Gist—

Tuning forks must be shown to be accurate by having been tested themselves. "Whether the instrument (radar) itself is accurate and is accurately operated must necessarily be demonstrated to the satisfaction of the trier in order to render the evidence produced by it admissible."

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216 A.2d 625

153 Conn. 365

STATE of Connecticut

v.

Michael R. TOMANELLI.

Supreme Court of Connecticut.

Feb. 1, 1966.

[153 Conn. 366]

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Charles S. Tarpinian, Willimantic, with whom, on the brief was Henry Kucharski, Willimantic, for appellant (defendant).

James N. Oliver, Jr., Pros. Atty., for appellee (state).

Before [153 Conn. 365] KING, C. J., and MURPHY, ALCORN, SHANNON and HOUSE, JJ.

[153 Conn. 366]

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ALCORN, Associate Justice.

The defendant was convicted of a charge of speeding after a jury trial in the Circuit Court. The Appellate Division of that court affirmed the conviction, and we granted certification. The evidence offered by the state concerning the defendant's speed was based entirely on the use of a [153 Conn. 367] speed detection instrument by the state police. The issues on this appeal are whether the scientific principles of this device, popularly called 'radar', and the application of those principles to the measurement of speed may be judicially noticed, whether the operator of the radar unit was qualified to testify as to the accuracy and operation of the particular instrument used, and whether the admission into evidence of a portion only of the graphic record made by the instrument was proper.

About 4 o'clock on a September afternoon, the state police had installed a radar instrument on a section of highway which had been posted by the state traffic commission for a speed limit of forty-five miles per hour. The instrument was tested by the use of tuning forks before being put into operation, and this test showed that both the visual speedmeter and the graphic recorder on the instrument were operating accurately. The highway had a blacktop surface approximately thirty feet wide with no observable defects. The area was rural with no houses in the vicinity. The weather was cloudy, but the road was dry and traffic was light. At about 5:25 p. m., a vehicle operated by the defendant passed through the radar field and caused the visual speedmeter and the graphic recorder to register a speed of sixty-four miles

an hour. The radar operator radioed another officer who was stationed about 1000 feet away and who stopped the defendant as he approached. The radar instrument was again tested by by the use of tuning forks two hours later, and that test indicated that it was functioning accurately.

At the trial the defendant conceded that his speed exceeded the posted limit, but he claimed that it was reasonable under the existing conditions. There [153 Conn. 368] was no other evidence concerning his speed except that recorded by the radar instrument. The defendant objected to testimony as to the recorded speed on the ground that it was inadmissible until evidence was offered concerning the accuracy and ability of radar to measure speed. The court ruled that it could judicially notice the inherent utility of the radar principle to measure speed accurately and admitted the evidence. The propriety of judicial notice of this proposition has not previously been before us, and it presents the first question for our consideration on this appeal.

I

'To take judicial notice is a function, and to apply it to the decision of causes a right, which appertains to every court of justice, from the lowest to the highest.' Arthur v. Norfield Congregational Church, 73 Conn. 718, 731, 49 A. 241, 246; Masline v. New York, N. H. & H. R. Co., 95 Conn. 702, 709, 112 A. 639. The true concept of what is judicially known is that it is something which is already in the court's possession or, at any rate, is so accessible that it is unnecessary and therefore time wasting to require evidence of it. State v. Main, 69 Conn. 123, 136, 37 A. 80. Judicial notice, therefore, in its appropriate field, meets the objective of establishing facts to which the offer of evidence would normally be directed. De Luca v. Park Commissioners, 94 Conn. 7, 10, 107 A. 611. The underlying theory is that proof by evidence concerning a proposition may be dispensed with where the court is justified, by general considerations, in declaring the truth of the proposition without requiring evidence from the party. 9 Wigmore, Evidence (3d Ed.) § 2565. This theory goes no further, however, than to mean [153 Conn. 369] that the proposition is taken as true without an offer of proof by the party who should ordinarily have offered it. Judicial notice of the proposition is in no sense conclusive, and the opponent is not prevented from disputing it by evidence if

he believes it to be disputable. 9 Wigmore, op. cit. § 2567. In this case, however, the defendant made no offer of countervailing evidence. Matters which may properly be judicially noticed in this way are those which come to the knowledge of men generally in the course of the ordinary experience of life or those matters which are generally accepted by mankind as true and are capable of ready and unquestionable demonstration. Roden v. Connecticut Co., 113 Conn. 408, 415, 155 A. 721. Thus, facts may be judicially noticed which are so notorious that the production of evidence would be unnecessary, or which the judicial function supposes the judge to be familiar with, in theory at least, or which, although they are neither notorious nor bound to be judicially known, are 'capable of such instant and unquestionable demonstration, if desired, that no party would think of imposing a falsity on the tribunal in the face of an intelligent adversary.' 9 Wigmore, op. cit. § 2571.

The term 'radar' is an acronym of the phrase 'RAdio Detection And Ranging' and is correctly applied only to a device such as that in general use by the armed forces for determining the range, direction and speed of a target object. This true 'radar' device, commonly known as the pulse type, emits at regular intervals a pulse or beam of short electromagnetic waves which are reflected from the target object. Richardson, Modern Scientific Evidence, p. 266. The instrument commonly used by the police, such as the one used in this case, operates[153 Conn. 370] on the principle known as the Doppler shift. That is to say, it emits a continuous electromagnetic wave which enables the speed of an object to be determined by measuring the difference in frequency between the wave emitted and the reflected wave, or echo wave, received. Direction and range cannot be measured by this device. The significant distinction, then, between true radar and the so-called police radar is that the former operates on a pulse principle while the latter operates on a continuous-wave principle. Because of the popular use of

the term, however, we use the term 'radar' in referring to the instrument used by the police in this case.

There can be no doubt, at this late date, of the general scientific acceptance of the Doppler-shift principle upon which police radar operates. As explained by the Austrian scientist Christian Johann Doppler over a century ago and as utilized by instruments such as the one used in the present case, the difference in frequency between the wave emitted by the radar set and the echo wave can, if the instrument itself is accurate and is properly operated, be translated into a velocity reading of extreme accuracy. 3 McGraw-Hill Encyc. of Science and Technology, p. 425; 4 id. 264, 265-266. The scientific accuracy of the Doppler-shift principle for the measurement of speed, if the principle is correctly applied, is, in the discretion of the court, a proper subject of judicial notice so that, especially where, as here, no evidence attacking it was proffered, expert testimony in explanation of the principle is not a necessary prelude to the introduction of radar evidence. See Everight v. City of Little Rock, 230 Ark. 695, 696, 326 S.W.2d 796; State v. Dantonio, 18 N.J. 570, 578, 115 A.2d 35, 49 A.L.R.2d 460; People v. Magri, 3 [153 Conn. 371] N.Y.2d 562, 566, 170 N.Y.S.2d 335, 147 N.E.2d 728; East Cleveland v. Ferell, 168 Ohio St. 298, 301, 154 N.E.2d 630.

Judicial notice can extend, however, only to the scientific accuracy of the Doppler-shift principle as a means of measuring speed if the principle is correctly applied. Judicial notice does not extend to the accuracy or efficiency of any given instrument designed to employ the principle. Whether the instrument itself is accurate and is accurately operated must necessarily be demonstrated to the satisfaction of the trier in order to render the evidence produced by it admissible. Of course, there may be, as illustrated by the scant literature on the subject, such as Kopper, 'The Scientific Reliability of Radar Speedmeters,' 16 Md.L.Rev. 1; Carosell & Coombs,

'Radar Evidence in the Courts,' 32 Dicta 323, outside influences which may affect the accuracy of the recording by a radar set sufficient to raise a doubt as to the reliability of the speed recorded through the use of the set. Conflicts in the evidence concerning the existence of interference of this nature would, when they arise, require additional consideration by the trier.

II

We turn now to the question whether the radar operator was qualified to testify as to the accuracy and operation of the radar instrument which was used. It is not necessary to recite in detail the evidence offered to establish the qualifications of the radar operator. We have carefully reviewed the evidence printed in the appendices to the briefs and are satisfied that the trial judge was amply justified in concluding that the operator was qualified to testify on these subjects. We have discovered no writer who states that the operation of police radar [153 Conn. 372] requires the technical knowledge of a radar scientist.

The operator relied, for his assurance of the accuracy of the instrument he was using, on tuning-fork tests made before and after the defendant's speed was recorded. These tests, in brief, were made by activating what were described as forty-sixty-and eighty-mile-per-hour tuning forks and by observing, in each test, that the speedmeter and graphic recorder of the radar instrument indicated corresponding readings of forty, sixty and eighty miles per hour. The theory of the test is that each tuning fork is set to emit a wave frequency corresponding to a mile-per-hour speed equivalent. It is obvious that the tuning forks themselves must be shown to be accurate if they are to be accepted as a valid test of the accuracy of the radar instrument. No attempt appears to have been made to establish the accuracy of the tuning forks. On the other hand, no effort was made by the defendant to attack the accuracy of the tuning forks. See City of St. Louis v. Boecker, 370 S.W.2d 731, 734 (Mo.Ct.App.). Under these circumstances the accuracy of the radar unit was unimpeached. The defendant asserts in his brief that he was 'precluded from offering expert testimony contra the applicability, reliability and accuracy of the particular instrument used or the scientific principles and methods of its operation' by the circumstance that the

court took judicial notice of the 'reliability, accuracy and applicability of radar.' That this is a mistaken conception of the effect of judicial notice has already been indicated.

III

There remains for consideration the defendant's third claim that the court erred in admitting into [153 Conn. 373] evidence only the portion of the graphic record made by the radar instrument which showed the speed of the defendant's vehicle. A brief explanation is necessary for an understanding of the claim.

The radar instrument which was used in this case registered the speed of the target vehicle in two ways. The first was by a visual speedmeter, that is, by a needle on a dial from which the operator could read the indicated speed as one would read the speed on an automobile speedometer. The radar operator used this reading as a basis for signalling the 'chase' officer to stop the vehicle. At the same time that this speed was registered, the radar instrument was making a graphic record by a line traced on a roll of paper graduated to make a permanent record of the speed. This graphicrecording process operated continuously for the entire period during which the radar instrument was functioning, in this case about three and one-half hours. It is the defendant's claim that the graphic record was admissible only if the entire paper roll covering the complete period of operation of the radar instrument was offered.

The objection is invalid for two reasons. After the radar operator had testified to the speed which he had observed on the speedmeter,

and which prompted him to signal the other officer to stop the vehicle, the state offered in evidence the portion of the paper roll on which that speed was graphically recorded. The defendant objected to the offer of this evidence. In his brief he concedes that this portion of the graphic record was offered to corroborate the testimony of the radar operator. The objection was not well taken since the offer was objected to, not because the proffered exhibit was [153 Conn. 374] claimed to be inadmissible for corroboration purposes, but because the defendant wished to have the whole roll in evidence in order to show 'what the operation of this radar unit was during the time that it was in operation [sic].' In the second place, the defendant, in his brief, misconstrues the original document or 'best evidence' rule and attempts to apply it to the offer of this evidence. This argument was not advanced as a ground of objection in the trial court. Nor is it valid. The rule applies when the terms of a writing need to be proved. The testimony of the radar operator in this case concerned his independent reading of the radar dial. The graph was merely a recording of the meter reading which had been independently observed by the radar operator. The 'best evidence' rule did not apply. McCormick, Evidence, pp. 408-411.

There is no error.

In this opinion KING, C. J., and HOUSE and SHANNON, JJ., concurred.

MURPHY, Associate Justice (dissenting).

The opinion is strangely silent about the circumstances under which the trial judge took judicial notice of the principle of radar as a scientific device for the measurement of speed. Over the defendant's objection, the state police trooper who operated the radar apparatus was permitted to testify concerning the principles of radar, the operation of the radar instrument and his observation of the radar speedmeter when the defendant's vehicle passed through the radar beam. Later the defendant moved to strike the trooper's testimony because no expert testimony had been offered by the state that the principle of radar as a speedtesting device was scientifically accurate. The court, in denying the motion, stated that, when the Circuit[153 Conn. 375] Court was organized, the judges, as a body, decided that radar had reached the point where it would be accepted as an 'established function' to measure speed, and that it would no longer be necessary to prove the principles of radar by expert testimony. I am unable to agree that this violation of the rules of evidence should receive the

imprimatur of this court.

In Nichols v. Nichols, 126 Conn. 614, 621, 13 A.2d 591, 595, we said: 'Most matters which the court may [judicially] notice fall into one of two classes, those which come to the knowledge of men generally in the course of the ordinary experience of life, and are therefore in the mind of the trier, or those which are generally accepted by mankind as true and are capable of ready demonstration by a means commonly recognized as authoritative. Roden v. Connecticut Co., 113 Conn. 408, 415, 155 A. 721. As to matters falling within the first class, obviously there is no occasion to introduce evidence. As to those falling within the second class, it may, in some cases, be the duty of counsel to provide the court with a means of ascertaining them, and * * * witnesses can be called for that purpose * * *. However, matter which it is claimed the court should judicially notice should ordinarily be called to its attention by a party seeking to take advantage of it in the course of presenting evidence in the case so that, if there is ground upon which it may be contradicted or explained, the adverse party will be afforded an opportunity to do so.' This rule now becomes archaic, and we, in effect, are holding that the principle and the efficiency of radar are such self-evident scientific facts of common knowledge that judicial notice can be taken of them. See Langin v. City of New Britain, 149 Conn. 431, 434, 180 [153 Conn. 376] A.2d 626;

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Silverman v. Swift & Co., 141 Conn. 450, 458, 107 A.2d 277.

The opinion refers to Richardson, Kopper, Carosell and Coombs, and the McGraw-Hill Encyclopedia of Science and Technology apparently as authorities on the subject. None of these works was offered or marked as an exhibit in evidence in the trial court. Where does this court acquire the power to reach into the unknown and use them for this purpose? In Kaplan v. Mashkin Freight Lines, Inc., 146 Conn. 327, 150 A.2d 602, 72 A.L.R.2d 926, we held it to be error for a party to read from treatises in argument to the jury when they had not been made full exhibits in the case. We are just as much in error in using the named works in the opinion here without any inkling as to the qualifications of the authors or the reliability of their offerings.

Also, the opinion shifts the burden of proof in this case, a criminal case, to the defendant. Fron now on, anyone who is caught speeding by radar is automatically guilty. If a radar reading is to be prima facie evidence of speeding, that rule should be adopted by the legislature, as has been done in Virginia and Maryland. Md.Ann. Code art. 35, § 91 (1965); Va.Code Ann. § 46.1-198 (1950). According to a recent periodical, the police in forty-five states use radar. But only a small minority, four, have adopted the judicial-notice theory.

I would have no objection to the taking of judicial notice by an appellate court under circumstances similar to those in the Dantonio case in New Jersey and the Everight case in Arkansas, both cited as authorities in the opinion. See Everight v. City of Little Rock, 230 Ark. 695, 326 S.W.2d 796; State v. Dantonio, 18 N.J. 570, 115 A.2d 35, 49 A.L.R.2d 460. In each of these cases, experts testified in the trial court on the usefulness[153 Conn. 377] and reliability of radar to test the speed of vehicles. The trial courts did not judicially notice radar. The Supreme Court in these states did so on the basis of the facts established in the trial courts. In the absence of legislative recognition of radar, we should not affirm the judgment on the record and procedure in this case.