied].

James v. State (1993), Ind., 613 N.E.2d 15, 21. We believe that in this case the nature of the expert testimony involved precise physical measurements and chemical testing, the results of which were not subject to dispute, and so the rule of Schultz v. State (1986), Ind., 497 N.E.2d 531 applies. Where the testimony of the experts involved "precise, physical measurements and chemical testing, and there is no showing that these experts were less than precise or able in their testing and observations, that the truth or accuracy of their testimony is questionable by some new evidence, or that there is evidence available or likely from other experts which would indicate they were wrong," the trial court did not abuse its discretion in denying a motion for appointment of an expert. Schultz, 497 N.E.2d at 534. Here there was every reason to believe that the Genescreen personnel [*25] were neutral. n18 Defendant made no attempt to question their precision, ability, truth or accuracy, nor did he make any showing which could reasonably lead to an indication that they were wrong. In applying this holding in future cases, however, it will be incumbent upon trial courts to assure that such experts are truly neutral--that the experts are aware that they are not advocates for either side and that neither side has any material advantage as to pre-trial access to them or to test results or materials.

- - - - -Footnotes- - - - -

n18 There was testimony to the effect that Genescreen was a private company, not a law enforcement agency, and that its services were available to prosecution and defense clients.

- - - - -End Footnotes- - - - -

Defendant relies on Ake v. Oklahoma, 470 U.S. 68, 84 L. Ed. 2d 53, 105 S. Ct. 1087 (1985), and Smith v. McCormick, 914 F.2d 1153 (9th Cir. 1990). In Ake, the Supreme Court reversed a conviction because the appointment of an expert in psychiatry [*26] was denied to an indigent defendant relying on an insanity defense. In Smith, a panel of the Court of Appeals for the Ninth Circuit rejected the appointment of a "neutral" psychiatrist and held that the defendant should have had independent psychiatric assistance.

We agree with the State that defendant's situation here is different from that in Ake and Smith. Psychiatry is an extremely uncertain field dealing with the mysteries of the human mind where expert opinions can be expected to and do differ widely. In contrast, the neutral Genescreen experts here were testifying to the results of a test "involving precise, physical measurements and chemical testing," James, 613 N.E.2d at 21 (citing Schultz, 497 N.E.2d at 533-34). Under these circumstances, the trial court did not abuse its discretion by denying appointment of defendant's requested expert.

As to the denial of the motions for continuance, we make several observations. The granting or denial of a continuance is primarily a matter

for the trial court, and the denial of one will be reviewed only for an abuse of discretion. n19 Woods v. State (1989), Ind., 547 N.E.2d 772, 788, [*27] reh'g granted on other grounds (1990), Ind., 557 N.E.2d 1325, cert. denied, 501 U.S. 1255 (1991). The record must reveal that the defendant was prejudiced by the failure to grant the continuance in order to demonstrate an abuse of discretion. Evans v. State (1986), Ind., 489 N.E.2d 942, 948.

-Footnotes-

n19 Indiana Code @ 35-36-7-1 (1988) sets forth certain statutory bases entitling defendant to a continuance. However, defendant here does not claim any statutory violation.

-End Footnotes-

Here, the reason the continuance was requested was to permit the requested defense expert to review the results of the Genescreen test. Because it was within the trial court's discretion to deny appointment of the underlying expert, we perceive no abuse in the court's denial of the continuance that was sought to permit that expert time to work.

Likewise, we find no reversible error in the trial court's admission of the DNA test results. First, the record suggests that [*28] defense counsel consented to the admission of the test results at the October 21, 1991, pre-trial conference. In any event, defendant did not renew his objection to the admission of the test results embodied in his motion in limine. n20 The issue was therefore waived for appeal. Conner v. State (1991), Ind., 580 N.E.2d 214, 219, cert. denied, 117 L. Ed. 2d 640, 112 S. Ct. 1501 (1992); Collins v. State (1984), Ind., 464 N.E.2d 1286, 1289-90.

-Footnotes-

n20 We acknowledge that defendant did renew at trial his motions for a continuance and for the appointment of an expert. Were it not for the second reason set forth below, we might well have held that these motions were sufficient to preserve defendant's objection to admissibility.

-End Footnotes-

Second, the DNA test results were of primary importance to only one of the charges--the knowing murder of Stacy Forsee--and defendant was acquitted of this crime. In fact, from our reading of [*29] the record, it would appear that the jury may very well have acquitted on this charge based in part on defense counsel's effective cross-examination of the Cellmark and Genescreen technician. n21 As noted in the discussion of Issue No. 1, supra, there existed substantial independent evidence apart from the DNA test results to support the convictions for Arson and the Murders of the children. Exclusion of the DNA test results would not have affected the sufficiency of the evidence supporting those convictions.

-Footnotes-

n21 Cross-examination of Judith I. Floyd of Genescreen by Defense Counsel:

XQ:

So as I understand it from your testimony, the sperm cells that you found, that you attribute to being in Ms. Forsee's mouth, right?

A: Right.

XQ:

One thousand out of every ten thousand, approximately, North American men fall into the category.

A: Approximately if you are including black and white.

XQ: That is right.

A: Correct.

XQ:

And if you were just including white, out of every thirteen thousand, there would be a thousand men that would fall in that category?

A: Approximately, that is correct.

Cross-examination of Dr. Lisa Forman of Cellmark of Genescreen by Defense Counsel:

XQ:

. . . In your first test you had no match with James Harrison.

A: That is right.

XQ:

In your second test, you weren't interested in James Harrison, you were running the victim against the unknown?

A:

That is right. The unknown was already run, and we were comparing the victim's standard to that banding pattern.

XQ: So from your test, your conclusion was that you had no match with James Harrison?

A: That is right.

- - - - -End Footnotes- - - - -

[*30]

6. Restriction on Alibi Testimony.

Defendant contends that the trial court committed reversible error by restricting his ability to present alibi testimony. After defendant filed a

notice of alibi, the prosecution filed a motion in limine seeking to exclude alibi evidence. Following a hearing, the trial court granted the State's motion.

We find no error here for two reasons. First, defendant did not file his notice of alibi until long after the deadline imposed by Indiana Code @ 35-36-4-3(b) (1988). n22 In fact, the notice was not filed until two days before trial. While we do not disagree with the defendant when he contends that the deadlines imposed in the alibi notice statute cannot be enforced so as to deny a defendant due process of law and a fair trial, we find nothing unreasonable in the trial court's restrictions on the eleventh hour alibi defense presented here. Not only was the prospect of an alibi defense not offered until the last minute, the defendant gave no reason for the delay, and the only information in the alibi notice was that the defendant was at his residence on the date of the crime. In similar circumstances we have held it proper to exclude alibi evidence. [*31] See Adkins v. State (1989), Ind., 532 N.E.2d 6, 8; Baxter v. State (1988), Ind. 522 N.E.2d 362, 369, reh'g denied.

-Footnotes-

n22 Indiana Code @ 35-36-4-1 (1988) requires a defendant in a felony prosecution to file notice of any alibi defense twenty days before the "omnibus date." The omnibus date in a felony prosecution is a date specified by the trial court no earlier than forty-five days and no later than seventy-five days after the completion of the initial hearing (unless the prosecuting attorney and the defendant agree to a different date). Ind. Code @ 35-36-8-1 (1988). The purpose of the omnibus date is to establish a point in time from which various deadlines under this article are established. Id.

Defense counsel's principal argument at the motion in limine hearing was that because the trial court had failed to set an omnibus date, defendant's alibi notice was timely. While the trial court did apparently fail to set an omnibus date, seventy-five days from the date of the initial hearing was July 13, 1991. Defendant did not file his notice until November 4, 1991.

-End Footnotes-

[*32]

Second, while there were two hearings during which the alibi issue was discussed, on neither occasion did the trial court prohibit the introduction of alibi evidence. Instead, the trial court ordered the defense to seek the court's permission outside the presence of the jury before doing so. On appeal, the defendant does not contend that he sought such permission and we find no evidence in the record that he did so. In Bieghler v. State (1985), Ind., 481 N.E.2d 78, reh'g denied, cert. denied, 475 U.S. 1031, 89 L. Ed. 2d 349, 106 S. Ct. 1241 (1986), we held that when the trial court grants the State's motion in limine and the defendant fails to make an offer of proof during trial, the defendant has not preserved for appellate review any alleged error pertaining to that evidence. Id. at 93.

7. Defendant's statements to investigating officers.

Defendant claims infringement of his Fifth Amendment right to counsel as a result of the admission at trial of his statements to police on three occasions--on January 18 and 19, 1989, and on April 4, 1990. At trial, [*33] two Indiana State Police detectives and the City of Mount Vernon Police Chief

testified as to their roles in the murder investigation, including their questioning of the defendant on those dates. n23

-----Footnotes-----

n23 None of defendant's statements to these law enforcement officers constituted a confession.

-----End Footnotes-----

Defendant offers no specifics to support his claim that the January, 1989, statements should have been suppressed, and we are unable to discern any basis for it. Defendant does not contend that he was in custody during this questioning, and the record indicates that he was not in custody and was free to go at the end of the questioning. Miranda safeguards apply only to custodial interrogation, Oregon v. Mathiason, 429 U.S. 492, 494, 50 L. Ed. 2d 714, 97 S. Ct. 711 (1977) (per curiam), Miranda v. Arizona, 384 U.S. 436, 444, 16 L. Ed. 2d 694, 86 S. Ct. 1602 (1966), and are not applicable to general questioning [*34] in a non-coercive atmosphere. Pasco v. State (1990), 563 N.E.2d 587, 593. n24 All questioning appears to have ceased upon defendant's request for counsel on January 20; defendant does not contend to the contrary. The trial court conducted a suppression hearing and concluded that there was no Miranda violation. We agree.

-----Footnotes-----

n24 Custodial interrogation refers to questioning initiated by law enforcement officers after a person has been taken into custody or otherwise deprived of his freedom of action in any significant way. Mathiason, 429 U.S. at 495; Pasco, 563 N.E.2d at 593. To be custodial in the non-arrest context, the interrogation must commence after a person has been deprived of freedom of action has been deprived in any significant way. Id.

-----End Footnotes-----

No further questioning of defendant occurred until April 4, 1990. This questioning was also non-custodial. Defendant argues that his statement to police [*35] should have been suppressed because it was taken in violation of Edwards v. Arizona, 451 U.S. 477, 68 L. Ed. 2d 378, 101 S. Ct. 1880 (1981). According to defendant, this violation occurred because he had requested a lawyer when questioned on January 20, 1989, and he was not provided with a lawyer when questioned again fifteen months later. We cannot agree.

Edwards requires that once the Fifth Amendment right to counsel has been asserted by the defendant, the defendant may not be further interrogated until counsel has been made available, unless the defendant initiates further communication and thereby knowingly and intelligently waives the right previously invoked. Edwards, 451 U.S. at 484-85; James, 613 N.E.2d at 26. Edwards, like Miranda, only applies to custodial interrogation:

The Fifth Amendment right identified in Miranda is the right to have counsel present at any custodial interrogation. Absent such interrogation, there would have been no infringement of the right that Edwards invoked and there would be [*36] no occasion to determine whether there had been a valid waiver.

Edwards, 451 U.S. at 485-86. Because the questioning in January, 1989, was not custodial interrogation, no Edwards rights were triggered that could have been violated at the questioning in the April, 1990.

8. Admission of Certain Photographs.

Defendant claims that it was reversible error for the trial court to admit State's exhibits 11 through 22. These exhibits consisted of photographs of the burned bodies of the three victims. We find nothing in the record indicating that defendant objected to the admission of these exhibits. By failing to object, defendant waived this issue. *Smith v. State* (1985), Ind., 475 N.E.2d 1139, 1144, reh'g denied, post-conviction relief granted on other grounds (1989), Ind., 547 N.E.2d 817. We do note, however, that defendant did object to the admission of exhibits 23 through 26, consisting of autopsy photographs of Stacy Forsee's stab wounds. Once it is established that a photograph is an accurate depiction of that which it is intended to portray, its admissibility [*37] turns on the question of relevancy. Photographs are relevant if they depict scenes that a witness is permitted to describe in their testimony. A relevant photo will be admitted into evidence unless its relevancy is outweighed by its tendency to inflame the passions of the jury. *Baird v. State* (1992), Ind., 604 N.E.2d 1170, 1189, cert. denied, 126 L. Ed. 2d 208, 114 S. Ct. 255 (1993); *Games v. State* (1989), Ind., 535 N.E.2d 530, cert. denied, 493 U.S. 874, 107 L. Ed. 2d 158, 110 S. Ct. 205 (1989). Although defendant claims that the "photographs could serve no purpose other than to inflame and prejudice the jury," Br. of Appellant at 22, they were in fact used to illustrate the testimony of a pathologist and so met the test of relevancy. Defendant makes no specific argument or showing as to how the relevancy of the photographs was outweighed by their tendency to inflame the passions of the jury. We have regularly held that such evidence is not unduly prejudicial, e.g., *Baird*, 604 N.E.2d at 1189, [*38] *Jackson v. State* (1992), Ind., 597 N.E.2d 950, 963, reh'g denied, cert. denied, 122 L. Ed. 2d 793, 113 S. Ct. 1424 (1993), *Kennedy v. State* (1991), Ind., 578 N.E.2d 633, 640, reh'g denied, cert. denied, 117 L. Ed. 2d 521, 112 S. Ct. 1299 (1992), after remand, (1993), Ind., 620 N.E.2d 17, reh'g denied, and do so here in the absence of any such argument or showing.

9. Jury Selection Procedures.

Defendant argues that the jury selection procedure employed in this case subjected him to an unfair trial. His argument appears to that it was impermissible under *Georgia v. McCollum*, 120 L. Ed. 2d 33, 112 S. Ct. 2348 (1992), to exclude those potential jurors who were excused "because they stated that they would not consider the death penalty under any circumstances." n25 Defendant does not challenge that those guidelines were adhered to in this case. n26 Br. of Appellant at 24. This argument reflects a misunderstanding of *McCollum*.

-Footnotes-

n25 "Prospective jurors unable to set aside their views about the death penalty that would 'prevent or substantially impair the performance of [their] duties as [jurors] in accordance with [their] instructions and [their] oath,'" *Wainwright v. Witt*, 469 U.S. 412, 424, 83 L. Ed. 2d 841, 105 S. Ct. 844 (1985) (quoting *Adams v. Texas* 448 U.S. 38, 45, 65 L. Ed. 2d 581, 100 S. Ct. 2521 (1980)), may be removed or cause according to the guidelines set out in *Witherspoon v. Illinois*, 391 U.S. 510, 20 L. Ed. 2d 776, 88 S. Ct. 1770

(1968), as refined by the decision in Witt. Defendant does not maintain that these guidelines were violated in this case. [*39]

n26

- - - - -End Footnotes- - - - -

McCullum is one of a series of recent United States Supreme Court cases placing limits upon the practice of peremptory challenges to prospective jurors. n27 While it is true that McCullum refers to the rights of prospective jurors not to be denied participation in jury service, the jurors in that case were sought to be excluded because of their race, not their attitudes on the death penalty. In fact, the McCullum Court pointed out, "While 'an individual juror does not have a right to sit on any particular petit jury, . . . he or she does possess the right not to be excluded from one on account of race.'" 112 S. Ct. at 2353 (quoting Powers v. Ohio, 499 U.S. 400, 409, 113 L. Ed. 2d 411, 111 S. Ct. 1364 (1991)). This right arises under the equal protection clause contained in the Fourteenth Amendment to the United States Constitution. Id. Defendant does not cite, and we know of no authority for the proposition that prospective jurors unable to set aside their views about the death [*40] penalty to the extent described in note 25, supra, constitute any type of a classification entitled to heightened scrutiny for purposes of Fourteenth Amendment equal protection analysis.

- - - - -Footnotes- - - - -

n27 J.E.B. v. Alabama ex rel. T.B., U.S. , 114 S. Ct. 1419 (1994) (forbidding gender discrimination in the exercise of peremptory challenges); Georgia v. McCollum, 120 L. Ed. 2d 33, 112 S. Ct. 2348 (1992) (forbidding racial discrimination in the exercise of peremptory challenges by criminal defendants); Edmonson v. Leesville Concrete Co., 500 U.S. 614, 114 L. Ed. 2d 660, 111 S. Ct. 2077 (1991) (forbidding racial discrimination in the exercise of peremptory challenges in civil cases); Powers v. Ohio, 499 U.S. 400, 113 L. Ed. 2d 411, 111 S. Ct. 1364 (1991) (forbidding racial discrimination in the exercise of peremptory challenges by criminal prosecutors where defendant was white and challenged jurors were black); Batson v. Kentucky, 476 U.S. 79, 90 L. Ed. 2d 69, 106 S. Ct. 1712 (1986) (forbidding racial discrimination in the exercise of peremptory challenges by criminal prosecutors where defendant and challenged jurors were black).

- - - - -End Footnotes- - - - -

[*41]

10. Other Issues on Appeal.

Defendant also argues that (i) the trial court improperly permitted "victim impact" evidence; (ii) the trial court failed to consider properly the character of defendant and circumstances of his crime when invoking the death penalty; (iii) the trial court erred by finding and considering aggravating circumstances not supported by the evidence while failing to find and consider mitigating circumstances clearly supported by the evidence, and by applying the wrong standard to determine if the aggravating factors outweighed the mitigating factors in order to impose the death penalty; and (iv) the death penalty is unconstitutional. We consider these issues below, the fourth under the heading "Constitutionality of the Death Penalty" and the first three under the caption

"Death Sentence Review."

Constitutionality of the Death Penalty

Defendant challenges on multiple grounds the constitutionality of the death penalty. He acknowledges that the Indiana death sentencing scheme has been upheld in the face of such challenges in the past but apparently wishes to preserve these issues for federal review.

a. Constitutionality Per Se.

Acknowledging that [*42] firmly established precedent is to the contrary, defendant nevertheless contends that "the killing of convicts by any means is always unconstitutional due to the suffering and degradation inherent in the very act of taking away a life, the arbitrariness with which the ultimate penalty is imposed and the availability with which the ultimate penalty is imposed and the punishments which lack the severity of death." Br. of Appellant at 33. Defendant's argument has been frequently analyzed at length and rejected, both by the United States Supreme Court and by our own court. See, e.g., *Gregg v. Georgia*, 428 U.S. 153, 168, 49 L. Ed. 2d 859, 96 S. Ct. 2909 (1976) (joint opinion of Stewart, Powell, and Stevens, JJ.); *Brewer v. State* (1981), 275 Ind. 338, 346-47, 417 N.E.2d 889, 894, cert. denied, 458 U.S. 1122, 73 L. Ed. 2d 1384, 102 S. Ct. 3510 (1982), reh'g denied, 458 U.S. 1132, 73 L. Ed. 2d 1403, 103 S. Ct. 18 (1982), denial of post-conviction relief [*43] aff'd (1986), Ind., 496 N.E.2d 371, cert. denied, 480 U.S. 940 (1987), conditional grant of writ of habeas corpus aff'd, *Brewer v. Shettle*, 917 F.2d 1306 (7th Cir. 1990), opinion issued, *Brewer v. Aiken*, 935 F.2d 850 (7th Cir. 1991). We reaffirm that the Indiana death penalty statute is constitutional.

b. Vindictive Justice.

Defendant contends that while, as a matter of federal constitutional law, retribution is a proper justification for the death penalty, *Gregg*, 428 U.S. at 183, it is an impermissible justification in Indiana because our constitution provides that our "penal code shall be founded on principles of reformation, and not vindictive justice." Ind. Const. art. 1, § 18. This argument has been considered and rejected by our court, both shortly after the enactment of our constitution, *Driskill v. State* (1855), 7 Ind. 338, 342, *Rice v. State* (1855), 7 Ind. 332, 338, and more recently in *Fleenor v. State* (1987), 514 N.E.2d 80, 90, [*44] reh' denied, cert. denied, 488 U.S. 872, 102 L. Ed. 2d 158, 109 S. Ct. 189 (1988). We reaffirm those holdings.

c. Electrocution.

Defendant argues that even if the death penalty is not unconstitutional per se, it is cruel and unusual as applied in Indiana because of the nature of electrocution. Defendant cites the graphic opinion of former United States Supreme Court Justice William Brennan in *Glass v. Louisiana*, cert. denied, 471 U.S. 1080 (1985) (Brennan, J., dissenting) and contends that "in an age which offers the alternative of lethal injection, the barbaric killing of people in 1993 by putting them in an antiquated electrical device should be considered no less cruel and unusual than burning at the stake or breaking on the wheel was considered to be in 1890." Br. of Appellant at 35. While we recognize the strong national trend toward lethal injection as the most appropriate form of capital punishment, n28 defendant's argument here does not persuade us to overrule our

prior holdings that execution of a death sentence by electrocution does not violate the Eighth Amendment [*45] of the United States Constitution or Article 1, § 16, of the Indiana Constitution. See Fleenor, 514 N.E.2d at 89.

- - - - -Footnotes- - - - -

n28 See, e.g., Lonny J. Hoffman, Note, 70 Tex. L. Rev. 1039, 1039 n.5 (1992).

- - - - -End Footnotes- - - - -

d. Prosecutorial Discretion.

Defendant argues that the Indiana death penalty statute is unconstitutional because the prosecuting attorney is given overbroad and unfettered discretion in seeking the death penalty. This court has frequently rejected this contention, most recently in *Bivins v. State*, 1994 WL 606510 at * 16 (Ind. Nov. 7, 1994).

e. Consideration of Aggravating and Mitigating Circumstances.

Defendant attacks the Indiana death penalty statute's provisions concerning aggravating and mitigating circumstances in several respects. First, defendant contends the statute is constitutionally infirm "because it does not require the jury to consider all proffered and mitigating evidence, while it precludes consideration of relevant mitigation." Br. of [*46] Appellant at 36. We disagree with defendant's characterization of the statute. Indiana Code § 35-50-2-9(c)(8) (1988) specifically authorizes the jury to consider "any other circumstances appropriate for consideration" for mitigation. Furthermore, defendant has not identified any mitigating evidence that the jury was precluded from considering. Similarly, while defendant contends that the statute does not permit the death sentence to be imposed based upon non-statutory aggravating circumstances, he has not identified any non-statutory aggravating evidence which was presented to the jury.

Defendant next contends that the death penalty statute is unconstitutional because "it does not require that the jury . . . make a unanimous finding that each charged aggravator has been proven beyond a reasonable doubt, but does require a unanimous finding of mitigation before it may be weighed against aggravation." Br. of Appellant at 36. Defendant's claim here relates to the problem identified by the United States Supreme Court in *Mills v. Maryland*, 486 U.S. 367, 374, 100 L. Ed. 2d 384, 108 S. Ct. 1860 (1988). If a jury is required to [*47] be unanimous in finding that a particular mitigating circumstance exists before that circumstance can be weighed against any aggravating circumstances found, then in theory, while all twelve jurors might agree that some mitigating circumstances were present (and even agree that those mitigating circumstances were significant enough to outweigh any aggravating circumstances found), unless all twelve could agree that the same mitigating circumstance was present, they would never be permitted to engage in the weighing process or any deliberation on the appropriateness of the death penalty. *Id.* Death penalty schemes requiring such unanimity were held unconstitutional in *Mills and McKoy v. North Carolina*, 494 U.S. 433, 439-44, 108 L. Ed. 2d 369, 110 S. Ct. 1227 (1990). n29 We do not believe Indiana's death penalty statute is subject to these infirmities. First, there is no language in our statute or case law that suggests jury unanimity is required on a mitigating circumstance before it can be weighed against any aggravating circumstances that can be properly found, and we hold that such unanimity is not required. [*48] Indeed, as we said in

Bivins, "Indiana procedure provides for jury consideration of any mitigating factor, enumerated or not, without reference to unanimity. Thus, the Indiana procedure does not run afoul of Mills." Bivins, 1994 WL 606510 at * 16. Second, there is no contention, and our review of the record does not suggest, that the trial court instructed the jury that unanimity was required.

The Maryland statute at issue in Mills and the North Carolina statute at issue in McKoy, though somewhat different from one another, both provided for sentencing by jury, and both provided that juries were required to answer specific questions about any mitigating circumstances found on written verdict forms. In Indiana, sentencing is by judge, not jury, Ind. Code § 35-50-2-9(e) (1988), and we do not use special verdicts or interrogatories to the jury. Ind. Trial Rule 49. Thus, the applicability of McKoy and Mills to death penalty jurisprudence in Indiana is attenuated at best.

Defendant urges that our statute is unconstitutional for not requiring such written findings as to particular aggravating and mitigating circumstances found and considered on the theory that [*49] the judge must give the jury's decision great weight in passing sentence on the defendant. Br. of Appellant at 37. We reject this argument. While the trial court must consider the jury's recommendation and its sentence must be based on the same standards that the jury was required to consider, we perceive nothing of a constitutional dimension that would require the trial court to have the details of the jury's deliberations before it in discharging these statutory obligations.

Lastly, defendant argues that the statute is constitutionally defective because it does not place the burden of proving that aggravating circumstances outweigh mitigating circumstances on the State, thus shifting that burden of proof to the defendant in violation of Mullaney v. Wilbur, 421 U.S. 684 at 685, 44 L. Ed. 2d 508, 95 S. Ct. 1881 (1975), and because it does not provide any guidance as to the method and level of proof required for determining if aggravating circumstances sufficiently outweigh mitigating circumstances. We have previously held that our statute [*50] does not shift the factual burden of proof in violation of the Eighth and Fourteenth Amendments, Bivins, 1994 WL 606510 at * 14, and decline to revisit the issue here. We have further held that "when a jury makes its ultimate determination of whether to recommend the death penalty, it need only find that the aggravating circumstances outweigh the mitigating circumstances; the jury is not required to reach this conclusion beyond a reasonable doubt." Rouster v. State (1992), Ind., 600 N.E.2d 1342, 1348, reh'g denied (emphasis in the original) (citing Daniels v. State (1983), Ind., 453 N.E.2d 160, 171, denial of post-conviction relief aff'd (1988), Ind., 528 N.E.2d 775, reh'g denied, cert. granted, judgment vacated, and remanded, 491 U.S. 902 (1989), after remand (1990), Ind., 561 N.E.2d 487 (affirming denial of post-conviction relief)). This standard provides sufficient guidance for the jury to engage in the weighing required by the statute. We have repeatedly affirmed the constitutionality of this standard, most [*51] recently in Bivins, 1994 WL 606510 at * 14.

g. Meaningful Appellate Review.

Defendant contends that our death penalty statute violates the Eighth and Fourteenth Amendments of the United States Constitution by failing to provide for a meaningful appellate review of defendant's conviction and sentence. Again, we have repeatedly rejected the contention that our statutory death penalty procedure for its constitutionally inadequate appellate review, most recently

in Bivins, 1994 WL 606510 at * 17.

Death Sentence Review

The Indiana Constitution provides that "the Supreme Court shall have, in all appeals of criminal cases, the power to review and revise the sentence imposed." Ind. Const. art. 7, § 4. Although our rules for appellate review of sentences require that great deference be given to the judgment of the trial court, e.g., Ind.Appellate Rule 17, where the sentence is death, those rules "stand more as guideposts for our appellate review than as immovable pillars supporting a sentence decision." *Spranger v. State* (1986), Ind., 498 N.E.2d 931, 947 n.2, reh'g denied (1986), Ind., 500 N.E.2d 1170, [*52] cert. denied, 481 U.S. 1033 (1987). In fact, we have made it clear that "this Court's review of capital cases under Article 7 is part and parcel of the sentencing process." *Cooper v. State* (1989), Ind., 540 N.E.2d 1216, 1218.

This special review of death sentences is grounded in the Indiana Constitution, our state's death penalty statute, and federal death penalty jurisprudence. Our constitution provides that appeals from judgments imposing a death sentence are to be brought directly to this court. Ind. Const. art. 7, § 4. Indiana Code § 35-50-2-9(h) (1988) specifies that a death sentence is subject to automatic review by this court, is to be given priority over all other cases, and that a death sentence is not to be carried out until this court has completed its review.

It is understandable that both our Constitution and legislature should require such special appellate scrutiny of death sentences because so many of the fundamental values embodied in our state Bill of Rights are at stake in death penalty cases. See, e.g., Ind. Const. art. 1, § 1 (life is an inalienable right); Ind. Const. art. 1, § 16 [*53] (cruel and unusual punishment shall not be inflicted; all penalties shall be proportioned to the nature of the offense); and Ind. Const. art. 1, § 18 (penal code shall be founded on principles of reformation and not vindictive justice).

The special role of this court in reviewing death sentences is also grounded in federal death penalty jurisprudence. In general, the United States Supreme Court "has repeatedly said that under the Eighth Amendment 'the qualitative difference of death from all other punishments requires a correspondingly greater degree of scrutiny of the capital sentencing determination.'" *Caldwell v. Mississippi*, 472 U.S. 320, 329, 86 L. Ed. 2d 231, 105 S. Ct. 2633 (1985) (quoting *California v. Ramos*, 463 U.S. 992, 988-99, 77 L. Ed. 2d 1171, 103 S. Ct. 3446 (1983)). Meaningful appellate review of death sentences plays a crucial role in ensuring that the death penalty is not imposed arbitrarily or irrationally. *Parker v. Dugger*, 498 U.S. 308, 321, 112 L. Ed. 2d 812, 111 S. Ct. 731 (1991); [*54] *Gregg*, 428 U.S. at 204-06.

Penalty Phase.

Our death penalty statute guides our review of death sentences by setting forth standards governing trial court imposition of death sentences. Following completion of the guilt phase of the trial and the rendering of the jury's verdict, the trial court reconvenes for the penalty phase. The State must prove at least one aggravating circumstance beyond a reasonable doubt. The defendant has the opportunity to present any additional evidence relevant to the aggravating circumstances alleged and to any mitigating circumstances. Ind.

Code @ 35-50-9-2(d) (1988).

As part of the State's presentation of evidence during this penalty phase of the trial, the State presented evidence of defendant's prior conviction for murder and the ages of Tia Forsee and Jordan Hanmore. Over objection by the defendant, the trial court also permitted an uncle of Stacy Forsee to read a seven-sentence statement to the jury relating the impact that the murders had on his family and, referring to defendant's previous convictions, concluding that "we must allow and enforce the death penalty in cases such as these." [*55]

Defendant argues that this statement was irrelevant to the jury's sentencing recommendation in that it did not provide any helpful information as to the culpability of the defendant, his personal characteristics, or the circumstances of the crime. Further, defendant argues that the statement was not as much a "victim impact" statement as it was an opinion that the death penalty should be imposed. Allowing such statements, defendant contends, "encourages random and arbitrary death penalty recommendations based on victim status." n29 Br. of Appellant at 27.

-----Footnotes-----

n29 Defendant also argues that the General Assembly has indicated that it considers victim impact evidence inadmissible in capital cases. It draws this conclusion from Ind. Code @ 35-38-1-8.5(a) (1991 Supp.), which requires a victim impact statement in all presentencing reports except capital cases. We do not agree. The statute in no way precludes victim impact statements in presentence reports in capital cases; it only makes them optional. See Bivins, 1994 WL 606510 at * 31 (Sullivan, J., concurring in part and concurring in result).

-----End Footnotes-----

[*56]

In the recent Bivins case, we held that "the admissibility of victim impact evidence depends upon its relevance to the death penalty statute's aggravating and mitigating circumstances." Bivins, 1994 WL 606510 at * 26. As in Bivins, the victim impact evidence here was improper both because of its lack of relevance to the charged aggravating circumstances and the mitigating circumstances asserted by the defendant. However, the victim impact evidence presented was extremely brief and not likely to have influenced jury. Furthermore, the prosecutor did not refer to the statement in closing argument. We find the admission of such evidence to be harmless beyond a reasonable doubt. Chapman v. California, 386 U.S. 18, 17 L. Ed. 2d 705, 87 S. Ct. 824 (1967); Rabadi v. State (1989), Ind., 541 N.E.2d 271, 276. Cf. Bivins, 1994 WL 606510 at * 26.

Following presentation of the State's evidence at the penalty phase, the defendant introduced his military record into evidence as a mitigating circumstance. Following closing arguments of counsel, the jury unanimously recommended that the death [*57] penalty be imposed.

Trial Court Sentencing Determination.

Once the jury has made its recommendation, the jury is dismissed, and the trial court has the duty of making the final sentencing determination. First, the trial court must find that the State has proved beyond a reasonable doubt that at least one of the aggravating circumstances listed in the death penalty

statute exists. Ind. Code @ 35-50-2-9(e)(1) (1988) (currently Ind. Code @ 35-50-2-9(i)(1) (1993)). Second, the trial court must find that any mitigating circumstances that exist are outweighed by the aggravating circumstance or circumstances. Ind. Code @ 35-50-2-9(e)(2) (1988) (currently Ind. Code @ 35-50-2-9(i)(2) (1993)). Third, before making the final determination of the sentence, the trial court must consider the jury's recommendation. Ind. Code @ 35-50-2-9(e) (1988). However, the court is not bound by the jury's recommendation. Id. The trial court must make a record of its reasons for selecting the sentence that it imposes. Ind. Code @ 35-38-1-3 (1988).

These statutory provisions make clear that the sentencing court has a separate and independent role in assessing and weighing the aggravating and mitigating [*58] circumstances and in making the final determination whether to impose the death penalty. *Benirschke v. State* (1991), Ind., 577 N.E.2d 576, 579, reh'g denied (1991), Ind., 582 N.E.2d 355, cert. denied, 120 L. Ed. 2d 910, 112 S. Ct. 3042 (1992). In arriving at its own separate determination as to whether the death penalty is an appropriate punishment, the sentencing court is to point out its employment of this process in specific and clear findings. Id.

The requirement for sentencing findings are more stringent in capital cases than in non-capital sentencing situations. *Evans v. State* (1990), Ind., 563 N.E.2d 1251, 1254, reh'g granted on other grounds (1992), Ind., 598 N.E.2d 516, reh'g denied. The trial court's statement of reasons (i) must identify each mitigating and aggravating circumstance found, (ii) must include the specific facts and reasons which lead the court to find the existence of each such circumstance, (iii) must articulate that the mitigating and aggravating circumstances have been evaluated and [*59] balanced in determination of the sentence, *Bernirschke*, 577 N.E.2d at 579, *Evans*, 563 N.E.2d at 1254, and (iv) must set forth the trial court's personal conclusion that the sentence is appropriate punishment for this offender and this crime. *Benirschke*, 577 N.E.2d at 579; *Woods*, 547 N.E.2d at 793.

We require such specificity in a sentencing order or statement of reasons for imposing a sentence to insure the trial court considered only proper matters when imposing sentence, thus safeguarding against the imposition of sentences which are arbitrary or capricious, and to enable the appellate court to determine the reasonableness of the sentence imposed. *Daniels v. State* (1990), Ind., 561 N.E.2d 487, 491.

The trial court's sentencing order reads as follows:

SENTENCING ORDER

(December 14, 1991)

The State of Indiana appears by Prosecuting Attorney Kimberly Kelley Mohr and Chief Deputy Prosecuting Attorney W. Trent VanHaften, and the Defendant appears in person, in custody of the Posey County Sheriff's Department, and by counsel, [*60] Ronald Warrum and Thomas M. Swain. The Defendant having been convicted on November 14, 1991 of Count I, Arson, a Class A Felony, Count III, Murder, and Count IV, Murder, and for being a Habitual Offender, the Cause proceeds to sentencing hearing.

After considering the testimony presented in open Court this date, the arguments of counsel, the pre-sentence report and the psychological evaluation

submitted by Dr. Thomas Liffick, the Court FINDS:

I.

FINDINGS

As to Count I, Arson, a Class A Felony, the aggravating circumstances and mitigating circumstances do not outweigh one another as to require a sentence greater or less than the presumptive sentence;

The sentence imposed on Count I should be enhanced by an additional thirty years for being a Habitual Offender.

The State of Indiana having sought the death penalty in this cause as to Counts III and IV, and the Jury having recommended the death penalty, the Court has considered the following aggravating factors as to Counts III and IV:

James P. Harrison committed the murder by intentionally killing the victim, Jordan Hanmore, while committing or attempting to commit Arson;

James P. Harrison has been convicted of another murder, to-wit: [*61] Murder of Denise T. Wilberger on June 22, 1973, Cause No. A63256, Circuit Court of Arlington County, Virginia; and

The victims of the murders, Tia Forsee and Jordan Hanmore, were both under twelve years of age, to-wit: Tia Forsee was 3 and 1/2 years old, and Jordan Hanmore was 21 months old.

The only factors the Court determines are mitigating are the fact that the Defendant served in the military in Vietnam and was wounded while in service to his country, and that Mr. Harrison suffered emotional, physical and sexual abuse as a child; and

The aggravating circumstances as to Counts III and IV far outweigh any mitigating circumstances requiring the Court to impose a sentence greater than the presumptive sentence, and allowing the Court to impose the death penalty.

II.

SENTENCE

The Court sentences the Defendant, James P. Harrison, as follows:

. . . .

On Count III and IV, Murder, James P. Harrison is sentenced to death.

The Defendant is remanded to the custody of the Posey County Sheriff's Department and he shall be transported forthwith to a facility designated by the Indiana Department of Correction, where inmates sentenced to die are held.

An execution date is not set at this time [*62] pending the appellate process.

We find that the foregoing sentencing order is insufficient. The order does not comply with Indiana Code @ 35-50-2-9(e) (1988) and our precedents governing sentencing statements in capital cases in at least the following respects. First, the order does not set forth specific facts and reasons which lead the court to find the existence of each aggravating and mitigating circumstance. In fact, there is no explicit finding in the order that any aggravating circumstances exists; the order only indicates that the trial court "considered" the aggravating circumstances set forth. n30 Second, the order does not establish that the trial court found that the State proved beyond a reasonable doubt that at least one aggravating circumstance exists. Third, there is nothing in the sentencing order indicating that the trial court considered the jury's recommendation; the order only acknowledges that the jury "recommended the death penalty." Fourth, the order does not contain the personal conclusion of the trial court that death is the appropriate punishment for this offender and this crime; the order only observes that aggravating circumstances "far outweigh any mitigating [*63] circumstances . . . allowing the Court to impose the death penalty."

- - - - -Footnotes- - - - -

n30 We are particularly troubled by the trial court's listing of the aggravating circumstance that the defendant intentionally killed Jordan Hanmore. Although there is some inconsistency among the charging instrument, the preliminary instructions, and the final instructions, the parties appear to agree that defendant was charged with and convicted of the felony murder of Jordan Hanmore. See Br. of Appellee at 14. Thus, that the killing was intentional, which is required to support this aggravating circumstance, was not established by the jury's verdict during the guilt phase. (We discussed the required *mens rea* for felony murder in another context above under "Issues on Appeal--1. Inconsistent Verdicts.") The State had the burden of proving beyond a reasonable doubt during the sentencing phase that the killing by arson was intentional if this aggravating circumstance was to be used to support a sentence of death. From a careful reading of the transcript of the trial court's comments during the sentencing hearing, it appears to us that the trial court made no distinction between felony murder and intentional killing for this purpose:

There are separate factors which the legislature says that the Judge has to consider on the death penalty. Indiana Code @ 35-50-2-9. And they are as follows. The Defendant committed the murder or murders by intentionally killing the victim while committing or attempting to commit any of the following: A. Arson. Now, you were only charged with killing Jordan Hanmore by arson. And that is all that I have considered as to these Counts III and IV. But you were charged with that by the State and, of course, it has been proved to beyond any reasonable doubt that you did kill Jordan Hanmore by arson.

. . . .

In order to impose the death penalty the Judge has to find that at least one of the aggravating circumstances has been proven beyond a reasonable doubt. . . . As to Jordan in Count IV, . . . the State also alleged that you killed Jordan Hanmore during the commission of an arson which, of course, you did and they proved that beyond a reasonable doubt.

Given this record, a far more detailed explanation is required to support a

finding that the defendant intentionally killed Jordan Hanmore.

- - - - -End Footnotes- - - - -
[*64]

While the sentencing order is clearly insufficient to permit us to give the death sentence here the meaningful appellate review required, we also recognize that the trial court conducted an extensive sentencing hearing in which the trial court appears to have recited on the record many of the findings that we require to be included in the written sentencing order. While there is some rational basis for simply incorporating the trial court's oral statements at the sentencing hearing into its sentencing order, in the end we believe we must "stand firm and require a clear demonstration that the essential operations of the death sentencing process have taken place." *Dillon v. State* (1983), Ind., 454 N.E.2d 845, 856 (DeBruler, J., concurring and dissenting), cert. denied, 465 U.S. 1109, 80 L. Ed. 2d 145, 104 S. Ct. 1617 (1984), writ of habeas corpus granted, *Dillon v. Duckworth*, 751 F.2d 895 (7th Cir. 1985), cert. denied, 471 U.S. 1108, 85 L. Ed. 2d 859, 105 S. Ct. 2344 (1985). We find this situation to [*65] be similar to that in *Judy v. State* (1981), 275 Ind. 145, 416 N.E.2d 95, and *Benirschke*. In *Judy*, the sentencing court had set forth at the sentencing hearing the evidence of mitigating circumstances into discrete categories and then simply did not recite them in its written findings. We remanded for an inclusion of such acts of judgment in the sentencing order. 275 Ind. at 173, 416 N.E.2d at 110-11. In *Benirschke*, we determined that the trial court had not clearly set out its findings that it had made the independent judgments required and had not sufficiently indicated the evaluation given to mitigating circumstances. As in *Judy*, we ordered the trial court to articulate more specifically its findings in these regards. *Benirschke*, 577 N.E.2d at 579.

Conclusion

We affirm the convictions of defendant James P. Harrison for the knowing Murder of Tia Forsee and for the Felony Murder of Jordan Hanmore. For the reasons set forth above, we remand the case to the Posey Circuit Court for a more specific sentencing order or statement of reasons for selecting [*66] the sentence it imposed.

DeBRULER, GIVAN, and DICKSON, J.J., concur.

SHEPARD, C.J., concurs in result with separate opinion.

Appendix B

COURT DECISIONS

ROCKLAND
COUNTY

COUNTY COURT

Judge Kelly

PEOPLE v. ROBERTO MORALES (Edited for publication)—Pursuant to a prior order of this court, a combined Dunaway-Wade-Huntley-Frye hearing was held and the following constitutes the findings and conclusions of the court.

Facts

The People called Police Officer Richard Pucillo of the emergency room of the Mount Vernon Police Department, who testified that on June 17, 1993 at approximately 11.00 p.m. he responded to the Mount Vernon Hospital where he saw Roberto Morales, a/k/a Tito, who had been shot in the thumb. He indicated that Mr. Morales acknowledged he had been shot but did not wish to cooperate with him so that he left the hospital.

Detective James Woulfe of the Town of Ramapo Police Department testified that on June 21, 1993 he interviewed Anthony Jacaruso in connection with the homicide of Frantz Egalite. He stated that when he spoke to him Mr. Jacaruso was lying in a bed in a hospital since he had been shot several times at the same time that Mr. Egalite was shot and killed. He stated that Mr. Jacaruso was not able to speak as he was hooked up to a number of different support systems and this interview took place only four days after the shooting incident which took place in Mr. Jacaruso's apartment at 50 Decatur Avenue in the Village of Spring Valley, in the Town of Ramapo. He stated that although Mr. Jacaruso could not speak he was able to nod and shake his head while being questioned. He said that he displayed a photographic array to Mr. Jacaruso that had been prepared by the Mount Vernon Police Department and which contained a photograph of Roberto Morales. He testified that Mr. Jacaruso did not appear to be able to focus on the photographic array and that therefore he pointed out three or four different photographs to Mr. Jacaruso, including the photograph of Mr. Morales. Nevertheless, Mr. Jacaruso did not indicate that he recognized any of the persons depicted therein.

Detective Woulfe stated that he assisted in arresting the defendant in Westchester County on September 2, 1993 for the murder of Frantz Egalite and transported him to the Ramapo Police Station. He stated that he had advised Mr. Morales of his rights from a Miranda card at the time of his arrest in Westchester and did so again in the Ramapo Police Station before he interviewed him. He said that the defendant indicated he wanted to speak with him and during the ensuing conversations the defendant denied he did anything or even knew an individual by the name of George Lyn (aka "G") and further stated that he had never been in Spring Valley in his life. Defendant also denied that he was known as Tito. Detective Woulfe testified that Mr. Jacaruso told him that two black males shot him and estimated their ages to be in their mid thirties and did not recall if he described either of those males as being Hispanic.

The People called Detective Stephen Moskwa of the Ramapo Police Department who testified that he exhibited photographic arrays to Mr. Jacaruso on August 26, and August 31, 1993, neither of which contained a photograph of the defendant. He said that Mr. Jacaruso did not recognize any of the persons in those arrays. He stated that on September 1, 1993 he showed another photographic array of six male suspects to Mr. Jacaruso and he selected a photograph of Roberto Morales whom he advised them was known to him as "Tito." He stated that he obtained the photograph that he used in this array from the Mount Vernon Police Department. He said that the photographic array he showed the defendant on August 26, 1993 contained a photograph of one Phillip Smith whom Mr. Jacaruso did not identify or recognize but whom he said resembled the shooter.

Detective Glen Graham testified and stated that he was present when Detective Woulfe showed photographic array to Anthony Jacaruso on June 21, 1993 at the hospital and said that Detective Woulfe held the array over the head of Mr. Jacaruso who was unable to speak because he had a respirator in his mouth at the time and that during the interview Mr. Jacaruso merely nodded his head when he was asked questions. He also stated that he put a check mark over the picture of the defendant on a copy of the photographic array that had been shown to Mr. Jacaruso on June 21, 1993 but that that check mark was not on the original array when it was exhibited to Mr. Jacaruso. He said he did so afterwards but before he sent it to the District Attorney's Office so that they would be able to identify Roberto Morales.

The People called Anthony Jacaruso who testified he was in his apartment at 50 Decatur Avenue in the Village of Spring Valley, Town of Ramapo, on June 17, 1993 between 9.30 p.m. and 10.30 p.m. when he

received a phone call from Frantz Egalite and that five minutes thereafter Mr. Egalite arrived at his apartment for the purpose of doing drugs with him. He stated that prior to his arrival he had smoked cocaine and smoked another hit after Mr. Egalite arrived. He said that about five minutes after Mr. Egalite arrived there was a knock at his door and when he asked who it was someone responded, "G," which is a nickname for a fellow drug dealer named George Lyn. He said that it sounded like "G's" voice and that when he looked out the window he saw a man known to him as Tito who he said was a friend of George's. He stated that there was another person with Tito, standing one step down against the building, so that he could only see that person's shoulder and not his face. He said it was dark outside but that he turned a porch light on next to the door and it illuminated the area outside the door so that he was able to see Tito and discern that there was another person standing outside but he could not see that person's face. He described Tito as Hispanic, a light skinned or very light skinned black. Mr. Jacaruso said that he recognized him because Tito had been in his house a month before and that Tito was accompanied by "G" at that time. On that prior occasion both "G" and Tito had been in his apartment for about ten minutes and that "G" introduced the defendant to him as Tito.

Mr. Jacaruso stated that at the time he looked out the window he was only two or three feet from Tito and that even though Tito was looking down he was able to see his face and recognized him from having been in the house before. He said that he unlocked the door and walked to the kitchen whereupon the door flew open like somebody slammed it and that he turned toward the door after he heard that sound and saw Tito standing in the doorway with a gun in his hand. He heard a shot and fell to the floor. He said that only a few seconds elapsed from the time he looked out the window, observed Tito, and unlocked the door and he did so because he thought it was "G" coming to do a drug deal. He said that although there were two individuals outside the door the only person he saw after the door flew open was Tito and that he was the only person standing there holding the gun when he was shot.

He said that he did not recall having seen or spoken with Detectives Woulfe or Graham on June 21, 1993 when he was in the hospital nor did he recall being shown any photograph of Tito or anyone else at that time. He states that he doesn't even recall what his physical condition was on June 21, 1993. He testified that thereafter he met with Detective Moskwa on two occasions that he recalls, and said that Detective Moskwa exhibited photographic arrays to him and that on the last occasion he picked out the photograph of Tito as having been the person who shot him. He stated he did not pick out any one exhibited to him in the first photographic array nor did he recall telling Detective Moskwa that one of the people in that array, to wit Phillip Smith, resembled the shooter.

On cross examination he acknowledged that he smoked his first hit of cocaine one half hour before Frantz Egalite arrived at his apartment and that he did another hit upon his arrival, so he had done at least two hits of freebase cocaine and possibly three within one half hour of the time the shooting occurred. He said that he had a high tolerance for cocaine and that even though he had that many hits it would not affect him so that he would not know what he was doing and opined that he was fully aware of what was going on around him. [Material deleted in editing.]

Frye Hearing

The court conducted a Frye hearing to determine the admissibility of Deoxyribonucleic Acid (hereinafter referred to as DNA) typing evidence.

Facts

The People called Dr. David Bing who testified that he is the Scientific Director of the CBR Laboratory which is a subsidiary of the Center for Blood Research, an affiliate of Harvard Medical School. It is a licensed clinical medical diagnostic testing laboratory that does forensic testing. Dr. Bing has been the Scientific Director of the Laboratory since 1986 and has been with the Laboratory for approximately twenty years in various capacities. Dr. Bing has held academic appointments at the Harvard Medical School, Western Reserve University, Michigan State University and Northeastern University. He submitted a Curriculum Vitae with a list of licensure and certifications, academic appointments, teaching experiences, hospital appointments and memberships in various professional societies.

He received his Doctorate in Microbiology and Biochemistry from Western Reserve University in 1966 and did post doctoral training at the University of California in Microbacteriology and Immunology. He has authored or co-authored approximately sixty one scientific papers and seven of those are publications in the area of DNA research. All of the DNA papers have been written in the past few years and have been peer-reviewed in the scientific community.

CBR is a laboratory that does four different types of molecular diagnostic testing. One area in which they are actively involved is the area of forensics and Dr. Bing has been qualified as an expert in the area of Molecular Biology and DNA testing for forensics in New York and a host of other states as well. Based upon his broad based background and specialized training in immunology, molecular biology, immunohematology and immunogenetics, the People offered his testimony as expert in those areas and it was accepted as such.

He testified that DNA typing is a new technical development in the area of immunohematology and immunology genetics. He stated that immunohematology and immunology as well as immunogenetics all have as a component therein genetic typing.

I shall attempt to summarize the highlights of Dr. Bing testimony. He stated that in human beings, DNA is found in all body cells except red blood cells, and each body cell contains the same DNA. An individual's entire complement of DNA, the genome, exists in that individual's chromosomes, which are thread like microscopic bundles consisting of a complex of nucleic acids and proteins found in each body cell.

DNA typing is a catch-all term for a wide range of methods for studying genetic variations. Genetics is the science of biological variations. The methods or different tests used merely distinguish differences in the genetic material itself. Advances in DNA technology permit us to detect variations (polymorphism) in specific DNA sequences of individuals which can reduce the probability of a chance match (inclusion) of two persons to an extremely low level. In principle DNA typing can become a method for exclusion or inclusion and in some cases even a means of absolute identification. Since no two persons (barring identical twins) have the same DNA sequence, unique identification is possible but the DNA typing system technology presently available can only examine a limited number of sites of variation and, consequently, resolution is limited.

However, a matching of DNA patterns at appropriate DNA sites can be considered strong evidence that the two samples came from the same source. Interpreting a DNA typing analysis requires a valid scientific method for estimating the probability that a random person by chance matches the forensic sample at the sites of DNA variation examined. Population studies of various social groupings and statistical techniques are used to estimate the probability or frequency of finding specific genetic types for individuals within these groups.

DNA is found in the chromosomes of every cell and contains the coded information that provides the genetic blueprint for all living things. Every cell of a particular individual contains the same configuration of DNA. The important feature of DNA for forensic purposes is that, with the exception of identical twins, no two individuals have the same DNA sequences at all sites.

A molecule of DNA is shaped like a double helix and resembles a twisted ladder. The sides of the ladder, which are composed of phosphate and sugar molecules, are connected by "rungs" made up of pairs of molecules called "bases." For the purposes of DNA profiling, the critical components of the ladder are these rungs. Each rung is composed of one pair of the following four organic bases: adenine, guanine, cytosine, and thymine. Because of their chemical composition, adenine will attach only to thymine and cytosine will attach only to guanine. This strict "complementary" pairing means that the order of the bases on one side of a DNA ladder will determine the order on the other side.

Each rung is called a "base pair" and the order in which these base pairs appear on the DNA ladder constitutes the genetic code for the cell. This code carries the necessary information to produce the many proteins which comprise the human body. Because human beings share more biological similarities than differences, approximately 99 percent of the DNA molecules in each of us are the same. Certain sections of the ladder, however, take different forms in different individuals. It is these areas where the base pairs differ between individuals, areas called "polymorphism," which provide the basis for DNA identification and produce great significance for forensic testing.

PCR is a method of DNA amplification. It allows one to take a small sample of DNA and multiply it in a test tube much like a xeroxing of the DNA molecule itself. Then after the product is multiplied or amplified it can be analyzed. With DNA typing one can amplify a genetically informative sequence that is a small portion of the DNA molecule itself, not the whole molecule. After that sequence is amplified, one can detect a genotype — the genetic makeup of an organism — in the amplified product itself.

PCR amplification permits the analysis of a very small amount of tissue or body fluids; theoretically even a single nucleated cell can be used to study DNA. The PCR process itself is simple. It is analogous to the process by which cells replicate themselves. The PCR amplification process itself consists of a three step cycle. This three step process by which the targeted sequence of the DNA molecule is copied is referred to as the PCR process.

The DNA sample is extracted from the surrounding biological matrix in which it is found and is placed into a thermalcycler. The sequence itself then consists of three distinct steps.

The first step is referred to as denaturation. It is the process by which the double stranded DNA is itself separated, by unfolding it into single strands. This is done by incubation at a high temperature, normally ninety four degrees centigrade. The heating of the DNA causes the DNA strands to separate.

The next step in the process is known as annealing. The temperature in the thermalcycler is lowered to sixty degrees to allow the primers to bind to their complimentary sequences in the DNA that is to be amplified. Once the temperature is lowered it allows the primers, which are short synthetic DNA molecules, to bond, that is they will adhere to the original sequences of the targeted DNA. The final step of the process, extension, extends the primers that have been added. Extension involves lowering the temperature to approximately seventy two degrees, the optimal temperature for adding an enzyme which causes the DNA to copy itself. That enzyme is called Taq-Polymerase. It catalyzes the DNA and is responsible for synthesizing the targeted sequences of the DNA molecule.

The PCR process involves the utilization of temperature changes to manipulate the DNA in a sequence where it is repeatedly duplicating copies which are made over and over of the same targeted sequences of the DNA. These increase exponentially until there is a vast amount of the original targeted sequence of the DNA molecule that has been copied.

The PCR process does not copy the entire DNA molecule. It copies the region of DNA between the primers are located. In the PCR process what is being amplified or duplicated are copies of very specific targeted sequences of the DNA molecule itself.

One of the genes that was tested in this case is a gene called the DQ Alpha gene. That gene is located on the sixth chromosome. A gene is the basic unit of heredity, a sequence of nucleotides on a chromosome.

Genes can exist in multiple forms and those multiple forms are called alleles. In the DQ Alpha system there are ten different known alleles. One of the tests that was used in this case, the DQ Alpha test, is used for testing forensic evidence and it can detect six out of the ten known alleles. A commercial kit is used to conduct this PCR forensics test. It uses reverse Dot Hybridization to detect variation at the HLA DQ locus. The PCR method of amplification produces a series of dots which indicate whether specific DNA characteristics are present or absent in a particular sample. Once the DNA has been amplified it can be tested for the detection of genetic variation in the amplified DNA product itself.

The PCR amplified target DNA is immobilized on a nylon membrane and a biotinylated probe is added. A chemical, biotin, is incorporated into the probe. The biotinylated probe will hybridize to the target DNA if there is no nucleotide mismatch. The probe is a short segment of single stranded DNA used to detect a particular complimentary DNA sequence. The probe only recognizes the sequence of the DNA itself. It only sees a small section of the copied DNA but can detect a specific allele.

In the DQ Alpha system there are probes which can detect all of the alleles and it does that by recording the pattern of dots that are created. By examining the dots on the strips the genetic type of that copied DNA can be determined.

Although there are ten different alternate forms of the DQ Alpha allele, this particular test, the DQ Alpha Test, only recognizes six of them. The use of allele-specific probes is the most generalized approach to the detection of alleles that differ in sequence.

The probe is mixed with disassociated strands of PCR reaction product under such conditions that the probe and product strands hybridize if there is a perfect sequence complementarity, but do not if there are mismatches in the sequence itself. An array of probes are immobilized on a test strip and the strip is emerged in a solution of PCR product. The PCR product hybridizes only to its complimentary probe.

This procedure is known as "reverse dot hybridization" and a commercial kit based on the reverse dot blotting principle has been released by the Cetus Corporation. If the probe hybridizes, that is if the complementary strands of probes reassociate on the strip, a bluish colored dot appears (on the colorless dot on the strip), which means that the test allele is present in the DNA sample. This dot-blot format permits one to make a typing identification of the DNA sample.

The DQ Alpha test is just one example of a PCR test that is currently in use for forensic testing. Therefore, if we examine a sample of DNA from an individual and a sample of DNA from an unknown source and after analysis we come up with the identical genetic type on that copied DNA we say that there is a match. Thereafter that match is assigned a statistical significance.

The commercial testing kits contain all the materials necessary to run the tests along with written instructions (protocols). The kit contains the primers used to do the amplification, typing strips, the probes, and a positive control which in the case of the DQ Alpha test contains a known DQ Alpha type.

The DNA evidence samples are tested along with the control samples and they are examined to see if the same genetic type shows up in both of them. If they match then they are compared with the results of population studies to see what percentage of persons within a given racial or ethnic grouping have that particular genetic profile.

In order to provide meaning to a match, probability estimates must be provided to show how often the particular DNA profile occurs in a population. Where a match is made multiplication rules of statistics are applied to arrive at how often this DNA profile is expected to occur in a given population grouping. A table of allele frequencies is made for the Caucasian, Black and Hispanic populations within the United States by analyzing the DNA profiles of sample databases for each population grouping.

Once a match is declared, one calculates the statistical significance of a match between two DNA profiles using tools from the field of human population genetics. The statistical significance is measured by the frequency with which a pattern of alleles occurs in a specific population. Probability calculations are necessary because it is impossible to match an entire DNA molecule. Certain statistical assumptions derived from the area of population genetics regarding the frequency with which certain base sequences within a DNA strand will occur in a population (Hardy-Weinberg principle) are utilized. They are supplemented and confirmed by the results of internal studies completed by CBR laboratories and are jointly employed in order to arrive at an estimate of the probability that the match found could have occurred fortuitously.

There is also a test that allows one to look at six different genetic sites at the same time. The DQ Alpha test only permits the viewing of one gene at a time. This test that simultaneously examines six sites is given the name Amplitype PM or the Polymarker test.

PM stands for Polymarker and this test looks at six different genes that are each found on a different chromosome. The fact that six genes can now be looked at altogether allows the power of discrimination of this PCR test to be increased from ninety three to over ninety nine percent.

The Polymarker test works similarly to the DQ Alpha test except that different primers and reagents are used. These genes are not quite as polymorphic as the DQ Alpha gene. They exist in two or three forms as opposed to ten forms.

However, given the fact that they can be analyzed all together at a given time, it permits one to discriminate more effectively one sample from the other. The terms Amplitype PM test or Polymarker test are used interchangeably. They both refer to a type of PCR testing and they both use the PCR method to detect discrete alleles.

All PCR methodology involves the same three step process — denaturation, annealing and extension. PCR is not the only method utilized in DNA testing. Another method of analysis is Restriction Fragment Length Polymorphism (hereafter RFLP).

The PCR method has a particular advantage in forensic setting over the RFLP system. In RFLP testing the required DNA sample must be a larger amount of DNA material in an intact form. There is a more stringent quantity and quality requirement in terms of sample needed in order to conduct RFLP analysis.

In PCR analysis one can work with a much smaller sample of DNA and the sample can be partially degraded. Generally forensic samples are not collected under ideal conditions and DNA that comes in a forensic sample will generally be somewhat degraded. The PCR system will work better on a degraded sample and it is easier to type through the PCR method a sample that comes from a source where there is potential degradation.

The PCR methodology is not new and has many other applications. It is the primary way in which people are typed for transplantation of organs and bone marrow as well. The PCR methodology is also the principle means for diagnosing genetic diseases and inherited genetic traits. In most cases when scientists have developed a new genetics test for detecting something or coding something it is often based on PCR methodology.

It is one of the mainstays of biotechnological industry. The PCR methodology is relevant to the entire molecular biology community and it is particularly relevant to genetic testing and genetic typing. It is through the PCR amplification technique, that DNA samples can be reproduced and then genetically typed. The DQ Alpha Amplitype Kit utilizes the PCR test process to genetically type the alleles found in the DQ Alpha gene.

Dr. Bing testified that this test is generally accepted in the scientific community as a reliable method for genetic typing and that the PCR methodology has been validated in the scientific literature and tested in numerous laboratories throughout the world. He said that he is not familiar with any scientific literature or studies that have ever cast doubt on the validity of the PCR methodology in the DQ Alpha Amplitype testing system.

He testified that laboratories throughout the world use various PCR systems, not just the DQ Alpha system, to conduct PCR analysis for forensics and other applications, such as paternity testing, transplantation of organs, cloning, etc. He said that there are twenty five laboratories currently validating Polymarker PCR systems at this time pursuant to written protocols prescribed by various licensing agencies. He is a member of the Technical Working Group on DNA Analyses and Methods (TWGDAM) which is a national committee of scientists that promulgates guidelines for RFLP and PCR analyses conducted in forensic laboratories throughout the country.

Dr. Bing testified to the results obtained in this case from the PCR tests by the DQ Alpha Amplitype System which were incorporated in the report of CBR Laboratories — namely that Roberto Morales' blood type was a DQ Alpha four and that some of the blood samples from the vehicle were also DQ Alpha type four. He said that further PCR testing was done utilizing the Polymarker or Amplitype PM test to obtain more refined test results from the samples submitted.

Dr. Bing stated that a commercial kit manufactured by the Perkin Elmer Company was utilized and said the protocol for the process was identical with the DQ Alpha Amplitype Kit except that different reagents (primers and probes) were used. The Polymarker Test, which examines five additional loci, permits an examination of six different genes each of which are on a different chromosome amplitype. This test disclosed a match at six separate genetic loci or six different chromosomes. After comparing the frequencies of these typing matches he ascribed a statistical significance namely that one out of 22,434 Hispanics in the population has the same genetic profile as the defendant.

The People called Dr. Robert Shaler, who testified that he is Director of the Forensic Biology Department in the Office of the Chief Medical Examiner for the City of New York. He was formerly the Director of the Serology Department there as well. He is currently an Adjunct Professor at the John Jay College of Criminal Justice and an Associate Professor of Forensic Medicine at the New York University School of Medicine.

He has also taught forensic chemistry at the University of Pittsburgh. As Director of the Forensic Biology Department, he is responsible for the scientific and administrative operation of the Forensic Biochemistry and Hematology and Forensic Molecular Biology Laboratories of the Office of the Medical Examiner.

He received his Master of Science Degree and Doctorate in Biochemistry from Pennsylvania State University. He is a member of numerous professional societies and is the author of twenty five published scientific articles relating to the typing of DNA evidence and other forensic topics. He testified that he was previously qualified as an expert in forensic biology six hundred times. Two of his publications are specifically concerned with PCR analysis of forensic evidentiary samples. His testimony has also been received as expert in the area of DNA typing and on each occasion PCR analysis was involved. His testimony was offered and received as expert in Forensic Biology and DNA typing of forensic evidence.

Dr. Sahler said forensic biology applies the laws of the biological and chemical sciences to the analysis of biological evidence that occurs as a result of a crime. As a Forensic Biologist he is concerned with identity testing. He tests evidentiary samples of blood, semen, or saliva to see if they can be typed or identified.

He stated that there were different methods for testing DNA in forensic investigations. He described the RFLP and PCR methods for typing DNA evidence. He said that the PCR method is used in almost all the biological sciences and is accepted as reliable in the forensic scientific community.

He stated that the PCR methodology is widely used in the medical field for a variety of very significant applications and that it is in fact a mainstay in medical testing procedures. He said that the PCR process was the principal method used to identify genetic diseases such as legionnaires disease, lyme disease, etc., and for identifying organs for transplant procedures and cloning genes in the biotechnic industry. He testified that he was familiar with the scientific literature validating the PCR tests used to identify and analyze forensic evidence and was not aware of any studies that challenged the validity of the PCR process itself, provided it was performed properly.

He also stated that he had personally validated the PCR methodology by extensive tests he had conducted in his own laboratories. He said he was aware of some of the concerns expressed regarding the validity of the PCR process in forensic applications but nevertheless expressed his endorsement of its reliability and general acceptance in the forensic scientific community. He was of the opinion that at the time the Committee prepared its report in 1992 they were concerned that there was an insufficient amount of quantifiable laboratory data to validate the process in forensic applications.

Dr. Shaler said that since that time, however, there has been an explosion of information from a large number of laboratories throughout the world that have been using and validating PCR in deriving identity testing results. He said that there is now a broad base of experience in the use of the technique in identity testing and this concern is now moot in his opinion.

Dr. Shaler said that another concern expressed by the Committee regarding PCR based typing was the possible contamination of evidence samples with other human DNA. Since PCR is not discriminating as to the source of the DNA it amplifies, and is exceedingly sensitive, there is a potential for amplification of contaminated DNA which could lead to spurious typing results. He said the Committee was concerned about contamination at several different levels. There was a concern about contamination of the forensic samples before they even came to the testing laboratory, a concern about contamination within the laboratory from sample to sample, and then there was concern about whether or not this contamination would lead to incorrect typing results. Dr. Shaler stated, as did Dr. Bing, there were guidelines that were published as to how to minimize possible contamination in the handling of samples in the PCR process within the laboratory itself.

He said the use of laboratory coats, the use of gloves, the use of dedicated equipment that would only be used in certain areas and the use of bio-safety cabinets were all designed to minimize and or eliminate the possibility of contamination. An additional safeguard or control was the fact that the laboratory areas where testing was performed were separated to minimize the possibility of mixing the samples and incorrectly amplifying the results. Internal controls are also run to insure that contamination does not occur.

Both Dr. Shaler and Dr. Bing testified that written protocols were used to assure quality control and that the DQ Alpha Amplitype Kit and the Polymarker Kit both contained such written protocols and quality assurance controls. Dr. Shaler was of the opinion, as was Dr. Bing, that these controls sufficiently addressed the issue of contamination that was raised in the Committee Report.

Dr. Shaler testified that he examined the results of the tests that were performed in this case by Dr. Bing's laboratory (CBR Laboratories.) He said that he examined the original laboratory data which were derived from the testing that was performed, as well as the reports that were generated from CBR Laboratories. He said that in his opinion said the report that was written is consistent with the laboratory results that were obtained.

He also stated that he examined the results of the CBR laboratory reports concerning the Polymarker Analysis Test. He said that in his opinion after having compared the original laboratory results that were obtained from Dr. Bing's use of the Polymarker Kit and after having examined the laboratory report, the results reflected in the report are consistent with the original laboratory results.

On cross examination Dr. Shaler conceded that it would be possible for a laboratory to have the forensic evidence samples as soon as possible after the underlying incident occurs. He said that forensic personnel usually have no control over that variable. He was asked whether or not he was aware that approximately six months had elapsed between the time that the incident occurred and the time that the testing was performed and he conceded that he was not.

He said that a number of factors could contribute to the degradation of a sample and he cited exposure to humidity over a period of time as a potential factor that might have an effect on the results of PCR analysis. He stated that at some point DNA can be degraded beyond the point of being able to perform any tests. He said that there is no bright line or point of demarcation where it becomes infeasible to perform PCR testing and that it varies and depends on each particular case and on the integrity of each sample.

However, he did say that if a sample becomes sufficiently degraded it would not yield an incorrect answer but would not merely give any answer. He also stated that the mere passage of time would not be per se determinative because if samples collected from a scene were collected and packaged properly it should not affect either the stability of the sample or the results of either PCR or RFLP testing. The People also called Dr. Kenneth Kidd who testified that he is currently employed as a full professor in the Department of Genetics at the Yale University School of Medicine. Dr. Kidd also has joint appointments in the Psychiatry and Biology Departments at Yale University where he has been a faculty member since 1973. He submitted a curriculum vitae which lists his current and previous positions, scholarships, fellowships, memberships in various professional organizations, certifications, and his most recent list of scientific publications.

He received his doctorate in genetics from the University of Wisconsin in 1969 and did postdoctoral work at the Institute of Genetics, University of Pavia and at the Stanford University School of Medicine, Department of Genetics. Dr. Kidd has authored approximately three hundred and nine scientific papers. Almost all of his recent papers relate in some way to DNA typing, and a large number of them also deal with PCR methodologies. The overwhelming majority of his papers have been published in peer review journals.

Dr. Kidd has qualified as an expert in both the areas of human molecular and population genetics in New York, Virginia, California, Colorado, Arizona, and a number of Federal Circuit Courts as well. Based upon his broad background in molecular biology and population genetics, the People offered his testimony as expert in those areas and it was accepted.

Dr. Kidd stated that genetics is the study of inheritance and that DNA is the molecule that encodes that inheritance. He said that much of the field of genetics deals very specifically with analysis of the DNA molecules.

He stated that he was familiar with the methods developed in the studying of the DNA molecule and described the RLFP and PCR techniques. He testified that population genetics is the study of how genes are distributed among individuals within populations, and the various factors that affect how genes are distributed. He said that the PCR technique is the most important and singly most utilized molecular technique in thousands of laboratories throughout the world. He stated that the PCR process is accepted as reliable in the scientific community for amplifying DNA sequences.

He discussed some of the concerns raised by the Committee of Scientists in the National Research Council report on DNA typing. He stated that at the time the Committee Report was prepared the PCR process had not been very widely validated and that there were concerns about how reliable the results were in view of the lack of quantifiable data and the dearth of reported experience with the process it-

self. He stated that was no longer a concern because PCR testing is commonplace now and there is extensive data available concerning PCR testing from numerous laboratories both domestically and abroad.

He said that in the last several years there has been a rapid increase in the use of this technology in forensic applications. He stated that there have been more rigorous protocols developed for laboratories and these laboratory controls have been implemented to address many of the contamination concerns that were raised in that original Committee Report. He said that with the addition of new markers for PCR analysis the chance of incorrect or spurious typing has been dramatically decreased if not eliminated.

He stated that the subtyping tests used in conjunction with the DQ Alpha system permit additional analyses which provide opportunities to exclude samples and furnish a more powerful statistical format for the elimination of frequency by chance. He stated that if contamination were to exist in a sample that was being used to examine the PCR method there were two ways in which it could be detected.

One way is through the use of a negative control which is always run with the test. This negative control should not give off any DNA signals and, in fact it does, then it alerts one to the fact that there is a problem which can be verified with further testing. If during the conduct of the test one obtains evidence of three different alleles then there is either a contamination problem or a mixed sample since no one person can have more than two alleles.

Dr. Kidd examined the DQ Alpha typing protocol from CBR Laboratories which had been entered into evidence, and concluded that the protocol is based on generally accepted scientific standards for the use of PCR tests as it relates to the DQ Alpha gene and that if the protocol were followed, test results obtained through the PCR method would produce scientifically reliable results.

Dr. Kidd also examined a published paper from Dr. Bing's laboratory on the method he used to subtype the four alleles and concluded that it is based on generally accepted scientific standards. He stated that if the protocol procedures were followed during the subtyping tests on the DQ Alpha four alleles it would produce accurate results. Dr. Kidd also stated that in all cases accurate results presuppose and are predicated on competent lab personnel following the protocols rigorously.

Dr. Kidd examined the Perkin Elmer amplicon protocol for the Polymarker test and concluded that if that protocol were to be followed it would produce reliable results as well. He stated that he was familiar with the commercial kits available and that in his opinion they were reliable.

At an earlier time he did not think so due to the fact that some of the earlier thermal-cycling machines were not as reliable as the new machines and the earlier protocols did not specify a sufficiently high temperature to assure that DNA denaturation occurred. As a consequence, allelic dropout might result along with attendant incorrect typing results. However, he stated that improved thermalcycler machines and changes in the protocols which specify higher temperatures to assure separation of the DNA strands have corrected these problems.

He described the PCR process by which one of the alleles of the DQ Alpha gene known as type four is detected and sub-typed using the kit and stated that Polymarker analysis is a system that uses the same technology except that it produces results for five different loci or genes. The DQ Alpha test uses a single pair of primers while the Polymarker system puts in five pairs of primers — a pair for each of the separate loci. Each pair does PCR on each of the five separate genes. This additional analysis provides additional opportunities to exclude or find a difference between DNA samples.

Conversely, if one cannot find a difference between samples it furnishes a more powerful statistical basis for projecting how frequently two samples would be found to be identical by chance. He said that if the kits and protocol for both systems were used properly the results generated using the PCR process are both reliable and accepted in the scientific community. In both systems the product is hybridized to the dot on the strip and they do or do not turn color using the same basic chemistry. Only the primers used and the material amplified in the PCR reaction is different.

He also described the methods used, in the field of population genetics, to come up with population databases for allele frequencies so that statistics could be generated to compare expected frequencies of types obtained with the kit. He stated that the databases that were used were constructed in a way that was generally accepted within the relevant scientific community for population genetics.

He said that he reviewed the results obtained from the three tests performed by Dr. Bing's Laboratory — the DQ Alpha test, the subtyping of the number four allele of the DQ Alpha gene, and the Polymarker test — and the conclusions he formulated regarding the combination of genotype frequencies found in the DQ Alpha test and five additional loci on the Polymarker test were in his opinion accurate.

Dr. Kidd also testified about the significance obtained by matching two different DNA samples and the frequency with which a certain genotype, happens to appear in the population. A genotype is the combination of the two alleles that the person providing the sample contributed. If it is a very common genotype, then two separate samples having the same type by chance alone would be seen relatively frequently. If it is a very uncommon genotype then a match is unlikely to occur by chance alone from two separate samples. The significance in a forensic setting depends upon which genotype is present and what the frequency of that genotype is in the relevant population.

He said that a large number of individuals from each relevant population group are typed to create a database which is used to determine the frequency in which alleles would show up in that population. The database is used to obtain frequency estimates for the various genotypes which can be used to evaluate the specific typing one sees.

To determine the frequency of alleles one simply counts out however many alleles are present in the sample, and what proportion of them were of each type. That frequency becomes the estimate for the frequency in the population at large. Dr. Kidd stated that this procedure is generally accepted as a reliable method in the field of population genetics to come up with a database for allele frequencies.

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He testified that Dr. Bing identified the defendant as a homozygous type four and that he observed genotype four in the sample as well. He said based upon an analysis of the findings that ninety nine point nine percent of the relevant population have a different combination of alleles. He stated that although his calculations were a little more conservative than those of Dr. Bing, the difference between that calculation was statistically insignificant or even minuscule. This means that the chances are ninety nine point nine percent that someone else in the population would not have the same allelic profile as the defendant. Translated, that would come out to about one in twenty two thousand or fifty in one million. Statistically only fifty individuals out of one million would have the same allelic profile as the defendant.

The defendant called Dr. Donald Riley who testified that he has a Bachelor of Science Degree in Chemistry and a Doctorate in Biochemistry. He testified that he was a Research Associate in the Department of Genetics and Medical Genetics for eight years at the University of Washington. He stated that he is currently an Assistant Professor jointly appointed in the Department of Urology and Pathobiology at the University of Washington School of Medicine. He stated that he had authored approximately twenty six published papers and scientific articles in the area of DNA analysis and that six of those recent publications are concerned with PCR analysis. His testimony was received as expert in the area of molecular biology and DNA analysis without objection.

He testified that the PCR process involves three different stages — denaturation, annealing and extension. He stated that the process involves the manipulation of temperature changes which are designed to repeatedly duplicate or make copies of the target DNA molecules. He said that it was very important that at each stage or each step of the process the proper temperatures be maintained. He stressed that it was necessary to make sure that the correct temperature is achieved for the correct amount of time in each of the three stages of the PCR process otherwise the typing results may not be accurate.

For example, in the first stage of the process, denaturation, he said that if the temperature was not high enough and maintained for the correct period of time, some of the DNA target molecules might not separate; and if they didn't separate, then they could not be amplified and essentially they would be missed in the reaction and the analysis that follows that reaction. He said

that if the temperature was not correctly maintained for the proper amount of time, the findings obtained at the end of the process itself would be suspect and unreliable.

He said that if the proper temperature was not maintained at the annealing stage, the primers might bind to the wrong site, that is to a site that was only partially complementary to them. He said that if the primers did not properly bind, they would not find their appropriate sites of recognition which in turn would yield an inefficient PCR reaction. This could lead to a falsely amplified target that was not the intended target. In other words, the proper sequences of DNA would not be detected or discriminated in the test itself and a false typing result could be obtained.

He testified that he examined several pages of graphs which indicated to him that the thermalcycler machine was not holding the proper temperatures for the appropriate amount of time in the three stages of the PCR process itself. He said that the tops and bottoms of the plot on the graphs should be flat, indicating that the machine had levelled off in temperature and held the sample at the correct temperature for the appropriate period of time.

Instead, he said that the tops and bottoms of the curves on those graphs were not flat, but in fact pointed, indicating that the thermalcycler was going to temperature and then immediately changing rather than holding the temperature for the appropriate time interval. He said that this could lead to "allelic dropout." He stated allelic dropout occurs when there is selective amplification of some alleles and not others and that it could produce incorrect typing results.

He said that if these findings were applied to population statistics they could produce incorrect results with regard to the frequency of occurrence within any population group. He also stated that it appeared to him that the operator of the thermalcycler opened up the machine thereby exposing the samples to the cold air causing an inappropriate drop in temperature which could have produced allelic dropout or false amplification of unrelated sites that could generate incorrect typing results.

He stated that the Polymarker Kit which looks at five different genetic sites is a new product of the Cetus Corporation that does not have any peer review literature validating its results. He said that although the DQ Alpha Kit has been around for some period of time and has gained some acceptance in the scientific community, in his opinion the Polymarker Kit is so new that it has not gained general acceptance in the scientific community.

He said that the Cetus Corporation recommends the use of a typing gel with the DQ Alpha Kit. He pointed out that the protocol used by the CBR Laboratory doesn't require the use of product gels, which are an important part of the protocol of the Cetus Company itself. He said that the product gel supplies information about the quality of the PCR reaction itself, how well that reaction has gone, how strong it is, and whether or not spurious targets have been amplified or not. He said that in his mind it is a very important part of the protocol and the analysis itself.

He said that in his opinion the failure to use product gels would negate or call into question the typing results obtained. He stated that the Cetus Corporation recommends running the product gel and analyzing it prior to doing the typing strips and that although that particular procedure is called for in the Cetus protocol it is not mentioned in the CBR laboratory protocol.

He testified that he found major inconsistencies in the report prepared by CBR Laboratories. He stated that in one place Mr. Morales' HBGG is listed as type B and in another his HBGG is listed as type A. He also pointed out that the typing of the laboratory technician, Janice Williamson, is classified in two different ways that are not consistent.

Janice Williamson is Dr. Bing's laboratory assistant and she was typed because she handled the samples. Since there is always a possibility of contamination, it was necessary to know what her DNA type was so that it could be considered when the final results were examined.

He also stated that it appeared that the temperature probe was not inserted tightly into the recorder and this in turn caused a temperature drop which may have caused primers to bind improperly. He stated that the errors and inconsistencies in the report undermined his confidence in the manner in which the particular laboratory procedures were conducted in this case and the results obtained as a result of those tests. He said that he used the same tables that Dr. Bing did in making his statistical extrapolations except he factored in the "ceiling principle."

He said that the ceiling principle is a procedure that was strongly recommended by the National Research Council for calculating frequencies of occurrence that occur within population groups. He said that the ceiling principle basically recommends that the highest frequency in any population should be used. He asserted that the reason for doing that is because population databases are not perfect, especially where there are sub population groupings, as one finds in the Hispanic population. He said that since population data are not perfect, a conservative approach to calculating these frequencies of occurrence should be used.

He also mentioned that the ceiling principle was not outlined in the protocol used by CBR Laboratories. He testified that when he factored in the ceiling principle he came up with a frequency of occurrence of one in two thousand two hundred twenty five (2,225) which represents a one tenth diminution in the probability of random occurrence in this population grouping.

On cross examination Dr. Riley stated that he had a problem with using the DQ Alpha Kit for inclusion because he did not think it was a powerful enough method to use for inclusion as opposed to exclusion. He stated that in his opinion accuracy and reliability are at least as dependent upon

the competence of the operator of the PCR test as the test itself.

He said that he was familiar with the literature that has been submitted regarding the validation of the DQ Alpha test and the kit itself and he conceded that literature has been peer reviewed within the scientific community. He did not state the validation studies were not accurate, but he felt they were not complete enough to warrant their use for inclusionary, as opposed to exclusionary purposes. He said that in terms of contamination they had only tested a limited number of possible contaminants and not others and that in his opinion the data were simply incomplete.

Dr. Riley said that he was not aware of or could not identify any papers that had concluded that PCR was an inappropriate methodology for forensic applications but, on the other hand, he said that did not mean that he found that it was generally acceptable either. He stated that while in his opinion the DQ Alpha test, when performed correctly, gives types that could be used for exclusions he would not say that was the case for the Polymarker Kit. He said that the five additional sites on the Polymarker test have not been sufficiently tested in forensic settings and that, therefore, they were incomplete. He said that in his opinion the Polymarker test is just too new and untested to be utilized in a court setting.

He stated that he was not aware of any studies or any criticisms of the Polymarker test and conceded that he was unaware of the fact that there are twenty five laboratories throughout the United States that are currently utilizing or testing the Polymarker System. He said that in his opinion the ceiling principle should be applied based upon his reading of the National Research Council Report and it did not matter whether or not the process utilized was the RFLP or PCR process because he felt that the principle was independent of the method selected.

The People recalled Dr. David Bing who testified that the only difference between the DQ Alpha test and Polymarker test are that they use different reagents and primers. He stated that the DQ Alpha test is generally accepted in the scientific community and that, although there are not published studies on the Polymarker test those studies have been conducted in field trials in numerous different laboratories.

He stated that the Federal Bureau of Investigation has done extensive studies on the Polymarker test and that these studies have all been submitted for peer review. He stated that his own laboratory did internal validation studies as well and that the results generated by using the Polymarker test have been validated internally and externally. He stated in his opinion the Polymarker test is not too new to be used for inclusionary purposes in forensic settings. He said the protocol of hybridization for the two kits is identical.

He said that his laboratory did not use a product gel to visualize the DNA because when one uses a product gel one has to open the tube and this presents an opportunity for contamination. The hybridiza-

tion process itself is totally specific, that is it will detect any alleles that are present and that the usage of gels while recommended is not a requirement. He also stated that he runs internal control tests for both the DQ Alpha test and the Polymarker test that are not required.

He conceded that there was a transcription error in the report prepared by his laboratory and that the defendant's type should be listed as A and not B. He stated that the deviation in the thermalcycler graph was occasioned by a break in the voltage. He said that this did not compromise the results because the strip chart recorder does not record temperature changes and that their maintenance chart indicated that the thermalcycler was working properly.

He stated that he does not use the ceiling principle because it was developed for RFLP and not PCR analysis. He said that although product gels are useful they are not necessary since the hybridization process is specific in that it detects the genetic type in the amplified DNA if it is there. He said that although there are no published peer review papers on the Polymarker test many of the laboratories use their own Polymarker tests and that their studies have been documented but their results have not been published yet. He said that his internal testing of the Polymarker test on every proficiency panel that was tested since 1990, whether it was blood stains, saliva or semen samples, has been validated and that every sample has been matched correctly since that date.

Findings

Recently the N.Y. Court of Appeals, in *People v. Wesley*, 83 N.Y. 2d 417 (a 3-2 divided opinion), determined that forensic DNA can be used in criminal trials. However, the Court's endorsement of forensic DNA analysis in *Wesley* was limited to Restriction Fragment Length Polymorphism (hereinafter referred to as RFLP) analysis. Since forensic DNA analysis is still in its infancy, new techniques such as Polymerase Chain Reaction (hereinafter referred to as PCR) will continue to emerge.

These new techniques will require Frye hearings to determine whether they are generally accepted by the relevant scientific community. In this case a novel test, the Polymarker test, which utilizes the PCR process but which has not been widely applied in forensic settings was employed in conjunction with the more conventional DQ Alpha test.

The long recognized rule of *Frye v. United States*, 293 F 1013, is that expert testimony based on scientific principles or procedures is admissible but only after a principle or procedure has gained general acceptance in a particular scientific field. The Court has noted that the particular procedure need not be unanimously endorsed by the scientific community but must be generally accepted as reliable (*People v. Middleton*, 54 N.Y. 2d 42, 49).

The People contend that the novel scientific evidence in this case, specifically DNA typing evidence obtained by utilizing the PCR method, is generally accepted in the relevant scientific community as a reliable procedure. Defendant contends that for a number of reasons the results of the DNA analysis performed by Dr. David Bing and his associates at the Center for Blood Research (hereinafter referred to as CBR) in Boston should not be admissible at the defendant's trial. The specific issue here concerns the acceptance by the relevant scientific community of the reliability of DNA profiling evidence obtained by the

PCR Method in general and the novel Poly Marker Test in particular.

In *People v. Wesley*, supra, the Court reaffirmed the test articulated in *Frye v. United States* as the appropriate standard in New York for determining the admissibility of novel scientific evidence. However, there were some differences between some members of the court with respect to the findings and scope of the hearing conducted by the trial court. In *Wesley*, supra, the majority opinion held that the general reliability of DNA matching was established at the hearing and that required no more than that. The majority opinion noted that some other objections which were made at the hearing but not at trial are actually matters going to trial foundation or the weight of the evidence and stated that both matters are not properly addressed in the pre-trial Frye proceeding.

The majority did not accept the more stringent requirements that would be added under the test proposed by the concurring opinion. They stated that after the Frye hearing the focus should then move from the general reliability concerns of Frye to the specific reliability of the procedures followed to generate the evidence proffered and whether they established a foundation for the reception of the evidence at trial. The majority held that the trial court should determine as a matter of law whether an adequate foundation for the admissibility of this particular evidence has been established and that the jury in the final stage should then determine the weight of the evidence.

However, in a concurring opinion, Judge Kaye stated that the hearing court erroneously determined that it considered only the theory of forensic DNA analysis as going to admissibility and relegated the remaining questions for weighing by the jury, including foundational inquiries regarding laboratory methodology and procedures. Judge Kaye also found that the hearing court committed error in concluding that concerns relating to statistical techniques affected the weight of the evidence only and not admissibility as well. She stated that whether the statistical technique is capable of producing reliable results went to the issue of admissibility, not weight.

The majority opinion would seem to reserve any further inquiry on the particular procedures employed for trial foundation and jury assessment. It is not clear from the concurring opinion whether Judge Kaye would require separate Frye inquiries into the validity of the "matching" and statistical techniques employed or would leave additional review of these issues for trial court foundational inquiry. Even though it seems that a majority of the Court of Appeals would not require additional Frye inquiry on these two issues, this court feels it would be appropriate to point out that it did consider the evidence on these issues as well in view of the seeming uncertainty regarding the necessity for detailed findings in this regard.

I find that the People have met their burden in establishing that the PCR tests at issue here are sufficiently established to gain general acceptance in the scientific community and satisfy the standard of reliability. Although the procedures are not without their critics in the forensic scientific community, the test for admissibility at trial is not whether a particular procedure is unanimously endorsed by the scientific community but whether it is generally accepted as reliable (*People v. Middleton*, supra). Even though it appears from the majority opinion that the Court of Appeals

would not require additional Frye inquiries on the issues of "matching" and the application of statistics in interpreting a match, this court has taken into account and considered those factors in making its determination.

It appears preliminarily as a matter of law that there is an adequate foundation for the admissibility of this particular evidence. The procedures followed to generate the evidence proffered indicate that proper techniques were utilized and followed by the laboratory which conducted the tests. Any particular infirmities in the collection and analysis of the evidence, not affecting its trustworthiness goes to weight, and can be challenged by counsel and evaluated by the jury at trial.

In view of the fact that population genetics is arguably the most crucial step of the analysis and is apparently an area of great controversy among the experts, the court has considered the hearing testimony pertaining to population studies and techniques employed by the CBR laboratory and has determined that they are capable of generating reliable results. The court has considered these issues in terms of admissibility so that the concerns voiced by the concurring opinion with respect to matching and statistical techniques have been evaluated.

At the hearing, the court considered not only the theory of forensic DNA analysis utilized in the PCR process and the Poly Marker Test, in the context of admissibility but also considered the additional concerns articulated in the concurring opinion (*Wesley*, supra), as well.

Even though the court finds that the PCR procedure is accepted as reliable in the scientific community, it will apply the "ceiling principle" and limit the statistical evidence to the conservative estimate derived by Dr. Donald Riley. In view of the fact that national controversy over DNA evidence has shifted to the importance of race and ethnicity in evaluating the significance of a DNA match I find that it would be appropriate to utilize the more conservative approach embodied in the ceiling principle. This principle recognizes that there are racial and ethnic subgroups also known as substructures within the Caucasian, Afro American and Hispanic populations that render suspect some population statistics based on such broad population groupings.

A blue ribbon panel of scientists (the Committee on DNA Technology In Forensic Science, National Research Council Staff (hereinafter referred to as Committee) met and issued a report in 1992 (NRC report) in an attempt to resolve some of the divergence of opinion within the scientific community concerning the forensic use of DNA for purposes of identification in forensic and legal environments. The NRC has commissioned a new study but their report, which will deal with some of the issues and criticisms raised since that time, has not yet been published.

The Committee recognized that population substructures may exist and attempted to provide a method for estimating population frequency in a manner that would adequately account for it. The report recommends using the ceiling method for population genetics calculation. They sought to provide conservative estimates of population frequency without giving up the inherent power of DNA typing. Although the Committee recognized that the ceiling principle is a conservative ap-

proach, it felt that it was appropriate because DNA typing is unique evidence in that the forensic analyst has an essentially unlimited ability to adduce additional evidence through typing additional loci. Therefore, whatever power was sacrificed by requiring conservative estimates can be regained by examining additional loci where required. In fact the Committee stated that although there may be some cases in which the DNA sample is insufficient to permit typing additional loci with RFLP technology, this limitation is likely to disappear with the eventual use of PCR technology.

Therefore, the ceiling principle should be utilized in applying the multiplication rule for estimating the frequency for particular DNA profiles. That formula requires that in applying the multiplication rule the upper confidence limit of the frequency of each allele should be calculated for separate racial groups within the United States and the highest of these values of ten percent, whichever is the larger, should be used.

At trial the People will still have to establish that the procedures utilized generated reliable evidence and they will be required to establish a foundation for the reception of that evidence at trial. The court's decision does not obviate the necessity for the People to do that.

At trial the court will, determine as a preliminary matter of law whether an adequate foundation for the admissibility of this particular evidence has been established and the jury will be left to hear the testimony and consider the weight of the evidence concerning any possible infirmities in the collection and analysis of the data. The court does not wish to imply or suggest that the necessity for the People to comply with proper foundational techniques and the ability of the defendant to attack that evidence is in any way compromised. The court is making these expanded findings so that there can be no question but that it took into account the additional considerations mentioned in the concurring opinion in Wesley, supra.

A contrary argument can be made, namely that if in fact population substructure does exist it is insubstantial and that the issue of population substructure should go to the weight rather than the admissibility of DNA evidence. It may be argued that the issue of substructure may be adequately addressed by defense counsel through expert witnesses, cross examination and summation.

Nevertheless, the Committee recommended the use of the ceiling principle because it felt that way the multiplication rule would yield conservative estimates even for a substructured population and would thereby be fair to suspects because the estimated probabilities would be conservative in their incriminating power. Since the issue of population substructure appears to be the weakest link in the DNA profiling chain, the court is of the opinion that it should limit the statistical evidence and extrapolations as to occurrence to the conservative estimate derived from factoring the ceiling principle into the multiplication rule for estimating the frequency of this particular DNA profile.

I will therefore limit the statistical evidence of frequency probability to one in two thousand two hundred forty three (2,243) instead of one in twenty two thousand four hundred thirty four (22,434). In a murder case where it appears that there is a single eyewitness, DNA evidence may mean a great deal. It is therefore appropriate to take into account the criticism surrounding the valutive significance of a DNA match within the Hispanic population since there are racial and ethnic subgroups (substructures) within that population.

The ceiling principle does that while at the same time it does not deprive the jury of relevant probative evidence. I agree that the issue of substructures within population groupings should go to the weight and not the admissibility of DNA evidence. Accordingly, the defendant's motion to suppress the DNA typing evidence obtained by the PCR technique and the Poly Marker Test is denied, however, the probability estimates shall be limited in accordance with the court's decision.

This Decision shall constitute the Order of this Court.
