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**612 So.2d 381**  
**Willie James POLK**  
**v.**  
**STATE of Mississippi.**  
**No. 90-KA-0308.**  
**Supreme Court of Mississippi.**  
**Dec. 31, 1992.**

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Clarence Whitaker, Vicksburg, for appellant.

Michael C. Moore, Atty. Gen., Mary Margaret Bowers, Sp. Asst. Atty. Gen., Jackson, for appellee.

Before HAWKINS, P.J., and PITTMAN and ROBERTS, JJ.

HAWKINS, Presiding Justice, for the Court:

Following a change of venue from Claiborne County, Willie James Polk was convicted in the circuit court of Warren County of the murders of Mary Belle Simmons and Georgia Mae Thomas and sentenced to two consecutive terms of life imprisonment. On this appeal we address the validity of a search warrant, speedy trial, and admissibility of DNA identification. Finding no error, we affirm.

**FACTS**

On February 12, 1989, around 5:30 p.m., Freddie and Dorothy Alexander went to the Port Gibson Police Department and asked an officer to accompany them to 1413 Vine Street, where Mrs. Alexander's mother lived with one of Dorothy's sisters. The Alexanders had been unable to get a response from Mary Belle Simmons or her daughter, Georgia Mae Thomas, by knocking on the door, and the front door of the house was apparently locked. All the curtains in the house, which usually were open, were closed.

Police Officer Willie Hamberlin returned to the Vine Street house with the Alexanders. This time they found the front door unlocked, and upon entering, they found the partially nude bodies of the two women. Blood was on the bodies, floor, and several large knives nearby. While they were in the front of the house, they heard a noise toward the back as if someone else was there.

Hamberlin called his chief, Buddy Miller, and the Claiborne County Sheriff's Department. The officers saw that the screen on the back porch had been torn or cut, and one side pulled loose, leaving a hole large enough for someone to go through.

Tracks led from behind the house down to a bridge which spanned a creek. Tracks were found both going into and coming out of the water. The tracks led from the back of the Thomas house to the creek and across the creek to a point near Polk's house. Port Gibson Mayor James Beesley suggested getting bloodhounds, and dogs were brought in and did follow the trail. However, no reference to their actions was admitted at trial.

A crowd gathered at the Thomas home, and Mayor Beesley talked with some of the family members in an attempt to calm things down. The mayor left around nine o'clock, after telling Chief Miller that he would sign a warrant when they felt that

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they had sufficient evidence to indicate the identity of the perpetrator of the crime.

The officers learned from neighbors that Polk had been seen going to the Thomas house earlier that afternoon. No one had seen him leave. After officers followed the tracks toward Polk's house, Hamberlin went to Polk's house and looked through a window. He saw Polk, wet and with muddy blue jeans and shoes nearby, lying in bed.

Hamberlin reported to Chief Miller at the Thomas home, who then began proceedings to obtain a search warrant. Officer Cupit wrote out the affidavit; Chief Miller read it, signed it, and then, around 10:00 p.m., went to the mayor's house.

Chief Miller and the mayor discussed the evidence. The mayor then asked the chief if the affidavit was a true reflection of the facts, and Chief Miller said that it was. Beasley then signed the warrant.

The officers returned to Polk's residence, obtained the evidence listed on the warrant, and arrested Polk. Polk was taken to the local doctor's office for testing with a rape assault kit. Although there was blood on the sheets of Polk's bed, as well as on some of his clothing, there was no evidence of any cut on Polk's body.

Blood samples were taken from Polk, and blood was also taken from the victims and from Polk's clothing. Both Polk and Mary Belle Simmons had type O blood; Georgia Mae Thomas had type B blood. Polk's blue jeans were found to be stained with both type O and type B blood. One of Polk's socks was also stained with type B blood.

DNA testing was done on the blood samples from both of the victims, as well as on the blood found on the waistband of Polk's underwear and on his blue jeans. The DNA from Georgia Mae Thomas's blood was found to match the DNA from the blood from Polk's underwear. Polk's fingerprints were also found on several objects in the victims' home.

Following a change of venue to Warren County, Polk was tried and convicted of both homicides, and sentenced to two consecutive life sentences.

Polk has appealed.

LAW

#### I. VALIDITY OF SEARCH WARRANT?

Polk argues Mayor Beesley was not a neutral and detached magistrate because the mayor actively participated in the investigation of the crimes by suggesting that the law enforcement officers get the bloodhounds from Simpson County and by "interviewing" witnesses. We find the search warrant was valid.

The mayor did view the scene and suggested that the officers get the bloodhounds from Simpson County. He and Police Chief Miller testified at the pre-trial suppression hearing that he did not participate in the investigation. He had left when the bloodhounds were brought to the scene.

Chief Miller testified that he asked Mayor Beesley to come to the crime scene because there had been a very serious crime committed, and neighbors and family members who had gathered at the Thomas home were aroused. Beesley talked to them in an effort to "calm things down." He denied that he "interviewed" anyone.

In his brief Polk also alleges that the only reason the mayor issued the warrant was because the crowd was chanting, "Get Willie Polk." The record supports no such charge. Mayor Beesley testified that he left the Thomas house around 9:00 p.m., after informing the chief he would be glad to sign a warrant when they had sufficient evidence to identify the perpetrator of the crime.

The United States Supreme Court has said that "[p]rior review by a neutral and detached magistrate is the time-tested means of effectuating Fourth Amendment rights." *United States v. United States District Court*, 407 U.S. 297 at 318, 92 S.Ct. 2125 at 2137, 32 L.Ed.2d 752 at 767 (1972). We have reiterated that the individual issuing the search warrant must be a neutral and detached magistrate. *Lockett v. State*, 517 So.2d 1317, 1323 (Miss.1987), cert. denied, 487 U.S. 1210, 108 S.Ct. 2858,

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101 L.Ed.2d 895 (1988); *McCommon v. State*, 467 So.2d 940 (Miss.1985), cert. denied, 474 U.S. 984, 106 S.Ct. 393, 88 L.Ed.2d 345 (1985); *Birchfield v. State*, 412 So.2d 1181 (Miss.1982).

Polk avers that Beesley acted merely as a "rubber stamp" for the police, in direct violation of *Aguilar v. Texas*, 378 U.S. 108, 84 S.Ct. 1509, 12 L.Ed.2d 723 (1964). Polk argues that Mayor Beesley had never denied Chief Miller a warrant when requested to issue one. Mayor Beesley had issued approximately ten warrants over a nine-year period. He said that he had never refused to issue a warrant because the chief "was usually pretty thorough" and that they would "discuss it pretty thoroughly."

The record shows that the chief went to the mayor's house at 10:00 p.m., told Mayor Beesley about the tracks leading from the back of the Thomas house to the creek and then to a point near Polk's house; about Officer Hamberlin seeing Polk lying in bed; and about Hamberlin seeing the wet, muddy clothing in Polk's bedroom. Mayor Beesley read the affidavit, and put Miller under oath; Miller swore to the truthfulness of the facts in the affidavit and warrant. Mayor Beesley determined that the police had probable cause, and signed the search warrant. The trial judge correctly found at Polk's suppression hearing that "any neutral and detached magistrate being presented with the evidence herein would have issued a search warrant...."

Law enforcement officers must act in the world in which we live, frequently far from ideal. In *Bevill v. State*, 556 So.2d 699, 713 (Miss.1990), a circuit judge who had gone to the crime scene and saw the victim subsequently issued a search warrant. The crime in that case occurred in one of our state's more populous cities, and while we cautioned trial judges to avoid any appearance of partiality, especially when another magistrate could be easily found, we nevertheless saw no reason that the judge's view of the scene and victim, and nothing more, prevented his being a neutral and detached magistrate. Nor is there anything in this record other than the supposition of Polk to support any conclusion but that Mayor Beesley was impartial, and that he required Chief Miller to give reasonable cause before executing the warrant.

Polk finally argues Beesley could not act, because a mayor as part of the executive branch of government cannot serve in a judicial function, namely as a magistrate. Port Gibson is a municipality of less than 10,000 population. Beesley as mayor had the statutory authority to act under both Miss.Code Ann. Secs. 21-25-5 (1972), and 21-23-7(3) (Supp.1991).

Moreover, Miss.Code Ann. Sec. 25-1-37 (1972), states in pertinent part:

The official acts of any person in possession of a public office and exercising the functions thereof shall be valid and binding as official acts in regard to all persons interested or affected thereby....

See *Upchurch v. Oxford*, 196 Miss. 339, 17 So.2d 204 (1944); *Bird v. State*, 154 Miss. 493, 122 So. 539 (1929); *Powers v. State*, 83 Miss. 691, 36 So. 6 (1904).

The issuance of the search warrant in this case was a valid and lawful act.

## II. SPEEDY TRIAL?

Polk was arrested on February 13, 1989, arraigned May 5, 1989, and his trial began March 5, 1990. Polk contends that the 385 days he spent in jail violated his constitutional right to a speedy trial.

For constitutional purposes, the right to a speedy trial attaches at the "time of a formal indictment or information or else the actual restraints imposed by arrest...." *Lightsey v. State*, 493 So.2d 375, 378 (Miss.1986). See also, *Smith v. State*, 550 So.2d 406, 408 (Miss.1989); *Vickery v. State*, 535 So.2d 1371, 1376 (Miss.1988). Following which the "balancing test of *Barker v. Wingo*, 407 U.S. 514, 92 S.Ct. 2182, 33 L.Ed.2d 101 (1972)" must be applied. *Bailey v. State*, 463 So.2d 1059, 1062 (Miss.1985); *Handley v. State*, 574 So.2d 671, 674 (Miss.1990); *Vickery v. State*, 535 So.2d 1371, 1376 (Miss.1988);

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*Dedeaux v. State*, 519 So.2d 886, 888 (Miss.1988).

Factors to be considered are:

- (1) length of delay,
- (2) the reason for the delay,
- (3) the defendant's assertion of his right, and
- (4) prejudice to the defendant.

*Barker v. Wingo*, 407 U.S. 514 at 530, 92 S.Ct. 2182 at 2192, 33 L.Ed.2d 101 at 117 (1972). These factors must be considered in light of all the circumstances, and no one factor is dispositive. See, e.g., *Jaco v. State*, 574 So.2d 625, 630 (Miss.1990); *Beavers v. State*, 498 So.2d 788, 790 (Miss.1986).

### (1) The length of delay

This triggers the inquiry; however, it must be presumptively prejudicial to do so. *Jaco v. State*, 574 So.2d 625, 630 (Miss.1990). In *Smith* we held that "[u]ntil there is some delay which is presumptively prejudicial, there is no necessity for inquiry into the other factors that go into the balance." *Smith v. State*, 550 So.2d 406, 408 (Miss.1989) (quoting *Barker v. Wingo*, 407 U.S. 514 at 530, 92 S.Ct. 2182 at 2192, 33 L.Ed.2d 101 at 117 (1972)). In *Smith*, we did hold that a delay of eight months or longer could be presumptively prejudicial. *Smith v. State*, 550 So.2d 406, 408 (Miss.1989). Here the delay of 385 days is sufficient to require consideration of the remaining factors.

### (2) Reason for delay

In calculating the length of delay, the delays which are not attributable to the defendant will count against the State, unless the prosecution can show good cause. *Vickery v. State*, 535 So.2d 1371, 1377 (Miss.1988). Polk argues that he was not responsible for any delay and that the State has not shown good cause for delay.

Polk filed fifteen motions before he was brought to trial on March 5, 1990. Seven were filed before the initial trial date of June 12, 1989, including one for a change of venue, filed on May 19, 1989. The change of venue was not formally granted until January 23, 1990, although an informal agreement had been reached on this issue in late August, 1989. Polk argues that the State was not ready for trial on June 12, 1989, anyway, and that the time required to decide the motion for change of venue should, therefore, not count against him. The record shows that, although the State did not have all of the evidence on the forensic DNA analysis on June 12, 1989, there is no evidence to show that the State could not have proceeded if the change of venue had already been decided.

Another of Polk's motions, filed August 30, 1989, required that the trial judge hold a Frye hearing to determine the admissibility of DNA analysis. The Frye hearing was held on January 8, 1990, and the trial court entered its order from that hearing on February 26, 1990. In addition, six other orders were entered by the trial court in response to motions filed by Polk before the case came to trial on March 5, 1990.

Polk alleges that the State's failure to produce DNA evidence required him to file three motions compelling its disclosure; therefore, Polk contends the State caused the delays. The dates of his motions to obtain DNA evidence were August 30, 1989; September 14, 1989; and October 26, 1989. However, the record shows that Polk filed three motions for the production of different evidence pertaining to the forensic DNA analysis. Although the headings on the three motions were similar, the information sought by each was different.

Despite Polk's contentions, the record reveals no action by the State to deliberately delay or impede bringing Polk to trial. Instead, the record supports the State's position that it could not try the case until the issues of change of venue and admissibility of forensic DNA analysis had been resolved. Also, Polk's numerous motions filed with

the court substantially contributed to the delay. Thus, the second factor under the Barker balancing test does not weigh in Polk's favor.

(3) Assertion of the right to a speedy trial

The defendant is under no obligation to bring himself to trial; it is the State that

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bears the burden of doing so. *Perry v. State*, 419 So.2d 194, 199 (Miss.1982). However, by asserting his right to a speedy trial, the accused gains more points under this prong of the test than he would otherwise. *Jaco v. State*, 574 So.2d 625, 632 (Miss.1990). Polk did file a motion on June 5, 1989, for a speedy trial, but he also filed numerous other motions materially contributing to the delay of his trial. Therefore, this prong of the test does not weigh so heavily in Polk's favor as it would have had Polk himself not delayed the trial.

(4) Prejudice to the defendant

Prejudice to the defendant may manifest itself in two ways. First, the delay may actually impair the accused's ability to defend himself. *Jaco*, 574 So.2d 625, 632 (Miss.1990). See *Perry v. State*, 419 So.2d 194, 200 (Miss.1982); *Wells v. State*, 288 So.2d 860, 863 (Miss.1974). Second, the defendant may suffer because of the restraints to his liberty, whether it be the loss of his physical freedom, loss of a job, loss of friends or family, damage to his reputation, or anxiety. See *Moore v. Arizona*, 414 U.S. 25 at 27, 94 S.Ct. 188 at 190, 38 L.Ed.2d 183 at 186 (1973); *Jaco v. State*, 574 So.2d 625, 632 (Miss.1990); *Trotter v. State*, 554 So.2d 313, 318 (Miss.1989).

In *Trotter* we held that the accused does not have to make an affirmative showing of prejudice to show that his right to a speedy trial has been violated. *Id.* at 318. However, without a showing of any prejudice, this prong of the balancing test cannot weigh in favor of the defendant.

Polk makes no argument that the delay either diminished his defense or strengthened the State's evidence. He states only that he suffered "a great deal of anxiety." Anxiety alone does not help his claim.

Considering all four factors as required in *Wells v. State*, 288 So.2d 860, 862 (Miss.1974), the circuit court found that the defendant's constitutional right to a speedy trial had not been violated under either the federal or the state constitution. The record supports this finding.

### III. STATUTORY RIGHT TO A TRIAL WITHIN 270 DAYS

Section 99-17-1 of the Mississippi Code requires that a defendant be tried within 270 days after arraignment, "[u]nless good cause be shown...." Miss.Code Ann. Sec. 99-17-1 (Supp.1991).

In *Vickery v. State*, this Court noted that continuances for "good cause" toll the running of the 270-day period, unless "the record is silent regarding the reason for delay," and then "the clock ticks against the State because the State bears the risk of non-persuasion on the good cause issue." *Vickery v. State*, 535 So.2d 1371, 1375 (Miss.1988); *Nations v. State*, 481 So.2d 760, 761 (Miss.1985). "Good cause" had been held to include congested trial court dockets, under certain circumstances. *Williamson v. State*, 512 So.2d 868, 876 (Miss.1987). And, the Court pointed out in *Vickery* that continuances which are granted to the defendant stop the running of the clock and are deducted from the total number of days before trial. *Vickery v. State*, 535 So.2d 1371, 1376 (Miss.1988).

As already noted, the defendant himself contributed to the delay in the commencement of his trial. Polk was arraigned on May 5, 1989, and filed a motion for change of venue on May 19, 1989. The motion was not granted until sometime in late August, as Polk conceded; however, a formal order was not entered by the trial court until January 23, 1990. Nonetheless, on August 30, 1989, Polk moved to hold a Frye hearing on the DNA evidence. The lower court set the hearing as soon as the docket allowed, which was on January 8, 1990, and a formal order was entered on February 26, 1990.

The fourteen days before Polk's motion for a change of venue was filed should definitely count against the State in calculating the number of days before Polk was brought to trial. However, the time between the filing of the motion and the resolution of that issue is a delay attributable to the defendant, and that time is deducted from the total. Even if the clock began to run after the informal decision to grant Polk's motion for a change of venue,

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in late August, 1989, the clock stopped again when Polk requested a Frye hearing on the admissibility of forensic DNA analysis, on August 30, 1989. The clock started once again at the conclusion of that hearing, then, on January 8, 1990, and the trial was started on March 5, 1990--well within the 270-day limit set by statute.

Because the words of the statute are plain, we need look no further. The State met its burden of proving that the delays were for "good cause," as required by the statute and interpreted by this Court. The third assignment of error raised by Polk is, likewise, without merit.

### IV. ADMISSION OF FORENSIC DNA TESTING

Since the discovery that genetic information is found in DNA (deoxyribonucleic acid) within the nuclei of cells, scientists have searched for a way to identify an individual by DNA testing. It is now scientifically recognized that there are tests which will identify a person based on an analysis of his DNA. See, e.g., *State v. Pierce*, 64 Ohio St.3d 490, 597 N.E.2d 107 (1992); *Ex parte Perry v. State*, 586 So.2d 242 (Ala.1991); *Caldwell v. State*, 260 Ga. 278, 393 S.E.2d 436 (1990); *People v. Castro*, 144 Misc.2d 956, 545 N.Y.S.2d 985 (Sup.Ct.1989).

All living cells which contain a nucleus also contain DNA. Within the DNA is the genetic "pattern" or "code" that gives each life form its characteristics. The fundamental structure of DNA is the same in all living things, but there are portions that vary from species to species, and, within a species, from individual to individual. Only identical twins have the same DNA patterns. This uniqueness is what gives DNA analysis its value.

The DNA molecule is a remarkably stable structure, visualized as much like a twisted ladder or spiral staircase. The "sides" of the "ladder" are repeating phosphate and sugar sequences. The "rungs" of the "ladder" are formed by a pair of organic bases joined together. There are four organic bases found in DNA: adenine (A), guanine (G), thymine (T), and cytosine (C). Because the distance between the "sides" of the "ladder" is uniform, the bases can only bond together in certain ways. A and T can bond together, and G and C can bond together; therefore, the only base pairs that can exist are A-T, T-A, G-C, or C-G. Any other combinations would cause the "sides" of the "ladder" to be too far apart or too close together, and the DNA molecule would become unstable.

Each "side" of the "ladder" contributes one of the organic bases in the base pair "rungs." If the "ladder" was split down the middle, between the two bases in each "rung," two complementary strands of DNA would result. That is, if one half of the "ladder" had a sequence of bases on its "side" that read "A--G--A--C--T--G," then the complementary strand from the other half of the "ladder" would read "T--C--T--G--A--C."

Each molecule of DNA contains over three billion base pairs. The sequences of the base pairs in these billions are the genetic "code" that determines the makeup of each organism. In humans, several million of these sites vary from person to person, except in identical twins. These varying sequences are called "polymorphisms" or "anonymous" sequences, and their presence is the basis of one of the most widely-used methods of DNA identification, Restriction Fragment Length Polymorphism testing (RFLP, pronounced "riflip"). RFLP testing is based on the fact that the polymorphisms can be isolated from one person's DNA to yield a unique pattern, except from identical twins. The pattern produced by identical twins, though, would still be unique to those two individuals.

DNA analysis has proven to be highly valuable in many areas--for example, in resolving cases of disputed paternity. Its inestimable value, however, lies in its potential to provide identification in criminal cases bordering on the absolute. 1

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In the United States at the time of this trial, there were three commercial laboratories that performed DNA identification testing: Cetus, Lifecodes, and Cellmark, the latter the testing lab in this case. In addition, the FBI and some other law enforcement agencies had established their own DNA testing labs. Although there are different methods for analyzing DNA, Cellmark performs RFLP testing for forensic DNA analysis.

The first step in RFLP testing is to obtain a sample of some substance that contains DNA. This could include white blood cells, hair cells, skin cells, or spermatazoa--any cell that contains a nucleus. Those cells are placed in a special solution that makes the nucleus release the DNA. Then the "twisted ladder" unwinds and becomes a straight "ladder."

Special enzymes, called restriction enzymes, are combined with the DNA "ladder." Each particular restriction enzyme is specific in its action and will only cut the "sides" of the DNA "ladder" at a specific location. It is able to do this because it "looks" for a precise sequence of bases.

Just as in this country we read in a standard manner, left to right, the base "codes" along one side of the DNA "ladder" must also be read in a standard direction. For instance, the restriction enzyme that recognizes the base sequence "A--T--G--C--T--A," may cut that sequence between the "G--C." Such an enzyme would, then, cut the DNA every time that it recognized the same sequence "A--T--G--C--T--A" along the sides of the DNA "ladder." This would leave the side "ladder" in two shorter pieces: "A--T--G" and "C--T--A." However, the same restriction enzyme would not cut the sequence "A--T--C--G--T--A," because, reading left to right, the resulting fragments would be "A--T--C" and "G--T--A." The enzymes are, therefore, very specific in their actions.

The shorter pieces of DNA "ladder" are then separated by gel electrophoresis. This procedure involves loading each DNA sample into a separate well on a thin gel plate and then applying an electrical charge. Because the DNA has a negative charge, applying an electrical current to the gel plate will cause the DNA fragments to migrate through the gel, each sample in its own lane, much like the swimmers in a race.

The heavier fragments of DNA, containing the most base pairs, will stop migrating first, and the shorter bands will migrate further. Thus, the fragments of DNA "ladder" will stop in a unique "banding pattern," characteristic of each DNA sample.

The DNA at this time is still in the double-stranded, "ladder," form. The next step in RFLP testing is to treat the DNA to cut the base pair "rungs" to yield two single strands of DNA; this step may be likened to "unzipping" the DNA to give two single strands.

The single-stranded DNA is then transferred onto a nylon membrane, with the bands from the gel staying in the same locations on the membrane that they occupied on the gel. The nylon sheet is then incubated with radioactive "probes," each containing a segment of DNA with a specific, known sequence of bases. Each radioactively-labeled known sequence of DNA will find a fragment with its complementary sequence of bases and bind to it. The excess probe is then washed off the nylon membrane.

After the excess probe has been removed, the membrane with the labeled DNA is exposed to a type of x-ray film. The resulting film, or autoradiograph (autorad), then shows a series of bands in each lane. Each lane contains a separate DNA sample, and the bands within each lane are unique to that sample.

By comparing the banding patterns given by a sample of DNA from a known individual with the banding pattern from an unknown sample of DNA, it is possible to see if the patterns "match." If the two samples do match, then the conclusion can be drawn that the known individual was in all likelihood the source of the DNA and a "match."

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After determining that two samples do match, the question then arises of the statistical probability that the match is unique. Such a question arises because forensic DNA testing currently maps only some of the polymorphisms present in an individual. We need not discuss the question of admissibility of population statistics, however, because those statistics were ruled inadmissible by the trial judge.

Polk requested that a hearing be held to determine the admissibility of the results of forensic DNA testing under the Frye test. Mississippi has continued to follow the Frye "general acceptance" standard even after the adoption of Rule 702 of the Mississippi Rules of Evidence. See *Hardy v. Brantley*, 471 So.2d 358, 366 (Miss.1985); *House v. State*, 445 So.2d 815, 822 (Miss.1984).

Frye requires that "the thing from which the deduction is made [be] sufficiently established to have gained general acceptance in the particular field in which it belongs." *Frye v. United States*, 293 F. 1013, 1014 (D.C.Cir.1923). While Polk does not expressly urge this Court to abandon the Frye standard and adopt the test from *People v. Castro*, 144 Misc.2d 956, 545 N.Y.S.2d 985 (Sup.Ct.1989), for determining the admissibility of forensic DNA analysis, Polk does make numerous references to the *Castro* test.

After a careful review of the record, as well as the available information from other jurisdictions regarding forensic DNA testing, this Court adopts the modified version of the *Castro* test set forth by the Supreme Court of Alabama in *Ex parte Perry v. State*:

I. Is there a theory, generally accepted in the scientific community, that supports the conclusion that DNA forensic testing can produce reliable results?

II. Are there current techniques that are capable of producing reliable results in DNA identification and that are generally accepted in the scientific community?

III. In this particular case, did the testing laboratory perform generally accepted scientific techniques without error in the performance or interpretation of the tests?

*Ex parte Perry v. State*, 586 So.2d 242, 250 (Ala.1991). 2 We therefore will examine the evidence using the three-pronged test from *Perry*.

Prong I.

The first two prongs of the test are essentially a re-wording of the Frye test. As the *Castro* court noted, "All the available legal precedents agree that DNA forensic evidence is admissible, and none have held that this evidence fails to pass the Frye standard." *People v. Castro*, 144 Misc.2d 956 at 979-80, 545 N.Y.S.2d 985 at 999 (Sup.Ct.1989).

Dr. George Herrin, Jr., testified on behalf of the State. Dr. Herrin was employed by the Georgia Bureau of Investigation as the DNA Special Unit supervisor. He had formerly worked in the testing laboratory for Cellmark, and had personally reviewed the data in this case. He had

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testified as an expert in DNA forensic testing in eleven different states in approximately twenty-five trials. Dr. Herrin was clearly qualified to testify as an expert in Polk's case.

Dr. Herrin testified that the theory underlying forensic DNA testing was generally accepted within the scientific community and supported his conclusion that it could yield reliable results.

Dr. Ronald Acton testified on behalf of Polk. Dr. Acton was a professor at the University of Alabama at Birmingham School of Medicine and director of the Immunogenetics DNA Laboratory for the University of Alabama Health Services Foundation. Dr. Acton, who was also qualified to testify as an expert, confirmed Dr. Herrin's assessment of the acceptance of DNA testing, saying that it was a time-tested, proven technique.

The trial judge concluded that the testing for DNA matching in Polk's case passed the first prong of the analysis under both the Frye test and the Castro test. The record supports the decision of the trial judge. We hold that there is a generally accepted scientific theory that forensic DNA testing can produce reliable results. The theory underlying the first prong of the test is thus met.

Prong II.

Dr. Herrin testified that Cellmark used restriction fragment length polymorphism (RFLP) analysis in Polk's case, which we have above described, and as outlined in Castro and Schwartz procedure. See *People v. Castro*, 144 Misc.2d 956 at 965-67, 545 N.Y.S.2d 985 at 990-992 (Sup.Ct.1989); *State v. Schwartz*, 447 N.W.2d 422, 425 (Minn.1989). He testified RFLP testing is capable of producing reliable results in DNA matching, and is generally accepted within the scientific community. Dr. Acton conceded this was an accepted technique.

The circuit judge correctly found that there are techniques capable of producing reliable results in DNA matching that are generally accepted in the scientific community.

Prong III.

In this case a blood sample was taken from both of the victims, as well as from dried blood found on the waistband of Polk's underwear, from his blue jeans, and from his sock. The sample from Polk's sock did not yield sufficient DNA to perform RFLP testing. RFLP testing was performed on the other samples, and the results were compared.

Dr. Herrin described Cellmark's steps in RFLP testing of DNA. First the DNA was extracted from all of the samples submitted to Cellmark for testing, along with three controls. The three control samples that had known banding patterns were subjected to the same testing conditions as all of the "unknowns." He described the procedure in which they combined the samples with a chemical that released the DNA from the cells' nuclei.

Next the solutions containing the freed DNA were mixed with specific restriction enzymes that cut the double-stranded DNA at specific sites. The fragments of DNA were then loaded onto gel plates, each sample in its own clearly-labeled lane. The control samples were loaded onto each side of the unknown samples to give another check on the quality of the test procedures.

Dr. Herrin testified that the gel plates then had an electrical charge applied to them. The negatively-charged DNA fragments migrated through the gel and were separated into bands, according to their size. The length of each fragment corresponded to the number of bases contained along that particular fragment, thus the "larger," longer fragments stopped migrating sooner than the smaller fragments did.

When the fragments were separated, Cellmark technologists treated the double-stranded DNA bands with a chemical that "unzipped" the DNA into two single strands. The bands remained fixed in their respective positions within the gel matrix.

After the DNA was separated into two strands, the DNA bands were transferred from the gel to a nylon membrane. This procedure was the standard method for performing a "Southern blot," a technique

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developed by Dr. Ed Southern during the mid-1970's.

Dr. Herrin explained that the next step in Cellmark's RFLP testing was the "tagging" of the unknown fragments of DNA with radioactive probes having a known sequence of DNA. The probes would find and bind to fragments of DNA having complementary base sequences. The excess radioactive probe was then washed off.

The next step outlined by Dr. Herrin was the exposure of a type of x-ray film to the nylon membrane containing the hybridized DNA bands. The film was developed to reveal the banding patterns produced in each lane by the DNA sample loaded into that lane.

Dr. Herrin showed the court the autorads produced in Polk's case and used them to explain how Cellmark concluded that there was a match between Georgia Mae Thomas's DNA and the DNA extracted from the waistband of Polk's underwear. He also called the court's attention to the lanes containing the control DNA. He testified that the resulting banding pattern from the controls were as expected, and also pointed out that the patterns the controls yielded on each side of the plate were identical.

Dr. Herrin described the method whereby Cellmark calls two patterns a match as a combination of visual inspection and measurement. He said that two scientists independently inspect the autorads to see if the banding

patterns in the lanes compared appear to be a match. If the results clearly indicate that there is not a match, no further evaluation is done. Marked visible differences in the banding patterns would be conclusive proof that the two sources of DNA were not the same. However, if the two banding patterns appear to be the same upon visual inspection, the technologists then perform measurements to determine if, in fact, the bands have migrated in the same pattern.

Dr. Herrin told the court that Cellmark required that there be no more than a one millimeter variation in the measurements between corresponding bands in samples under comparison. Dr. Herrin provided the procedure manual from Cellmark Laboratories, as well as a complete description of the quality control measures used in forensic DNA analysis at Cellmark. He testified that Cellmark's protocol included specific measures directed at proper labeling and handling of all specimens to prevent any substitution of samples or of cross-contamination. He also said that the testing was performed according to scientifically accepted techniques and outlined in the procedure manual.

He testified that seven of eight bands from Georgia Mae Thomas's DNA met the criteria to be determined a match with the DNA obtained from the blood on Polk's underwear. He showed the court the matching seven bands on the autorad produced by Cellmark. He noted that there was also a consistency between the blue jean band and the banding pattern from Thomas's DNA, but Cellmark did not call a match between the two samples because the measurements did not fall within their accepted range. He testified an insufficient amount of DNA was obtained from Polk's sock to allow for any testing.

Dr. Herrin's testimony that the RFLP testing, as performed by Cellmark in Polk's case, was accepted in the scientific community was not contradicted by Dr. Acton. His only challenge to Dr. Herrin's testimony in regard to Cellmark's performance in Polk's case was that he could not duplicate Cellmark's results in making measurements within one millimeter. However, on cross-examination he admitted that he could not do so "[b]ecause there are a lot of things that I don't know. I don't know where they start...." Acton did not question Cellmark's ability to make such measurements, only his own ability to duplicate their measurements.

Dr. Acton's testimony primarily consisted of an attack on Cellmark's calculation of probabilities and their population statistics. Since that evidence was, as above noted, excluded, we do not discuss these points raised by Dr. Acton.

The lower court found that the specific techniques used by Cellmark in Polk's case were the type generally accepted. The

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court also found that, in this particular case, both the RFLP testing procedures and analysis of the data to declare a match between some of the DNA samples from Polk's clothing and one of the victims were properly performed by Cellmark. The court concluded that Cellmark's testing had satisfied the Frye and Castro tests. We agree and hold that the forensic DNA testing, as performed by Cellmark in this case, also passed the third prong of Perry. The testimony of Dr. Herrin together with the exhibits offered by the State, clearly made the State's evidence competent. Dr. Acton's testimony was no more than an attack on its credibility.

We have considered this case carefully, in appreciation of the difficulty in addressing DNA testing in detail for the first time. The circuit court correctly allowed the admission of the DNA "matching" evidence.

Cellmark determined that there was a match between the DNA known to have come from Georgia Mae Thomas and the blood obtained from the waistband of Polk's underwear. Although the pattern from the blue jean sample was consistent with the DNA banding pattern from Georgia Mae Thomas, Cellmark found that the measurements were not within the required range to fit their match criteria. They did not draw any conclusion, then, from the blood from the blue jeans. They did not call a match between the blood from any of Polk's clothing and the blood drawn from Mary Belle Simmons.

Polk's last assignment of error is also without merit.

Rather than lengthen the body of this opinion, as an appendix we set forth guidelines for the bench and bar on DNA testing.

Finding no error, we affirmed.

AFFIRMED.

ROY NOBLE LEE, C.J., PRATHER, SULLIVAN, PITTMAN, BANKS and ROBERTS, JJ., concur.

DAN M. LEE, P.J., and McRAE, J., concur in result only.

#### APPENDIX A

The entire process of forensic DNA testing is quite complex and is subject to error at several points. The testing laboratory must follow strict quality control guidelines throughout the entire procedure.

For instance, the lab should have standard operating procedures to determine that no samples are mislabeled or contaminated by DNA from another source such as bacterial contamination. Any materials or reagents used in performing the tests must be checked for proper test performance by using appropriate checks; for instance, using them with samples of DNA with known banding patterns to determine that the expected patterns will result.

All forensic testing should include running known control samples in parallel with the unknown samples to indicate any errors in test performance. And all resulting autorads should be independently measured and the results verified by at least two qualified persons. The laboratories should also have well-documented participation in a proficiency-testing program, and laboratory personnel should participate in continuing education programs in the area of forensic DNA analysis.

Because of the potential for jurors to rely solely on the evidence provided by DNA to the exclusion of other evidence, it is important that courts hold a hearing outside the hearing of the jury to determine if the tests in a particular case can pass the Perry analysis.

It is also imperative that no defendant have such evidence admitted against him without the benefit of an independent expert witness to evaluate the data on his behalf. In *Ake v. Oklahoma*, the U.S. Supreme Court pointed out, when the State made a defendant's mental condition an issue in their case, the assistance of a psychiatrist could be crucial to the defendant's ability to defend himself. *Ake v. Oklahoma*, 470 U.S. 68 at 80, 105 S.Ct. 1087 at 1095, 84 L.Ed.2d 53 at 64 (1985). The Court continued,

[P]sychiatrists gather facts ...; they analyze the information gathered and

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from it draw plausible conclusions.... They know the probative questions to ask of the opposing party's psychiatrists and how to interpret their answers.... Further, where permitted by evidentiary rules, psychiatrists can translate a medical diagnosis into language that will assist the trier of fact, and therefore offer evidence in a form that has meaning for the task at hand....

Id.

Employing like reasoning in this present state of the DNA testing technology, we find that due process considerations require that a defendant have access to an independent expert. This does not mean that a defendant has a right to choose whomever he pleases, at whatever costs. Rather, a defendant must only be allowed reasonable funds for access to an expert who can independently evaluate the evidence presented against him by the State, analyze it, and present that analysis at trial.

Discovery should be wide open to both the State and the defendant on this issue. The guidelines set forth by the Castro court provide examples of the kinds of information that should be provided and include:

- (1) copies of any autorads and an opportunity to examine the original, if necessary;
- (2) copies of any quality control tests run;
- (3) copies of the results provided by the testing laboratory to any proponent;
- (4) copies of the laboratory procedure manuals, proficiency testing results, and proof of continuing education for personnel;
- (5) explanations for any discrepancy in the testing, observed defects or laboratory errors, as well as the reasons for those and the effects; and
- (6) chain of custody documents.

This list is illustrative, and other information may be needed as well.

The complexity of forensic DNA analysis requires that an attorney or judge have more than just a nodding acquaintance with the subject. This Court would hope that future CLE seminars may provide the needed familiarity for any attorney or judge involved in a case where forensic DNA testing is an issue.

Finally, this Court notes that any testimony on the subject should be supplemented by drawings, graphs, charts, or other exhibits; as well as detailed explanations in language readily understandable by the general public. Neither a judge nor a jury should rely solely on the testimony of expert witnesses in the evaluation of forensic DNA evidence.

Evidence of this type should not be regarded as conclusive on the issue of guilt, for it is but one piece of evidence among many. There is still a presumption of innocence that must remain with the defendant until the State proves guilt beyond a reasonable doubt. The ultimate determination of whether or not the State has met its burden of proof is the province of the jury, not of experts.

1 For instance, in this case, the probability that the blood on the waistband of Polk's underwear was from any person other than Georgia Mae Thomas was calculated to be 1 in 530,000,000.

2 Many other jurisdictions have held the questions of reliability of DNA evidence go to the credibility of such evidence, rather than the competency. See, e.g., *United States v. Jakobetz*, 955 F.2d 786 (2nd Cir.1992), cert denied,

--- U.S. ----, 113 S.Ct. 104, 121 L.Ed.2d 63 (1991); *People v. Thomas*, 137 Ill.2d 500, 148 Ill.Dec. 751, 561 N.E.2d 57, cert. denied, 498 U.S. ----, 111 S.Ct. 1092, 112 L.Ed.2d 1196 (1991); *Smith v. Deppish*, 248 Kan. 217, 807 P.2d 144 (1991); *Perry v. State*, 586 So.2d 242 (Ala.1991); *Caldwell v. State*, 260 Ga. 278, 393 S.E.2d 436 (1990); *State v. Pennington*, 327 N.C. 89, 393 S.E.2d 847 (1990); *Glover v. State*, 787 S.W.2d 544 (Tex.Ct.App.1990), review granted, 825 S.W.2d 127 (Tex.1992); *State v. Ford*, 301 S.C. 485, 392 S.E.2d 781 (1990); *Martinez v. State*, 549 So.2d 694 (Fla.Dist.Ct.App.1989); *Cobey v. State*, 80 Md.App. 31, 559 A.2d 391 (1989), cert. denied, 317 Md. 542, 565 A.2d 670 (1989); *Andrews v. State*, 533 So.2d 841 (Fla.Dist.Ct.App.1988), review denied, 542 So.2d 1332 (Fla.1989); *People v. Shi Fu Huang*, 145 Misc.2d 513, 546 N.Y.S.2d 920 (Cty.Ct.1989); *State v. Schwartz*, 447 N.W.2d 422 (Minn.1989); *People v. Castro*, 144 Misc.2d 956, 545 N.Y.S.2d 985 (Sup.Ct.1989); *People v. Wesley*, 140 Misc.2d 306, 533 N.Y.S.2d 643 (Albany Cty.Ct.1988).

In this extraordinarily complex, still-evolving technology, we find it more appropriate for the courts to first test its competency.