IN THE COURT OF APPEALS OF MARYLAND

No. 94

September Term, 1994

DAVID ELLIS GOLDSTEIN

v.

STATE OF MARYLAND

Eldridge
Rodowsky
Chasanow
Karwacki
Bell
Raker,

JJ.

Opinion by Raker, J.

Filed: September 7, 1995

The issue in this criminal case is the admissibility of readings from a device that uses lasers to measure the speed of motor vehicles. We shall affirm the trial court's rulings and the petitioner's conviction.

I.

Petitioner David Ellis Goldstein was issued a citation on July 17, 1992, charging him with traveling seventy-four miles per hour in a fifty-five mile per hour zone, in violation of Maryland Code (1977, 1992 Repl. Vol., 1994 Cum. Supp.) § 21-801.1 of the Transportation Article. An officer of the Howard County Police Department clocked petitioner's vehicle with the LTI 20-20, a device that uses lasers to measure velocity.

Goldstein was convicted in the District Court of Maryland in Howard County. Pursuant to Maryland Code (1974, 1995 Repl. Vol.) § 12-401 of the Courts and Judicial Proceedings Article ("CJ"), he appealed to the Circuit Court for Howard County. In circuit court, Goldstein filed a motion to exclude all laser evidence on the grounds that (1) the General Assembly implicitly rejected the admissibility of laser technology by refusing to enact proposed legislation that would specifically permit laser evidence, and (2) the LTI 20-20 does not satisfy the standard for the admission of scientific evidence under *Reed v. State*, 283 Md. 374, 391 A.2d 364 (1978). The trial judge reserved ruling on these issues until after the presentation of evidence.

At trial, each side called a scientific expert to testify concerning the reliability and acceptance of the LTI 20-20 in the particular scientific community. The State's expert testified that the LTI 20-20 is generally accepted as reliable and capable of measuring the speed of a motor vehicle accurately within one mile per hour. In opposition, Goldstein's expert testified that the LTI 20-20 is not generally accepted, due primarily to flaws in the particular device. Both experts agreed, however, that in theory laser technology could be used to measure the speed of a motor vehicle.

The trial judge found Goldstein guilty of exceeding the speed limit. The court found that the State had proven by a preponderance of the evidence that the LTI 20-20 is generally accepted in the relevant scientific community and that measurements from the LTI 20-20 are therefore admissible to prove the speed of a motor vehicle. Goldstein was fined $40 and costs.

We granted Goldstein's petition for a writ of certiorari to answer the following questions:

> "1. Did the trial court commit error by denying the Defendant's motion to exclude all evidence derived from the use of infra-red light (LASER) to measure the speed of a motor vehicle because the Maryland General Assembly rejected this scientific technique when they in 1992 and 1993 refused to amend the statute (Md. Cts. & Jud. Proc. §10-301) which exclusively authorizes the use of radio-microwaves (RADAR) to prove the speed of a motor vehicle to also authorize the use of LASER?

> "2. Did the trial judge commit error by determining that the LASER speed detection device (the LTI 20-20) used to measure the speed of Defendant's motor vehicle is generally accepted as reliable in the relevant scientific community thus satisfying the criteria for admissibility of a new scientific technique set forth in *Reed v. State*, 283 Md. 374, 391 A.2d 364 (1978)?
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> "3. Did the trial judge commit error by ruling that as the proponent of the new scientific technique in a criminal case the State's burden of proving general acceptance in the relevant scientific community was only by a preponderance of the evidence, rather than beyond a reasonable doubt or some other standard?"

We shall answer the first of these questions in the negative. We shall also conclude that there was no error in admitting the LTI 20-20 evidence and that it is not necessary for us to reach the third question presented.

II.

Evidence based on new scientific techniques may become admissible in judicial proceedings by statute, or by satisfaction of the "general acceptance" test adopted in *Reed v. State*, 283 Md. 374, 381, 391 A.2d 364, 368 (1978). General acceptance may be proven through expert testimony or judicial notice or a combination of the two. *Id.* at 380-81, 391 A.2d at 367-68; 5 L. McLain, *Maryland Evidence* § 401.4(b), at 270 (1987).

Goldstein's first argument is that, far from being statutorily admissible, laser evidence in speeding cases has in fact been found

inadmissible by the General Assembly. This argument is based on CJ § 10-301 and the consideration of and rejection by the General Assembly of bills to amend § 10-301 to expressly authorize laser evidence.

A.

In 1953, the Maryland General Assembly enacted legislation providing that readings from devices made to measure velocity using radio-micro waves are admissible in legal proceedings to prove the speed of a motor vehicle. 1953 Maryland Laws ch. 583, § 1, at 1085. The statute, as amended, now reads as follows:

> The speed of a motor vehicle may be proved by evidence of a test made upon it with a device designed to measure and indicate the speed of a moving object by means of radio-micro waves.

CJ § 10-301. Goldstein asserts that this statute implicitly bars the admission of speed measurements derived from scientific tools other than radio-micro wave technology.

"When the language of a statute is plain and clear and expresses a meaning consistent with the statute's apparent purpose, no further analysis of legislative intent is ordinarily required." *Rose v. Fox Pool*, 335 Md. 351, 359, 643 A.2d 906, 910 (1994). In this case, the statute states that speed "may" be proven with radio-micro waves technology. The use of the word *may* indicates that the use of radio-micro waves is neither mandatory nor exclusive, and that other methods of proving speed are therefore

not precluded. *See Fairbanks v. McCarter*, 330 Md. 39, 46, 622 A.2d 121, 125 (1993).

This reading of the plain language is consistent with the statute's apparent purpose. The statute focuses exclusively on radio-micro waves, suggesting that the General Assembly was merely facilitating the admission of such evidence without intending to address, favorably or unfavorably, the admission of any other method of proving speed. Moreover, laser technology did not become available until the 1970s, well after CJ § 10-301 was enacted; it is surely beyond dispute that the Legislature did not intend, in 1953, to exclude a form of evidence that did not even exist for another two decades. Accordingly, based on the plain language of the statute and the context of its enactment, we find no merit in this argument.

B.

The heart of Goldstein's statutory argument, however, is not that CJ § 10-301 excludes laser evidence by negative implication, but rather that the General Assembly affirmatively rejected the use of laser technology by declining to amend the statute to permit such evidence.

In 1992 and 1993, legislative committees of the General Assembly rejected proposed legislation that would have amended § 10-301 to specifically authorize the use of laser speed

determinations as evidence in legal proceedings.[1] Goldstein contends that the failure of these bills reflects the General Assembly's conclusion that measurements from the LTI 20-20 are not sufficiently reliable to be admissible and that this conclusion is binding on the courts. We disagree.

Petitioner relies on the concept of legislative inaction to support his argument that a laser speed determination is inadmissible. For analytical purposes, legislative inaction cases may be divided into three categories: the "acquiescence cases," the "reenactment cases," and the "rejected proposal cases." W. Eskridge, Jr., *Interpreting Legislative Inaction*, 87 Mich. L. Rev. 67, 71 (1988). Goldstein relies on the third category, the rejected proposal cases, "in which the Court infers from the

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[1] In 1992 and 1993, the General Assembly considered three proposals relating to laser evidence. The first of these, House Bill 649, introduced in 1992, would have amended CJ § 10-301 to read as follows (capitals indicate matter added to existing law):

> The speed of a motor vehicle may be proved by evidence of a test made upon it with a device designed to measure and indicate the speed of a moving object by means of radio-micro waves OR LIGHT AMPLIFICATION BY STIMULATED EMISSION OF RADIATION (LASER).

This bill was defeated in the Judiciary Committee of the House of Delegates. House Bill 528, which was introduced in 1993 and would have added the identical language, received an unfavorable report from the Judiciary Committee.

Senate Bill 38, also introduced in 1993, would have added "or light waves" at the end of the existing version of CJ § 10-301. This bill received an unfavorable report from the Senate Judicial Proceedings Committee.

rejection of a bill or amendment by Congress, or by a chamber or committee of Congress, that an interpretation similar to the rejected proposal is excluded from the statute." *Id.*

Our goal in interpreting a statute is always to discern the intent of the Legislature. *Tidewater v. Mayor of Havre de Grace*, 337 Md. 338, 344, 653 A.2d 468, 472 (1995). When ascertaining legislative intent, this Court may take into consideration the "legislative history of a statute, including amendments that were considered and/or enacted as the statute passed through the Legislature, and the statute's relationship to earlier and subsequent legislation." *Rose*, 335 Md. at 360, 643 A.2d at 910.

Nonetheless, Maryland generally adheres to the majority view on legislative inaction, which is that ordinarily "the fact that a bill on a specific subject fails of passage in the General Assembly is a rather weak reed upon which to lean in ascertaining legislative intent." *Automobile Trade Ass'n v. Ins. Comm'r*, 292 Md. 15, 24, 437 A.2d 199, 203 (1981); *accord T.H.E. Ins. v. P.T.P. Inc.*, 331 Md. 406, 422, 628 A.2d 223, 231 (1993); *see also Police Comm'r v. Dowling*, 281 Md. 412, 420-21, 379 A.2d 1007, 1012 (1977); *Harden v. Mass Transit Adm.*, 277 Md. 399, 406, 354 A.2d 817, 820-21 (1976). Thus, the mere fact that the General Assembly has declined to adopt a particular proposal does not preclude this Court from incorporating the substance of that proposal into the common law or our interpretation of a statute.

Furthermore, the legislative inaction in this case is particularly ambiguous because more than one purpose can be attributed to the defeat of the legislation. The committees' rejection of the proposals may have reflected a judgment that LTI 20-20 evidence is insufficiently reliable. On the other hand, the committees may simply have intended to let the admissibility of laser speed measurements be determined in judicial proceedings, as is ordinarily the case with scientific evidence.

Courts have traditionally been reluctant to infer legislative intent from legislative inaction when there are several possible reasons for defeat. For instance, in *Schneidewind v. ANR Pipeline Co.*, 485 U.S. 293, 108 S. Ct. 1145, 99 L. Ed. 2d 316 (1988), the petitioner argued that Congress, by refusing to enact bills conferring on a federal agency the authority to regulate the issuance of securities of natural gas companies, indicated an intent to let the states regulate such securities. The United States Supreme Court rejected this argument, noting that members of Congress who did not support the bills might have intended that the states be free to regulate the securities, but, on the other hand, they might have desired that neither the states nor the federal agency exercise the authority in question. *Id.* at 306.

Uncertainty as to the reason for inaction in committee leads us to apply the common law. It is well-established that "in construing a statute, we assume that the statute was not intended

to modify, nullify, or supersede the common law of the State absent any clear indication to the contrary." *Richwind v. Brunson*, 335 Md. 661, 672, 645 A.2d 1147, 1152 (1994). As we said in *Lutz v. State*, 167 Md. 12, 172 A. 354 (1934):

> "It has been said that statutes are not presumed to make any alterations in the common law further than is expressly declared, and that a statute, made in the affirmative without any negative expressed or implied, does not take away the common law. The rules of the common law are not to be changed by doubtful implication, nor overturned except by clear and unambiguous language."

Id. at 15, 172 A. at 356 (quoting 25 R.C.L. 1054).

If the enactment of a statute ordinarily will not displace the common law, then *a fortiori* the inaction of a legislative committee should not be construed to overrule common-law precepts. Accordingly, we conclude that the General Assembly did not intend to prohibit the use of laser evidence, but rather anticipated that, following their failure to specifically authorize such evidence, the courts would conduct *Frye-Reed* hearings.

III.

Having concluded that the General Assembly's rejection of proposals concerning laser evidence does not bar the admission of such evidence, we must now decide whether measurements taken with the LTI 20-20 were properly admitted in this case.

A.

Our analysis begins by examining the operation of the LTI 20-20. The theory underlying the LTI 20-20 would be familiar to any student of high school physics. In fact, laser speed devices operate on the same principles as military radar (police radar works somewhat differently). *See* 1 *McCormick on Evidence* § 204, at 880 (J. Strong 4th ed. 1992). McCormick explains military radar as follows:

> The radar antenna transmits microwave radiation in pulses. The equipment measures the time it takes for a pulse to reach the target and for its echo to return. Since the radiation travels at a known speed (the speed of light), this fixes the distance to the target. The changes in the distances as determined from the travel times of later pulses permit the target's velocity to be computed.

Id. § 204, at 880 n.17.

Laser speed measurements work exactly the same way, except that the device relies on lasers rather than microwave radiation. Laser is an acronym for "light amplification by stimulated emission of radiation." 15 *Funk & Wagnalls New Encyclopedia* 410 (R. Phillips ed., 1983).

> Lasers are devices that amplify light and produce coherent light beams, ranging from infrared to ultraviolet. A light beam is coherent when its waves, or photons, propagate in step with one another. Laser light, therefore, can be made extremely intense, highly directional, and very pure in color (frequency).

Id.

Light and microwaves, the building blocks of lasers and radar, respectively, occupy different points on the electromagnetic spectrum but are otherwise similar. P. Tipler, *Physics* 852-54 (2d ed. 1982). According to the State's expert, the main advantage that lasers offer over radio-micro waves is that the beam is narrower and therefore easier to keep focused on the target vehicle.

A hypothetical might clarify this discussion. Our example involves a runner in a 200-meter dash. For purposes of our example, we assume that light travels at 200 meters per second. The actual speed of light is approximately 300 million meters per second, or 186,000 miles per second; our use of a different figure, however, is consistent with the relevant scientific principles and makes the calculations in our example easier.

An instant before the race begins, an observer standing at the finish line sends a laser beam toward the runner in the starting blocks. The beam reaches the runner and returns in two seconds. Thus, the distance for the round trip was 400 meters, so the runner must have been 200 meters away when the laser reached her. Five seconds later, the observer's laser device emits another light pulse, which returns in 1.5 seconds; thus, when the beam reached the runner, she was 150 meters away. We can then calculate that the runner traveled fifty meters in the five-second interval

between the two measurements; accordingly, she is running at an average speed of ten meters per second.[2]

B.

The trial court conducted a *Frye-Reed* review of both the general technique of laser speed measurements and the individual design of the LTI 20-20. As we now explain, we think this was not required. Because the court's inquiry afforded Goldstein more process than he was entitled to, however, we find no error.

With respect to the technique, there was no actual dispute. The defense effectively conceded that the use of lasers to measure speed is generally accepted within the relevant scientific community. Thus, there was no need to inquire into this matter as a predicate to the admissibility of the laser readings.

With respect to the design of the LTI 20-20 itself, the *Frye-Reed* inquiry was unnecessary.[3] The *Frye-Reed* test was designed to

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[2] If the observer is not standing directly in front of the runner (or directly behind, if our hypothetical had placed the observer at the beginning of the track), then his measurements will understate the runner's speed. This phenomenon, known as the cosine effect, creates a potential source of error in the LTI 20-20's measurements. Because this error always favors the motorist, however, it is not at issue in this case.

[3] Goldstein challenged the specific design of the LTI 20-20, but not the feasibility in general of constructing a laser gun for measuring the speed of motor vehicles. Had he made this more general objection, he might have been entitled to a *Frye-Reed* hearing.

apply to scientific theories and processes, not to brand-name products.

In *Reed v. State*, 283 Md. 374, 391 A.2d 364 (1978), in which this Court adopted the *Frye* standard, the issue presented was the admissibility of voiceprint evidence to prove identity. We held such evidence inadmissible, without inquiring into the specific design of the device used by the voiceprint analysts. *See generally id.* at 389-400, 391 A.2d at 372-77.

The *Reed* Court also noted other applications of the *Frye* standard:

> The *Frye* test has been invoked by courts in their consideration of, *inter alia*, paraffin test, *Brooke v. People*, [139 Colo. 388, 339 P.2d 993 (1959)]; medical testimony regarding the cause of birth defects, *Puhl v. Milwaukee Automobile Ins. Co.*, [8 Wis. 2d 343, 99 N.W.2d 163 (1959)]; breath analysis devices designed to test for intoxication, *People v. Morse*, [325 Mich. 270, 38 N.W.2d 322 (1949)]; truth serum injections, *State v. Linn*, [93 Idaho 430, 462 P.2d 729 (1969)]; blood tests, *People v. Alston*, [79 Misc. 2d 1077, 362 N.Y.S.2d 356 (1974)]; neutron activation analysis, *State v. Stout*, [478 S.W.2d 368 (Mo. 1972)]; gunshot residue tests, *State v. Smith*, [50 Ohio App. 2d 183, 362 N.E.2d 1239 (1976)]; Nalline tests for detection of narcotics use, *People v. Williams*, [164 Cal. App. 2d Supp. 858, 331 P.2d 251 (1958)]; ink identification tests, *United States v. Bruno*, [333 F. Supp. 570 (E.D. Pa. 1971)]; and hypnotism, *People v. Busch*, [56 Cal. 2d 868, 366 P.2d 314, 16 Cal. Rptr. 898 (1961)].

Id. at 383, 391 A.2d at 369. Three of these cases merit special attention.

In the first case, *People v. Morse*, 325 Mich. 270, 38 N.W.2d 322 (1949), the Supreme Court of Michigan applied the *Frye* standard to a device for determining blood alcohol level by measuring breath alcohol content. Although the court only examined one specific brand of device, the Harger Drunkometer, it stated the question presented more broadly:

> Is there general scientific recognition that the breath test applied by the Harger Drunkometer will afford an accurate index of the alcoholic content of the blood?

Id. at 323. As this quotation reveals, the court concentrated on the theory underlying the device, not on the design of the Drunkometer.

The other two significant cases cited in *Reed* are *State v. Smith*, 50 Ohio App. 2d 183, 362 N.E.2d 1239 (1976), and *State v. Stout*, 478 S.W.2d 368 (Mo. 1972). Each of these cases rejected a specific version of a generally accepted scientific technique. In each case, however, the flaws in the technique were theoretical, not limited to the individual tools employed.

In *Smith*, the police used a modified version of the Harrison-Gilroy Gunpowder Residue Test, which is designed to detect lead, antimony, and barium on the subject's skin; the presence of these elements suggests that the subject has recently fired a gun. Although the test is generally accepted, the police in *Smith* modified the procedure in a manner that introduced into the testing process a filter paper containing the very elements the test is

supposed to detect, rendering the results indeterminate. 362 N.E.2d at 1245.

As for *Stout*, that case presented the Supreme Court of Missouri with the use of a modified form of neutron activation analysis to determine the chemical composition of a blood sample. Although the parties agreed that this technique is generally accepted in its unmodified form, the State's expert in *Stout* had altered it in a manner that he conceded was not generally accepted. The Supreme Court of Missouri, noting the expert's concession that his process was not generally accepted with respect to identification of the source of blood, held the evidence inadmissible. 478 S.W.2d at 372.

There are important considerations of judicial economy underlying the practice of limiting *Frye-Reed* to general processes, rather than brand-name products. If every brand of every instrument were subject to a discreet *Frye-Reed* evaluation, trial courts would be mired in hearings concerning devices incorporating scientific principles, possibly including calculators and magnifying glasses. *See People v. Mendibles*, 199 Cal. App. 3d 1277, 245 Cal. Rptr. 553, 563 (1988) (stating that a *Frye* hearing is not required with respect to a colposcope, which the court characterized as "a weak microscope").

Moreover, the scientific consensus that forms a prerequisite for the admission of evidence would ordinarily be elusive, because,

while scientists may be familiar with the general principles underlying a particular device, they may have no occasion to use the device itself. In the instant case, for example, the LTI 20-20 has little use other than for law enforcement purposes. Consequently, neither of the experts who testified at trial actually used the device in his work. The State's expert was an astrophysicist who was well-versed in the use of lasers to measure distances and speed; he was familiar with the LTI 20-20 itself, however, only because he had been engaged by the manufacturer to provide expert testimony. The defense expert, on the other hand, worked for a maker of radar detectors and became acquainted with the LTI 20-20 in the process of developing a device for detecting laser beams as well as radar beams.

We believe that the ordinary truth-seeking methods of the adversarial process will suffice to expose design flaws in the devices used to gather evidence, without requiring the courts to place a "*Frye-Reed* Seal of Approval" on individual brands. We also note the existence of another method for ensuring the reliability of individual devices, namely, agency certification.

The General Assembly has adopted this method with respect to the measurement of breath alcohol content. In order for such a measurement to be admissible in a court proceeding, both the operator of the measuring equipment and the equipment itself must have been certified by the Postmortem Examiners Commission, an

organ of the Department of Mental Health and Hygiene. *See* CJ § 10-304(b). Of course, it is for the Legislature, not this Court, to determine whether this approach would be appropriate for the certification of laser speed measurement devices.

In this case, the trial court made an extensive investigation into the reliability of the laser speed measurements. The court found that the use of lasers to measure speed is generally accepted in the relevant scientific community. We agree, and we hold that laser speed measurements may be admitted into evidence in judicial proceedings in the State of Maryland.

Although the trial court was not required to conduct a *Frye-Reed* inquiry with respect to the LTI 20-20, there was no prejudice. If anything, the court's prudence favored the defendant. Accordingly, we further hold that the trial court did not err in allowing the admission of the LTI 20-20 evidence.

JUDGMENT OF THE CIRCUIT COURT FOR HOWARD COUNTY AFFIRMED. COSTS TO BE PAID BY PETITIONER.