DAVID PRENTICE *v.* DALCO ELECTRIC, INC., ET AL.
(SC 17444)

Borden, Norcott, Katz, Vertefeuille and Sullivan, Js.

Argued April 17—officially released October 17, 2006

John B. Farley, with whom was *David J. Crotta, Jr.*, for the appellant (named defendant).

Juri E. Taalman, with whom, on the brief, was *Timothy Brignole*, for the appellee (plaintiff).

Opinion

BORDEN, J. The dispositive issue in this appeal is whether the trial court properly admitted scientific evidence without first holding a hearing pursuant to *State* v. *Porter*, 241 Conn. 57, 698 A.2d 739 (1997), cert. denied, 523 U.S. 1058, 118 S. Ct. 1384, 140 L. Ed. 2d 645 (1998). The defendant, Dalco Electric, Inc. (Dalco), appeals[1] from the judgment of the trial court in favor of the plaintiff, David Prentice, following a jury trial.[2] The defendant claims that the trial court improperly admitted certain expert testimony because the testimony lacked the required scientific foundation.[3] We conclude that the testimony in question was scientific evidence that required a validity assessment designed to ensure reliability pursuant to our analysis in *Porter*. Accordingly, we reverse the judgment of the trial court and remand the case for a new trial.

The plaintiff brought this personal injury action against the defendant alleging negligence. Prior to trial, the plaintiff identified Mervin Strauss, a professional forensic engineer and accident reconstructionist, as an expert witness. The defendant filed a motion in limine seeking to preclude Strauss' testimony and requested a *Porter* hearing. The trial court declined to rule on this motion prior to trial and, over the defendant's repeated objection, allowed Strauss' expert testimony to be entered into evidence.[4] The jury returned a verdict for the plaintiff awarding the plaintiff $1.2 million in damages. Subsequently, the defendant filed a motion to set aside the jury's verdict. Following extensive posttrial hearings, the trial court concluded that Strauss' testimony was admissible and did not constitute scientific evidence that required a validity assessment under *Porter*.[5] Accordingly, the trial court denied the defendant's motion to set aside the jury's verdict and rendered judgment thereon. This appeal followed.

The jury reasonably could have found the following facts. The plaintiff was employed by B.G. Graphics, Inc., a sign making company hired by the defendant to install a sign on the front of its building in Meriden. The plaintiff accompanied Benedict Gagliardi, Jr., a partner at B.G. Graphics, Inc., to complete the installation. Upon arriving at the defendant's building in Meriden and learning of the precise location on the building where the sign was to be installed, the plaintiff and Gagliardi informed Daniel Luft, a part owner of the defendant, that they would be unable to complete the work that day because the ladders that they had with them were too short. Luft offered Gagliardi the use of one of the defendant's extension ladders in order to install the

sign. Gagliardi accepted Luft's offer solely to enable the plaintiff to take the necessary measurements to facilitate the installation of the sign on a future date. Gagliardi and the plaintiff informed Luft, however, that two people and two extension ladders were required to install the sign and that borrowing an extension ladder did not mean that the sign would go up that day.[6] Luft offered the plaintiff the use of another one of the defendant's extension ladders and informed him that he was willing to provide any help necessary to complete the installation. Neither the plaintiff nor Gagliardi accepted Luft's offer to locate a second ladder or to provide assistance.

The plaintiff and Gagliardi used the first extension ladder provided by the defendant and positioned it at the front of the building so that the plaintiff could take the necessary measurements for the sign's future installation. Although Gagliardi and the plaintiff had decided to take measurements only, and to install the defendant's sign on another day, Luft located a second extension ladder in one of the defendant's storage areas and, with the assistance of one of his employees, brought it to the front of the building where the sign was to be installed. Luft leaned the second ladder against the side of the building approximately eight to ten feet to the left of where the plaintiff had positioned the first ladder.[7] The plaintiff informed Luft that he and Gagliardi would not use the second ladder because it was in poor condition and because they were only taking measurements, which did not require multiple people or ladders to complete. In particular, the plaintiff noticed that the second ladder was missing braces required for stability and that someone had tried to repair it by bolting pieces of iron to the bottom of the ladder's legs.

The plaintiff fully extended the first ladder and rested the top section of the ladder against the aluminum edge of the building's roof. The plaintiff then climbed approximately ten feet up the first ladder to take measurements for the sign's future installation. As the plaintiff was completing his work, the second ladder, which was positioned approximately ten feet to the left of where the plaintiff was working, fell to the right, slid against the edge of the defendant's roof and struck the first ladder, on which the plaintiff was standing, causing him to fall to the ground and to sustain serious injuries. No one was standing on or touching the second ladder when it fell and collided with the plaintiff.

On the day of the incident, Meriden and the surrounding area experienced sustained winds of 11.5 miles per hour, with gusts of wind up to 18 miles per hour. The safety label on the ladder that collided with the plaintiff stated that it should not be used in high wind. Meteorologically, a high wind warning occurs when winds exceed thirty-nine miles per hour, and a high wind advisory occurs when a sustained wind

exceeds forty-five miles per hour. Neither a high wind advisory nor a high wind warning had been issued for Meriden on the day the plaintiff was injured. Building on the facts surrounding the weather conditions on the day of the accident, the plaintiff introduced Strauss' expert testimony in an attempt to demonstrate that it would have been physically impossible for the prevailing winds to have overturned a ladder that was properly set up and free from defects. Additional facts will be set forth as necessary.

We begin with the standard of review that governs this case. It is well established that "[t]he trial court's ruling on evidentiary matters will be overturned only upon a showing of a clear abuse of the court's discretion." (Internal quotation marks omitted.) *State* v. *Billie*, 250 Conn. 172, 180, 738 A.2d 586 (1999). Concerning expert testimony specifically, "the trial court has wide discretion in ruling on the admissibility of expert testimony and, unless that discretion has been abused or the ruling involves a clear misconception of the law, the trial court's decision will not be disturbed. . . . Expert testimony should be admitted when: (1) the witness has a special skill or knowledge directly applicable to a matter in issue, (2) that skill or knowledge is not common to the average person, and (3) the testimony would be helpful to the court or jury in considering the issues." (Citations omitted; internal quotation marks omitted.) Id.

"Beyond these general requirements regarding the admissibility of expert testimony, [t]here is a further hurdle to the admissibility of expert testimony when that testimony is based on . . . scientific [evidence]. In those situations, the scientific evidence that forms the basis for the expert's opinion must undergo a validity assessment to ensure reliability. *State* v. *Porter*, supra, 241 Conn. 68–69. In *Porter*, this court followed the United States Supreme Court's decision in *Daubert* v. *Merrell Dow Pharmaceuticals*, *Inc.*, 509 U.S. 579, 113 S. Ct. 2786, 125 L. Ed. 2d 469 (1993), and held that scientific evidence should be subjected to a flexible test, with differing factors that are applied on a case-by-case basis, to determine the reliability of the scientific evidence. . . . Following *State* v. *Porter*, supra, 81–84, scientific evidence, and expert testimony based thereon, usually is to be evaluated under a threshold admissibility standard assessing the reliability of the methodology underlying the evidence and whether the evidence at issue is, in fact, derived from and based upon that methodology . . . ." (Citations omitted; internal quotation marks omitted.) *Maher* v. *Quest Diagnostics*, *Inc.*, 269 Conn. 154, 168, 847 A.2d 978 (2004). Accordingly, we limit the scope of our review to whether the trial court abused its discretion in determining that Strauss' opinion was not scientific evidence and that a *Porter* hearing was not required. See *State* v. *Kirsch*, 263 Conn. 390, 399, 820 A.2d 236 (2003);

State v. *Pappas*, 256 Conn. 854, 878, 776 A.2d 1091 (2001).

By way of further background, we are also mindful that "[i]n *State* v. *Porter*, supra, 241 Conn. 78–80, we expressly recognized that, because the term scientific evidence houses such a large and diverse variety of topics, the formulation of a mechanical evidentiary standard of admissibility designed to apply universally to the many forms scientific evidence may take is an unworkable concept. Rather, the better formulation is a general, overarching approach to the threshold admissibility of scientific evidence . . . . In accordance with this philosophy, we set forth in *Porter* a number of different factors, nonexclusive and whose application to a particular set of circumstances could vary, as relevant in the determination of the threshold admissibility of scientific evidence. . . . In particular, we recognized the following considerations: general acceptance in the relevant scientific community; whether the methodology underlying the scientific evidence has been tested and subjected to peer review; the known or potential rate of error; the prestige and background of the expert witness supporting the evidence; the extent to which the technique at issue relies upon subjective judgments made by the expert rather than on objectively verifiable criteria; whether the expert can present and explain the data and methodology underlying the testimony in a manner that assists the jury in drawing conclusions therefrom; and whether the technique or methodology was developed solely for purposes of litigation." (Citations omitted; internal quotation marks omitted.) *Maher* v. *Quest Diagnostics, Inc.*, supra, 269 Conn. 179–80.

In *Porter*, we also set forth a "fit" requirement for scientific evidence. Id., 180. We stated that the "proposed scientific testimony must be demonstrably relevant to the facts of the particular case in which it is offered, and not simply be valid in the abstract. . . . Put another way, the proponent of scientific evidence must establish that the specific scientific testimony at issue is, in fact, derived from and based upon [the scientifically reliable] methodology. . . . [A]lthough some conclusions can be reasonably inferred from the methodology employed, others cannot." (Citations omitted; internal quotation marks omitted.) Id.

Similarly, we recognized in *Porter* that "a critical postulate that underlies the *Porter* factors and indeed underlies the entire *Porter* analysis [is that] in order for the trial court, in the performance of its role as the gatekeeper for scientific evidence, properly to assess the threshold admissibility of scientific evidence, the proponent of the evidence must provide a sufficient articulation of the methodology underlying the scientific evidence. Without such an articulation, the trial court is entirely ill-equipped to determine if the scien-

tific evidence is reliable upon consideration of the various *Porter* factors. Furthermore, without a clear understanding as to the methodology and its workings, the trial court also cannot properly undertake its analysis under the fit requirement of *Porter*, ensuring that the proffered scientific evidence, in fact, is based upon the reliable methodology articulated." Id., 181.

The defendant claims that a new trial is necessary because the trial court improperly admitted Strauss' expert opinion testimony. In particular, the defendant contends that Strauss' testimony was scientific evidence that lacked the required scientific foundation and was, therefore, inadmissible because it had not been subjected to a reliability and validity assessment under *Porter*. Conversely, the plaintiff contends that the trial court properly concluded that Strauss' testimony was not scientific evidence and, therefore, that its admissibility was not dependent on the outcome of a *Porter* hearing. We agree with the defendant.

The following additional facts are relevant to our analysis of the question of whether a *Porter* hearing was required in this case. The plaintiff alleged that the defendant had erected a defective ladder, which "gave out at the defective portion of the foot, and began to slide across the front of the building striking the ladder [that] the [p]laintiff was on . . . ." In particular, the plaintiff claimed that the defendant was negligent due to its numerous acts and omissions related to the "defective condition" of the ladder and its improper installation.

Strauss was qualified by the trial court, without objection, as an expert in the field of mechanical and forensic engineering. At trial, Strauss opined, over the defendant's objection, that the prevailing wind conditions in Meriden on the day of the accident would not have caused a properly set up ladder, free of defects, to fall from the building and collide with the plaintiff. Strauss further testified, however, that he could not state, within a reasonable degree of engineering probability, that the wind conditions on the day of the accident were not the sole cause of the second ladder's becoming dislodged from its resting position and colliding with the plaintiff.[8]

Strauss also acknowledged at trial that determining the amount of force required to move a particular object is an exercise within the realm of physics that requires the accumulation of certain factual data and the completion of mathematical calculations. Specifically, Strauss noted that, in order to make the necessary calculations in this case, an expert would need to know the wind speed, the weight of the ladder, and the coefficient of friction applicable to the ladder and to the aluminum edge of the defendant's roof. Equipped with this information, an engineer could then calculate whether an 11.5 to 18 mile per hour wind could apply sufficient

force to cause a properly set up ladder of the same size, weight, and condition as the ladder in this case, to fall. Strauss acknowledged that he had not acquired any of this information as part of his investigation and experimentation at the accident site, and had not performed the scientific calculations that would allow him to express his opinion to a "reasonable degree of engineering probability."

Indeed, Strauss testified that his conclusions were based on his experience as an engineer and that, despite his ability to undertake such an effort, at no point had he attempted to apply the readily available and applicable tools of physics and mathematics with which he could have tested his hypothesis. We also note that Strauss asserted that common experience may allow a layperson to conclude that a ladder will fall only if it is set up improperly, is defective, or is subjected to sufficient external force to knock it over. Strauss maintained, however, that common experience was not sufficient to enable a layperson to assess the likely effect of a wind at a certain speed on an immobile ladder. To the contrary, Strauss asserted that what distinguished him from an ordinary layperson was his engineering experience and education, which allowed him to apply the laws of physics to make such a calculation.

The trial court concluded that Strauss' opinion testimony did not require a "preliminary gatekeeper *Porter*-type validity assessment." In particular, it noted that "[t]he opinion testimony [that Strauss] provided . . . regarding the effect of certain wind speeds on a properly setup ladder in good condition was supported by other evidence [and was] thoroughly tested on cross-examination . . . ." Additionally, the trial court ruled that a *Porter* hearing was not required because, although Strauss' testimony was rooted in scientific principles, it was "not the sort of scientific evidence that would place the jury in the position of abandoning common sense and sacrificing independent judgment to the expert's assertions based on his special skill or knowledge." (Internal quotation marks omitted.) We conclude that Strauss' opinion was scientific evidence within the meaning of *Porter*, and that the trial court abused its discretion by permitting Strauss' expert opinion testimony without first assessing the validity of the methodology underlying his opinion as part of a *Porter* hearing.

First, by concluding that a separate validity assessment was not required under *Porter*, at least in part because Strauss' opinion testimony was supported by other evidence and was tested thoroughly on cross-examination,[9] the trial court misconstrued the task that was before it. Specifically, the fact that there was other evidence in the record concerning the wind, namely, the subjective impressions of laypersons, a meteorologist's description of the prevailing winds on the day of the accident,[10] and the warning that the ladder should not

be used in high winds, does not render Strauss' opinion unscientific per se. In short, otherwise scientific evidence does not become unscientific simply because the opposing party has had an opportunity for cross-examination, or because there is unscientific evidence that tends to corroborate the expert's testimony. Indeed, all scientific evidence is subject to cross-examination and likely will find some corroboration from other evidence in the record. This fact, however, does not obviate the need for the trial court separately to determine whether Strauss' testimony required a validity assessment under *Porter*.

Second, with respect to the trial court's conclusion that a *Porter* hearing was not required because Strauss' testimony, although rooted in scientific principles, would not place the jury in the position of abandoning common sense and sacrificing its independent judgment, Strauss' own statements at trial do not support the trial court's ruling. As discussed previously, Strauss acknowledged that common experience was not sufficient to enable a layperson to assess the likely effect of a wind at a certain speed on an immobile ladder. To the contrary, Strauss testified that the determination of the *amount* of force required to move a particular object is an exercise within the realm of physics, and requires the accumulation of certain factual data and the completion of mathematical calculations. This exercise is very different from an understanding of the general principle, which may be known to the average layperson, that if an external force is exerted on an object, that object may fall over. Indeed, an understanding of how to apply the sciences of physics and mathematics is necessary to determine the *amount* of force required to dislodge the defendant's ladder from the building, and whether that force could have been exerted by the prevailing winds in Meriden on the day of the accident, and the average person does not possess such an understanding.

Strauss acknowledged this reality when he testified that he would need to know several variables, including the weight of the ladder and the coefficient of friction between the ladder and the building. Additionally, Strauss testified that physics and mathematics are scientific tools relied upon by engineers, but that he was unable to state his opinion to a "reasonable degree of engineering probability" because his investigation of the accident did not include any scientific calculations concerning what forces were applied to the ladder by the wind.[11] Accordingly, although Strauss failed to gather the relevant data that would have enabled him to complete the required calculations,[12] his opinion that the force created by the prevailing wind conditions in Meriden on the day of the accident was not sufficient to have caused a ladder that had been set up properly and was free of defects to fall over, was dependent on the result of scientific measurement and calculation.

This opinion, therefore, constituted scientific evidence that required a validity assessment pursuant to our analysis in *Porter*.

Additionally, by exempting Strauss' opinion from a validity assessment under *Porter*, the trial court ignored the "critical postulate" that underlies the entire *Porter* analysis, which is that any exemption for scientific evidence that depends upon existing techniques must presuppose an ability on the part of the proponent of the evidence to "provide a sufficient articulation of the methodology underlying the scientific evidence." *Maher* v. *Quest Diagnostics, Inc.*, supra, 269 Conn. 181. In this case, by Strauss' own admission, and despite his familiarity with the scientific calculations that would have allowed him to have tested his theory that the force of the prevailing wind was not sufficient to upset a ladder that was properly set up and was free from defects, he used no methodology to arrive at his conclusions. In light of our previous conclusion that Strauss' opinion on the effect of the wind was "scientific evidence" for the purposes of a *Porter* analysis, the trial court was obliged to hold a hearing and the plaintiff was obliged to explain the methodology underlying Strauss' opinion. This information was necessary to assess the scientific reliability and validity of Strauss' opinion.

The plaintiff argues that pursuant to our holdings in *State* v. *Reid*, 254 Conn. 540, 546–49, 757 A.2d 482 (2000), and *State* v. *Hasan*, 205 Conn. 485, 490–91, 534 A.2d 877 (1987), a validity assessment by the trial court was not required in this case because not all testimony grounded in scientific principles requires a *Porter* hearing. We disagree.

In *Maher* v. *Quest Diagnostics, Inc.*, supra, 269 Conn. 170–71 n.22, we noted a line of cases dealing with scientific evidence that falls within a narrow category of exceptional situations wherein "although ostensibly rooted in scientific principles and presented by expert witnesses with scientific training, [the evidence is] not scientific for the purposes of our admissibility standard for scientific evidence, either before or after *Porter*." (Internal quotation marks omitted.) In particular, we referenced *State* v. *Reid*, supra, 254 Conn. 547–49, in which we concluded that the testimony of a criminologist regarding visible characteristics of, and similarities between, strands of hair was not scientific evidence for *Porter* purposes,[13] and *State* v. *Hasan*, supra, 205 Conn. 490, in which we held that a podiatrist's testimony as to the likelihood that a certain pair of sneakers would fit on the defendant's feet was not scientific evidence.[14] We conclude that Strauss' opinion does not fit within the category of expert opinion identified in these cases, nor does it fit within the rationale employed in those cases to conclude that a validity assessment pursuant to *Porter* was not required.

This narrow and distinct line of cases "indicates that

evidence, neither scientifically obscure nor instilled with an aura of mystic infallibility . . . which merely places a jury . . . in a position to weigh the probative value of the testimony without abandoning common sense and sacrificing independent judgment to the expert's assertions based on his special skill or knowledge . . . is not the type of scientific evidence within the contemplation of *Porter* . . . ." (Citations omitted; internal quotation marks omitted.) *Maher* v. *Quest Diagnostics, Inc.*, supra, 269 Conn. 170 n.22. In particular, we noted that "*Hasan* and *Reid* stand for the proposition that evidence, even evidence with its roots in scientific principles, which is within the comprehension of the average juror and which allows the jury to make its own conclusions based on its independent powers of observation and physical comparison, and without heavy reliance upon the testimony of an expert witness, need not be considered scientific in nature for the purposes of evidentiary admissibility." (Internal quotation marks omitted.) Id., 170–171 n.22. In short, in *Hasan* and *Reid*, the expert witness taught the jury how to look at physical evidence and then left the jury to look at that evidence and reach its own conclusions.

Strauss did not teach the jury how to calculate the force that a wind of 11.5 to 18 miles per hour would exert on a ladder or how much force is required to cause a ladder that is properly set up and in good condition to be set into motion and to slide against the aluminum edge of the defendant's roof. Similarly, Strauss did not provide the jury with the necessary factual data to undertake such a calculation because he never performed that analysis as part of his own investigation. Consequently, the jury in this case lacked any of the data, education or tools required to determine whether a particular wind speed could have overturned such a ladder. Contrary to the plaintiff's assertion, therefore, the jury largely was dependent on Strauss' assessment of the role that the wind played in the accident, and had no meaningful way to evaluate independently the amount of force that the prevailing wind would have exerted on a ladder leaning against the defendant's building. As a result, this case must be distinguished from *Reid* and *Hasan* because the jury in this case could not evaluate Strauss' hypothesis or compare the likely effect of the force of the prevailing wind on the ladder that collided with the plaintiff, as opposed to a ladder that was properly set up and free from defects.

The problem with the jury's dependence on Strauss' testimony is that his opinion, by his own admission, was based only on his experience, and was formed without the benefit of an established scientific methodology. Strauss' opinion nevertheless was introduced at trial under the seal of science because it came from an individual qualified as an expert in the fields of mechanical and forensic engineering. The implication of a scientific foundation for his opinion was especially

misleading because, although Strauss testified that as a forensic engineer he had previous experience in assessing whether wind would overturn an object on the earth's surface and had examined "at least a couple of dozen of ladders or more over the years" in connection with accidents, he also acknowledged that he did not have experience in determining what force a wind must exert on a ladder to cause it to fall over, and that none of his previous ladder cases dealt with a fact pattern similar to this case. Strauss' experience, therefore, was hardly extensive with respect to the specific question on which he was asked to opine.

Furthermore, the trial court highlighted the perceived expert nature of Strauss' testimony by excluding the lay opinion of an eyewitness to the incident who testified that he believed that a gust of wind had caused the second ladder to fall and to collide with the plaintiff.[15] In sum, if Strauss' expertise as a scientist made his opinion admissible, as compared to the opinion of a layperson who witnessed the accident but had no scientific training, then it was incumbent on the trial court to conduct a *Porter* hearing to determine whether Strauss had used his expertise to develop his opinion.[16] In the absence of such a validity assessment by the trial court in its role as gatekeeper, the jury in this case was confronted with a scientific conclusion, from an individual qualified as a scientific expert and presumably rooted in scientific principles, when in fact the opinion had no basis in science and was derived from the expert's limited experience with the particular factual situation at issue. The trial court's failure to characterize Strauss' testimony as scientific evidence and to carry out its role as a gatekeeper by conducting a *Porter* hearing, constituted an abuse of its discretion.

The plaintiff also argues that a *Porter* hearing was not required because the underlying physical laws governing mass, force and motion were so fundamental and dealt with such low level forces on common objects that it was unnecessary for Strauss, given his experience and qualifications as an engineer, to conduct any experimentation or testing. We disagree.

First, we reiterate that the question of whether the prevailing winds in Meriden on the day of the plaintiff's accident were capable of generating enough force to overturn an immobile ladder leaning against the defendant's building is more complicated than simply understanding that a force applied to an object may cause the object to fall over. Specifically, as Strauss acknowledged at trial, he never calculated the *amount* of force that was generated by the wind on the day of the accident or how this force was hindered by the coefficient of friction attributable to the building's roof when he investigated the accident. Moreover, both figures would have required scientific data gathering and experimentation that would have been inaccessible to the average

juror and could not have been performed by the average juror.

Additionally, the general acceptance in the scientific community of Newtonian physics does not eliminate the need for a validity assessment in this case pursuant to *Porter*. In short, a party may not circumvent a validity assessment simply by asserting that generally recognized physical laws serve as the underpinnings for the scientific methodology on which they seek to rely. Most scientific methodologies are capable of being reduced to a well recognized set of scientific principles. Under *Porter*, however, it is the methodology itself that is subject to a validity assessment. See *Maher* v. *Quest Diagnostics, Inc.*, supra, 269 Conn. 179. Accordingly, if the stated methodology,[17] apart from its foundational physical laws, is not accessible to the jury, as was the case here, the trial court is required to conduct a validity assessment pursuant to *Porter*.

Finally, the plaintiff contends that the defendant was not prejudiced by the trial court's admission of Strauss' opinion without a preliminary *Porter* hearing and, therefore, any error was harmless. In particular, the plaintiff argues that the fact that there was other evidence in the record to support the jury's verdict, and that the defendant had the opportunity to take Strauss' deposition, to cross-examine him at trial, and to present rebuttal evidence, all negated any prejudice that may have occurred by admitting Strauss' expert opinion without an assessment of its reliability. We disagree.

We acknowledge that "[e]ven when a trial court's evidentiary ruling is deemed to be improper, [as is the case here] we [still] must determine whether that ruling was so harmful as to require a new trial. . . . In other words, an evidentiary ruling will result in a new trial only if the ruling was both wrong *and* harmful. . . . [T]he standard in a civil case for determining whether an improper ruling was harmful is whether the . . . ruling [likely] would [have] affect[ed] the result." (Citations omitted; emphasis added; internal quotation marks omitted.) *Ryan Transportation, Inc.* v. *M & G Associates*, 266 Conn. 520, 530, 832 A.2d 1180 (2003); see also *Swenson* v. *Sawoska*, 215 Conn. 148, 153, 575 A.2d 206 (1990) (rejecting standard that would have required treating as harmless error any evidentiary ruling, regardless of its effect upon verdict, so long as evidence not implicated by ruling was sufficient as matter of law to sustain verdict). Additionally, we have held that "any error in the admission of evidence does not require reversal of the resulting judgment if the improperly admitted evidence is merely cumulative of other validly admitted testimony." (Internal quotation marks omitted.) *Fink* v. *Golenbock*, 238 Conn. 183, 211, 680 A.2d 1243 (1996). We conclude that the trial court's improper decision to admit Strauss' testimony without first conducting a *Porter* hearing likely affected the

result of the trial and, therefore, warrants a new trial.

First, in the context of a harmless error analysis, it is not enough that there was other evidence in the record to support the jury's verdict. As noted previously, we specifically rejected such a standard in *Swenson* v. *Sawoska*, supra, 215 Conn. 153, in which we concluded that the "sufficient other evidence standard . . . is too restrictive in that it does not encompass situations where the erroneously admitted evidence, while not necessary itself to sustain the jury's verdict, may nonetheless have affected the jury's perception of the remaining evidence." (Internal quotation marks omitted.) Similarly, the fact that the defendant had the opportunity to take Strauss' deposition, to cross-examine him at trial, and to present rebuttal evidence, while indicative of the sufficiency of the evidence presented at trial to support the jury's verdict, does not demonstrate conclusively that the defendant was not harmed by the trial court's evidentiary ruling. As noted previously, the relevant question is whether the "ruling . . . [likely] would [have] affect[ed] the [trial's] result"; (internal quotation marks omitted) *Ryan Transportation, Inc.* v. *M & G Associates*, supra, 266 Conn. 530; and, as we stated in *Swenson*, this assessment can include merely whether the trial court's ruling "affected the jury's perception of the remaining evidence." *Swenson* v. *Sawoska*, supra, 153.

Second, Strauss' opinion was the only evidence to support the plaintiff's principal theory of liability, namely, that the defendant's negligence in setting up the ladder, rather than the wind, was the proximate cause of the ladder's falling over. In this regard, Strauss' opinion regarding whether an 11.5 to 18 mile per hour wind could generate sufficient force to dislodge a ladder that was properly set up and free from defects, from its resting place against the roof of the defendant's building, was critical to the plaintiff's case. Simply put, the plaintiff could not make his case that the defendant's negligence caused the ladder in this case to fall unless he could establish that it was impossible for the prevailing wind on the day of the accident to knock over a ladder that had been set up properly and was in good condition. Once the wind was eliminated as a potential cause of the collision, the plaintiff was able to argue to the jury, under a theory of res ipsa loquitur, that the second ladder must have fallen: (1) because the defendant negligently had set up the device; (2) because the defendant had erected a damaged and unstable ladder next to where the plaintiff was working; or (3) due to some combination of these two actions. Accordingly, Strauss' opinion as to the effect of the wind on a ladder that was properly set up and in good condition likely played a role in how the jury viewed the other evidence presented by the plaintiff regarding the defendant's negligence.[18]

Moreover, during closing argument, counsel for the plaintiff noted that the "issue of the wind [was] critical,"[19] and read to the jury the opinion Strauss had offered during direct examination regarding the effect of the wind on a properly set up ladder.[20] Indeed, the plaintiff devoted a significant portion of his closing argument to Strauss' opinion about the prevailing winds on the day of the accident. His emphasis on Strauss' opinion about the wind further suggests that Strauss' opinion affected the jury's evaluation of the remaining evidence presented at trial.

The judgment is reversed and the case is remanded for a new trial.

In this opinion the other justices concurred.

[1] The named defendant appealed from the judgment of the trial court to the Appellate Court. We then transferred the appeal to this court pursuant to General Statutes § 51-199 (c) and Practice Book § 65-1.

[2] The plaintiff's employer, B.G. Graphics, Inc., was permitted to intervene as a plaintiff in this matter but did not file a brief and waived its right to oral argument. For convenience, we refer to Prentice as the plaintiff.

In addition, the plaintiff also brought this action against 125 Research, LLC, which owns the building where Dalco operates its business and where the negligence at issue allegedly occurred. After the jury returned a verdict in favor of 125 Research, LLC, the trial court rendered judgment accordingly and the plaintiff has not appealed from that judgment. As a result, 125 Research, LLC, is not a party to this appeal and we refer to Dalco as the defendant.

[3] The defendant also claims that the evidence was inadmissible on other grounds, and that the trial court improperly instructed the jury on the theory of res ipsa loquitur. In light of our order for a new trial on the issue of a *Porter* hearing, we decline to review these claims because we conclude that it is unlikely that they will arise on remand.

[4] The trial court declined to rule on several other motions filed by the defendant to exclude Strauss' expert testimony, including a motion to strike, which was filed immediately following the conclusion of Strauss' testimony at trial, and a motion for a directed verdict, which was filed at the conclusion of the plaintiff's case. Additionally, throughout the four days of Strauss' testimony, the defendant repeatedly reiterated its objection to Strauss' expert opinion and asked the trial court to conduct a *Porter* hearing. Over the defendant's objection, the trial court declined to make a ruling on the issue and allowed Strauss' testimony to proceed.

[5] The trial court also concluded that Strauss' testimony was not so speculative as to be irrelevant, and that it had properly instructed the jury regarding the plaintiff's theory of negligence under the doctrine of res ipsa loquitur. See footnote 3 of this opinion.

[6] Gagliardi also informed Luft that the plaintiff was able to climb an extension ladder, but that Gagliardi was afraid of heights and was unable to do so.

[7] The second ladder subsequently was fully extended to the roof of the building. The record is unclear as to who fully extended the second ladder and completed its set up. The plaintiff and Gagliardi testified, however, that they never touched the second ladder and had observed only Luft and his employees handle it.

[8] Strauss' recognition that he could not offer an opinion about the wind's effect on the ladder within a "reasonable degree of engineering probability" was a disclaimer about his expert opinion that was also echoed in his deposition testimony prior to trial.

[9] Over the course of four days of testimony, Strauss was asked several times for his opinion as to whether the wind could have caused a ladder that had been set up properly and was in good condition to fall over. On direct examination, he offered the opinion that an 11.5 to 18 mile per hour wind would not cause such a ladder to fall. On cross-examination, however, Strauss testified, as he had at his deposition, that he could not offer such an opinion "within a reasonable degree of engineering probability." As part of redirect examination by the plaintiff, Strauss changed his answer and

testified that an 11.5 to 18 mile per hour wind would not have caused such a ladder to fall "within a reasonable degree of engineering probability." On recross-examination, however, Strauss contradicted this statement once again and stated that he could not rule out an 11.5 mile per hour wind as the sole cause of the plaintiff's accident "within a reasonable degree of engineering probability." The equivocal nature of Strauss' testimony during cross-examination does not render his opinion unscientific. Strauss' contradictory testimony, however, does highlight the importance of a trial court conducting a reliability and validity assessment of Strauss' methodology pursuant to our analysis in *Porter*.

[10] In particular, in addition to testifying that the prevailing winds in Meriden ranged from 11.5 and 18 miles per hour on the day of the accident, Robert Cox, a meteorologist, testified that the winds likely would move leaves and small branches on trees, but not stable objects on the earth's surface. The plaintiff does not claim, however, that the testimony of Cox, who is a meteorologist but is not an engineer, would have been sufficient for the jury to find liability. It is clear from the record that it was Strauss' testimony that formed the necessary basis for the plaintiff's claim of negligence.

[11] Specifically, during cross-examination at trial, the following colloquy took place between Strauss and the defendant's counsel:

"Q. You . . . testified last Friday that among the tools that the engineer has at his disposal is physics?

"A. Yes.

"Q. And physics is a science?

"A. Yes.

"Q. That relies heavily on mathematics?

"A. Yes, it is a tool.

"Q. The science of . . . physics relies on algebra, trigonometry and calculus does it not?

"A. Yes.

"Q. And in your file you have no mathematical calculations at all concerning what forces were applied to exhibit 40 on March 16, 2000, isn't that true?

"A. That is true.

"Q. There isn't a single mathematical calculation in your file concerning that subject, right?

"A. Correct.

"Q. Nor are you able as you sit here now to undertake those mathematical calculations because you don't know one of the components of the equation, namely, the weight, isn't that right?

"A. As of the moment, no.

"Q. Now the ladder was available to you to weigh, wasn't it?

"A. Yes.

"Q. And if you had wanted to weigh it nobody told you that you couldn't, correct?

"A. Correct.

"Q. And you knew, didn't you, as an engineer who uses physics, that in order to do a mathematical computation you need to know, among other things, what is the weight, right?

"A. That is one of the factors.

"Q. But you didn't ascertain what it was?

"A. I did not sir . . . .

"Q. Do I understand your testimony here to be that a wind of 11.5 miles per hour cannot in your opinion as an engineer cause a properly set up ladder that is not defective to fall over, is that your opinion?

"A. That is my opinion.

"Q. But that is based on no mathematical calculations?

"A. Based on years of experience sir.

"[The Defendant's Counsel]: I didn't ask you that.

"Q. I asked you, that is based on no mathematical computations, correct?

"A. That is correct.

"Q. And it is based on your not knowing what the ladder weighed?

"A. That is true.

"Q. Even though you recognized that in order to properly apply the principles of physics to this problem you [would] need to work out a mathematical equation that calculates not only the force which in this case would be 11.5 miles per hours in this hypothetical, but also the weight of the ladder, correct?

"A. You would need to know all of that information, yes."

[12] We note that Strauss' failure to gather and analyze scientific data in forming his conclusion is exactly the sort of flaw in his expert opinion that

a validity assessment pursuant to *Porter* was meant to identify. In particular, as we stated in *Maher* v. *Quest Diagnostics, Inc.*, supra, 269 Conn. 181, the "critical postulate" underlying the entire *Porter* analysis is that "the proponent of the evidence must provide a sufficient articulation of the methodology underlying the scientific evidence. Without such an articulation, the trial court is entirely ill-equipped to determine if the scientific evidence is reliable [and] also cannot properly undertake its analysis under the 'fit' requirement . . . ensuring that the proffered scientific evidence, in fact, is based upon the reliable methodology articulated."

[13] Specifically, in *State* v. *Reid*, supra, 254 Conn. 545–49, we held that a validity assessment was unnecessary when the state sought to present the expert testimony of a criminologist who had performed a microscopic analysis and comparison of hair samples. The witness presented enlarged photographs of the hair samples and explained to the jury how he had compared them. The jurors were then free to make their own comparison and decide for themselves whether the hairs matched, leading us to conclude that a *Porter* hearing was not required because the criminologist's testimony "simply required the jurors to use their own powers of observation and comparison." Id., 547.

[14] Specifically, in *State* v. *Hasan*, supra, 205 Conn. 493–95, we upheld the admission of a podiatrist's testimony as to the likelihood that a pair of sneakers would fit the defendant's feet. In particular, we concluded that the podiatrist's testimony was not "scientific evidence" because the podiatrist merely compared the footwear to the defendant's feet. Id., 490. Accordingly, the jury was in a position to weigh the probative value of the testimony without abandoning common sense and sacrificing independent judgment to the expert's assertions based on his special skill or knowledge. Id., 491. Furthermore, "[t]he jury was not required to accept blindly the merit of [the expert's] conclusions or methods. It had before it the same sneakers which had been examined by the podiatrist and, during the course of the trial, had seen the defendant try them on and walk in them." Id., 494. In sum, although the podiatrist's skill and training were based on science, the subject to which he testified "was a matter of physical comparison rather than scientific test or experiment . . . ." Id., 490.

[15] Specifically, the following colloquy took place at trial during direct examination of Keith Donahue, an employee of the defendant, by the defendant's counsel:

"Q. So this ladder here, exhibit 40, slid to the right coming in contact with the ladder that [the plaintiff] was on, correct?

"A. Correct.

"Q. And do you know what caused this ladder to fall over?

"The Court: This is just, yes or no.

"A. Yes.

"Q. Can you tell us what?

"A. I believe that it was the wind.

"[The Plaintiff's Counsel]: Objection.

"[The Defendant's Counsel]: What is the basis?

"The Court: Wait, what is the objection?

"[The Plaintiff's Counsel]: It calls for a conclusion. It calls for an opinion, a legal opinion, with regard to causation.

"The Court: Counsel sidebar please.

"[The Plaintiff's Counsel]: It is without foundation.

"The Court: I am going to sustain the objection to that question. Members of the jury, I am striking that answer. You are not to consider that answer in your deliberations."

[16] We are also mindful that in order for an expert's opinion to be admissible, it must assist the trier of fact in "understanding the evidence or in determining a fact in issue." Conn. Code Evid. § 7-2. Additionally, in order to be helpful and, therefore, relevant, an expert's opinion must be derived from the application of whatever skill or knowledge he or she brings to the case. See *State* v. *Billie*, supra, 250 Conn. 178–81 (expert's knowledge concerning behavioral effects caused by components of drug mixture not admissible where expert had no knowledge of mixture ratio). Strauss' opinion failed to meet this standard because, by his own admission, it was based only on his experience, rather than on calculations derived from the laws of physics and mathematics.

[17] We note that in this case, Strauss did not state a methodology for his opinion, other than his experience as a professional engineer, which made it impossible for the trial court to evaluate whether the methodology was reliable and whether the expert opinion was "in fact, derived from and

based upon that methodology . . . .” *Maher* v. *Quest Diagnostics, Inc.*, supra, 269 Conn. 168.

[18] We also note that Strauss’ expert opinion was unique and was not cumulative of other evidence in the record. Indeed, the only other expert to testify concerning the wind was Cox, who did not testify about the effect of the wind on the ladder and limited his testimony to a discussion of the prevailing wind speeds in Meriden on the day of the accident, as well as to the likely appearance of such conditions to the average observer. By stipulation, the plaintiff’s counsel stated: “Cox, is not going to testify as to causation, a wind speed knocking over this ladder. That’s causation. I am not going to ask . . . Cox . . . whether a [certain] wind speed . . . will knock over a ladder.”

[19] The trial court similarly acknowledged the critical nature of Strauss’ testimony. Specifically, it instructed the jury as follows: “Thus, unless you find it proven, by a preponderance of the evidence, that the wind wouldn’t have blown over a ladder in good condition properly set up, [the] plaintiff’s case fails, and you must return a defendant’s verdict for each defendant.”

[20] Specifically, during closing argument, counsel for the plaintiff emphasized certain portions of Strauss’ testimony by reading from the transcript as follows:

“Question: ‘Mr. Strauss, the question that we left off with on Friday was, would a properly set up ladder with no defects in . . . Meriden with a . . . sustained [wind] speed of approximately 11.5 miles per hour be knocked over based upon the wind? Again, assume proper set up and no defects.’ Answer: ‘In my opinion it would not be overturned.’ . . . Next question. . . . ‘Would a properly set up ladder with no defects in . . . Meriden [leaned] against the side of a building, again, the same twenty-eight foot ladder on the side of a building with a five second interval or gust of wind at . . . eighteen miles an hour cause this properly set up, nondefective, extension ladder to fall over?’ Answer: ‘In my opinion, it would not.’ ”