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Modern Traffic Law Enforcement

Edward C. Fisher*

I. DEVELOPMENT

The story of the various devices in common use in law enforcement today reads like the science fiction of yesterday. Such a story might be entitled, "Crime Detection Gadgets and How They Grew" or, "You Can't Fool Science." Jules Verne's romantic story of life on a submarine, considered nothing more than a fanciful dream when it was written, has come to be accepted as commonplace fact in 1957, with undersea craft powered by atomic energy—an idea not even conceived or born until the middle of the 20th Century. The ancients dreamed of ways to transmit messages by means of supernatural intervention, without the use of human messengers. Today we all enjoy the marvels of television and radio, whereby we actually sit in our living rooms and see and hear thoughts being expressed, actions being performed, by persons thousands of miles away. And we have ceased to marvel at such things. They are taken as an incident of our modern life.

Twenty-five years ago, people would have found it difficult to believe that a quarter of a century hence we would be looking at a dial on a little black box to tell, with astonishing accuracy, just how fast a passing car was traveling. No wires—no hoses across the road—no stop watches—no measurements as such, yet the little black box can shoot out its invisible beam and register speed so exactly that people don't even argue about it—much—any more.

This and other developments, which the ancients would have put down as *miracles*, have become a part of our everyday life in this, the latter half of the 20th Century. Nor has the law been slow to utilize these modern inventions and scientific devices in the detection, pursuit and conviction of criminals. The police laboratory of the present day is a marvel of scientific know-how and skill. As rapidly as new devices are perfected they are put into use for the benefit of society in protecting it against its enemies—chief of which is the criminal. The list of such modern day miracles is long, and mention of only a few will illustrate the extent to which we

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have become accustomed to the use of devices which our forefathers would have pointed to as supernatural phenomena, no less. Such things as moving pictures, in color, with sound, faithfully recording every detail of a criminal making a confession, or showing a person, allegedly totally disabled, performing usual daily activities, are the accepted thing today. Ballistics tests, by which the identity of the firearm from which a fatal bullet was fired can be determined beyond question or quibble, also fit into the picture. Other equally commonplace examples are wonders of modern photography: pictures taken in the dark, or from the air, or by means of cameras tripped by the force of light. Note the almost unbelievable advances in the use of chemistry to analyze various substances, and even to determine the amount of alcohol a person has in his blood. Witness the principles of physics applied to black smears left on the pavement to determine the speed of an automobile. And in addition practical psychology is combined with practical physiology to find out if a person is telling the truth. These and countless other devices make up a substantial portion of the modern armory of law enforcement agencies.

An investigating officer today, equipped with the proper training and experience, can tell you quite accurately what happened in an automobile accident just by studying the telltale marks on the pavement and other significant indications found at the scene.¹ Experts who have studied the science of momentum and force can tell from examining damaged cars, or even studying photographs of them, how the damage was inflicted—how the cars came together, the angle thereof, whether both were in motion at the time and even the approximate speed of each.² The ability to judge speed merely by studying the type and character of skid mark smears has become so common that even the courts are beginning to take judicial notice of so-called stopping distances.³ In fact, the courts now recognize, as a matter of common knowledge, that the average *reaction time*—that interval of time from perception of danger to the application of the brake—is three-quarters of a second; an

¹ But the testimony of an officer who is neither an expert in the physical sciences nor an eye-witness to the accident may be of little value as evidence in court. See *Tyndall v. Harvey C. Hinds Co.*, 226 N.C. 620, 39 S.E.2d 828 (1946).

² *Storbakken v. Soderberg*, 75 N.W.2d 496 (Minn. 1956).

³ *McMinn v. Thompson*, 301 P.2d 326 (N.M. 1956); *State for the Use of Stehley v. Belle Isle Cab Co.*, 194 Md. 550, 71 A.2d 435 (1950); *Yeaman v. Storms*, 358 Mo. 774, 217 S.W.2d 495 (1949); *Ashbrook v. Cleveland Ry. Co.*, 34 N.E.2d 992 (Ohio App. 1941); *Vietmeier v. Voss*, 246 S.W.2d 785 (Mo. 1952). See *Traffic Digest and Review*, Jan. 1956, p. 20.

illustration of everyday application of the combined principles of physics, physiology and psychology.⁴ Science has demonstrated the truth of these principles to the point where reasonable doubt no longer exists.

Certainly man has pierced deep into the secrets of nature to become master of the elements and put them to his practical use in enforcing the law. He has done this by practical demonstration of scientific truth. And these uses today are not merely interesting scientific novelties. They are known and taken for granted. They are used everyday—all day. We do not always stop to realize what a wealth of human experience, practical experimentation, scientific study and tireless effort has gone into the development of these everyday miracles we have come to accept without comment.

For instance, it arouses no special wonder that we use airplanes in traffic control. Colonel Sanders of the Nebraska State Safety Patrol has described in fascinating detail how his organization makes use of aircraft for this purpose.⁵ Airplanes are used to spot areas of congestion, and communication with ground units is maintained by radio. A more ingenious use of airplanes is described by Colonel Sanders—*clocking speeders from the air!* In Nebraska most of the roads, at least in the eastern part of the state, are laid out along section lines, a mile apart. All the air observer must do is to count the intersections crossed by the speeding car within a certain number of seconds, gauged by a stop-watch. In areas where the intersection lines are not regular and the road parallels railroad tracks, the railroad mile posts are used to measure distance. In other areas where there are neither section lines nor railroad mile posts, white lines are painted on the highway a mile apart—and there you are.⁶

Some of our man-made miracles, however, have not met the

⁴ *Yeaman v. Storms*, 358 Mo. 774, 217 S.W.2d 495 (1949); *Ashbrook v. Cleveland Ry Co.*, 34 N.E.2d 992 (Ohio App. 1941); *Vietmeier v. Voss*, 246 S.W.2d 785 (Mo. 1952).

⁵ F.B.I. Bulletin, June 1956, p. 12.

⁶ Colonel C. J. Sanders explains that the standard practice on aerial clocking of speeders is for the aerial observer to maintain visual contact with the speeding automobile until it is apprehended on the ground. When charges are brought upon these aerial clockings, both the aerial observer and the patrolman making the apprehension are available to testify. To the best of Colonel Sanders' knowledge, there has been only one serious challenge to allowing aerial clockings as evidence in a speeding case. A finding of guilty in the Dawson County Court was appealed to the District Court for Dawson County, and was affirmed. Letter, Colonel C. J. Sanders to Neb. L. Rev., Oct. 1, 1956.

same acceptance as these we have discussed, due to disagreement among the experts as to their accuracy and reliability. For instance the well-known lie detector, the courts say, has not yet been shown to be sufficiently reliable and trustworthy so that its results will be accepted in court. It must be remembered that basically the rules of evidence exclude that which is not known or shown to be generally accurate and reliable. This refusal of the courts to accept such evidence does not mean, however, that such a device as the Polygraph (lie detector) does not have its valuable uses in crime detection. In fact it is widely used and is found to be especially useful in obtaining confessions. It is an interesting fact to note, too, that most of the cases wherein lie detector evidence has been ruled out are those in which the *defendant* sought to show its results.⁷

Interesting as these various methods and devices are in the field of law enforcement, it is not the purpose of this paper to cover the field of criminal law in detail. This has been well explored in the various journals of criminal law. What is proposed here is to discuss in some detail how these modern inventions are being adapted for use in traffic law enforcement and how they can be used in producing evidence legally admissible in court. Obviously these devices are not of much practical use unless the evidence produced by them can be used in court.

We are long past the time when a vast array of scientific, mechanical and electrical gadgets have to be carefully explained to the courts before evidence produced by them will be received. Clocks, watches, chronometers, moving pictures, X-rays, scales, phonographs, photography, wireless telegraphy, radio, and now even television have become matters of such common knowledge as to be accepted in court without foundation. This is simply an illustration of the rule that the courts are supposed to know what every other reasonably well-informed person knows. (As one court has expressed it, judges are no dumber than anybody else.)

As far as the rules of evidence are concerned there are no new or unique problems presented when scientific evidence of this kind is offered. Nevertheless modern methods of detecting the speed of vehicles have seemed to puzzle some of the courts and many prosecutors. When the radar speedometer was just making its appearance, about 1952, the legal department of the Northwestern University Traffic Institute was virtually flooded with requests for

⁷ E.g. *People v. Davis*, 343 Mich. 348, 72 N.W.2d 269 (1956); *Henderson v. State*, 94 Okla. Crim. 45, 230 P.2d 495 (1951); *Boeche v. State*, 151 Neb. 368, 37 N.W.2d 593 (1949).

information and opinions as to the admissibility of such evidence. There were the usual objections of "unconstitutionality" which come along with so many of our advances in law enforcement. We hear this as soon as some new scientific device reaches the state where it becomes useful in crime detection and law enforcement. Some of our inquirers thought the evidence produced by these new-fangled speed-check devices was not admissible in evidence in the absence of a statute expressly permitting it. The same state of confusion existed in regard to the familiar chemical tests for intoxication.

Actually none of these things have presented anything more than a new application of long established rules of evidence. Reduced to its essence, the rule regarding all evidence is, and always has been, that in order to meet the primary test of competency the party offering such evidence has the burden of showing that it is generally trustworthy and reliable—that it can be depended upon to reflect the truth for which the law is ever seeking. This burden applies to all kinds of mechanical and scientific evidence and the proponent is not relieved of proving its reliability until the use of the particular device has become so commonplace and well-understood as to be a matter of common knowledge. We can look back over the years and centuries of human progress and watch the gradual emergence of many of the things we use today without a thought as to their reliability.

Consider the timepiece, for instance. It is a mechanical gadget. No doubt it was a fearful and wonderful device when it first made its appearance back there in the dim past, when it looked like a turnip more than anything else. Imagine the cautious steps the courts must have taken when first called upon to accept its readings as evidence of the time of day! Had the necessary experiments been conducted to assure its accuracy as compared to the *sundial*? Had it been tested and compared with the well-known and undoubted accuracy of the *hour glass*? All this seems quaint now, when everybody knows that watches, clocks, and such devices are depended upon by everyone to give reasonably accurate indications of the passage of time. No doubt future lecturers will point to the hesitancy of our present-day courts to recognize the dependability of the radar speedmeter, chemical tests for intoxication and so on, as examples of that staid conservatism which has always characterized the law. True enough, watches and clocks do not always agree, and mechanical defects may cause them to run fast or slow. But no court in A.D. 1957 would require an expert in the art of watch-making to come before the court and explain how watches work and that they may be depended upon to give reliable and trustworthy readings as to time.

In a recent article Zebulon D. Alley, Assistant Director of the Institute of Government, North Carolina, theorizes that the very earliest type of evidence to be presented in speed cases was the estimate of witnesses, usually officers.⁸ Unquestionably admissible, these estimates were open to attack on the ground they were not accurate measurements. The earliest mechanical device for measuring speed was the stop watch, the result of which was accepted by an English court in 1906.⁹ The officer merely timed the motorist over a measured distance and established his speed by a simple calculation of the time elapsed in covering the distance. In our town we had a marshal who used this method, and if he decided the driver was speeding he would hop on his *bicycle* and overtake him! Usually, though, there were two policemen, one to operate the stop watch and the other to make the pick-up.

Another recent article describes the first attempted use of a "speed trap" in this country in 1903.¹⁰ On the road leading from the Bronx into Westchester County, New York, the police were having trouble with speeders who could drive fast enough to escape the bicycle policeman. The commissioner set up three dummy tree trunks along the road, with a stop watch policeman in each of these hollow trees equipped with a telephone. As a speeding car passed the first station the policeman telephoned the time to the officer in the next tree, who set his stop watch accordingly and computed the speed. If it was above the limit he phoned the officer in the third tree who lowered a pole across the road. When the boom was lowered on him the driver stopped and was warned about his speed. This certainly was more reliable than a mere estimate, but was open to the objection that it was *hearsay* in that each officer had to testify as to what the other said to him over the phone. It had the advantage, however, of establishing the identity of the violator on the spot. It was valuable as a warning, but useless insofar as actual prosecution was concerned.

It is interesting to note that a similar objection was raised in the earlier cases involving the use of radar. In establishing the mechanical accuracy of the device it is the custom to compare its readings with the speedometer readings of a squad car driven past it. In those early cases the prosecution made the mistake of having the radar operator take the witness stand and testify that as the patrol car sped past, its driver *told him via radio* that his speed-

⁸ Alley, Speed-Watch, Modern Counterpart of an Old Device, Popular Government, April 1956, p. 3.

⁹ *Plancq v. Marks*, 94 L.T. 577, 22 T.L.R. 432 (K.B. 1906).

¹⁰ Saturday Evening Post, Jan. 28, 1956, p. 41, 82.

ometer was then registering a certain number of miles per hour, that the operator-witness then compared this figure with that on his radar dial and that the two corresponded. This obviously involved the use of hearsay, which was easily eliminated by having *both officers testify* as to the readings of their respective devices.¹¹ These were some of the "bugs" that had to be worked out.

These new speed-check devices are typical of our interest in mechanical devices and gadgets. One of the first to be developed and accepted in court was a photographic device used in Boston in 1910.¹² Operating upon perfectly sound principles of photography, this was a camera set to take successive shots of a passing vehicle at one-second intervals. Then by measurement of the decreasing size of the object in the pictures in the one-second interval, it was (and is) possible to calculate speed with a high degree of accuracy. There the Supreme Judicial Court of Massachusetts said, in sustaining the conviction of a bus driver for speeding:

In this case the result of the experiments did not depend upon the fluctuations of human agencies, nor on conditions whose relations to the result were uncertain, but upon the immutable workings of natural laws; and upon such evidence the presiding judge may well have found that such experiments were likely to be more reliable as to the speed of the automobile than the conjectural statement of an eye witness or the interested statement of a chauffeur. . . . Indeed it would seem desirable to have some machine whose action being dependent upon the uniform working of the laws of nature would record the speed of a moving object.¹³

It is worthy of note that the principles of photographic science involved in the Boston case are implicit in the modern device known as the Photo-Traffic Camera. There is another interesting device called the Photo-Patrol which operates on the "electric eye" principle. A small high speed camera is mounted on a post beside the road, set to expose when a vehicle passes the "eye" in excess of a predetermined speed. When this occurs the camera produces a picture of the rear exposure of the guilty vehicle, showing its license plate, its color and a more or less distinct outline of its driver. Operating upon the presumption that the registered owner of the vehicle was driving it at the time, a complaint is filed in the local court and

¹¹ *People v. Offerman*, 204 Misc. 769, 125 N.Y.S.2d 179 (Sup. Ct. Erie County, 1953). See *People v. Tormey*, 204 Misc. 1023, 128 N.Y.S.2d 864 (County Ct., Monroe County, 1954); *People v. Katz*, 205 Misc. 522, 129 N.Y.S.2d 8 (Ct. of Sp. Sess., 1954); *People v. Sarver*, 205 Misc. 523, 129 N.Y.S.2d 9 (Ct. of Sp. Sess., 1954); *People v. Beck*, 205 Misc. 757, 130 N.Y.S.2d 354 (Sup. Ct. Erie County, 1954); Annot., 29 A.L.R.2d 469 (1956).

¹² *Commonwealth v. Buxton*, 205 Mass. 49, 91 N.E. 128 (1910).

¹³ *Id.* at 51, 91 N.E. at 129.

a summons issued to such owner. The success of this scheme has been seriously handicapped by a decision of the New York Court of Appeals to the effect that there is no presumption that the registered owner is driving it at any given time.¹⁴ So a number of these automatic "seeing eyes" have largely failed of their purpose due to their inability to identify the guilty driver. The radar device suffers no such disadvantage since its operator or his assistant is able to stop the driver on the spot (or near it).

In a case presented to the Kentucky Court of Appeals in 1951, the admissibility of evidence obtained by use of the Prather Speed Device was involved. This was one of the devices utilizing hoses stretched across the road at measured distances with electronic connections to a reading dial in the nearby squad car. The police officer testified as to the principles of its operation, how they checked and tested it for accuracy by trial runs prior to the incident in question, and generally as to its proper operation at the time in question. The objection of the defense was that the reliability of the device has not been sufficiently established to permit the showing of its result in evidence. The court in sustaining the conviction said:

. . . When it is shown that an instrument meets the tests of accuracy, its findings are accepted in evidence. We have long accepted the testimony of police officers based upon the calibrations of a speedometer as competent evidence, even though it is a matter of common knowledge that various degrees of friction, temperature or atmosphere, air pressure in the tires, and other factors affect the operation of the instrument to some extent. . . . In the case at bar it was established by proof of high quality that the device used fulfilled the function for which it was designed and was mechanically sufficient at the time it was used in connection with appellant's apprehension. We conclude that the conviction was sustained by sufficient evidence and the judgment is therefore affirmed.¹⁶

In referring to the use of speedometer readings the court cited *Spokane v. Knight*,¹⁷ a Washington case decided in 1917, wherein the defense sharply questioned the use of such evidence without previous foundation laid by expert testimony to show that speedometers are reliable indicators of speed. Knight had been convicted upon the testimony of the arresting officer as to readings shown by the speedometer on his motorcycle. The court held the accuracy of the particular speedometer was for the jury to determine, not a question of law. In the course of its opinion the court said:

¹⁴ *People v. Hildebrandt*, 308 N.Y. 397, 126 N.E.2d 377 (1955). Compare *People v. Rubin*, 284 N.Y. 392, 31 N.E.2d 501 (1940).

¹⁵ *Carrier v. Commonwealth*, 242 S.W.2d 635 (Ky. 1951).

¹⁶ *Id.* at 635.

¹⁷ *City of Spokane v. Knight*, 96 Wash. 403, 165 P. 105 (1917).

Speedometers, like other machines, may get out of order, but, where they are tested regularly, they may be relied upon with reasonable certainty to determine the rate of speed at which a machine is driven. It cannot be said that because speedometers may get out of order, rates of speed may not be measured by instruments manufactured for that purpose, and which usually give approximately correct rates of speed.¹⁸

In other words the court was saying that readings obtained from a device in such common use as the speedometer were admissible in evidence without preliminary showing of accuracy, although the *weight* of such evidence may be affected by showing defects or inaccuracies in the particular instrument, such as absence of recent scientific checking.

The early cases involving the admissibility of radar evidence followed the decision in the Kentucky case discussed above, and some convictions were reversed because of the absence of preliminary showing by experts that the radar speedometer was generally accurate and reliable, fulfilled the function for which it was intended, and so on. Under that rule the prosecution was faced in every case with the necessity of calling experts to establish the scientific principles upon which the device operated, that it was reliable, etc. Following the decision in the *Offerman* case¹⁹ in 1953, the several cases shortly following showed extreme diligence on the part of the prosecution to make sure this elaborate foundation was sufficiently laid. All of these early cases involving radar were decided by lower courts, principally those of New York.

In 1955 the first radar case to reach a court of last resort came before the Supreme Court of New Jersey. In *State v. Dantonio*,²⁰ the defendant was the operator of a Quaker City bus traveling north on the New Jersey Turnpike. As he came within range of a radar unit operated by the state police his speed was recorded at 69 to 70 miles an hour, in a 60 mile zone. The defendant contended such readings were not reliable due to the possibility of error. As this point, the court said: "In any event, the possibility of error would not wholly deny the admissibility of the radar evidence but would simply affect its weight. . . ."

The *Dantonio* case is highly significant in that it flatly holds the preliminary calling of experts to attest the accuracy, reliability and theory of the device may be dispensed with. *The courts will take judicial notice of these matters.* In sweeping away the archaic for-

¹⁸ Id. at 405, 165 P. at 106.

¹⁹ *People v. Offerman*, 204 Misc. 769, 125 N.Y.S.2d 179 (Sup. Ct. Erie County, 1953).

²⁰ 18 N.J. 570, 115 A.2d 35 (1955).

mality of the old rule requiring affirmative evidence, the New Jersey Supreme Court said:

Through the years our courts have been properly called upon to recognize scientific discoveries and pass upon their effects in judicial proceedings. When fingerprint evidence was not accepted as universally as it is now, the Court of Errors and Appeals was required to deal with the contention that the trial court had erred in permitting an expert to testify as to the art of fingerprinting and its use as a means of identification. In holding that the testimony had properly been admitted, Justice Minturn in *State v. Cerciello*, 186 N.J.L. 309, 314, 90 Atl. 1112, 1114], aptly said: "In principle its admission as legal evidence is based upon the theory that the evolution in practical affairs of life, whereby the progressive and scientific tendencies of the age are manifest in every other department of human endeavor, cannot be ignored in legal procedure, but that the law in its efforts to enforce justice by demonstrating a fact in issue, will allow evidence of those scientific processes which are the work of educated and skillful men in their various departments and apply them to the demonstration of a fact, leaving the weight and effect to be given to the effort and its results entirely to the consideration of the jury. . . ."²¹

Placing itself definitely on record as being in favor of the adoption of modern scientific methods in traffic law enforcement the court concluded:

While it is vital under our basic concepts of justice and due process that every individual accused of a speeding violation be afforded a fair hearing and be not adjudged guilty without evidence which convinces beyond reasonable doubt, it is equally vital that no unnecessary obstacles be placed in the State's efforts to deal fairly and effectively with a public threat which has reached staggering proportions. The number of highway accidents is appalling and speed is generally recognized as a factor particularly where fatalities and serious injuries are involved. . . . In dealing with this as well as other law enforcement problems, enlightened officials properly avail themselves of scientific discoveries as soon as their reliability appears and modern courts of justice may not rightly lag far behind. We are satisfied that readings of radar speedmeters which have been set up and operated in the manner established by the evidence in the instant matter constitute legally admissible evidence which may readily support a finding of guilt by the trier of the facts.²²

II. SIGNIFICANCE

The *Dantonio* case marks an important milestone in the constant struggle to improve traffic conditions and detect the violations of those who jeopardize the safety of others on our streets and highways. The decision serves to clear the air of many of the common misconceptions as to admissibility of radar evidence.

²¹ Id. at 576, 115 A.2d at 38.

²² Id. at 582, 115 A.2d at 42.

The court also held the state troopers competent to test the device to determine its proper working order prior to use in the instant case, by the use of experimental runs with their squad cars. It is highly significant that the court goes on to express serious doubt that *any* proof of accuracy or experiments are necessary to determine proper working order, pointing out that such preliminary proof has long since been dispensed with in reference to speedometer evidence. An English case²³ so holding is cited and the rationale of that decision is restated by the New Jersey court in these terms:

. . . Our courts receive evidence daily of readings on watches, scales and other measures without affirmative proof of their testing; the defendant is free, of course, to attack the readings through cross examination and otherwise the ultimate determination is fairly left to the trier of the facts.²⁴

Cases decided since the *Dantonio* case have recognized the validity of the conclusions reached by the Supreme Court of New Jersey. One of the most significant of these is a Nebraska case, *Dietze v. State*,²⁵ in which the defendant was convicted of speeding by means of radar evidence. There was no expert testimony as to the operational principles and reliability of the device, and the foundation consisted merely of showing that prior to commencing their operations on the day in question the patrolmen had checked its readings against the speedometer readings on their patrol cars during test runs through the radar beam. The defense claimed lack of sufficient foundation but the Supreme Court held this without merit. "The lack of foundation, if there was a lack, did not destroy the competency of the evidence." The court said that while a foundation for such evidence *may* be laid by the testimony of experts regarding the construction, operation and purpose of the device, ". . . this method is not and should not be regarded as exclusive." An equally sufficient foundation may be supplied by showing the results of experiments conducted with the device, as the patrol officers did in this case. The court expressed it this way:

In the light of common knowledge and the experience of the ages, it does not appear that anything is more convincing as to inanimate mechanisms than a course of experiments which discloses the production of unvarying results.²⁶

It is to be noted that the decision in the *Dietze* case has broader scope than that of the *Dantonio* case, which, in applying the rule of judicial notice to the reliability of the radar speedmeter, does not

²³ *Nicholas v. Penny*, [1950] 2 K.B. 466.

²⁴ 18 N.J. at 580, 115 A2d at 41.

²⁵ 162 Neb. 80, 75 N.W.2d 95 (1956).

²⁶ *Id* at 84, 75 N.W.2d at 98.

extend the same recognition to other devices not actuated on the principles of radar. This leaves such devices as the Speedwatch, Ametron, Traffic Timer and others still subject to the requirement that foundation be laid by experts to prove accuracy. The reasoning of the *Dietze* case, however, holding foundation by experiments sufficient, would cover any and all such devices regardless of their principle of operation. These others frequently operate on the principle of timing over a measured stretch, with hoses across the roadway to actuate the mechanism which registers the speed.

Another recent radar case to which attention should be called, is *People v. Sachs*,²⁷ in which Judge DelGiorno, New York City Magistrate, wrote an exhaustive opinion discussing all of the adjudicated cases and legal articles on the subject. A large number of radar cases had been adjourned to await his decision in this one. He states:

In conclusion and after exhaustive study of all the testimony in this case as to the theory and operation of Radar, this court concludes that expert testimony as it relates to the accuracy of the Radar equipment presently used by the Police Department may be dispensed with in future prosecutions.²⁸

The legislatures of Maine, Maryland, Nebraska, North Dakota, Ohio, Oregon and Virginia have enacted statutes relating to the use of mechanical and electronic speed-check devices.²⁹ The statutes of Maine and Maryland are restricted to the use of *radar*. The others extend to the use of any mechanical or electrical timing device. The statutes of Maryland and Ohio are restrictive rather than permissive in that they require posting of signs near where the device is in operation, to warn motorists of its presence. Those of Virginia, Maine and Oregon merely require such signs at the state lines and at the limits of cities over 3,500 population. Nebraska and North Dakota require *no* signs. Four of the states, Nebraska, North Dakota, Oregon and Virginia, provide authority for arrest without warrant by officers who observe the recording or to whom such information is radioed immediately. From the standpoint of effective law enforcement the laws of North Dakota and Nebraska are easily the most comprehensive.

The states of California, Oregon and Washington have expressly outlawed all evidence of speed obtained by the use of "speed traps,"

²⁷ 1 Misc.2d 148, 147 N.Y.S.2d 801 (N.Y.City Mag. Ct. 1955).

²⁸ *Id.* at 161, 147 N.Y.S.2d at 814.

²⁹ Me. Rev. Stat. c. 22 § 113-A (Supp. 1956); Md. Code Ann. art. 35 § 99 (Flack 1954); Neb. Rev. Stat. § 39-7, 108.02 (Supp. 1955); Laws of N.D. 1956, c. 239; Ohio Rev. Code § 4511.091 (Page 1954); Ore. Rev. Stat. § 483.112 (1955); Va. Code § 46-215.2 (Supp. 1956).

which they define as any system whereby the speed of a vehicle is taken or recorded by means of *timing over a measured stretch*. In California and Washington the courts have held radar not within the ban of these statutes, inasmuch as it does not record speed by timing over a measured stretch.³⁰ These decisions are based on the proposition that its operation involves no factor of elapsed time; there is no relationship of time and distance. Radar operates on the principle of reflecting microwaves, rebounding between the radar antennae and the approaching object.

III. OTHER SPEED CHECK DEVICES

A recent article described the use of the so-called Markel (or Abell) camera which consists of a small camera device mounted on the driver's compartment of a car, arranged so as to snap a candid shot of the rear of the vehicle being followed.³¹ Attached is a clock mechanism to record the time, and an arrangement of mirrors to record the speedometer reading of the pursuing car. Also included somehow is the recorded day, month and year. The camera is actuated by controls in the hands of the driver, who may shoot several "still" shots of the vehicle ahead or may, by continuous pressure on the button, have a moving picture of it. This ingenious device produces a series of pictures, which, used as still pictures in sequence or shown as a movie, show the vehicle in question moving down the road, perhaps weaving back and forth, with its speed, the time of day, and the date indelibly recorded in the pictures. Also, by comparing the size of the image shown in the pictures the judge is in an excellent position to tell whether the pursuer was gaining on the pursued, as the latter so often maintains. Primarily designed for use in the insurance field, the camera has not been widely used by police, although the city of Midland, Michigan, has used it on a loan basis with great success.³² More recently it has been used for law enforcement purposes in the state of North Carolina.

Another familiar device for registering speed is the Tocograph, a small graph instrument attached to the speedometer on some com-

³⁰ *People v. Beamer*, 130 Cal. App.2d 874, 279 P.2d 205 (1955); *aff'd sub nom In re Scott Beamer*, 133 Cal. App.2d 63, 283 P.2d 356 (1955); *State v. Ryan*, . . . Wash. . . ., 293 P.2d 399 (1956).

³¹ *Saturday Evening Post*, April 23, 1955, p. 18.

³² According to the *Saturday Evening Post* article, the publication of the pictures of speeders made with the Markel Camera by local newspapers brought about greater respect for speed regulations. In court, the pictures were accepted as evidence, in some instances to show that the pursuing patrol car was gaining on the alleged violator, bringing about dismissal of the charges.

mercial vehicles to keep a record of their speed. Examination of the drawing on the graph will show whether or not the truck was driven at excessive speed, and by means of attached clock mechanism, the time is likewise shown. The writer had such evidence introduced before him in the trial of a trucker charged with exceeding the 60 mile limit. The Tocograph was brought in to prove that his speed was not excessive except for one sharp "peak" during which the tell-tale graph showed 71 m.p.h. at the precise time about which the patrolman testified.

The Admiral Radar Speed Meter is a new device combining the features of several other devices. (1) It detects speed. (2) It can be set to register only cars going over a certain speed, thus eliminating cars traveling at legal speeds. (3) It verifies its own accuracy by holding the highest meter reading for at least two minutes after the speed has registered. (4) A camera device makes a permanent motion picture record of the violation, showing the license plates and the speed meter reading on a split-image film. (5) It can be equipped with lights and camera synchronized to operate automatically with the speed meter, either day or night. (6) It makes a permanent sound record on magnetic tape, i.e., the officer verbally describes the vehicle, driver, license plate, date and other data relative to the case for his use in testifying about the violation.

Even our familiar T.V. set has its uses in the new program of law enforcement. In New Hampshire the state police officers use it to catch speeders on the New Hampshire turnpike. The television camera is set up along the road, automatically set to picture oncoming cars. This picture is relayed to the monitor down the road where the observers can see the car, its license plates, and have time to stop it as it approaches.³³

IV. SKID MARK EVIDENCE

Another type of speed-check evidence coming into more and more prominent use today is that gained from the study of skid marks. What is not generally recognized is the fact that skid marks measure only the *minimum speed* of the vehicle which laid them down. In police classes conducted at the Traffic Institute and elsewhere over the country we frequently hear officers saying their judge or their prosecutor will not recognize such evidence. This simply reflects the human tendency to reject methods or principles merely because they are new or because we do not understand them. We have tended to be skeptical of all new developments in connec-

³³ Today's Traffic, June 1955.

tion with modern inventions such as the automobile, the airplane and now atomic energy. Certainly, evidence of speed deduced from skid marks is eminently fair to the person accused, since they show only his *minimum* speed. Usually the skid mark is broken—interrupted by impact with another car, and of course the speed of the vehicle is sharply reduced or stopped altogether at that point. The accuracy of skid mark evidence is long since beyond the area of debate and doubt. It is based on simple principles of science and mathematics. *Reaction time*, *braking distance* and *stopping distances* have now become matters of common knowledge and the courts are beginning to judicially notice such things. Skid marks are merely streaks of rubber burned onto the pavement by the friction of locked wheel against the rough surface. It takes no great amount of scientific learning or experience to qualify one as an expert to judge speed by such means. Police officers or others who have conducted experiments along this line are commonly called upon to give testimony of this kind. Any high school mathematics instructor is competent to explain such things as the “coefficient of friction” upon which such estimates are based. Citation of only a few of the very numerous cases involving determination of speed from skid marks should suffice for the present purpose.³⁴

V. CHEMICAL TESTS FOR INTOXICATION

Much has been said and more has been written of late years concerning scientific methods of testing for intoxication. Somehow since the motor car began to crowd our highways the problem of the drunken operator has occupied much of the attention given to solving the problem of automobile accidents. So much emphasis has been laid upon this one type of accident causer as to give rise to the common impression that the drunken driver is the *only* menace to highway safety—if a driver is sober he can do no wrong. The problem of proof in drunken driving cases has been one to intrigue the various agencies concerned in law enforcement, often to the exclusion of similar attention devoted to other, even more prolific accident causers.

The early stages of our experience in trying to discover effective methods of proof in such cases saw the law enforcement officer dependent upon the familiar performance tests—more accurately referred to in later years as “objective symptoms” or “clinical symptoms” tests. If the defendant staggered, spoke incoherently,

³⁴ *Gitten v. Lundberg*, 3 Utah2d 392, 284 P.2d 1115 (1955); *Barge v. House*, 94 Ohio App. 515, 110 N.E.2d 425 (1953); *Monday v. Milsap*, 37 Tenn. App. 371, 264 S.W.2d 6 (1953); *State v. Lingman*, 97 Utah 180, 91 P.2d 457 (1939).

had the smell of liquor on his breath and had his clothing messed up this was considered strong evidence of alcoholic impairment. Now medical science has learned and demonstrated that identical symptoms may indicate some 70 or more pathological conditions in no way linked with alcohol.

The use of chemical tests of body fluid began in Sweden in the year 1914, and it was then used in autopsies for use before coroners' inquests to determine if the person killed had been under the influence of liquor at the time. The European scientists, especially those of the Scandinavian countries, were far in advance of our own in exploration and experiments in this field. Some of our prominent pioneers are Dr. Herman Heise of Milwaukee, Dr. R. N. Harger of Indiana, Dr. Clarence Muehlberger of Michigan and Dr. Rehling of Alabama.

The first experiments involved testing of blood or urine of the suspected person. Actually it is fairly well known now that alcoholic content rapidly becomes constant in all the fluids of the body. While tests of urine, spinal fluid, saliva and other body fluids are equally reliable, the test most widely used today is the breath test. By means of Dr. Harger's Drunkometer and other devices such as the Alcometer, Intoximeter, or the new Breathalyzer, the amount of alcohol concentration in the blood may be quickly and easily determined by qualified police officers. No taking of blood, no hospital, no expert technician; all that is necessary is to obtain a specimen of breath. Breath, run through the series of tubes containing certain chemicals, tells its own story on the spot and enables the officer to tell whether the condition of the suspect is due to alcohol or to one of the many other acute conditions which might require immediate medical attention to save his life.

Nebraska and 22 other states have adopted statutes such as § 39-727.01 Neb. Rev. Stat. (1943), establishing the presumption that one whose test shows .15 per cent blood alcohol content is presumed to be under the influence of liquor. To those who may be of the opinion that this figure (.15 per cent) is unreasonably low, it should be pointed out that it is the highest of any country in the world! Some of the European countries fix the presumptive level as low as .05 (Norway). Sweden fixes it at .08. They maintain it should be no greater than .10 in any event, since their exhaustive tests proved that eight out of ten persons tests were definitely under the influence when they tested .10. At .12 per cent they were able to prove that nine out of ten were definitely affected. But in this country, knowing that the person accused would insist he was the one in ten not definitely under the influence, a higher level was insisted upon. At .15 per cent there was no disagreement among

the scientists whatsoever. All conceded that one showing a blood alcohol concentration of .15 per cent would necessarily be affected. Exhaustive studies conducted at Michigan State College confirm this.³⁵ It is the extreme figure and experiments prove it takes six to seven ounces of *alcoholic liquor in the blood* to produce such a reading. Bonded whiskey normally contains 50 per cent alcohol, so it would take *quite a lot of drinks* to total up to .15 per cent. The body eliminates alcohol from the blood at a constant rate so the time factor is important in this connection. To attain a reading of .15 per cent, all of the six to seven ounces of liquor would have to be present in the blood at one time. The process of assimilation into the blood takes from a half to three-quarters of an hour, during which time some of that in the blood has been eliminated. Thus it is obvious that in order to reach or surpass a reading of .15 per cent, the subject must have imbibed a very considerable quantity of liquor.

So here, in another respect, science has provided a means of aiding law enforcement by detecting drunken drivers and furnishing proof to convict them in the courts. Likewise it provides the means of protecting the victims of insulin shock, multiple sclerosis, and many, many other conditions producing symptoms of drunkenness, from being charged and convicted upon the opinions of witnesses who might mistake their sickness for intoxication.

VI. DEVELOPMENTS OF THE FUTURE

Time does not stand still; human ingenuity and inventiveness have not been exhausted. The ancients thought they had conquered all when suddenly Columbus came back and reported the discovery of a brand new continent nobody had ever dreamed about (except Lief the Lucky and his hardy kindred who discovered it two or three centuries earlier.) Despite the fact that we now look back and trace the development of practical methods and devices unheard of in our grandfather's day, we seem oddly dubious about the possibility of developing farther. The automobile was just a fad—people would soon forget it and go back to the horse and buggy. Probably men had the same ideas about the steam engine, and history is replete with stories of inventors who have starved to death because they have been unable to interest anybody in their revolutionary devices. Courts, being traditionally conservative, carry this tendency even more to extreme. Despite the fact that those in the enforcement field had long known and demonstrated that the radar speedmeter

³⁵ National Safety Council Committee on Tests for Intoxication, *Evaluating Tests for Intoxication*.

would measure speed so accurately as to remove all doubt, it was not until June, 1955, that a court of last resort recognized this fact, which had been a matter of common knowledge for years. What of chemical tests for intoxication? The legislatures of 23 states provide for their admission in evidence, with presumptions as to their effect. People generally recognize the "balloon test" as reliable. Blood tests are unquestioned when properly conducted. How long will it take for the courts of the other 25 states to acknowledge judicially what everybody else knows as a matter of common knowledge?

Gradually the law enforcement agencies add to their arsenals of weapons and slowly—"with deliberate speed"—the courts come to recognize their validity and place their stamp of approval upon them. Courts follow along cautiously in the wake of advancements and scientific progress. Perhaps this is just as well, for by the time the courts get around to recognizing these things they are in the perfected state and the mistakes of the experimental states are thus avoided.

Meanwhile we must not become discouraged and give up in despair when the courts reject the newest products of man's ingenuity. Substantial progress is not always the swiftest, and we have only to look back upon the truly astonishing developments in crime detection since the dawn of the present century to regard the future with confidence that even greater things are to come.

One of the Oklahoma courts said recently in upholding the validity of drunkometer tests for intoxication:

We should favor the adoption of scientific methods for 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.³⁶

³⁶ *Toms v. State*, 95 Okla. Crim. 60, 68, 239 P.2d 812, 821 (1952). For a detailed discussion of the Harger Drunkometer, see *People v. Kovacik*, 205 Misc. 275, 128 N.Y.S.2d 492 (Ct. of Sp. Sess. 1954).