

SUPREME COURT OF NORTH CAROLINA

State v. Bullard, 312 N.C. 129

322 S.E.2d 370 (1984) · No. No. 252A82 · Decided November 6, 1984

OPINION

FRYE, J.

322 S.E.2d 370 (1984) 312 N.C. 129 STATE of North Carolina v. Vonnie Ray BULLARD. No. 252A82. Supreme Court of North Carolina. November 6, 1984. *371 Rufus L. Edmisten, Atty. Gen. by Joan H. Byers, Asst. Atty. Gen., Raleigh, for the State-appellee. Carl A. Barrington, Jr., Fayetteville, for defendant-appellant. FRYE, Justice.

The defendant raises several assignments of error. Both parties agree, however, that the dispositive and crucial issue *372 to this appeal is whether the trial court improperly allowed Dr. Louise Robbins, a physical anthropologist, to testify as an expert in the identification of a bloody bare footprint. This issue is one of first impression in this State. It is our conclusion, after carefully reviewing the entire record, the parties' arguments, and the relevant law, that the trial court correctly allowed Dr. Robbins to testify and render her opinion.

First, we will consider the issue involving the expert testimony. The remaining assignments of error, also considered to be without merit, will be addressed later in this opinion. The trial of Vonnie Ray Bullard was complicated. Eighty-one witnesses testified, and more than half of them possessed the surname Bullard. Exhibits in excess of 1,000 were also introduced into evidence.

The testimony revolved around the sequence of events during the evening of 25 August 1981. The events during that evening occurred within the Beaverdam Community and were concentrated primarily within a three-mile stretch of State Road 210, where the defendant and Pedro Hales lived.

The majority of this testimony concerned the location of Pedro Hales (the decedent), Vonnie Ray Bullard (the defendant) and defendant's truck during various times on 25 and 26 August 1981. The evidence, which is mostly circumstantial, is summarized as follows: Pedro Hales and the defendant were neighbors in the community of Beaverdam in Cumberland County, which clusters around the intersection of State Roads 210 and 242.

In October 1978, Pedro Hales had shot and wounded the defendant's son and was found not guilty by a jury on the basis of self-defense. Since that time, Vonnie Ray Bullard had made threatening statements about Pedro Hales to several witnesses. Defendant had specifically stated during 1978 or 1979 that he intended to kill Pedro Hales. During April 1981, the defendant continued to threaten that he would get Pedro and that every time he saw Pedro he thought about shooting him.

At approximately 8:30 p.m. on 25 August 1981, the defendant and Pedro were seen riding in Pedro's truck and talking at a local store. Several witnesses stated that they observed the defendant addressing Pedro in a loud and angry voice but could not determine what was being said. Later that evening, prior to Pedro's disappearance, the defendant was seen with a small pistol in his watch pocket.

Defendant acknowledged that he owned a .22 caliber pistol, but claimed he had lost it several days before Pedro's death. The defendant was not wearing shoes when he was seen during this time. Pedro was last seen alive without apparent injuries at approximately 11:00 p.m. on 25 August 1981. A local neighbor, who had seen Pedro on the side of the road and suspected he was drunk, went to Pedro's mother's house to tell Pedro's brother, Carson Hales, about Pedro.

The neighbor and Carson both observed the defendant's red truck going by as they stood on Carson Hales' porch at approximately 11:05 p.m. Immediately thereafter, they went back to where Pedro had last been seen but could not find him. Fruitlessly, they began to search in the general area for Pedro. Carson Hales and his mother also went to defendant's home at approximately 11:30 p.m. to inquire whether the defendant had seen Pedro, since the defendant had driven earlier in the general direction where Pedro was last seen.

However, no one was home and defendant's red truck was not there. Meanwhile, at approximately the same time of 11:30 p.m., two witnesses observed a vehicle stopped on Melvin's Bridge, located approximately four miles from where Pedro was last seen. These witnesses pulled over on the side of the road as they approached the bridge.

After about forty-five seconds, the vehicle drove away from the bridge, toward the two witnesses, who described the vehicle as the distinctive red truck owned by the defendant. The witnesses could not see who was driving the truck.

The defendant's truck was next observed at approximately 12 midnight, traveling at *373 a rapid rate of speed. He was seen pulling his truck behind his house, which is not where he normally parks it. The defendant was observed turning his headlights off as soon as his truck entered the driveway. Approximately ten minutes later, the defendant spoke with several witnesses, who testified that defendant's hair was wet and freshly combed and that he looked as though he had just changed clothes and showered.

The following day, 26 August 1981, a large amount of blood, a .22 bullet, glass, bloody bare footprints, a bare footprint in sand, tire tracks, and a piece of red plastic safety belt assembly were found on Melvin's Bridge. During a search of defendant's truck that same day, a blood smear matching the victim's, but different from the defendant's, was found on the floor board.

The back window on defendant's truck was broken. The safety belt assembly on the passenger's side was missing. Scientific comparisons of the glass found at the crime scene and the glass from

defendant's truck showed the glass was of a common origin.

The sections of the seat belt assembly still present in the passenger's side of the truck revealed a small hole at approximately the head level of a passenger. The particles in the hole were found to be lead which is consistent with a lead bullet passing through the seat belt assembly. Also, the safety belt assembly found at the scene was identical to the seat belt assembly in defendant's truck.

A detective from the Sampson County Sheriff's Department testified that he took a series of photographs with a 35mm camera at varying shutter speeds of a bloody bare footprint on the asphalt and another bare footprint in sand. He also testified that he had brushed some sand away from the bloody footprint before he photographed it. This same footprint was later sprayed with luminol reagent, which enhances the footprint and illuminates the bloody areas.

Photographs of the luminol-enhanced footprint were also taken. Additionally, the detective testified that as he was trying to remove the piece of asphalt with the bloody footprint, the asphalt broke primarily in the heel region of the footprint. A supervisor of the latent evidence section of the SBI laboratory testified that he took ink and latex paint impressions of the defendant's feet and that he gave the impressions and copies of the photographs of the unknown footprint (both natural light and luminol enhanced) to Dr. Louise Robbins.

He also testified that he observed no ridge details on the unknown footprints found on the bridge and could not make a comparison with known footprints of the defendant. He also testified he would not make an identification of the footprints based on shape alone. Dr. Louise Robbins, a physical anthropologist employed at the University of North Carolina at Greensboro, testified, over objection and after a lengthy voir dire hearing, about her background, qualifications, and independent studies in bare footprint comparisons.

She explained her methodology for comparing known and unknown bare footprints by size and shape, without relying on ridge detail in the bare footprints. She testified that in her opinion a bloody bare footprint found on Melvin's Bridge was that of the defendant. Pedro's body was found several days later in the South River. An autopsy revealed he had been stabbed seventeen times and shot three times.

A.22 bullet was removed from his body. The first bullet had entered the left side of the head exiting at the center of the back. The second bullet had entered the right side of the back near the shoulder, and there was no exit wound. A.22 caliber bullet was found in this back wound.

The third bullet entered in the left shoulder and exited a short distance later. Basically, the wounds were inflicted in a left to right direction. During the search for Pedro's body, the defendant stated, "Do you think he deserved to live after he shot my son?" He also made the statement, "What would you do if someone had shot your young'un and the law had turned him loose?"

The defendant, when questioned by authorities, *374 stated that he did not know of anyone else who had his truck on the evening of 25 August 1981. He admitted driving over Melvin's Bridge on 25 August 1981 at approximately 10:30 p.m. and seeing an old Volkswagen. Defendant's house and vehicle were searched and no.22 caliber pistol was found.

The defendant claimed that he lost his pocket knife and pistol several days prior to the killing. Defendant and another witness testified that defendant broke his window in his truck earlier during the day of the killing. Defendant also stated that he had been at a local roadside market from 10:45 until 11:45 p.m. on the evening of Pedro's disappearance.

The defendant's sister testified that defendant was with her from 10:40 to 11:40 p.m. on 25 August 1981. Afterwards, defendant's wife testified that defendant arrived home at 11:45 p.m. and that she remained with him the rest of the night. Defendant denied killing Pedro and stated that they were friends. Defendant admitted he was with Pedro earlier on the evening of 25 August 1981.

He also stated that no one else used his truck during the entire evening. Evidence was presented that three people went over Melvin's Bridge earlier during the morning of 26 August 1981 and no blood was observed by these three people. A deputy with the Cumberland County Sheriff's Department did observe the blood on the north side of Melvin's Bridge at approximately 10:30 a.m. that same morning.

Several character witnesses testified on behalf of the defendant. The defense also presented testimony of Professors Cartmill and Robertson of the Duke University Medical School, Department of Anatomy, who stated that Dr. Louise Robbins' method of footprint analysis was inaccurate and that the unknown footprints did not, in their opinion, belong to the defendant.

I. EXPERT TESTIMONY We first consider defendant's challenge to the introduction of the testimony of Dr. Louise Robbins, a physical anthropologist.[1] The defendant's objection to Dr. Robbins' testimony is premised on the following specifically alleged errors by the trial court: 1.

The trial court erred in allowing Dr. Robbins to testify as an expert in the field of footprint identification when, in fact, as shown by the evidence adduced in voir dire hearing prior to her testimony, there is no such area of such expertise recognized by our law. 2.

The trial court erred in failing to exclude or suppress Dr. Robbins' testimony because it has no basis or recognition whatever in the scientific community and is not sufficiently reliable or acceptable by the court. 3.

The trial court erred by failing to grant defendant's motion to strike the opinion testimony of Dr. Robbins because she was not properly qualified to give such an opinion, and her testimony was too speculative and had no basis in science or fact. 4.

The trial court erred in allowing Dr. Robbins to testify as an expert and give her opinion because the court did not make findings of fact as to her expertise. The first three contentions by defendant primarily deal with the application of a technique utilized by Dr. Robbins which is allegedly unprecedented in North Carolina and the United States.[2] In Part A we will *375 address defendant's fourth assignment of error.

The remaining errors will be the focus of Part B. Before beginning our analyses and conclusions, however, some attention to Dr. Robbins' professional background and her challenged methodology is in order. Dr. Robbins testified during voir dire and on direct examination about her qualifications and achievements in the field of physical anthropology.[3] During direct examination, she explained, by utilizing colored slides, how she examines unknown footprints for purposes of trying to determine if they are made by a particular individual.[4] The method of comparison employed by Dr. Robbins does not involve ridge detail as does traditional fingerprint analysis.

Instead, she relies upon a technique of comparison pertaining to the size and shape of the footprint in four areas: namely, the heel, arch, ball, and toe regions. The footprint size and shape reflect the size and shape of the internal bone structure of the foot, so the bones indirectly play a major part in the analysis of the footprint, according to Dr. Robbins.

Dr. Robbins explains that since each person's foot size and shape are unique, she can identify a footprint represented by a clearly definable print of whatever part of the foot touches the ground. By examining the sides, front, and rear ends of each region of the foot, Dr. Robbins explains that she can compare known footprints with unknown footprints and determine if they are made by the same person.[5] At the time of the trial Dr. Robbins stated that she had testified as an expert in Oklahoma, California, Pennsylvania, and Florida.[6] The only reported decision from *376 Florida did not refer to Dr. Robbins; however, her name did appear in the transcript as an expert.

A. Initially, we will address defendant's fourth assignment of error. In determining whether Dr. Robbins was properly allowed to testify as an expert and give her opinion, it is important to consider certain legal fundamentals in the area of expert testimony. It is undisputed that expert testimony is properly admissible when such testimony can assist the jury to draw certain inferences from facts because the expert is better qualified.

Cogdill v. Highway Commission, 279 N.C. 313, 182 S.E.2d 373 (1971). G.S. 8-58.13 (1981) further provides: Opinion testimony permitted. If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion.[7] It is not necessary that an expert be experienced with the identical subject area in a particular case or that the expert be a specialist, licensed, or even engaged in a specific profession.

State v. Phifer, 290 N.C. 203, 225 S.E.2d 786 (1976), cert. denied, 492 U.S. 1123, 97 S. Ct. 1160, 51 L. Ed. 2d 573 (1977); Shaw v. Sylvester, 253 N.C. 176, 116 S.E.2d 351 (1960). Furthermore, the trial judge is afforded wide latitude of discretion when making a determination about the admissibility of expert testimony. Justice Moore stated in State v. King, 287 N.C.

645, 215 S.E.2d 540 (1975), death sentence vacated, 428 U.S. 903, 96 S. Ct. 3208, 49 L. Ed. 2d 1209 (1976): Whether the witness has the requisite skill to qualify him as an expert is chiefly a question of fact, the determination of which is ordinarily within the exclusive province of the trial judge.... A finding by the trial judge that the witness possesses the requisite skill will not be reversed on appeal unless there is no evidence to support it.

Id. at 658, 215 S.E.2d at 548-49; accord State v. Combs, 200 N.C. 671, 158 S.E. 252 (1931); see, e.g., 1 Brandis on North Carolina Evidence, § 133 (2d rev. ed. 1982). Dr. Robbins was clearly in a superior position and better qualified to compare the bloody bare footprint found on the bridge with those of the defendants.

The expertise to make the comparisons involved a certain knowledge which was beyond the realm of that of the average juror. Her testimony indicated that there were unusual and distinct features observed by Dr. Robbins when she examined the photograph of the bloodstained footprint on the *377 bridge, the crime scene.[8] In examining the footprints, Dr. Robbins made acetate overlays by tracing the photographed footprints.

She made visual comparisons by observing these footprints with her naked eye and with a magnifying glass. After Dr. Robbins had observed the footprints and prepared the acetate tracing overlays, she used the tracings of the left and right footprints in the photographs to compare them with the footprints made by the defendant on several rolls of brown paper.

In explaining her observations,[9] Dr. Robbins testified on direct as follows: Q. Can you point out to the jurors what, if any, features you observed when you were making the comparison? A. The particular features that I was observing in the photograph pertaining to the left footprint and the acetate tracings of the left footprint was with the footprint of the left foot on the brown paper here.

Again, I was looking at the toe region, the ball, the arch region and the heel region. The most noticable features were the inner balls on the inside of the big toe pads, the absence of the stem or the big toe and the absence of the inside ball of the left footprint. Also, the position relative to one another of toes two, three and four; toe four's position, in turn, relative to where toe five is placed, noting that toe five is placed very close to the front margin of the ball and there being a notable space between toe four and the little toe next to it.

The other side of the ball was examined, was compared, again noting that only the outer part of the ball is impressed on the paper in many of the left footprints. The outer part of the arch, a rather narrow arch was impressed on the paper; but yet, we get the inside part of the heel as well as the

outer part of the heel impressed on the paper. Q. Any of the other features that you observed on both the rolls that are up there and the photographs?

A. Looking at the right footprint, using the acetate tracing that had been made of the right footprint, and the photograph, I compared the heel region. It has a long, oval shape to it. The narrow to moderately wide arch. You will notice that there is some variation in width of the arch region in the different footprints on the brown paper. Also, the outer margin along the arch and the ball showing a rather long, slightly bulging margin up to a rather sharp point behind toe five where the outer margin meets with the front margin of the ball.

The front margin has this long, kind of indenting contour here behind the little toe. The little toe is positioned very close to the front edge of the ball. It is separated a little bit from toe four, which is more full in some right footprints than in others. And toes three and four cluster together along with toe two. But, three and four, in particular, show up in front of this peaking part that is in the front margin of the ball. *378 Certainly, Dr. Robbins' testimony assisted the jury in making certain inferences about the footprints on the bridge, which could not have been made without the testimony of someone with the qualifications of Dr. Robbins.

Even though Dr. Robbins has no formal training in footprint identification,[10] she testified at length concerning her independent study and research which spanned the last fourteen years. In addition, she is an expert in the field of physical anthropology and has received extensive formal training in this area. During voir dire the judge stated: THE COURT: It is clear that she is certainly an expert in the field of physical anthropology.

She has testified that there are four areas of the human foot from which she is able to ascertain the identity of the particular individual who made the particular footprints, and that that footprint is unique from all others.

Finally, the trial judge, in his discretion, chose to overrule defense counsel's objection to the State's offer of Dr. Robbins as an expert in the comparison of footprint impressions. During voir dire the following dialogue took place: THE COURT: You are propounding her as an expert in this field of physical anthropology? MR. ANDREWS: I would not offer her as an expert in anything since the court...

I would offer her as an expert in the comparison and identification of unknown footprints with known footprints, footprint impressions. MR. BARRINGTON: That is exactly what we object to. THE COURT: The objection is overruled. I'm going to make up my mind as to whether to make findings of facts, or whether to listen to the questions as they are propounded. THE COURT: I think you're going to be able to get it in.

The question is whether I make some findings of fact as to her expertise, or rule on the individual questions as you ask them. I think it's a matter of weight for the jury to determine, based on Mr.

Barrington's objection. Afterwards, defense counsel did not specifically request the court to make specific findings concerning the qualifications of Dr. Robbins.

This Court has stated: In the absence of a request by the appellant for a finding by the trial court as to the qualification of a witness as an expert, it is not essential that the record show a specific finding on this matter, the finding being deemed implicit in the ruling admitting or rejecting the opinion testimony of the witness. *State v. Perry*, 275 N.C.

565, 169 S.E.2d 839. And in *State v. Moore*, 245 N.C. 158, 95 S.E.2d 548 (1956) the Court stated: "Regardless of the professional label, it is for the court to say whether the witness is qualified to testify as one skilled in the matter at issue, and his finding will not be disturbed when there is evidence to support it, and the discretion has not been abused."

Id. at 164, 95 S.E.2d at 552; accord *Cogdill*, 279 N.C. 313, 182 S.E.2d 373; *Apex Tire and Rubber Company v. Merritt Tire Company*, 270 N.C. 50, 153 S.E.2d 737 (1967). Without a specific objection, the court was not required to make specific findings of fact concerning Dr. Robbins' qualifications in bare footprint comparison. Furthermore, there was evidence to support the trial judge's finding that she was qualified to testify about the subject footprints.

See note 3 *supra*. Therefore, the judge in his discretion chose not to disqualify Dr. Robbins, and it does not appear that he abused this discretion. The trial judge properly concluded, absent a specific finding of facts, that Dr. Robbins' field of expertise was a proper subject for expert testimony and defendant's fourth assignment of error is rejected. *379 B. We will now discuss defendant's first three assignments of error, which can be condensed into one issue: Whether scientific evidence which tends to identify an accused by bare footprint comparison is admissible where the expert relies upon methods other than ridge detail in making such comparison.

This is an issue of first impression in this jurisdiction. Counsel for the defense strenuously argues that to allow the expert testimony of Dr. Robbins would require the jury to make a "leap of faith," blindly accepting at face value the ultimate opinion of a person who professes to be the only one skilled in a particular subject area. Defendant argues that the fundamental differences between the method of identification used in existing case law and that which was propounded by the State in this case necessitates an independent determination by this Court that the method used by Dr. Robbins is itself reliable and sufficiently established to have gained general acceptance in its field.

The single fact that the application of the method employed by Dr. Robbins suffers a dearth of recognition does not per se prevent the admissibility of her testimony. This general proposition was implicitly acknowledged by this Court in *State v. Rogers*, 233 N.C. 390, 64 S.E.2d 572 (1951).

In that case the comparison of a bare footprint was made with that of the defendant's. See generally, *Annot.*, 28 A.L.R. 2d 1104 (1953) (citing this case and others in a discussion of the

admissibility of bare footprint marks). An S.B.I. agent testified about his study of the science of taking and comparing footprints and fingerprints of human beings at various schools and of his practical experience.

He also testified that footprints yield identifiable characteristics just as fingerprints do. The court found the agent to be an expert in footprint analysis. The Court took judicial notice of the fact that fingerprinting was sufficiently established and since the technique involved in comparing the bare footprint was essentially the same as identifying fingerprints, then the footprint evidence should also be admissible.

However, in this case defendant counters with the argument that the identification process in Rogers was based upon ridge detail of the print, as is also true in fingerprint analysis. In the case sub judice, Dr. Robbins does not use ridge detail to make her comparisons. Ipso facto, defendant contends that this distinction alone should bar the admissibility of this particular method of footprint analysis.

The salient kernel to be gleaned from Rogers is that this Court in 1951 was faced with a technique which was in its infancy, as is Dr. Robbins' technique. The expert in Rogers analyzed the bare footprints by studying enlarged photographs of a bare footprint that was imprinted on the front page of a newspaper left at the crime scene.

The expert witness testified that he compared these enlarged photographs with those of the defendant's. Because he also testified that he analyzed ridge detail, which was the same technique employed in identifying fingerprints, the court accepted his testimony based on this similarity to the established technique of fingerprinting analysis. Ultimately, this Court admitted expert testimony that a photograph of a barefoot imprint on newspaper was identical to that of the defendant's when the two prints were compared.

This testimony was admitted without the Court conducting a head count to determine if the method was recognized. Similarly, we have here the development of a scientific method that is in its infancy. Admittedly, the method utilized by Dr. Robbins has not been cited in any reported decision. Justice Ervin noted in Rogers that "[d]iligent search has failed to uncover a single decision in any jurisdiction involving the admissibility of this precise type of footprint evidence."

Id. at 397, 64 S.E.2d at 577. However, that fact alone did not prevent the Rogers court from accepting the expert testimony. In varying degrees all courts have sometimes been reluctant to admit unique scientific testimony.

In fact, the use of fingerprinting as a means of identification, which *380 existed prior to the time of Christ,[11] was itself the subject of doubt and speculation. This form of scientific evidence, though universally accepted now, had to make its appearance for acceptance in some court.

In *People v. Jennings*, 252 Ill. 534, 96 N.E. 1077 (1911), the admission of fingerprint evidence was a case of first impression, but the court accepted this novel and unique method. In *Jennings*, the court stated: When photography was first introduced, it was seriously questioned whether pictures thus created could properly be introduced into evidence, but this method of proof, as well as by means of x-rays and the microscope, is now admitted without question.

Id. at 548, 96 N.E. at 1082. As with most scientific phenomena, the passage of time can serve, as it has in fingerprinting, to demonstrate the reliability and acceptance of a once speculative and unproved premise. Thus, the novelty of a chosen technique does not justify rejecting its admissibility into evidence. Defendant in this case further argues that this Court has adopted a test that would prevent Dr. Robbins' scientific testimony because it is unreliable and not generally accepted.

The courts of this nation, including our own, have struggled to enunciate a formula for ruling on the admission of new and untested scientific principles. See McCormick, *Scientific Evidence: Defining a New Approach to Admissibility*, 67 Iowa L.Rev. 879 (1982); Gianelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, A Half Century Later*, 80 Col.L.Rev.

1197 (1980). Defendant contends that the Frye^[12] formula for determining the admissibility of new scientific evidence must be applied in this case. Defendant argues that the Frye test has been chosen by the courts of this State to determine admissibility,^[13] citing *State v. Temple*, 302 N.C. 1, 273 S.E.2d 273 (1981) and *State v. Peoples*, 311 N.C. 515, 319 S.E.2d 177 (1984).

However, in *Peoples* this Court stated that "we have not specifically adopted the Frye test in this jurisdiction (but) we have used the theory underlying that decision." *Id.* at 532, 319 S.E.2d at 187. Nowhere in *State v. Temple* did the court even intimate that the Frye formula was adopted by this Court. Plainly, our Court does not adhere exclusively to the Frye formula.

In *Temple*, however, the Court stated a general rule for admitting new scientific methods: This Court is of the opinion, that we should favor the adoption of scientific methods of crime detection, where the demonstrated accuracy and reliability has become established and recognized. Justice is truth in action, and any instrumentality, which aids justice in the ascertainment of truth, should be embraced without delay. *381 *Id.*, 302 N.C., at 12, 273 S.E.2d 280.

A second general principle regarding admissibility of such evidence in this State is as follows: In general, when no specific precedent exists, scientifically accepted reliability justifies admission of the testimony of qualified witnesses, and such reliability may be found either by judicial notice or from the testimony of scientists who are expert in the subject matter, or by a combination of the two.

1 Brandis on North Carolina Evidence, § 86, at 323 (footnote citations omitted). We will examine the law in this area, beginning with Temple, in an effort to synthesize the significant factors relied upon by the courts when evaluating whether a scientific method in its infancy is reliable and whether it should be adopted or rejected.

In Temple, the admission of bite mark identification was a question of first impression also. The expert witness had prepared plaster casts and overlays of the impressions of the defendant's teeth and matched these overlays with a bite mark on the upper left chest area of the victim. He testified to various identifiable areas of dentition between the bite mark and the overlays.

The court relied upon People v. Marx,[14] 54 Cal. App. 3d 100, 126 Cal. Rptr. 350 (1975) and held that the evidence was properly admissible. This Court, citing from Marx, stated: [T]he basic data on which the experts based their conclusions were verifiable by the court. Further, in making their painstaking comparisons and reaching their conclusions, the experts did not rely on untested methods, unproved hypotheses, intuition or revelation.

Rather, they applied scientifically and professionally established techniquesx-rays, models, microscopy, photographyto the solution of a particular problem which, though novel, was well within the capability of those techniques.

In short, in admitting the evidence, the court did not have to sacrifice its independence and common sense in evaluating it. Temple, 302 N.C. at 11, 273 S.E.2d at 280, (quoting Marx, 54 Cal.App.3d at 111, 126 Cal.Rptr. at 356). This Court in Temple determined that the expert had utilized established techniques in dentistry and photography to solve a novel problem.

The expert made visual comparisons, as did Dr. Robbins in this case, of physical items of evidence. Furthermore, the expert testified that he had, over the years in practice, examined thousands of persons' teeth and concluded that each had unique dentition. This Court concluded that "the expert testimony in this case was based upon established scientific methods, and is admissible as an instrument which aids justice in the ascertainment of the truth."

Id., 302 N.C., at 13, 273 S.E.2d at 280. There was no conclusion or explanation within Temple concerning whether and by whom these scientific methods had become established, recognized or generally accepted. See Note, Criminal LawExpert Testimony on Bite MarksState v. Temple, 302 N.C. 1, 273 S.E.2d 273 (1981), 4 Campbell L.Rev. 179 (1981). Instead, the Court in Temple focused on the "reliability" of the test, rather than its "establishment and recognition." [15] This seems to be in accord *382 with Professor Brandis' emphasis on the reliability of the scientific method and not its popularity within a scientific community.

Brandis, supra at § 86. A year after Temple was decided, this Court in State v. Green, 305 N.C. 463, 290 S.E.2d 625 (1982) again accepted the expert's testimony alone to substantiate the reliability of bite mark identification, further expanding the method employed in Temple.

The expert in Green made his comparisons by using photographs of the victim's bite wound rather than making his comparisons with the actual bite wounds on the victim's body, as was performed by the expert in Temple the year before.

In Green, the Court rejected defendant's argument that the distinction between the two methods of comparison, one using photographs of the wound and the other the actual wound itself, precluded the admissibility of the expert's testimony.

The Court briefly reviewed how the expert used photographs made to approximate scale of the victim's wound to identify points of identification in his visual comparison of the two. The Court concluded that there was "no reason to suspect that the methodology employed by this expert was anything less than scientifically sound and reliable." *Id.* at 471, 290 S.E.2d at 630.

The Court also mentioned, without elaborating, that the methodology had been approved recently in three other jurisdictions. *Id.* at 471-72, 290 S.E.2d at 630. An earlier North Carolina case, *State v. Crowder*, 285 N.C. 42, 203 S.E.2d 38 (1974) also reviewed a novel scientific method.

The defendant argued that an expert who conducted a gunshot residue test utilizing flameless atomic absorption spectrophotometry should not have been allowed to testify because such method was "speculative and highly unreliable." *Id.* at 53, 203 S.E.2d at 45.

In determining the reliability of this test, the Court considered the expert's professed experience in that field, the fact that the expert had presented technical papers on the subject to various associations of forensic scientists, and his independent research. These facts rendered this expert's testimony both reliable and competent as viewed by this Court.

In matching threads among the cases and analogizing them to the present one, we determine that the method employed by Dr. Robbins is reliable. As in Temple and Marx, the expert in this case used scientifically established measurement techniques relied upon in the established field of physical anthropology to make her measurements.

The Court in Crowder reviewed the professional background and involvement of the expert in forensic science and determined that his testimony was reliable. Certainly, the extensive professional achievements and endeavors of Dr. Robbins should render her testimony reliable as was the expert's in Crowder. Additionally, the experts in Temple and Green used photographs, models, slides and overlays that were before the court and verifiable by the jury.

So, too, did Dr. Robbins. She did not ask the jury to sacrifice its independence by accepting her scientific hypotheses on faith. Rather, she explained in detail to the jury the basis of her measurements and the interrelationships of the various portions of the foot and how her visual comparisons enabled her to identify unknown footprints and compare them with known footprints.

She explained the number of footprints she had collected to justify why she believed each footprint is unique, just as the expert in Temple explained how he had examined the teeth of thousands of people and believed that each person possessed an individual and unique dentition. All of the foregoing factors relative to an expert's testimony based on a novel scientific method have been accepted by this Court as *383 cogent to its determination that the expert's method was reliable and his testimony admissible.

We also have determined that Dr. Robbins' unique scientific method is reliable because of her explanatory testimony, professional background, independent research, and use of established procedures to make her visual comparisons of bare footprints.

The technique utilized here is not comparable to the art of hypnosis, recently rejected by this Court as an unreliable scientific process when used to elicit testimony from a witness. *State v. Peoples*, 311 N.C. 515, 319 S.E.2d 177.

Therefore, our decision in *Peoples* does not command a similar conclusion herein. In reviewing the state of the art of hypnosis in *Peoples*, this Court recognized inherent problems in such a process, "such as the enhanced suggestability of the subject, his tendency to confabulate when there are gaps in his recollection, his increased confidence in the truthfulness and accuracy of his post-hypnotic recall which may preclude effective cross-examination, and the inability of either experts or the subject to distinguish between memory and confabulation...."

Peoples, 311 N.C. at 532, 319 S.E.2d at 187. All of these factors made such hypnotically induced testimony unreliable. Justice Exum, after acknowledging that the State has not adopted the Frye formula, explained that the theory underlying the formula has been utilized in this State when the courts rendered inadmissible the results of polygraph examinations.

State v. Foye, 254 N.C. 704, 120 S.E.2d 169 (1961); accord, *State v. Brunson*, 287 N.C. 436, 215 S.E.2d 94 (1975). In the polygraph cases, this Court stressed the fact that the polygraph "had not yet attained scientific acceptance as a reliable and accurate means of ascertaining the truth or deception." *Foye*, 254 N.C. at 708, 120 S.E.2d at 172; *Brunson*, 287 N.C. at 445, 215 S.E.2d at 100.

This "lack of general scientific recognition" was a major factor in excluding polygraph results. However, the polygraph, unlike the method involved in bite mark and barefoot print analyses, does not employ visual comparisons that are comprehensible to a jury.

In fact, the expert's use of mechanical equipment in polygraph testing distinguishes that method from one in which visual comparisons are made by an expert who does not rely on a machine in rendering an opinion. Indeed, a similar distinction among the types of scientific evidence and their admissibility has also been espoused by reputable legal scholars: On the other hand, when the nature of the technique is more esoteric, as with some types of statistical analyses and serological

tests, or when inferences from the scientific evidence sweep broadly or cut deeply into sensitive areas, a stronger showing of probative value should be required.

McCormick On Evidence, § 203, at 606 (3d ed. 1984) (citing *State v. Catanese*, 368 So. 2d 975, 981 (La.1979) (dealing with the admission of polygraph results). Hypnosis, like the polygraph, is related to "attempts to prove the workings of the mind and human behavior." *Id.* at 622, n. 4. These areas involve matters concerned with particularly sensitive areas. *Id.* at 633.

This same premise was acknowledged in *Peoples* when the Court stated, "Yet there is a 'scientific' aura which is associated with hypnosis that may be so well-entrenched in the minds of potential jurors that they may assign undue credibility to hypnotically refreshed testimony." 311 N.C. at 526, 319 S.E.2d at 184. (citations omitted.) A similar distinction between polygraph and handprint analyses was recognized by the court in *People v. Columbo*, 118 Ill. App.

3d 882, 74 Ill. Dec. 304, 455 N.E.2d 733 (1983), cert. denied, ___ U.S. ___, 104 S. Ct. 2394, 81 L. Ed. 2d 351 (1984). The expert in that case had compared gloved handprints that had been placed on the fender and trunk of a car with the handprint of the defendant who was missing his left index finger.

The expert found the prints comparable. The technique employed by the expert was novel because the handprint itself had been made while the person was wearing a pair of gloves, thus leaving no ridge detail. However, the expert testified that based upon his specialized knowledge of *384 the human skeletal structure, he could determine that the handprint on the fender and another handprint on the trunk were those of a person who was missing the index finger on his left hand.

The court recognized that this technique was not the traditional method employed when handprint analysis is made because the prints on the car were not compared with prints on file at the police headquarters to determine comparable size and measurements of the handprints.

The defendant argued that this form of evidence was novel and lacked foundational requirement of general acceptance and therefore should have been inadmissible. The defendant in *Columbo*, in an attempt to challenge the admissibility of the method of identifying the gloved handprint, cited as authority a case that had rejected the results of polygraph testing.

People v. Monigan, 72 Ill.App.3d 87, 28 Ill. Dec. 395, 390 N.E.2d 562 (1979). The *Columbo* court rebuffed the defendant's analogy and instead compared the expert's analysis of the gloved handprints with the analysis made of bite mark impressions, both involving a visual comparison.

In distinguishing the handprint analysis from polygraph evidence, the court stated that "Monigan (polygraph machine)... concern(s) the admissibility of evidence derived from the interpretation of mechanical data rather than visual comparisons." *Columbo*, 118 Ill.App.3d at 937, 74 Ill.Dec. at 359, 455 N.E.2d at 788 (citation omitted).

Therefore, unlike the methods of hypnosis and polygraph testing employed by the experts in the North Carolina cases of Peoples, Foye, and Brunson, the Court here is dealing with a scientific method which can be considered reliable based on the testimony of the expert while displaying to the jury visual aids used in making observable visual comparisons. Dr. Robbins did rely upon established techniques in physical anthropology, according to her own testimony.

Furthermore, she did not engage a polygraph machine or perform hypnosis, techniques that possess a scientific aura and that sweep broadly into sensitive areas. Nor is there any effort by Dr. Robbins to explore the workings of the mind, as do experts in hypnosis and polygraph testing.

For these reasons, we reject any argument that the expert testimony before this Court should be inadmissible because the method of analysis is comparable to hypnosis or polygraph testing. C. After determining that this evidence is sufficiently reliable, the next question is whether it is also relevant. Relevant evidence is admissible if it "has any logical tendency however slight to prove the fact at issue in the case."

State v. Pratt, 306 N.C. 673, 678, 295 S.E.2d 462, 466 (1982). In that case Chief Justice Branch, writing for the majority, admitted evidence of the similarity of shoe prints found at the crime scene with the shoes of the defendant. He stated that "[e]vidence of shoe prints at the scene of the crime corresponding to those of the accused may always be admitted as tending more or less strongly to connect the accused with the crime."

Id. at 677-78, 295 S.E.2d at 465. It is also true in this case that defendant introduced the testimony of two witnesses who contradicted the testimony of Dr. Robbins by stating that they did not agree that defendant's footprint matched the footprint at the crime scene.[16] This rebuttal testimony goes to the weight of the evidence, not to its admissibility.

"What the evidence proves or fails to prove is a question of fact for the jury." State v. Stephens, 244 N.C. 380, 384, 93 S.E.2d 431, 433-34 (1956) (citations omitted). The differing views of the experts concerning the comparisons of the *385 footprints were properly submitted to the jury for their determination.

The reliability and credibility of Dr. Robbins' opinion were subject to refutation, and the weight of her testimony was fairly presented to the jury. II. EVIDENCE OF WEAPON POSSESSION Defendant contends that the trial court erred in allowing into evidence testimony that the defendant possessed a five-inch pocket knife a year before the victim's death and that the defendant possessed and shot a small pistol near a mentally retarded boy approximately three months before the victim's death.

We find no error regarding this evidence because the evidence concerning the knife was stricken from the record, the possession of the small pistol was relevant, and the details of the shooting

incident were admitted only after the defendant "opened the door" during re-direct examination of the defense witness.

The State sought to introduce evidence that about a year prior to the victim's death the defendant had threatened a witness with a five-inch pocket knife. Before admitting any testimony about the alleged threat by the defendant, there was an in-chambers proceeding to determine whether the witness would be allowed to testify about the incident. During the proceeding in chambers, the State cited to the court *State v. Stanfield*, 292 N.C.

357, 233 S.E.2d 574 (1977) where this Court held it was not error for the trial court, in a murder prosecution where the deceased was killed with a shotgun, to allow into testimony that one month earlier the defendant had threatened and assaulted his landlord's son with a shotgun.

In *Stanfield*, these threats were made approximately one month prior to the victim's death. In the instant case, the trial judge, citing *State v. McClain*, 240 N.C. 171, 81 S.E.2d 364 (1954), specifically denied the State's request to allow any testimony about the threats made a year prior to the victim's death.

The only testimony allowed was that which established that the defendant was seen with a pocket knife in his pocket a year earlier and that the witness saw the defendant take it out and open it. During direct examination by the State, the witness testified only that he had seen the defendant a year earlier in possession of a five-inch pocket knife, within the perimeters of the judge's instructions.

On cross-examination, defense counsel asked the witness the following: Q. You're very familiar with the farming out there, aren't you? A. Yes, Sir. Q. During the farming season you know that almost everybody out there connected with farming carries some sort of pocket knife, don't you? A. I would not know that, but some people do carry knives. Q. Most of the people actively engaged in farming carry a knife.

A. Yes, Sir. Q. That's quite an area for hunting and fishing out there, isn't it? A. Yes, sir. Q. And most of the people involved in hunting or fishing carry knives, regularly, out there. A. Yes, sir. After asking several other questions concerning when the witness observed the knife in defendant's possession, defense counsel made a motion to strike the witness's testimony, which was granted.

The court stated: "Don't consider the testimony of the witness concerning whether he saw a knife in the possession of the defendant." Generally, an error in admission of evidence is cured when the jury is instructed to disregard stricken evidence and such evidence is withdrawn from the jury's consideration. *State v. Craig and Anthony*, 308 N.C. 446, 302 S.E.2d 740 (1983).

Furthermore, the defendant was not prejudiced by the initial admission of this evidence in view of the fact that defense counsel effectively *386 diminished any deleterious effect during cross-examination of the witness by eliciting facts which tended to establish that defendant's possession of the pocket knife was a usual and common practice among persons in this farming and hunting area.

This assignment of error is overruled. The court likewise committed no error in allowing certain evidence concerning the alleged use and possession by the defendant of a small pistol less than three months before the victim's death. During cross-examination of defense witness, Thelwyn Bullard, the defendant's first cousin, the State elicited, without objection, that the defendant pulled a pistol from his pocket and shot it into the ground when the witness, the defendant, and other people were in a squash field.

Generally, defendant's failure to enter a timely objection to evidence results in a waiver of his right to assert the alleged error on appeal. N.C. Gen.Stat. § 15A-1446(b) (1978); *State v. McDougall*, 308 N.C. 1, 301 S.E.2d 308 (1983).

In reviewing the testimony challenged by the defendant, we find no plain error in the trial court's allowing such evidence. Even if defendant had made a timely objection, this evidence is relevant and competent to contradict the defendant's testimony that he kept the little pistol in his truck before the pistol was lost and did not generally carry the pistol on his person.

On re-direct of this same witness, the defendant endeavored to minimize the effect of the testimony about the defendant carrying the gun and shooting it into the ground three months earlier. Defense counsel sought to accomplish this by asking the witness a series of questions concerning how many people carry guns on racks in their pickup trucks and in their glove compartments.

On re-cross, the State, without objection, asked the following questions: Q. He didn't go back to his truck and pull a gun out of his gun rack, did he? A. No, sir. Q. There was something going on there, and all of a sudden you saw his hand and heard a shot. A. Yes, sir.

On redirect, the defendant then asked the witness the following: Q. He didn't shoot at anybody, did he? A. No, sir. Q. Didn't scare anybody, did he? A. No, sir. Q. Do you know whether he was shooting at a snake or not? A. No, I don't. Q. Snakes out there in June, aren't there? A. Yes, sir.

After defense counsel's attempt to suggest to the jury that no one was shot at or scared and that the defendant was shooting at snakes, the State in re-cross brought out that the defendant had shot in the direction of a mentally retarded boy whom the defendant or the defendant's son had been teasing and that when the shot was fired the defendant was standing within seven or eight steps of the boy.

Thus, during redirect examination of this witness, the defendant "opened the door" to the introduction of the State's evidence about the details of the shooting. *State v. Small*, 301 N.C. 407, 272 S.E.2d 128 (1980). Therefore, the introduction of this evidence also does not constitute reversible error. III. VENUE The next assignment of error, admittedly minor as conceded by defense counsel, challenges the propriety of venue being in Sampson County rather than in Bladen County.

During one of the pre-trial motions to dismiss, the issue of proper venue was heard by Judge Henry Stevens during the 20 November 1981 session of Sampson County Superior Court. Judge Stevens found, on the basis of the evidence presented, that the South River forms the boundary between Bladen and Sampson Counties in the area where Melvin's Bridge crosses the river, that the victim was found floating *387 in the South River, that a large quantity of blood of the same type as the victim's was found on Melvin's Bridge over the normal channel of the South River, but closer to the Bladen County side than the Sampson County side, that bare footprints, pieces of glass, and other objects allegedly from the defendant's truck were found on the bridge in the same area as the blood, and that the victim had been shot and stabbed.

When a defendant makes a motion to dismiss for improper venue, the burden is on the State to prove by a preponderance of the evidence that the offense occurred in the county named in the indictment. *State v. Loucheim*, 296 N.C. 314, 250 S.E.2d 630, cert. denied, 444 U.S. 836, 100 S. Ct. 71, 62 L. Ed. 2d 47 (1979). G.S. 15-129 (1975) is controlling on the issue of venue when a crime is committed on a watercourse, which forms a county boundary.

This statute reads as follows: When any offense is committed on any water, or watercourse whether at high or low water, which water or watercourse, or the sides or shores thereof, divides counties, such offense may be dealt with, inquired of, tried and determined, and punished at the discretion of the court, in either of the two counties which may be nearest to the place where the offense was committed.

This statute has been interpreted by this Court to allow venue to lie in either county bordering the waterway, regardless of where on the watercourse the crime took place and regardless of whether the midpoint of the river or its shoreline formed the county boundary. *Martin County v. Trust Company*, 178 N.C. 26, 100 S.E. 134 (1919); see, e.g., *Coates, Crime is Local*, 14 N.C.L.Rev.

313 (1936). All the evidence indicates that at least a portion of the murder took place on Melvin's Bridge which spans the South River between Sampson and Bladen Counties. G.S. 15-129 and the cases interpreting it indicate that there is no legal significance to the fact that the crime committed on Melvin's Bridge was somewhat closer to the Bladen County than the Sampson County side of the river.

Since the crime apparently took place over the boundary watercourse, either Bladen or Sampson County was a proper location for venue for the trial of this case. Accordingly, defendant's assignment of error is without merit and overruled because the judge could find by a preponderance of the evidence that the offense did occur in the county named in the indictment.

IV. MOTION TO DISMISS Finally, defendant contends that the trial court erred when it refused to grant the defendant's motion to dismiss at the end of the State's evidence and again at the end of all of the evidence.

Because the defendant introduced evidence on his own behalf, he waived his right to argue on appeal the motion for the directed verdict at the end of the State's case. N.C.Gen. Stat. § 15-173 (1983); *State v. Leonard*, 300 N.C. 223, 266 S.E.2d 631, cert. denied, 449 U.S. 960, 101 S. Ct. 372, 66 L. Ed. 2d 227 (1980).

Therefore, the sufficiency of the evidence at the conclusion of both parties' evidence is the sole issue before this Court. When a defendant moves for dismissal, the trial court must determine whether there is substantial evidence of each essential element of the offense charged (or of a lesser offense included therein), and of the defendant's being the one who committed the crime.

If that evidence is present, the motion to dismiss is properly denied. *State v. Earnhardt*, 307 N.C. 62, 296 S.E.2d 649 (1982); *State v. Powell*, 299 N.C. 95, 261 S.E.2d 114 (1980). "Substantial evidence is such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *State v. Smith*, 300 N.C. 71, 78-79, 265 S.E.2d 164, 169 (1980) (citation omitted).

In ruling on a motion to dismiss, the evidence must be considered by the court in the light most favorable to the State, and the State is entitled to every *388 reasonable inference to be drawn from the evidence. *State v. Earnhardt*, 307 N.C. 62, 296 S.E.2d 649. Contradictions and discrepancies must be resolved in favor of the State, and the defendant's evidence, unless favorable to the State, is not to be taken into consideration.

Earnhardt, 307 N.C. 62, 296 S.E.2d 649; *State v. Jones*, 280 N.C. 60, 184 S.E.2d 862 (1971). The test of the sufficiency of the evidence on a motion to dismiss is the same whether the evidence is direct, circumstantial, or both. *State v. Powell*, 299 N.C. 95, 261 S.E.2d 114. All evidence actually admitted, both competent and incompetent, which is favorable to the State must be considered.

State v. McKinney, 288 N.C. 113, 215 S.E.2d 578 (1975). The defendant in this case was charged with and convicted of first degree murder. First degree murder is the unlawful killing of a human being with malice and with premeditation and deliberation. *State v. Judge*, 308 N.C. 658, 303 S.E.2d 817 (1983); *State v. Fleming*, 296 N.C. 559, 251 S.E.2d 430 (1979).

The intentional use of a deadly weapon gives rise to a presumption that the killing was unlawful and that it was done with malice. *State v. Judge*, 308 N.C. 658, 303 S.E.2d 817. A pistol is a

deadly weapon per se. *State v. Powell*, 238 N.C. 527, 78 S.E.2d 248 (1953). A knife can be a deadly weapon if, under the circumstances of its use, it is likely to produce death or great bodily harm.

State v. Randolph, 228 N.C., 228, 45 S.E.2d 132 (1947). Premeditation and deliberation must ordinarily be proved by circumstantial evidence. Among the circumstances to be considered are: (1) want of provocation on the part of the deceased, (2) conduct and statements of the defendant before and after the killing, (3) threats made against the victim by the defendant, ill will or previous difficulty between the parties, and (4) evidence that the killing was done in a brutal manner.

State v. Calloway, 305 N.C. 747, 291 S.E.2d 622 (1982). The nature and number of the victim's wounds is certainly a circumstance from which an inference of premeditation and deliberation can be drawn. *State v. Brown*, 306 N.C. 151, 293 S.E.2d 569, cert. denied, 459 U.S. 1080, 103 S. Ct. 503, 74 L. Ed. 2d 642 (1982).

In applying the foregoing principles of law to the facts in this case, this Court does not find error in the trial court's refusal to dismiss at the end of all the evidence. Viewed in the light most favorable to the State and acknowledging that the State is entitled to every reasonable inference, the evidence tends to prove the necessary elements of first degree murder and that defendant perpetrated the crime.

This evidence can be summarized thusly: The defendant and Pedro Hales had previously experienced ill will resulting from Pedro's shooting and wounding defendant's son. Defendant had repeatedly threatened Pedro's life. This evidence clearly tends to prove that defendant had a motive to kill Pedro. Defendant and Pedro were seen together earlier in the evening of 25 August 1981, the last night Pedro was seen alive; and defendant was observed angrily addressing Pedro.

At this time, defendant was observed with a .22 caliber gun. Admittedly, defendant had an opportunity to kill Pedro. Later witnesses saw defendant in the same general vicinity where Pedro was last seen alive, and defendant's truck was also observed on Melvin's Bridge, the scene of the crime, during the evening of 25 August 1981. Defendant admitted that no one else had possession of his truck, except himself, the entire evening.

The wounds were basically inflicted in a left to right direction, an angle consistent with shots fired from the driver's seat toward a passenger. The seat belt assembly in defendant's truck contained a small bullet hole at head level. This evidence circumstantially links the defendant and his truck to the crime scene, Melvin's Bridge. All of the physical evidence was identified as originating from defendant or his truck.

The type and number of wounds received by Pedro, the hostile comments made by defendant when Pedro was missing, coupled with the prior threats and lack of evidence tending to show any

provocation by Pedro are all facts tending to prove the elements of unlawfulness, malice, premeditation *389 and deliberation. State v. Calloway, 305 N.C. 747, 291 S.E.2d 622; State v. Judge, 308 N.C.

658, 303 S.E.2d 817. Thus, substantial evidence was presented to show the elements of first degree murder and that the defendant committed that murder. Accordingly, this assignment of error is overruled. In the defendant's trial, we find NO ERROR. NOTES [1] Dr. Robbins testified that physical anthropology is a subdivision of anthropology in which the focus is on the biological makeup of people, namely, the similarities and differences in people around the world.

More specifically, Dr. Robbins has been involved in forensic anthropology, which is the application of anthropological techniques and methods to problems pertaining to law enforcement. [2] Dr. Robbins testified that she is the only person in this country to attempt the kind of analysis undertaken to identify the footprints in question. She has been in contact with Owen Macey of Scotland Yard and Arly Claus of Germany who employ the same technique and analysis.

Also there are several persons in India who engage in footprint analysis consistent with her analysis. [3] Dr. Robbins has been a professor in the Physical Anthropology Department at the University of North Carolina at Greensboro since September 1974.

Before then, she was a Professor at Mississippi State University, University of Kentucky, and University of Nebraska. She obtained her Bachelors, Masters and Ph.D. Degrees from Indiana University. Her Ph.D. was in anthropology, with a minor in physiology. She has taught courses in forensic anthropology and written an article entitled "The Individuality of Footprints," which is to be published in the Journal of Forensic Science.

See, e.g., Robbins, Anthropological Methodologies Applied to Medicolegal Problems, 7 Crim.Just.Rev. 1 (Spring, 1982). She is expected to have a book published soon also dealing with human footprints. In addition, Dr. Robbins has presented papers at the American Academy of Forensic Sciences Annual Meeting and is consulted by the FBI in cases dealing with footprints.

She is a member of the American Academy of Forensic Science, with membership premised on experience in working with law enforcement problems. Dr. Robbins' forensic experience includes analyzing and testifying in at least four other states.

[4] This testimony consisted of a scholarly presentation describing the bone structure and internal structure of the human foot. Dr. Robbins explained in detail the anatomy of the foot, with six pages in the transcript being devoted to this presentation. She also testified that she began her study of footprints in 1971 when she analyzed prehistoric prints in the caves of Kentucky and Tennessee.

Although she had never had formal training in the study of footprints, she began collecting footprints and formulating her own study because there was no scientific literature or studies available at that time. Dr. Robbins has collected over 1,200 footprints impressed in dust and lifted by means of a hardening agent. During the course of her studies, she testified that she has had occasion to examine thousands of footprints.

[5] On direct, Dr. Robbins further explained the basis for her technique: Q. When you started working with these living footprints, were you... the footprints of living human beings, were you doing something new, or were you building on something other people had done? A. Well, here in the United States, no previous studies of footprints had been done for the collection of information about footprints had been conducted.

However, in England, a forensic scientist, Sir Sidney Smith, had used footprints in some of his own work, both when he was employed in Cairo, Egypt and... especially in Egypt. The footprints have been used in the British Leather Industry, and also the American Military, in the development of shoes that would not hurt the feet of soldiers.

The measurement of footprints had been taken by the early French in the early nineteen hundreds. But, a man by the name of Alphonse Bertillon started working with footprints, and then the discovery of fingerprints came in and he did not pursue the footprints. Q. Have you studied the work of these people? A. Yes, Sir, I have.

[6] The defendant filed a memorandum of additional authority after his original brief was filed with this Court but prior to oral arguments. The defendant vigorously attacked the State's assertion that there was legal authority reported in the national reporting system where Dr. Robbins' testimony had been considered.

The State cited *People v. Puluti*, 120 Cal. App. 3d 357, 174 Cal. Rptr. 595, 597 (1981) where Dr. Robbins testified as an expert. She examined a pair of shoes found near the deceased's grave. Dr. Robbins testified that the defendant, Puluti, had worn the shoes found at the gravesite. She had made a comparison between the defendant's footprints and the impression of a footprint that was impressed in the intersole of the shoe.

Defendant correctly identified Puluti as an unpublished opinion, pursuant to an Order of the California Supreme Court dated 13 August 1981. Rule 977(a) of the California Rules of Court requires that unpublished opinions are not valid legal authority in any legal proceeding, thus this opinion cannot be cited as authority for anything in California. And, ipso facto it cannot be considered persuasive authority within this State.

It is worth noting that Dr. Robbins testified in a trial court of North Carolina as an expert in the field of physical anthropology in the case of *State v. Maccia*, 311 N.C. 222, 316 S.E.2d 241 (1984). Shoes found at the crime scene contained imprints on the insole of footprints. Dr. Robbins

prepared a cast of the imprints and compared them with footprints made in paint and ink by the defendant.

She concluded that "the defendant's feet made the imprints inside the shoes found at the scene of the crime." *Id.* at 225, 316 S.E.2d at 243. This is sometimes referred to as a "Cinderella analysis." The expert testimony by Dr. Robbins was not an issue on appeal.

[7] G.S. 8C-1, Rule 702, effective July 1, 1984, is identical to the present statute. [8] Dr. Robbins explained that the SBI had given her photographs of a bloodstained right footprint on asphalt and a bare left footprint in sand, taken at varying shutter speeds.

The bloody bare footprint was subsequently treated by the SBI with a chemical substance called luminol, which enhances the detail of the photographed footprint. She was asked to compare both the natural light and luminol-enhanced photographs with the footprints appearing on six rolls of paper.

The footprints on the six rolls of paper were made by a person (unknown to Dr. Robbins, all of these footprints were those of the defendant) whose feet had been smeared on the bottom with ink and latex paint. The footprints were made on the paper when the defendant walked from one end of the paper to the other, turned around and then impressed his prints in the opposite direction.

[9] Dr. Robbins' detailed, precise, and exhaustive explanations and responses to similar questions propounded by both attorneys concerning her comparisons comprised over 175 pages of transcript testimony. It would be of little value to further reiterate the technical details contained in this testimony.

[10] In North Carolina, even a lay person can testify that in that person's opinion a shoe print at a crime scene corresponds to those of the accused. *State v. Pratt*, 306 N.C. 673, 295 S.E.2d 462 (1982). [11] *Stacy v. State*, 49 Okla. Crim. 154, 292 P. 885 (1930) ("an allusion to finger print impressions for the purpose of identification is referred to in writings as early as 650 A.D. and they are traced back to a period some 100 years before Christ."

Id. at 157, 292 Pac. at 887). [12] *Frye v. United States*, 293 Fed. 1013 (D.C.Cir. 1923) dealt with the forerunner of the polygraph machines. The court stated the following rule in excluding the admission of such expert testimony regarding the results of this machine: "Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define.

Somewhere in this twilight zone the evidential force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs."

Id. at 1014. [13] This formula envisions that before a technique can be admitted, it must be "generally acceptable." But by whom or what scientific field? What must be accepted? How is general acceptance established? All of these questions and more have been the focus in a continuing debate and confusion among courts and scholars concerning the Frye formula.

For a thorough discussion, refer to McCormick, *Scientific Evidence: Defining a New Approach to Admissibility*, 67 Iowa L.Rev. 879 (1982); Gianelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, A Half Century Later*, 80 Col.L. Rev. 1197 (1980).

[14] This was the first reported case dealing with bite mark evidence. About seven weeks after the victim was buried, her body was exhumed so that impressions of bite marks on the victim's nose could be taken. The court observed that no established technique existed for identifying a person from his bite marks.

The Frye "general acceptance" standard was not a barrier to admissibility of this novel technique since the expert relied upon established techniques in the field of dentistry and demonstrated his comparisons by use of models, photographs, x-rays, and slides.

[15] In McCormick on Evidence, there is a discussion about the varying interpretations of the Frye formula by various courts and how the formula has been the subject of criticism and applied in sundry fashion. Id. § 203, at 606 (3d ed.1984). Marx, cited in Temple, was recognized as one case which did not question the validity of the Frye standard but chose to diminish the "general acceptance" requirement of the test.

Marx held that general acceptance goes to the weight rather than the admissibility of the evidence. See McCormick, *supra* at 606. A more flexible approach is endorsed by these authorities in applying the Frye formula: "Not every scrap of scientific evidence carries with it an aura of infallibility. Some methods, like bite mark identification,... are demonstrable in the courtroom.

Where the methods involve principles and procedures that are comprehensible to a jury, the concerns over the evidence exerting undue influence and inducing a battle of the experts have little force." McCormick, *supra*, § 203, at 606 (citing Marx to support this proposition).

[16] Dr. Matthew Cartmill and Dr. James Robertson testified for the defense to rebut Dr. Robbins' testimony. Dr. Cartmill is a Professor in the Anatomy Department and is Associate Professor in the Anthropology Department at Duke University. Dr. James Robertson is both a medical doctor and Chairman of the Department of Anatomy at Duke University Medical Center.

Neither of these witnesses had conducted any independent research in the area of footprint comparison as had Dr. Robbins.

