MEMORANDUM

TO: Members of the Colorado Supreme Court Committee on the Rules of Evidence

FROM: David R. DeMuro, Chairman DRD

RE: Agenda for Meeting at 1:30 P.M. on November 9, 2001

DATE: October 17, 2001

To confirm the e-mail that you have already received, the next meeting of the Committee is scheduled for 1:30 P.M. on Friday, November 9, 2001, in the 5th Floor Conference Room of the Colorado Judicial Building at 2 East 14th Avenue, Denver. There is only one item on our agenda but it is an important one: What should this Committee recommend to the Colorado Supreme Court about whether there should be amendments to CRE 701 et seq., in light of the federal amendments on FRE 701 et seq. that took effect December 1, 2000, and in light of the Supreme Court's April 23, 2001, opinion in People v. Shreck, 22 P.3d 68 (Colo. 2001)?

There was a difference of opinion on this issue that developed during the last meeting on September 14, 2001. Because of that difference of opinion, and because we wanted to have the issue reviewed and analyzed by as many members of the Committee as possible, the Committee decided to push this issue back to the next meeting on November 9. To assist you in preparing for this meeting, I have attached the following items:

1. Minutes of the meeting of 9/14/01 - pages 1-3.

2. CRE 701-706 - pages 4-5.

3. FRE 701-706 (as amended 12/1/00) - pages 6-14.

4. An October 15, 2001, memorandum prepared by Professor Mueller analyzing possible choices for us on CRE 702 - pages 15-21B.

5. A copy of People v. Shreck, 22 P.3d 68 (Colo. 2001) - pages 22-37.

I know that each of you has a very busy schedule and one or more of you undoubtedly will have a conflict with the November 9 meeting date that cannot be avoided. Nevertheless, I would appreciate it if you could attend this next meeting to discuss this important issue. As always, please feel free to contact me regarding questions or scheduling conflicts at 303-892-3875 or ddemuro@vaughandemuro.com.

COLORADO SUPREME COURT
COMMITTEE ON THE RULES OF EVIDENCE

MINUTES OF MEETING
September 14, 2001

David R. DeMuro, called the meeting to order at 1:30 p.m., in the Supreme Court Conference Room.

The following members were present:
David R. DeMuro, Chair

Judge Harlan Bockman
Philip A. Cherner
Professor Sheila Hyatt
Professor Christopher Mueller
David K. Rees
Bob Russel

The following members were excused:
Judge Rebecca Bromley
Justice Ben Coats (liaison justice)
Judge Janice Davidson
Judge Martin Egelhoff
Christopher Miranda
Henry Reeve

Approval of Minutes:
The minutes from the June 1, 2001 meeting were approved without objection.

CRE 701-705

Professor Mueller provided the members with a document that he had prepared showing the changes to the Federal Rules that were made December 1, 2000, the Colorado rules, and a suggested change and possible committee comment to Rule 702. (Attachment 1).

There was lengthy discussion about the status of Rule 702 in light of the Colorado Supreme Court ruling in People V. Schreck . Professor Mueller provided background to the committee about Rule 702 stating that a change to Rule 702 was adopted then the Schreck decision came down which adopted its own standard instead of following Daubert and the federal model. Colorado law is the Schreck standard, not the Daubert standard. He suggested that the Federal Rule is not inconsistent with Schreck; however, if the Federal Rule is adopted there should be a note that the rule as adopted embodies Schreck.

This way it would keep the great opinion of Schreck by noting that the rule is a codification of Schreck.

Professor Mueller noted that if Rule 702 is amended to mirror the Federal rule with no note that discusses Schreck then it would appear Schreck was ignored and Daubert was codified.

Judge Bockman, and Professor Mueller discussed the meaning of Schreck with Judge Bockman stating that under Schreck the trial court has a limited analysis to make and Professor Mueller disagreeing. Professor Mueller indicated his interpretation that Schreck requires the trial court to decide if the evidence is accepted in the scientific community. Judge Bockman indicated that it is the trier of fact that is to make this decision.

Judge Bockman suggested that a change to Rule 702 should instruct on admissibility based on: reliability, qualification of witness, and usefulness of testimony to the jury. Professor Mueller indicated that the committee could either go with the Federal Rule or make no changes to the Colorado rule which then keeps Schreck in place since the case was decided under the current rule.

There was discussion of the Schreck, Daubert and Kumho cases.

Mr. Rees stated that he wished to revive a motion he had made at the previous meeting which is to adopt changes in the 700 series so the Colorado and Federal rules are identical. He noted that there are several rules where the wording is identical yet, it is common for the practitioner to know that annotated cases indicate a different application. He suggested that the Colorado rules should only deviate from the Federal if it is absolutely necessary. He indicated that if the Supreme Court determines that something is being done that it does not want they will reject the suggested changes.

Mr. Cherner proposed that the Rules should be written in such a way that would save having to find the cases thus, it is the committee's obligation to suggest changes that codify Schreck. He suggested that the Schreck decision says what law isn't not what it is.

Judge Bockman indicated that the trial judge is required to decide probative value and whether it outweighs prejudice and articulate why this is an area of scientific value that the jury can use. He said this is more of a Rule 703 analysis.

Professor Hyatt offered that Daubert is not end all be all regarding scientific validity and Daubert is useless without Kumho. After Schreck the court has a significant gate keeping role regarding reliability and validity. She posed the question of whether cases brought in Federal Court and Colorado courts would be decided in a different way from one another if the changes to Rule 702 are adopted.

The group discussed whether an adoption of the Federal rule with no comment implies a superseding of Schreck.

There was a suggestion that a note should indicate the law in Colorado is no longer what it was prior to Rule 702 and that the standard is much different after Schreck than before the case.

The committee discussed the usefulness of comments. At the previous meeting there was discussion about the extent to which they are or should be used. The context of that discussion was a comment to Rule 103. The committee earlier agreed that in general, comments should be avoided unless needed. There seemed to be agreement that a comment to Rule 702 is needed.

There was discussion about whether language in Schreck should be quoted in a comment. Mr. Rees suggested that the committee pass the Rule to mirror the Federal, include the comment, and send it to the Court. The Court can then decide whether it is what they want. Judge Bockman questioned whether the comment would be what Professor Mueller has suggested or a note "see Schreck".

The committee discussed the fact that the language in the Federal Rule (1) "sufficient facts or data" is not anywhere else and does not come from caselaw. They pondered whether testimony would be inadmissible because it is "not based on enough data."

The members present decided the 7 of them was too few people to take a vote on the Rule 702 issues. David DeMuro noted that several members had expressed their desire to be at the meeting but indicated in advance they could not attend.

It was decided that the Rule 702 matter would be laid over until another meeting and that Professor Mueller will put together a short comment to the Rule for the committee's consideration indicating the reliability factor should be interpreted in light of the Shreck decision. The materials will be distributed in hard copy in advance of the next meeting.

The date of November 9, 2001, 1:30-3:30 p.m. was selected. The Supreme Court Conference room was reserved pending verification that more members can attend. An e-mail will be distributed seeking a response by Monday September 24, 2001.

Respectfully submitted, Terri S. Morrison

RULE 613. PRIOR STATEMENTS OF WITNESSES

(a) Examining Witness Concerning Prior Inconsistent Statements for Impeachment Purposes. Before a witness may be examined for impeachment by prior inconsistent statement the examiner must call the attention of the witness to the particular time and occasion when, the place where, and the person to whom he made the statement. As a part of that foundation, the examiner may refer to the witness statement to bring to the attention of the witness any purported prior inconsistent statement. The exact language of the prior statement may be given.

Where the witness denies or does not remember making the prior statement, extrinsic evidence, such as a deposition, proving the utterance of the prior evidence is admissible. However, if a witness admits making the prior statement, additional extrinsic evidence that the prior statement was made is inadmissible.

Denial or failure to remember the prior statement is a prerequisite for the introduction of extrinsic evidence to prove that the prior inconsistent statement was made.

RULE 614. CALLING AND INTERROGATION OF WITNESSES BY COURT

(a) Calling by Court. The court may, on its own motion or at the suggestion of a party, call witnesses and all parties are entitled to cross-examine witnesses thus called.

(b) Interrogation by Court. The court may interrogate witnesses, whether called by itself or by a party.

(c) Objections. Objections to the calling of witnesses by the court or to interrogation by it may be made at the time or at the next available opportunity when the jury is not present.

RULE 615. EXCLUSION OF WITNESSES

At the request of a party the court shall order witnesses excluded so that they cannot hear the testimony of other witnesses, and it may make the order of its own motion. This rule does not authorize exclusion of (1) a party who is a natural person, or (2) an officer or employee of a party which is not a natural person designated as its representative by its attorney, or (3) a person whose presence is shown by a party to be essential to the presentation of his cause.

ARTICLE VII. OPINIONS AND EXPERT TESTIMONY

RULE 701. OPINION TESTIMONY BY LAY WITNESSES

If the witness is not testifying as an expert, his testimony in the form of opinions or inferences is limited to those opinions or inferences which are (a) rationally based on the perception of the witness and (b) helpful to a clear understanding of his testimony or the determination of a fact in issue.

RULE 702. TESTIMONY BY EXPERTS

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

RULE 703. BASES OF OPINION TESTIMONY BY EXPERTS

The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to him at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence.

RULE 704. OPINION ON ULTIMATE ISSUE

Testimony in the form of an opinion or inference otherwise admissible is not objectionable because it embraces an ultimate issue to be decided by the trier of fact.

RULE 705. DISCLOSURE OF FACTS OR DATA UNDERLYING EXPERT OPINION

The expert may testify in terms of opinion or inference and give reasons therefor without first testifying to the underlying facts or data, unless the court requires otherwise. The expert may in any event be required to disclose the underlying facts or data on cross-examination.

Amended eff. Nov. 16, 1995.

RULE 706. COURT APPOINTED EXPERTS

(a) Appointment. The court may on its own motion or on the motion of any party enter an order to show cause why expert witnesses should not be appointed, and may request the parties to submit nominations. The court may appoint any expert witnesses agreed upon by the parties, and may appoint expert

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witnesses of its own selection. An expert witness shall not be appointed by the court unless he consents to act. A witness so appointed shall be informed of his duties by the court in writing, a copy of which shall be filed with the clerk, or at a conference in which the parties shall have opportunity to participate. A witness so appointed shall advise the parties of his findings, if any; his deposition may be taken by any party; and he may be called to testify by the court or any party. He shall be subject to cross-examination by each party, including a party calling him as a witness.

(b) Compensation. Expert witnesses so appointed are entitled to reasonable compensation in whatever sum the court may allow. The compensation thus fixed is payable from funds which may be provided by law in criminal cases and civil actions and proceedings involving just compensation under the fifth amendment. In other civil actions and proceedings the compensation shall be paid by the parties in such proportion and at such time as the court directs, and thereafter charged in like manner as other costs.

(c) Disclosure of Appointment. In the exercise of its discretion, the court may authorize disclosure to the jury of the fact that the court appointed the expert witness.

(d) Parties' Experts of Own Selection. Nothing in this rule limits the parties in calling expert witnesses of their own selection.

ARTICLE VIII. HEARSAY

RULE 801. DEFINITIONS

The following definitions apply under this article:

(a) Statement. A "statement" is (1) an oral or written assertion or (2) nonverbal conduct of a person, if it is intended by him to be communicative.

(b) Declarant. A "declarant" is a person who makes a statement.

(c) Hearsay. "Hearsay" is a statement other than one made by the declarant while testifying at the trial or hearing, offered in evidence to prove the truth of the matter asserted.

(d) Statements Which Are Not Hearsay. A statement is not hearsay if—

(1) *Prior Statement by Witness.* The declarant testifies at the trial or hearing and is subject to cross-examination concerning the statement, and the statement is (A) inconsistent with his testimony, or (B) consistent with his testimony and is offered to rebut an express or implied charge against him of recent fabrication or improper influence or motive, or (C) one of identification of a person made after perceiving him, or

(2) *Admission by Party-Opponent.* The statement is offered against a party and is (A) the party's own statement in either an individual or a representative capacity or (B) a statement of which the party has manifested an adoption or belief in its truth, or (C) a statement by a person authorized by the party to make a statement concerning the subject, or (D) a statement by the party's agent or servant concerning a matter within the scope of the agency or employment, made during the existence of the relationship, or (E) a statement by a coconspirator of a party during the course and in furtherance of the conspiracy. The contents of the statement shall be considered but are not alone sufficient to establish the declarant's authority under subdivision (C), the agency or employment relationship and scope thereof under subdivision (D), or the existence of the conspiracy and the participation therein of the declarant and the party against whom the statement is offered under subdivision (E).

Amended eff. Jan. 1, 1999.

Committee Comment

The last sentence of this Rule was added to track a corresponding change in F.R.E. 801(d)(2).

RULE 802. HEARSAY RULE

Hearsay is not admissible except as provided by these rules or by the civil and criminal procedural rules applicable to the courts of Colorado or by any statutes of the State of Colorado.

RULE 803. HEARSAY EXCEPTIONS: AVAILABILITY OF DECLARANT IMMATERIAL

The following are not excluded by the hearsay rule, even though the declarant is available as a witness:

(1) Spontaneous Present Sense Impression. A spontaneous statement describing or explaining an event or condition made while the declarant was perceiving the event or condition.

(2) Excited Utterance. A statement relating to a startling event or condition made while the declarant was under the stress of excitement caused by the event or condition.

(3) Then Existing Mental, Emotional, or Physical Condition. A statement of the declarant's then

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ARTICLE VII. OPINIONS AND EXPERT TESTIMONY

Rule 701. Opinion Testimony by Lay Witnesses

If the witness is not testifying as an expert, the witness' testimony in the form of opinions or inferences is limited to those opinions or inferences which are (a) rationally based on the perception of the witness, (b) helpful to a clear understanding of the witness' testimony or the determination of a fact in issue, and (c) not based on scientific, technical, or other specialized knowledge within the scope of Rule 702.

(Pub.L. 93–595, § 1, Jan. 2, 1975, 88 Stat.1937; Mar. 2, 1987, eff. Oct. 1, 1987; Apr. 17, 2000, eff. Dec. 1, 2000.)

ADVISORY COMMITTEE NOTES

1972 Proposed Rules

The rule retains the traditional objective of putting the trier of fact in possession of an accurate reproduction of the event.

Limitation (a) is the familiar requirement of first-hand knowledge or observation.

Limitation (b) is phrased in terms of requiring testimony to be helpful in resolving issues. Witnesses often find difficulty in expressing themselves in language which is not that of an opinion or conclusion. While the courts have made concessions in certain recurring situations, necessity as a standard for permitting opinions and conclusions has proved too elusive and too unadaptable to particular situations for purposes of satisfactory judicial administration. McCormick § 11. Moreover, the practical impossibility of determining by rule what is a "fact," demonstrated by a century of litigation of the question of what is a fact for purposes of pleading under the Field Code, extends into evidence also. 7 Wigmore § 1919. The rule assumes that the natural characteristics of the adversary system will generally lead to an acceptable result, since the detailed account carries more conviction than the broad assertion, and a lawyer can be expected to display his witness to the best advantage. If he fails to do so, cross-examination and argument will point up the weakness. See Ladd, Expert Testimony, 5 Vand.L.Rev. 414, 415–417 (1952). If, despite these considerations, attempts are made to introduce meaningless assertions which amount to little more than choosing up sides, exclusion for lack of helpfulness is called for by the rule.

The language of the rule is substantially that of Uniform Rule 56(1). Similar provisions are California Evidence Code § 800; Kansas Code of Civil Procedure § 60–456(a); New Jersey Evidence Rule 56(1).

1987 Amendments

The amendments are technical. No substantive change is intended.

2000 Amendments

Rule 701 has been amended to eliminate the risk that the reliability requirements set forth in Rule 702 will be evaded through the simple expedient of proffering an expert in lay witness clothing. Under the amendment, a witness' testimony must be scrutinized under the rules regulating expert opinion to the extent that the witness is providing testimony based on scientific, technical, or other specialized knowledge within the scope of Rule 702. *See generally Asplundh Mfg. Div. v. Benton Harbor Eng'g*, 57 F.3d 1190 (3d Cir. 1995). By channeling testimony that is actually expert testimony to Rule 702, the amendment also ensures that a party will not evade the expert witness disclosure requirements set forth in Fed.R.Civ.P. 26 and Fed.R.Crim.P. 16 by simply calling an expert witness in the guise of a layperson. *See* Joseph, *Emerging Expert Issues Under the 1993 Disclosure Amendments to the Federal Rules of Civil Procedure*, 164 F.R.D. 97, 108 (1996) (noting that "there is no good reason to allow what is essentially surprise expert testimony." and that "the Court should be vigilant to preclude manipulative conduct designed to thwart the expert disclosure and discovery process") *See also United States v. Figueroa-Lopez*, 125 F.3d 1241, 1246 (9th Cir. 1997) (law enforcement agents testifying that the defendant's conduct was consistent with that of a drug trafficker could not testify as lay witnesses; to permit such testimony under Rule 701 "subverts the requirements of Federal Rule of Criminal Procedure 16(a)(1)(E)").

The amendment does not distinguish between expert and lay *witnesses*, but rather between expert and lay *testimony*. Certainly it is possible for the same witness to provide both lay and expert testimony in a single case. *See, e.g, United States v. Figueroa-Lopez*, 125 F.3d 1241, 1246 (9th Cir. 1997) (law enforcement agents could testify that the defendant was acting suspiciously, without being qualified as experts; however, the rules on experts were applicable where the agents testified on the basis of extensive experience that the defendant was using code words to refer to drug quantities and prices). The amendment makes clear that any part of a witness' testimony that is based upon scientific, technical, or other specialized knowledge within the scope of Rule 702 is governed by the standards of Rule 702 and the corresponding disclosure requirements of the Civil and Criminal Rules.

The amendment is not intended to affect the "prototypical example[s] of the type of evidence contemplated by the adoption of Rule 701 relat[ing] to the appearance of persons or things, identity, the manner of conduct, competency of a person, degrees of light or darkness, sound, size, weight, distance, and an endless number of items that cannot be described factually in words apart from inferences." *Asplundh Mfg. Div. v. Benton Harbor Eng' g*, 57 F.3d 1190, 1196 (3d Cir. 1995).

For example, most courts have permitted the owner or officer of a business to testify to the value or projected profits of the business, without the necessity of qualifying the witness as an accountant, appraiser, or similar expert. *See, e.g., Lightning Lube, Inc. v. Witco Corp.* 4 F.3d 1153 (3d Cir. 1993) (no abuse of discretion in permitting the plaintiff's owner to give lay opinion testimony as to damages, as it was based on his knowledge and participation in the day-to-day affairs of the business). Such opinion testimony is admitted not because of experience, training or specialized knowledge within the realm of an expert, but because of the particularized knowledge that the witness has by virtue of his or her position in the business. The amendment does not purport to change this analysis. Similarly, courts have permitted lay

witnesses to testify that a substance appeared to be a narcotic, so long as a foundation of familiarity with the substance is established. *See, e.g., United States v. Westbrook*, 896 F.2d 330 (8th Cir. 1990) (two lay witnesses who were heavy amphetamine users were properly permitted to testify that a substance was amphetamine; but it was error to permit another witness to make such an identification where she had no experience with amphetamines). Such testimony is not based on specialized knowledge within the scope of Rule 702, but rather is based upon a layperson's personal knowledge. If, however, that witness were to describe how a narcotic was manufactured, or to describe the intricate workings of a narcotic distribution network, then the witness would have to qualify as an expert under Rule 702. *United States v. Figueroa-Lopez, supra.*

The amendment incorporates the distinctions set forth in *State v. Brown*, 836 S.W.2d 530, 549 (1992), a case involving former Tennessee Rule of Evidence 701, a rule that precluded lay witness testimony based on "special knowledge." In *Brown*, the court declared that the distinction between lay and expert witness testimony is that lay testimony "results from a process of reasoning familiar in everyday life," while expert testimony "results from a process of reasoning which can be mastered only by specialists in the field." The court in *Brown* noted that a lay witness with experience could testify that a substance appeared to be blood, but that a witness would have to qualify as an expert before he could testify that bruising around the eyes is indicative of skull trauma. That is the kind of distinction made by the amendment to this Rule.

GAP Report—Proposed Amendment to Rule 701

The Committee made the following changes to the published draft of the proposed amendment to Evidence Rule 701:

1. The words "within the scope of Rule 702" were added at the end of the proposed amendment, to emphasize that the Rule does not require witnesses to qualify as experts unless their testimony is of the type traditionally considered within the purview of Rule 702. The Committee Note was amended to accord with this textual change.

2. The Committee Note was revised to provide further examples of the kind of testimony that could and could not be proffered under the limitation imposed by the proposed amendment.

Rule 702. Testimony by Experts

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

(Pub.L. 93-595, § 1, Jan. 2, 1975, 88 Stat. 1937; Apr. 17, 2000, eff. Dec. 1, 2000.)

ADVISORY COMMITTEE NOTES

1972 Proposed Rules

An intelligent evaluation of facts is often difficult or impossible without the application of some scientific, technical, or other specialized knowledge. The most common source of this knowledge is the expert witness, although there are other techniques for supplying it.

Most of the literature assumes that experts testify only in the form of opinions. The assumption is logically unfounded. The rule accordingly recognizes that an expert on the stand may give a dissertation or exposition of scientific or other principles relevant to the case, leaving the trier of fact to apply them to the facts. Since much of the criticism of expert testimony has centered upon the hypothetical question, it seems wise to recognize that opinions are not indispensable and to encourage the use of expert testimony in non-opinion form when counsel believes the trier can itself draw the requisite inference. The use of opinions is not abolished by the rule, however. It will continue to be permissible for the experts to take the further step of suggesting the inference which should be drawn from applying the specialized knowledge to the facts. See Rules 703 to 705.

Whether the situation is a proper one for the use of expert testimony is to be determined on the basis of assisting the trier. "There is no more certain test for determining when experts may be used than the common sense inquiry whether the untrained layman would be qualified to determine intelligently and to the best possible degree the particular issue without enlightenment from those having a specialized understanding of the subject involved in the dispute." Ladd, Expert Testimony, 5 Vand.L.Rev. 414, 418 (1952). When opinions are excluded, it is because they are unhelpful and therefore superfluous and a waste of time. 7 Wigmore § 1918.

The rule is broadly phrased. The fields of knowledge which may be drawn upon are not limited merely to the "scientific" and "technical" but extend to all "specialized" knowledge. Similarly, the expert is viewed, not in a narrow sense, but as a person qualified by "knowledge, skill, experience, training or education." Thus within the scope of the rule are not only experts in the strictest sense of the word, e.g., physicians, physicists, and architects, but also the large group sometimes called "skilled" witnesses, such as bankers or landowners testifying to land values.

2000 Amendments

Rule 702 has been amended in response to *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993), and to the many cases applying *Daubert*, including *Kumho Tire Co. v. Carmichael*, 119 S.Ct. 1167 (1999). In *Daubert* the Court charged trial judges with the responsibility of acting as gatekeepers to exclude unreliable expert testimony, and the Court in *Kumho* clarified that this gatekeeper function applies to all expert testimony, not just testimony based in science. *See also Kumho*, 119 S.Ct. at 1178 (citing the Committee Note to the proposed amendment to Rule 702, which had been released for public comment before the date of the *Kumho* decision). The amendment affirms the trial court's role as gatekeeper and provides some general standards that the trial court must use to assess the reliability and helpfulness of proffered expert testimony. Consistently with *Kumho*, the Rule as amended provides that all types of expert testimony present questions of admissibility for the trial court in deciding whether the evidence is reliable and helpful. Consequently, the admissibility of all expert testimony is governed by the principles of Rule 104(a). Under that

Rule, the proponent has the burden of establishing that the pertinent admissibility requirements are met by a preponderance of the evidence. *See Bourjaily v. United States*, 483 U.S. 171 (1987).

Daubert set forth a non-exclusive checklist for trial courts to use in assessing the reliability of scientific expert testimony. The specific factors explicated by the *Daubert* Court are (1) whether the expert's technique or theory can be or has been tested—that is, whether the expert's theory can be challenged in some objective sense, or whether it is instead simply a subjective, conclusory approach that cannot reasonably be assessed for reliability; (2) whether the technique or theory has been subject to peer review and publication; (3) the known or potential rate of error of the technique or theory when applied; (4) the existence and maintenance of standards and controls; and (5) whether the technique or theory has been generally accepted in the scientific community. The Court in *Kumho* held that these factors might also be applicable in assessing the reliability of non-scientific expert testimony, depending upon "the particular circumstances of the particular case at issue." 119 S.Ct. at 1175.

No attempt has been made to "codify" these specific factors. *Daubert* itself emphasized that the factors were neither exclusive nor dispositive. Other cases have recognized that not all of the specific *Daubert* factors can apply to every type of expert testimony. In addition to *Kumho*, 119 S.Ct. at 1175, *see Tyus v. Urban Search Management*, 102 F.3d 256 (7th Cir. 1996) (noting that the factors mentioned by the Court in *Daubert* do not neatly apply to expert testimony from a sociologist). *See also Kannankeril v. Terminix Int'l, Inc.*, 128 F.3d 802, 809 (3d Cir. 1997) (holding that lack of peer review or publication was not dispositive where the expert's opinion was supported by "widely accepted scientific knowledge"). The standards set forth in the amendment are broad enough to require consideration of any or all of the specific *Daubert* factors where appropriate.

Courts both before and after *Daubert* have found other factors relevant in determining whether expert testimony is sufficiently reliable to be considered by the trier of fact. These factors include:

(1) Whether experts are "proposing to testify about matters growing naturally and directly out of research they have conducted independent of the litigation, or whether they have developed their opinions expressly for purposes of testifying." *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 43 F.3d 1311, 1317 (9th Cir. 1995).

(2) Whether the expert has unjustifiably extrapolated from an accepted premise to an unfounded conclusion. *See General Elec. Co. v. Joiner*, 522 U.S. 136, 146 (1997) (noting that in some cases a trial court "may conclude that there is simply too great an analytical gap between the data and the opinion proffered").

(3) Whether the expert has adequately accounted for obvious alternative explanations. *See Claar v. Burlington N.R.R.*, 29 F.3d 499 (9th Cir. 1994) (testimony excluded where the expert failed to consider other obvious causes for the plaintiff's condition). *Compare Ambrosini v. Labarraque*, 101 F.3d 129 (D.C. Cir. 1996) (the possibility of some uneliminated causes presents a question of weight, so long as the most obvious causes have been considered and reasonably ruled out by the expert).

(4) Whether the expert "is being as careful as he would be in his regular professional work outside his paid litigation consulting." *Sheehan v. Daily Racing Form, Inc.*, 104 F.3d 940, 942 (7th Cir. 1997). *See Kumho Tire Co. v. Carmichael*, 119 S.Ct. 1167, 1176 (1999) (*Daubert* requires the trial court to assure itself that the expert "employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field").

(5) Whether the field of expertise claimed by the expert is known to reach reliable results for the type of opinion the expert would give. *See Kumho Tire Co. v. Carmichael*, 119 S.Ct.1167, 1175 (1999) (*Daubert's* general acceptance factor does not "help show that an expert's testimony is reliable where the discipline itself lacks reliability, as for example, do theories grounded in any so-called generally accepted principles of astrology or necromancy."), *Moore v. Ashland Chemical, Inc.*, 151 F.3d 269 (5th Cir. 1998) (en banc) (clinical doctor was properly precluded from testifying to the toxicological cause of the plaintiff's respiratory problem, where the opinion was not sufficiently grounded in scientific methodology); *Sterling v. Velsicol Chem. Corp.*, 855 F.2d 1188 (6th Cir. 1988) (rejecting testimony based on "clinical ecology" as unfounded and unreliable).

All of these factors remain relevant to the determination of the reliability of expert testimony under the Rule as amended. Other factors may also be relevant. *See Kumho*, 119 S.Ct. 1167, 1176 ("[W]e conclude that the trial judge must have considerable leeway in deciding in a particular case how to go about determining whether particular expert testimony is reliable."). Yet no single factor is necessarily dispositive of the reliability of a particular expert's testimony. *See, e.g., Heller v. Shaw Industries, Inc.*, 167 F.3d 146, 155 (3d Cir. 1999) ("not only must each stage of the expert's testimony be reliable, but each stage must be evaluated practically and flexibly without bright-line exclusionary (or inclusionary) rules."); *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 43 F.3d 1311, 1317, n.5 (9th Cir. 1995) (noting that some expert disciplines "have the courtroom as a principal theatre of operations" and as to these disciplines "the fact that the expert has developed an expertise principally for purposes of litigation will obviously not be a substantial consideration.").

A review of the caselaw after *Daubert* shows that the rejection of expert testimony is the exception rather than the rule. *Daubert* did not work a "seachange over federal evidence law," and "the trial court's role as gatekeeper is not intended to serve as a replacement for the adversary system." *United States v. 14.38 Acres of Land Situated in Leflore County, Mississippi*, 80 F.3d 1074, 1078 (5th Cir. 1996). As the Court in *Daubert* stated: "Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence." 509 U.S. at 595. Likewise, this amendment is not intended to provide an excuse for an automatic challenge to the testimony of every expert. *See Kumho Tire Co. v . Carmichael*, 119 S.Ct.1167, 1176 (1999) (noting that the trial judge has the discretion "both to avoid unnecessary 'reliability' proceedings in ordinary cases where the reliability of an expert's methods is properly taken for granted, and to require appropriate proceedings in the less usual or more complex cases where cause for questioning the expert's reliability arises.").

When a trial court, applying this amendment, rules that an expert's testimony is reliable, this does not necessarily mean

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that contradictory expert testimony is unreliable. The amendment is broad enough to permit testimony that is the product of competing principles or methods in the same field of expertise. *See, e.g., Heller v. Shaw Industries, Inc.*, 167 F.3d 146, 160 (3d Cir. 1999) (expert testimony cannot be excluded simply because the expert uses one test rather than another, when both tests are accepted in the field and both reach reliable results). As the court stated in *In re Paoli R.R. Yard PCB Litigation*, 35 F.3d 717, 744 (3d Cir. 1994), proponents "do not have to demonstrate to the judge by a preponderance of the evidence that the assessments of their experts are correct, they only have to demonstrate by a preponderance of evidence that their opinions are reliable.... The evidentiary requirement of reliability is lower than the merits standard of correctness." *See also Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 43 F.3d 1311, 1318 (9th Cir. 1995) (scientific experts might be permitted to testify if they could show that the methods they used were also employed by "a recognized minority of scientists in their field."); *Ruiz-Troche v. Pepsi Cola*, 161 F.3d 77, 85 (1st Cir. 1998) ("*Daubert* neither requires nor empowers trial courts to determine which of several competing scientific theories has the best provenance.").

The Court in *Daubert* declared that the "focus, of course, must be solely on principles and methodology, not on the conclusions they generate." 509 U.S. at 595. Yet as the Court later recognized, "conclusions and methodology are not entirely distinct from one another." *General Elec. Co. v. Joiner*, 522 U.S. 136, 146 (1997). Under the amendment, as under *Daubert*, when an expert purports to apply principles and methods in accordance with professional standards, and yet reaches a conclusion that other experts in the field would not reach, the trial court may fairly suspect that the principles and methods have not been faithfully applied. *See Lust v. Merrell Dow Pharmaceuticals, Inc.*, 89 F.3d 594, 598 (9th Cir. 1996). The amendment specifically provides that the trial court must scrutinize not only the principles and methods used by the expert, but also whether those principles and methods have been properly applied to the facts of the case. As the court noted in *In re Paoli R.R. Yard PCB Litig.*, 35 F.3d 717, 745 (3d Cir. 1994), "*any* step that renders the analysis unreliable ... renders the expert's testimony inadmissible. *This is true whether the step completely changes a reliable methodology or merely misapplies that methodology.*"

If the expert purports to apply principles and methods to the facts of the case, it is important that this application be conducted reliably. Yet it might also be important in some cases for an expert to educate the factfinder about general principles, without ever attempting to apply these principles to the specific facts of the case. For example, experts might instruct the factfinder on the principles of thermodynamics, or bloodclotting, or on how financial markets respond to corporate reports, without ever knowing about or trying to tie their testimony into the facts of the case. The amendment does not alter the venerable practice of using expert testimony to educate the factfinder on general principles. For this kind of generalized testimony, Rule 702 simply requires that: (1) the expert be qualified; (2) the testimony address a subject matter on which the factfinder can be assisted by an expert; (3) the testimony be reliable; and (4) the testimony "fit" the facts of the case.

As stated earlier, the amendment does not distinguish between scientific and other forms of expert testimony. The trial court's gatekeeping function applies to testimony by any expert. *See Kumho Tire Co. v. Carmichael*, 119 S.Ct. 1167, 1171 (1999) ("We conclude that *Daubert's* general holding—setting forth the trial judge's general 'gatekeeping' obligation—applies not only to testimony based on 'scientific' knowledge, but also to testimony based on 'technical' and 'other specialized' knowledge."). While the relevant factors for determining reliability will vary from expertise to expertise, the amendment rejects the premise that an expert's testimony should be treated more permissively simply because it is outside the realm of science. An opinion from an expert who is not a scientist should receive the same degree of scrutiny for reliability as an opinion from an expert who purports to be a scientist. *See Watkins v. Telsmith, Inc.*, 121 F.3d 984, 991 (5th Cir. 1997) ("[I]t seems exactly backwards that experts who purport to rely on general engineering principles and practical experience might escape screening by the district court simply by stating that their conclusions were not reached by any particular method or technique."). Some types of expert testimony will be more objectively verifiable, and subject to the expectations of falsifiability, peer review, and publication, than others. Some types of expert testimony will not rely on anything like a scientific method, and so will have to be evaluated by reference to other standard principles attendant to the particular area of expertise. The trial judge in all cases of proffered expert testimony must find that it is properly grounded, well-reasoned, and not speculative before it can be admitted. The expert's testimony must be grounded in an accepted body of learning or experience in the expert's field, and the expert must explain how the conclusion is so grounded. *See, e.g.*, American College of Trial Lawyers, *Standards and Procedures for Determining the Admissibility of Expert Testimony after* Daubert, *157 F.R.D. 571, 579 (1994) ("[W]hether the testimony concerns economic principles, accounting standards, property valuation or other non-scientific subjects, it should be evaluated by reference to the 'knowledge and experience' of that particular field.").*

The amendment requires that the testimony must be the product of reliable principles and methods that are reliably applied to the facts of the case. While the terms "principles" and "methods" may convey a certain impression when applied to scientific knowledge, they remain relevant when applied to testimony based on technical or other specialized knowledge. For example, when a law enforcement agent testifies regarding the use of code words in a drug transaction, the principle used by the agent is that participants in such transactions regularly use code words to conceal the nature of their activities. The method used by the agent is the application of extensive experience to analyze the meaning of the conversations. So long as the principles and methods are reliable and applied reliably to the facts of the case, this type of testimony should be admitted.

Nothing in this amendment is intended to suggest that experience alone—or experience in conjunction with other knowledge, skill, training or education—may not provide a sufficient foundation for expert testimony. To the contrary, the text of Rule 702 expressly contemplates that an expert may be qualified on the basis of experience. In certain fields, experience is the predominant, if not sole, basis for a great deal of reliable expert testimony. *See, e.g., United States v. Jones*, 107 F.3d 1147 (6th Cir. 1997) (no abuse of discretion in

admitting the testimony of a handwriting examiner who had years of practical experience and extensive training, and who explained his methodology in detail); *Tassin v. Sears Roebuck*, 946 F.Supp. 1241, 1248 (M.D.La. 1996) (design engineer's testimony can be admissible when the expert's opinions "are based on facts, a reasonable investigation, and traditional technical/mechanical expertise, and he provides a reasonable link between the information and procedures he uses and the conclusions he reaches"). *See also Kumho Tire Co. v. Carmichael*, 119 S.Ct. 1167, 1178 (1999) (stating that "no one denies that an expert might draw a conclusion from a set of observations based on extensive and specialized experience.").

If the witness is relying solely or primarily on experience, then the witness must explain how that experience leads to the conclusion reached, why that experience is a sufficient basis for the opinion, and how that experience is reliably applied to the facts. The trial court's gatekeeping function requires more than simply "taking the expert's word for it." *See Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 43 F.3d 1311, 1319 (9th Cir. 1995) ("We've been presented with only the experts' qualifications, their conclusions and their assurances of reliability. Under *Daubert*, that's not enough."). The more subjective and controversial the expert's inquiry, the more likely the testimony should be excluded as unreliable. *See O'Conner v. Commonwealth Edison Co.*, 13 F.3d 1090 (7th Cir. 1994) (expert testimony based on a completely subjective methodology held properly excluded). *See also Kumho Tire Co. v. Carmichael*, 119 S.Ct . 1167, 1176 (1999) ("[I]t will at times be useful to ask even of a witness whose expertise is based purely on experience, say, a perfume tester able to distinguish among 140 odors at a sniff, whether his preparation is of a kind that others in the field would recognize as acceptable.").

Subpart (1) of Rule 702 calls for a quantitative rather than qualitative analysis. The amendment requires that expert testimony be based on sufficient underlying "facts or data." The term "data" is intended to encompass the reliable opinions of other experts. See the original Advisory Committee Note to Rule 703. The language "facts or data" is broad enough to allow an expert to rely on hypothetical facts that are supported by the evidence. *Id.*

When facts are in dispute, experts sometimes reach different conclusions based on competing versions of the facts. The emphasis in the amendment on " sufficient facts or data" is not intended to authorize a trial court to exclude an expert's testimony on the ground that the court believes one version of the facts and not the other.

There has been some confusion over the relationship between Rules 702 and 703. The amendment makes clear that the sufficiency of the basis of an expert' s testimony is to be decided under Rule 702. Rule 702 sets forth the overarching requirement of reliability, and an analysis of the sufficiency of the expert's basis cannot be divorced from the ultimate reliability of the expert's opinion. In contrast, the "reasonable reliance" requirement of Rule 703 is a relatively narrow inquiry. When an expert relies on inadmissible information, Rule 703 requires the trial court to determine whether that information is of a type reasonably relied on by other experts in the field. If so, the expert can rely on the information in reaching an opinion. However, the question whether the expert is relying on a *sufficient* basis of information—whether admissible information or not—is governed by the requirements of Rule 702.

The amendment makes no attempt to set forth procedural requirements for exercising the trial court's gatekeeping function over expert testimony. *See* Daniel J. Capra, *The Daubert Puzzle*, 38 Ga.L.Rev. 699, 766 (1998) ("Trial courts should be allowed substantial discretion in dealing with *Daubert* questions; any attempt to codify procedures will likely give rise to unnecessary changes in practice and create difficult questions for appellate review."). Courts have shown considerable ingenuity and flexibility in considering challenges to expert testimony under *Daubert*, and it is contemplated that this will continue under the amended Rule. *See, e.g., Cortes-Irizarry v. Corporacion Insular*, 111 F.3d 184 (1st Cir. 1997) (discussing the application of *Daubert* in ruling on a motion for summary judgment); *In re Paoli R.R. Yard PCB Litig.*, 35 F.3d 717, 736, 739 (3d Cir. 1994) (discussing the use of *in limine* hearings); *Claar v. Burlington N.R.R.*, 29 F.3d 499, 502–05 (9th Cir. 1994) (discussing the trial court's technique of ordering experts to submit serial affidavits explaining the reasoning and methods underlying their conclusions).

The amendment continues the practice of the original Rule in referring to a qualified witness as an "expert." This was done to provide continuity and to minimize change. The use of the term "expert" in the Rule does not, however, mean that a jury should actually be informed that a qualified witness is testifying as an "expert." Indeed, there is much to be said for a practice that prohibits the use of the term "expert" by both the parties and the court at trial. Such a practice "ensures that trial courts do not inadvertently put their stamp of authority" on a witness's opinion, and protects against the jury's being "overwhelmed by the so-called 'experts'." Hon. Charles Richey, *Proposals to Eliminate the Prejudicial Effect of the Use of the Word "Expert" Under the Federal Rules of Evidence in Criminal and Civil Jury Trials*, 154 F.R.D. 537, 559 (1994) (setting forth limiting instructions and a standing order employed to prohibit the use of the term " expert" injury trials).

GAP Report—Proposed Amendment to Rule 702

The Committee made the following changes to the published draft of the proposed amendment to Evidence Rule 702:

1. The word "reliable" was deleted from Subpart (1) of the proposed amendment, in order to avoid an overlap with Evidence Rule 703, and to clarify that an expert opinion need not be excluded simply because it is based on hypothetical facts. The Committee Note was amended to accord with this textual change.

2. The Committee Note was amended throughout to include pertinent references to the Supreme Court's decision in *Kumho Tire Co. v. Carmichael*, which was rendered after the proposed amendment was released for public comment. Other citations were updated as well.

3. The Committee Note was revised to emphasize that the amendment is not intended to limit the right to jury trial, nor to permit a challenge to the testimony of every expert, nor to preclude the testimony of experience-based experts, nor to prohibit testimony based on competing methodologies within a field of expertise.

4. Language was added to the Committee Note to clarify that no single factor is necessarily dispositive of the reliability inquiry mandated by Evidence Rule 702.

Rule 703. Bases of Opinion Testimony by Experts

The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence in order for the opinion or inference to be admitted. Facts or data that are otherwise inadmissible shall not be disclosed to the jury by the proponent of the opinion or inference unless the court determines that their probative value in assisting the jury to evaluate the expert's opinion substantially outweighs their prejudicial effect.

(Pub.L. 93–595, § 1, Jan. 2, 1975, 88 Stat.1937; Mar. 2, 1987, eff. Oct. 1, 1987; Apr. 17, 2000, eff. Dec. 1, 2000.)

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Facts or data upon which expert opinions are based may, under the rule, be derived from three possible sources. The first is the firsthand observation of the witness with opinions based thereon traditionally allowed. A treating physician affords an example. Rheingold, The Basis of Medical Testimony, 15 Vand.L.Rev. 473, 489 (1962). Whether he must first relate his observations is treated in Rule 705. The second source, presentation at the trial, also reflects existing practice. The technique may be the familiar hypothetical question or having the expert attend the trial and hear the testimony establishing the facts. Problems of determining what testimony the expert relied upon, when the latter technique is employed and the testimony is in conflict, may be resolved by resort to Rule 705. The third source contemplated by the rule consists of presentation of data to the expert outside of court and other than by his own perception. In this respect the rule is designed to broaden the basis for expert opinions beyond that current in many jurisdictions and to bring the judicial practice into line with the practice of the experts themselves when not in court. Thus a physician in his own practice bases his diagnosis on information from numerous sources and of considerable variety, including statements by patients and relatives, reports and opinions from nurses, technicians and other doctors, hospital records, and X rays. Most of them are admissible in evidence, but only with the expenditure of substantial time in producing and examining various authenticating witnesses. The physician makes life-and-death decisions in reliance upon them. His validation, expertly performed and subject to cross-examination, ought to suffice for judicial purposes. Rheingold, *supra*, at 531; McCormick § 15. A similar provision is California Evidence Code § 801(b).

The rule also offers a more satisfactory basis for ruling upon the admissibility of public opinion poll evidence. Attention is directed to the validity of the techniques employed rather than to relatively fruitless inquiries whether hearsay is involved. See Judge Feinberg's careful analysis in Zippo Mfg. Co. v. Rogers Imports, Inc., 216 F.Supp. 670 (S.D.N.Y. 1963). See also Blum et al., The Art of Opinion Research: A Lawyer's Appraisal of an Emerging Service, 24 U.Chi.L.Rev. 1 (1956); Bonynge Trademark Surveys and Techniques and Their Use in Litigation, 48 A.B.A.J. 329 (1962); Zeisel, The Uniqueness of Survey Evidence, 45 Cornell L.Q. 322 (1960); Annot., 76 A.L.R.2d 919.

If it be feared that enlargement of permissible data may tend to break down the rules of exclusion unduly, notice should be taken that the rule requires that the facts or data "be of a type reasonably relied upon by experts in the particular field." The language would not warrant admitting in evidence the opinion of an "accidentologist" as to the point of impact in an automobile collision based on statements of bystanders since this requirement is not satisfied. See Comment, Cal.Law Rev.Comm'n, Recommendation Proposing an Evidence Code 148–150 (1965).

1987 Amendments

The amendment is technical. No substantive change is intended.

2000 Amendments

Rule 703 has been amended to emphasize that when an expert reasonably relies on inadmissible information to form an opinion or inference, the underlying information is not admissible simply because the opinion or inference is admitted. Courts have reached different results on how to treat inadmissible information when it is reasonably relied upon by an expert in forming an opinion or drawing an inference. *Compare United States v. Rollins*, 862 F.2d 1282 (7th Cir. 1988) (admitting, as part of the basis of an FBI agent's expert opinion on the meaning of code language, the hearsay statements of an informant), *with United States v. 0.59 Acres of Land*, 109 F.3d 1493 (9th Cir. 1997) (error to admit hearsay offered as the basis of an expert opinion, without a limiting instruction). Commentators have also taken differing views. *See e.g.*, Ronald Carlson, *Policing the Bases of Modern Expert Testimony*, 39 Vand.L.Rev. 577 (1986) (advocating limits on the jury's consideration of otherwise inadmissible evidence used as the basis for an expert opinion); Paul Rice, *Inadmissible Evidence as a Basis for Expert Testimony: A Response to Professor Carlson*, 40 Vand.L.Rev. 583 (1987) (advocating unrestricted use of information reasonably relied upon by an expert).

When information is reasonably relied upon by an expert and yet is admissible only for the purpose of assisting the jury in evaluating an expert's opinion, a trial court applying this Rule must consider the information's probative value in assisting the jury to weigh the expert's opinion on the one hand, and the risk of prejudice resulting from the jury's potential misuse of the information for substantive purposes on the other. The information may be disclosed to the jury, upon objection, only if the trial court finds that the probative value of the information in assisting the jury to evaluate the expert's opinion substantially outweighs its prejudicial effect. If the otherwise inadmissible information is admitted under this balancing test, the trial judge must give a limiting instruction upon request, informing the jury that the underlying information must not be used for substantive purposes. *See* Rule 105. In determining the appropriate course, the trial court should consider the probable effectiveness or lack of effectiveness of a limiting instruction under the particular circumstances.

The amendment governs only the disclosure to the jury of information that is reasonably relied on by an expert, when

that information is not admissible for substantive purposes. It is not intended to affect the admissibility of an expert's testimony. Nor does the amendment prevent an expert from relying on information that is inadmissible for substantive purposes.

Nothing in this Rule restricts the presentation of underlying expert facts or data when offered by an adverse party. *See* Rule 705. Of course, an adversary's attack on an expert's basis will often open the door to a proponent's rebuttal with information that was reasonably relied upon by the expert, even if that information would not have been discloseable initially under the balancing test provided by this amendment. Moreover, in some circumstances the proponent might wish to disclose information that is relied upon by the expert in order to "remove the sting" from the opponent's anticipated attack, and thereby prevent the jury from drawing an unfair negative inference. The trial court should take this consideration into account in applying the balancing test provided by this amendment.

This amendment covers facts or data that cannot be admitted for any purpose other than to assist the jury to evaluate the expert's opinion. The balancing test provided in this amendment is not applicable to facts or data that are admissible for any other purpose but have not yet been offered for such a purpose at the time the expert testifies.

The amendment provides a presumption against disclosure to the jury of information used as the basis of an expert's opinion and not admissible for any substantive purpose, when that information is offered by the proponent of the expert. In a multi-party case, where one party proffers an expert whose testimony is also beneficial to other parties, each such party should be deemed a "proponent" within the meaning of the amendment.

GAP Report—Proposed Amendment to Rule 703

The Committee made the following changes to the published draft of the proposed amendment to Evidence Rule 703:

1. A minor stylistic change was made in the text, in accordance with the suggestion of the Style Subcommittee of the Standing Committee on Rules of Practice and Procedure.

2. The words "in assisting the jury to evaluate the expert's opinion" were added to the text, to specify the proper purpose for offering the otherwise inadmissible information relied on by an expert. The Committee Note was revised to accord with this change in the text.

3. Stylistic changes were made to the Committee Note.

4. The Committee Note was revised to emphasize that the balancing test set forth in the proposal should be used to determine whether an expert's basis may be disclosed to the jury either (1) in rebuttal or (2) on direct examination to "remove the sting" of an opponent's anticipated attack on an expert's basis.

Rule 704. Opinion on Ultimate Issue

(a) Except as provided in subdivision (b), testimony in the form of an opinion or inference otherwise admissible is not objectionable because it embraces an ultimate issue to be decided by the trier of fact.

(b) No expert witness testifying with respect to the mental state or condition of a defendant in a criminal case may state an opinion or inference as to whether the defendant did or did not have the mental state or condition constituting an element of the crime charged or of a defense thereto. Such ultimate issues are matters for the trier of fact alone.

(Pub.L. 93–595, § 1, Jan. 2, 1975, 88 Stat. 1937; Pub.L. 98–473, Title IV, § 406, Oct. 12, 1984, 98 Stat. 2067.)

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The basic approach to opinions, lay and expert, in these rules is to admit them when helpful to the trier of fact. In order to render this approach fully effective and to allay any doubt on the subject, the so-called "ultimate issue" rule is specifically abolished by the instant rule.

The older cases often contained strictures against allowing witnesses to express opinions upon ultimate issues, as a particular aspect of the rule against opinions. The rule was unduly restrictive, difficult of application, and generally served only to deprive the trier of fact of useful information. 7 Wigmore §§ 1920, 1921; McCormick § 12. The basis usually assigned for the rule, to prevent the witness from "usurping the province of the jury," is aptly characterized as "empty rhetoric." 7 Wigmore § 1920, p. 17. Efforts to meet the felt needs of particular situations led to odd verbal circumlocutions which were said not to violate the rule. Thus a witness could express his estimate of the criminal responsibility of an accused in terms of sanity or insanity, but not in terms of ability to tell right from wrong or other more modern standard. And in cases of medical causation, witnesses were sometimes required to couch their opinions in cautious phrases of "might or could," rather than "did," though the result was to deprive many opinions of the positiveness to which they were entitled, accompanied by the hazard of a ruling of insufficiency to support a verdict. In other instances the rule was simply disregarded, and, as concessions to need, opinions were allowed upon such matters as intoxication, speed, handwriting, and value, although more precise coincidence with an ultimate issue would scarcely be possible.

Many modern decisions illustrate the trend to abandon the rule completely. People v. Wilson, 25 Cal.2d 341, 153 P.2d 720 (1944), whether abortion necessary to save life of patient; *Clifford–Jacobs Forging Co. v. Industrial Comm.*, 19 Ill.2d 236, 166 N.E.2d 582 (1960), medical causation; *Dowling v. L. H. Shattuck*, Inc., 91 N.H. 234, 17 A.2d 529 (1941), proper method of shoring ditch; *Schweiger v. Solbeck*, 191 Or. 454, 230 P.2d 195 (1951), cause of landslide. In each instance the opinion was allowed.

The abolition of the ultimate issue rule does not lower the bars so as to admit all opinions. Under Rules 701 and 702, opinions must be helpful to the trier of fact, and Rule 403 provides for exclusion of evidence which wastes time. These provisions afford ample assurances against the admission of opinions which would merely tell the jury what result to reach, somewhat in the manner of the oath-helpers of an earlier day. They also stand ready to exclude opinions phrased in terms of inadequately explored legal criteria. Thus the question, "Did T have capacity to make a will?" would be excluded, while the question, "Did T have sufficient mental capacity to know the nature and extent of his property and the natural objects of his bounty and to formulate a

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rational scheme of distribution?" would be allowed. McCormick § 12.

For similar provisions see Uniform Rule 56(4); California Evidence Code § 805; Kansas Code of Civil Procedure § 60–456(d); New Jersey Evidence Rule 56(3).

Rule 705. Disclosure of Facts or Data Underlying Expert Opinion

The expert may testify in terms of opinion or inference and give reasons therefor without first testifying to the underlying facts or data, unless the court requires otherwise. The expert may in any event be required to disclose the underlying facts or data on cross-examination.

(Pub.L. 93–595, § 1, Jan. 2, 1975, 88 Stat. 1938; Mar. 2, 1987, eff. Oct. 1, 1987; Apr. 22, 1993, eff. Dec. 1, 1993.)

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The hypothetical question has been the target of a great deal of criticism as encouraging partisan bias, affording an opportunity for summing up in the middle of the case, and as complex and time consuming. Ladd, Expert Testimony, 5 Vand.L.Rev. 414, 426–427 (1952). While the rule allows counsel to make disclosure of the underlying facts or data as a preliminary to the giving of an expert opinion, if he chooses, the instances in which he is required to do so are reduced. This is true whether the expert bases his opinion on data furnished him at secondhand or observed by him at firsthand.

The elimination of the requirement of preliminary disclosure at the trial of underlying facts or data has a long background of support. In 1937 the Commissioners on Uniform State Laws incorporated a provision to this effect in their Model Expert Testimony Act, which furnished the basis for Uniform Rules 57 and 58. Rule 4515, N.Y. CPLR (McKinney 1963), provides:

"Unless the court orders otherwise, questions calling for the opinion of an expert witness need not be hypothetical in form, and the witness may state his opinion and reasons without first specifying the data upon which it is based. Upon cross-examination, he may be required to specify the data * * *."

See also California Evidence Code § 802; Kansas Code of Civil Procedure §§ 60–456, 60–457; New Jersey Evidence Rules 57, 58.

If the objection is made that leaving it to the cross-examiner to bring out the supporting data is essentially unfair, the answer is that he is under no compulsion to bring out any facts or data except those unfavorable to the opinion. The answer assumes that the cross-examiner has the advance knowledge which is essential for effective cross-examination. This advance knowledge has been afforded, though imperfectly, by the traditional foundation requirement. Rule 26(b)(4) of the Rules of Civil Procedure, as revised, provides for substantial discovery in this area, obviating in large measure the obstacles which have been raised in some instances to discovery of findings, underlying data, and even the identity of the experts. Friedenthal Discovery and Use of an Adverse Party's Expert Information, 14 Stan.L.Rev. 455 (1962).

These safeguards are reinforced by the discretionary power of the judge to require preliminary disclosure in any event.

1987 Amendment

The amendment is technical. No substantive change is intended.

1993 Amendment

This rule, which relates to the manner of presenting testimony at trial, is revised to avoid an arguable conflict with revised Rules 26(a)(2)(B) and 26(e)(1) of the Federal Rules of Civil Procedure or with revised Rule 16 of the Federal Rules of Criminal Procedure, which require disclosure in advance of trial of the basis and reasons for an expert's opinions.

If a serious question is raised under Rule 702 or 703 as to the admissibility of expert testimony, disclosure of the underlying facts or data on which opinions are based may, of course, be needed by the court before deciding whether, and to what extent, the person should be allowed to testify. This rule does not preclude such an inquiry.

Rule 706. Court Appointed Experts

(a) Appointment. The court may on its own motion or on the motion of any party enter an order to show cause why expert witnesses should not be appointed, and may request the parties to submit nominations. The court may appoint any expert witnesses agreed upon by the parties, and may appoint expert witnesses of its own selection. An expert witness shall not be appointed by the court unless the witness consents to act. A witness so appointed shall be informed of the witness' duties by the court in writing, a copy of which shall be filed with the clerk, or at a conference in which the parties shall have opportunity to participate. A witness so appointed shall advise the parties of the witness' findings, if any; the witness' deposition may be taken by any party; and the witness may be called to testify by the court or any party. The witness shall be subject to cross-examination by each party, including a party calling the witness.

(b) Compensation. Expert witnesses so appointed are entitled to reasonable compensation in whatever sum the court may allow. The compensation thus fixed is payable from funds which may be provided by law in criminal cases and civil actions and proceedings involving just compensation under the fifth amendment. In other civil actions and proceedings the compensation shall be paid by the parties in such proportion and at such time as the court directs, and thereafter charged in like manner as other costs.

(c) Disclosure of appointment. In the exercise of its discretion, the court may authorize disclosure to the jury of the fact that the court appointed the expert witness.

(d) Parties' experts of own selection. Nothing in this rule limits the parties in calling expert witnesses of their own selection.

(Pub.L. 93–595, § 1, Jan. 2, 1975, 88 Stat.1938; Mar. 2, 1987, eff. Oct. 1, 1987.)

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1972 Proposed Rules

The practice of shopping for experts, the venality of some experts, and the reluctance of many reputable experts to involve themselves in litigation, have been matters of deep concern. Though the contention is made that court appointed experts acquire an aura of infallibility to which they are not entitled, Levy, Impartial Medical Testimony—Revisited, 34 Temple L.Q. 416 (1961), the trend is increasingly to provide for their use. While experience indicates that actual appointment is a relatively infrequent occurrence, the assumption may be made that the availability of the procedure in itself decreases the need for resorting to it. The ever-present possibility that the judge may appoint an expert in a given case must inevitably exert a sobering effect on the expert witness of a party and upon the person utilizing his services.

The inherent power of a trial judge to appoint an expert of his own choosing is virtually unquestioned. *Scott v. Spanjer Bros., Inc.*, 298 F.2d 928 (2d Cir.1962); *Danville Tobacco Assn. v. Bryant-Buckner Associates*, Inc., 333 F.2d 202 (4th Cir.1964); Sink, The Unused Power of a Federal Judge to Call His Own Expert Witnesses, 29 S.Cal.L.Rev. 195 (1956); 2 Wigmore § 563, 9 *id.* § 2484; Annot., 95 A.L.R.2d 383. Hence the problem becomes largely one of detail.

The New York plan is well known and is described in Report by Special Committee of the Association of the Bar of the City of New York: Impartial Medical Testimony (1956). On recommendation of the Section of Judicial Administration, local adoption of an impartial medical plan was endorsed by the American Bar Association. 82 A.B.A.Rep. 184–185 (1957). Descriptions and analyses of plans in effect in various parts of the country are found in Van Dusen, A United States District Judge's View of the Impartial Medical Expert System, 32 F.R.D. 498 (1963); Wick and Kightlinger, Impartial Medical Testimony Under the Federal Civil Rules: A Tale of Three Doctors, 34 Ins. Counsel J. 115 (1967); and numerous articles collected in Klein, Judicial Administration and the Legal Profession 393 (1963). Statutes and rules include California Evidence Code §§ 730–733; Illinois Supreme Court Rule 215(d), Ill.Rev.Stat.1969, c. 110A, § 215(d); Burns Indiana Stats.1956, § 9–1702; Wisconsin Stats.Annot.1958, § 957.27.

In the federal practice, a comprehensive scheme for court appointed experts was initiated with the adoption of Rule 28 of the Federal Rules of Criminal Procedure in 1946. The Judicial Conference of the United States in 1953 considered court appointed experts in civil cases, but only with respect to whether they should be compensated from public funds, a proposal which was rejected. Report of the Judicial Conference of the United States 23 (1953). The present rule expands the practice to include civil cases.

Note to Subdivision (a). Subdivision (a) is based on Rule 28 of the Federal Rules of Criminal Procedure, with a few changes, mainly in the interest of clarity. Language has been added to provide specifically for the appointment either on motion of a party or on the judge's own motion. A provision subjecting the court appointed expert to deposition procedures has been incorporated. The rule has been revised to make definite the right of any party, including the party calling him, to cross-examine.

Note to Subdivision (b). Subdivision (b) combines the present provision for compensation in criminal cases with what seems to be a fair and feasible handling of civil cases, originally found in the Model Act and carried from there into Uniform Rule 60. See also California Evidence Code §§ 730–731. The special provision for Fifth Amendment compensation cases is designed to guard against reducing constitutionally guaranteed just compensation by requiring the recipient to pay costs. See Rule 71A(*l*) of the Rules of Civil Procedure.

Note to Subdivision (c). Subdivision (c) seems to be essential if the use of court appointed experts is to be fully effective. Uniform Rule 61 so provides.

Note to Subdivision (d). Subdivision (d) is in essence the last sentence of Rule 28(a) of the Federal Rules of Criminal Procedure.

1987 Amendment

The amendments are technical. No substantive change is intended.

ARTICLE VIII. HEARSAY

ADVISORY COMMITTEE NOTES

1972 Proposed Rules

Introductory Note; The Hearsay Problem. The factors to be considered in evaluating the testimony of a witness are perception, memory, and narration. Morgan, Hearsay Dangers and the Application of the Hearsay Concept, 62 Harv. L.Rev. 177 (1948), Selected Writings on Evidence and Trial 764, 765 (Fryer ed. 1957); Shientag, Cross-Examination—A Judge's Viewpoint, 3 Record 12 (1948); Strahorn, A Reconsideration of the Hearsay Rule and Admissions, 85 U.Pa. L.Rev. 484, 485 (1937), Selected Writings, *supra*, 756, 757; Weinstein, Probative Force of Hearsay, 46 Iowa L.Rev. 331 (1961). Sometimes a fourth is added, sincerity, but in fact it seems merely to be an aspect of the three already mentioned.

In order to encourage the witness to do his best with respect to each of these factors, and to expose any inaccuracies which may enter in, the Anglo–American tradition has evolved three conditions under which witnesses will ideally be required to testify: (1) under oath, (2) in the personal presence of the trier of fact, (3) subject to cross-examination.

(1) Standard procedure calls for the swearing of witnesses. While the practice is perhaps less effective than in an earlier time, no disposition to relax the requirement is apparent, other than to allow affirmation by persons with scruples against taking oaths.

MEMORANDUM

To: Evidence Rules Committee
Justice Ben Coats
David DeMuro, Committee Chair
Honorable Janice Davidson
Honorable Harlan Bockman
Honorable Martin Egelhoff
Honorable Rebecca Bromley
Christopher Mueller
Sheila Hyatt
David Rees
Henry Reeve
Philip Cherner
Elizabeth Griffith
Christopher Miranda
Robert Russel

From: Christopher Mueller
Date: October 15, 2001
Re: Rule 702 – The Possible Choices

In recent meetings of this Committee, there was consensus that we should recommend to the Supreme Court the adoption of the same changes to Rules 701, 703, and 705 that were adopted in the federal system last December. What remains is probably the single most important point, which is whether to recommend a change in Rule 702 -- the provision that supports the standard on scientific evidence. (The other changes can be made regardless what we decide about Rule 702.)

There are three obvious choices: One is to recommend the same language that the federal system adopted. Second is to make a simpler change that would alert people to the fact that Rule 702 embodies a validity standard for scientific evidence. Third is to recommend no change. Set out below are these three possibilities, and of course the second one ("simpler change") could itself be tinkered with if you like the idea but not the way I formulated it:

Three Options

Option 1 -- Rule 702 (federal): If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, IF (1) THE TESTIMONY IS BASED UPON SUFFICIENT FACTS OR DATA, (2) THE TESTIMONY IS THE PRODUCT OF RELIABLE PRINCIPLES AND METHODS, AND (3) THE WITNESS HAS APPLIED THE PRINCIPLES AND METHODS RELIABLY TO THE FACTS OF THE CASE.

Option 2 -- Rule 702 (simpler change): If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as

an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, PROVIDED THAT THE TESTIMONY IS BASED UPON VALID AND RELIABLE PRINCIPLES AND METHODS.

Option 3 -- COLORADO RULE 702 (no change): If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

Arguments for Option 1

To cut to the chase, I think Option 1 (federal) is best, but that we should include an Evidence Advisory Committee Note stating that we are adopting a Colorado standard that rests on cases like *Schreck.* Two versions of a possible Note are attached at the end of this memorandum ("Draft Short Note" and "Draft Extended Note"). For each version, I suggest some alternative language in case everyone thinks we should adopt Option 2 (simpler change) instead of Option 1 (federal). (If we take Option 3 (no change), obviously we don't need any kind of note at all.)

I think Option 1 (federal) is best for two reasons: First, this language does a good job in saying that scientific evidence is subject to certain standards, and is helpful in pointing out that the standards apply both to *principles* and to the *application* of principles. Second, our "default" position is that we follow the federal model unless we have a strong reason to do otherwise, because it seems to be easier all around if federal and state standards are the same. There is no strong reason *not* to follow the federal lead here. In fact, *Schreck* is generally consistent with *Daubert,* so that even though Colorado has not formally adopted *Daubert,* it has gone in the same general direction as *Daubert:* Many of the factors mentioned in *Schreck* are also mentioned in *Daubert,* and both decisions leave room for courts to consider factors other than the ones listed.

If we adopt the federal language without an explanatory Note, people will think we've adopted the federal law that goes with it. The federal ACN to will reinforce this notion because it says FRE 702 was "amended in response to *Daubert"* and "the many cases applying *Daubert,* including *Kumho Tire."* I don't think we should just adopt *Daubert* and *Kumho Tire,* and the federal decisions applying and interpreting those cases. The main reason is that Colorado has a robust, elaborate, carefully considered body of law on this subject. Also, on a matter of this importance where we can expect considerable growth and change over time as more and more science is offered and must be appraised, we shouldn't tie Colorado courts to a body of law evolving elsewhere. The Colorado

standard is not *Daubert* as such, but rather "the *Schreck* standard" or a "CRE 702 standard." Indeed, there are so many differences between the way *Daubert* and *Schreck* describe what they're doing that it would be surprising if the two cases always led to the same result.[1] Still, the decisions are so similar that they probably produce the same result most of the time, and they are so broadly formulated that both are consistent with the new language in FRE 702.

I want to make four more comments about FRE 702:

(1) New subdivision (1) has less to do with *Schreck* or *Daubert* than with foundation: Has the expert considered enough information to support the conclusion to be offered? Adding this language doesn't really "codify the scientific evidence standard," but it does clarify a point that is already stated, but only obscurely, in Rules 702 and 703. FRE 702 (before and after amendment) says expert testimony reflecting "scientific, technical" or "specialized" knowledge must "assist the trier of fact," and FRE 703 says the "facts or data" may be made known to the expert "at or before" trial and "need not be admissible" if they are "of a type reasonably relied upon." These clauses at least *imply* that there must be an adequate basis, particularly since the 702 language has been read as requiring "validity" or "reliability." The ACN to FRE 702 says there is "some confusion" over the "relationship" between FRE 702 and 703, that the amendment "makes clear" that FRE 702 covers this point, and that the question

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[1] In *Daubert,* the Court endorsed a three-part standard: The proof must be valid science, must fit the case, and may nevertheless be excluded if it is too prejudicial, confusing, or misleading in comparison with probative worth. "Validity" is the central element, to be determined by considering many things, including testability, peer review, error rates, standards, general acceptance. See *Daubert v. Merrell Dow Pharmaceuticals, Inc.,* 509 U.S. 579 (1993). In *Schreck,* the Colorado Supreme Court endorsed a different three-part standard, in which courts are to consider the reliability of the scientific principles, the qualifications of the witness, and the usefulness of the testimony to the jury. "Reliability" is the central element, to be determined in "the totality of the circumstances," and courts "may, but need not, consider any or all" of the following factors: (1) whether the technique can be and has been tested, (2) known or potential rates of error, (3) whether the theory or technique has been subjected to peer review and publication, (4) the existence or nonexistence of standards applicable to the technique, (5) the degree of acceptance of the technique in the relevant scientific community, (6) the relationship of the technique to better established techniques, (7) the existence and extent of specialized literature dealing with the technique, (8) nonjudicial uses for the technique, (9) frequency and types of error generated by the technique, (10) whether such evidence has been used in other cases, (11) other factors that may be reliable in assessing reliability. See People v. Schreck, 22 P.3d 68, 77-78 (Colo. 2001).

of basis "cannot be divorced from" the question of admissibility. This clarifying provision is just as useful in Colorado as in the federal system.

(2) Subdivisions (2) and (3) embody the two central points of *Daubert* and *Schreck,* which are that *the principles* and *the application of the principles* must be valid. In *Daubert,* the US Supreme Court expressly said the validity standard requires a court to determine whether "the reasoning or methodology" is valid and whether it "properly can be applied to the facts in issue." *Schreck* doesn't draw this distinction as sharply, and usually refers simply to "scientific evidence." Still, *Schreck* recognizes that the standard applies to "scientific principles" and the "techniques" deployed, and the opinion mostly focuses on the latter. So both *Daubert* and *Schreck* ask trial courts to scrutinize underlying principles and their application.

(3) The amendment is unclear on one significant point, leaving room for Colorado courts to make their own choice. I'm referring to the "protocol" question: Who decides whether the people who performed the steps in a laboratory process did them right or made mistakes? Amended Rule 702 says the witness must "appl[y] the principles and methods reliably." The federal ACN comments that the court must "scrutinize not only the principles and methods, . . . but also whether those principles and methods have been properly applied," and the ACN also says it is important that the "application be conducted reliably." These words can be read to mean that the court is to decide the protocol question as a matter affecting admissibility, but this conclusion is less than compelling, and there is room to go the other way.

Most courts say the protocol question affects "weight" rather than admissibility, which would mean it is for the jury rather than the court to determine, and Colorado may be in this camp. To be specific, most courts would say in a DNA case that the judge decides whether the theory or principle of genetic identity is valid and whether a particular way of measuring (for instance) "restriction fragment length polymorphisms" (RFLP) is valid, but a protocol error by a technician (like not changing gloves between each step in the process) affects weight. *Schreck* comments that courts applying *Frye* sometimes say that not only "theory" and "technique" must be valid, but that there is "a third requirement," which is that "actual testing procedures [be] employed properly." In an earlier case applying *Frye,* however, the Colorado Supreme Court said these issues affect weight, not admissibility. See *Fishback v. People,* 851 P.2d 884, 893 (Colo. 1993) (noting concerns on question whether techniques of FRLP analysis "were properly performed in a particular case," and commenting that such concerns "go to the weight, and not the admissibility, of DNA typing evidence").

I personally think courts should decide this point as an issue affecting admissibility. Since *Schreck* moved Colorado away from *Frye* to the new "702 standard," perhaps the Colorado Court of Appeals or the Supreme Court will in

the future address the question whether *Fishback* is still the law on this point, but we don't have appellate authority on this point yet.

(4) The amendment doesn't address the standard to be applied on appellate review: Are decisions on admissibility to be reviewed as matters of law (strict or *de novo* determination on appeal), or are they subject to the "clear error" standard, or to the most lenient "abuse-of-discretion" standard? In the federal system, *Kumho* says the latter applies: Trial courts are reviewed for abuse of discretion *both* on the factors that they choose to consider and on the decisions they make in applying those factors. *Schreck* points in the same direction: It favors a "flexible" approach, offers only a "nonexclusive list" of things the trial court "might" consider, and says trial courts "may, but need not" consider the various *Daubert* factors. But I don't think we can be sure yet, in either the state or federal system, that the abuse-of-discretion standard is really going to stick. There are so many reversals in the federal system that it is hard to believe this lenient standard is being applied, and I'm doubtful that it's the right standard. And while *Schreck* endorses a "liberal" standard and uses language endorsing "flexibility," the decision in that case stresses "discretion" only in connection with the trial court's consideration of probative worth versus unfair prejudice under CRE 403. Hence it is not quite so clear in Colorado that "abuse of discretion" is the appellate standard. The important point, however, is that this question is simply not resolved by the amended Rule, which means that Colorado law can evolve in whatever way the Courts of Appeal and Supreme Court may choose.

Why Options 2 and 3 are Less Attractive

Option 2 (simpler change) offers one advantage, which is that everyone would immediately know this is *Colorado* law, not the *federal* rule. And Option 2 is better than Option 3 (no change) because Option 2 at least makes it clear that courts are to decide the validity question, which you wouldn't guess from the language of Rule 702 as it exists today. Even with Option 2, I think we need an Evidence Committee Note, so that people understand that we are not throwing out the law adopted in Colorado by cases like *Schreck*. Option 2 conflates the second and third clauses of Option 1, so Option 2 is less informative than Option 1 (which is better in saying *expressly* that admissibility requires *both* "reliable principles and methods" and that these be "reliably applied"). Finally, Option 2 omits the first clause in Option 1, which is better in expressly incorporating a reference to the requirement that there be sufficient facts or data to support whatever opinion the expert is to give.

Option 3 (no change) is least attractive because it is the least informative language. Nobody would guess, just from reading existing Rule 702, that it embodies a validity standard that applies to scientific evidence. The only thing to be said for Option 3 is if we *don't intend* to change the law, then not changing the

language is usually a pretty good way to go. But there is a *huge* disconnect between what the existing language says and what the law really is, so I don't think the "no change" argument is compelling. We need to change the language just to clarify the situation.

Draft Short Note
Amended Colorado Rule 702
(Separate Formulations for Option 1 and Option 2)

[Draft Short Note for Option 1 (tracking federal changes)]: Amended CRE 702 is identical to FRE 702 as the latter was amended in December 2000. The amendment to CRE 702 clarifies Colorado law rather than changes it. The requirement of sufficient facts or data is implicit in the reliability criterion that was part of pre-amendment CRE 702, and is also implicit in CRE 703, which requires that the facts or data be "of a type reasonably relied upon" by experts in the field. The requirements of reliable principles and methods and reliable application of principles and methods were developed in Colorado cases over many years. See See People v. Schreck, 22 P.3d 68 (Colo. 2001) (in determining admissibility of scientific evidence, courts should determine "reliability" of scientific principles, "qualifications" of the witness and "usefulness" of testimony); Brooks v. People, 975 P.2d 1105, 1113 (Colo. 1991) (to be admissible under FRE 702, specialized knowledge "remains subject to an inquiry regarding validity and reliability"); Schultz v. Wells, 13 P.3d 846, 850 (Colo. App. 2000) (courts determine "reliability and validity" of expert opinion under FRE 702).

[Draft Short Note for Option 2 (simple changes)]: Amended CRE 702 clarifies Colorado law. As amended, CRE 702 adds language requiring that evidence reflecting scientific, technical, or other specialized knowledge rest upon "valid and reliable principles and methods." This new language reflects developments in Colorado cases over many years. See People v. Schreck, 22 P.3d 68 (Colo. 2001) (in determining admissibility of scientific evidence, courts should determine "reliability" of scientific principles, "qualifications" of the witness and "usefulness" of testimony); Brooks v. People, 975 P.2d 1105, 1113 (Colo. 1991) (to be admissible under FRE 702, specialized knowledge "remains subject to an inquiry regarding validity and reliability"); Schultz v. Wells, 13 P.3d 846, 850 (Colo. App. 2000) (courts determine "reliability and validity" of expert opinion under FRE 702).

Draft Extended Note
Amended Colorado Rule 702

[Draft Extended Note for First Paragraph if we Adopt Option 1 (tracking federal changes)]: Amended CRE 702 tracks FRE 702 as the latter was amended in December 2000. For evidence reflecting scientific, technical, or specialized knowledge, amended CRE 702 retains two requirements expressed in the Rule before amendment: Such evidence must "assist the trier of fact" and the witness must be "qualified as an expert." Amended CRE 702 then adds three criteria: The testimony must rest upon "sufficient facts or data"; the testimony must be "the product of reliable principle and methods"; the principles and methods must be "reliably applied." These additions clarify Colorado law. The requirement of sufficient facts or data is implicit in the reliability criterion that was part of pre-amendment CRE 702 and is also implicit in CRE 703, which requires that the facts or data be "of a type reasonably relied upon" by experts in the field. The requirements of reliable principles and methods and reliable application of principles and methods were developed in Colorado cases over many years. See Brooks v. People, 975 P.2d 1105, 1113 (Colo. 1991) (to be admissible under FRE 702, specialized knowledge "remains subject to an inquiry regarding validity and reliability"); Schultz v. Wells, 13 P.3d 846, 850 (Colo. App. 2000) (courts determine "reliability and validity" of expert opinion under FRE 702).

[Draft Extended Note for First Paragraph if we Adopt Option 2 (simple changes)]: For evidence reflecting scientific, technical, or specialized knowledge, amended CRE 702 retains two requirements that were already in the Rule. Such evidence must "assist the trier of fact" and the witness must be "qualified as an expert." Amended CRE 702 then adds that the underlying principles and methods must be valid and reliable. This new language clarifies the law, reflecting principles developed in Colorado cases over many years. See Brooks v. People, 975 P.2d 1105, 1113 (Colo. 1991) (to be admissible under FRE 702, specialized knowledge "remains subject to an inquiry regarding validity and reliability"); Schultz v. Wells, 13 P.3d 846, 850 (Colo. App. 2000) (courts determine "reliability and validity" of expert opinion under FRE 702).

Deciding whether the science is valid and the results are reliable requires trial courts to consider "the totality of the circumstances" and to take into account a "wide range of considerations." In conducting this inquiry, the trial court may "may, but need not, consider any or all" of the following factors: (1) whether the technique can be and has been tested, (2) known or potential rates of error, (3) whether the theory or technique has been subjected to peer review and publication, (4) the existence or nonexistence of standards applicable to the technique, (5) the degree of acceptance of the technique in the relevant scientific community, (6) the relationship of the technique to better established techniques, (7) the existence and extent of specialized literature dealing with the technique, (8) nonjudicial uses for the technique, (9) frequency and types of error generated by the technique, (10) whether such evidence has been used in other cases, (11) other factors that may be reliable in assessing reliability. See People v. Schreck,

22 P.3d 68, 77-78 (Colo. 2001); Schultz v. Wells, 13 P.3d 846, 850 (Colo. App. 2000).

Colorado does not follow the *Frye* standard, which required scientific evidence to be generally accepted in the pertinent scientific community, see Frye v. United States, 293 F. 1013 (D.C. Cir. 1923). Also, Colorado has not adopted the modern federal standard associated with Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993), which requires trial judges to determine the validity of proffered scientific evidence, to determine whether it adequately "fits" the case at hand, and to weigh probative value against any tendency to confuse, mislead, or introduce unfair prejudice into the case. Instead, Colorado follows a "702 standard" under which courts are to determine the validity and reliability of scientific evidence by conducting the broad inquiry outlined in the previous paragraph. See Schultz v. Wells, 13 P.3d 846, 76-77 (Colo. 2001) (rejecting *Frye* as "unsuitable as the sole dispositive standard" and commenting that trial courts "may, but need not, consider the factors listed in *Daubert*" and that FRE 702's "overarching mandate of reliability and relevance" should suffice to exclude any "invalid scientific assertions").

Under the Colorado approach contained in amended FRE 702, a court considering whether to admit evidence reflecting scientific, technical, or specialized knowledge should determine (1) the qualifications of the witness, (2) the usefulness of the evidence to the jury, (3) the reliability and validity of the underlying principles and methods, and (4) the balance of probative worth against risks of confusion of issues, misleading the jury, or unfair prejudice under FRE 403. When these issues are raised, the trial judge resolves them as matters affecting the admissibility of evidence under CRE 103(a), and the trial judge should make specific findings on these points. See People v. Schreck, 22 P.3d 68, 78-79 (Colo. 2001).

[Draft Extended Note Ends here if we Adopt Option 1 (federal changes).]

[Draft Extended Note Includes this Last Paragraph if we Adopt Option 2 (simple changes)]: It should be noted that CRE 702 was identical to FRE 702 until the latter was amended in December 2000, for the purpose of codifying the decisions in Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993), and Kumho Tire Co. v. Carmichael, 526 U.S. 137 (1999). The amendment to CRE 702 is intended to reflect Colorado law as expounded most fully in People v. Schreck, 22 P.3d 68, 78-79 (Colo. 2001). It should be noted that the two Rules are similar, and the standards of the *Schreck* and *Daubert* decisions are similar as well. In both Colorado and the federal system, the trial court acts as "gatekeeper" to keep out evidence reflecting scientific, technical, or specialized knowledge if the underlying science or technique is unreliable; in both systems the trial judge is to conduct a particularized assessment of the evidence; in both systems, the trial

judge may consider all factors that are relevant to these inquiries and is not limited to a particular checklist.

tort action and to the anticipatory declaratory judgment action. The primary purpose in allowing anticipatory declaratory judgment actions in such a context is to enforce a valid insurance contract, when the existence of the policy's duty to defend and indemnify can be resolved as a matter of law. Application of the factors enunciated in *Constitution Associates* is the means by which the trial court determines whether the anticipatory declaratory judgment action should or should not proceed, when the defendant in the underlying tort action is relying on the duty to defend and indemnify under the policy, and when the resolution of these issues affects the plaintiff's ability to realize payment by the insurer on behalf of the defendant for the tort.

[2] After Progressive Casualty filed a summary judgment motion for determination of the household exclusion's legal effect, the trial court issued a one-line order granting Williams's motion for stay of the anticipatory declaratory judgment action. In response to our rule to show cause, Williams has not pointed us to any disputed issues of fact regarding the insurance policy or the underlying tort action as it relates to the insurance policy. Additionally, there is nothing in the record before us to show that the trial court applied the factors enunciated in *Constitution Associates.*

Because it appears from the unrebutted posture of this original proceeding that Progressive Casualty had a proper basis for maintaining its anticipatory declaratory judgment action under the circumstances, the trial court should have proceeded to entertain the legal issues of the insurance contract upon summary judgment. The stay the court issued required the insurance carrier to either continue its defense of a person who, it alleged, had no legal basis for requiring it to defend, or, in the alternative, to discontinue the defense and risk a suit for bad faith refusal to defend. Hence, without making the appropriate findings, the trial court abused its discretion in staying the insurer's anticipatory declaratory judgment action until completion of the underlying negligence action.

Accordingly, we make the rule absolute and return this case to the trial court for application of the standards set forth in *Constitution Associates.*[4]

4. We express no opinion as to the outcome of the trial court's *Constitution Associates* analysis.

In re the PEOPLE of the State of Colorado, Plaintiff,

v.

Michael Eugene SHRECK, Defendant.

No. 00SA105.

Supreme Court of Colorado, En Banc.

April 23, 2001.

As Modified May 14, 2001.

Defendant in prosecution for sexual assault and other offenses moved to bar admission of certain DNA evidence. The District Court, Boulder County, Daniel C. Hale, J., granted motion. State initiated original proceeding for relief from order. Issuing rule to show cause why order should not be vacated, the Supreme Court, Rice, J., held that: (1) as matter of first impression, DNA evidence derived from polymerase chain reaction (PCR) testing, and specifically such evidence when derived from short tandem repeats (STR) systems, is sufficiently reliable for admission under governing evidence rule; (2) DNA evidence derived from PCR testing using sixplex and nineplex STR systems was admissible; (3) evidence rule applicable to expert testimony, rather than *Frye* test, represents appropriate standard for determining admissibility of scientific evidence, abrogating *People v. Anderson,* 637 P.2d 354; *Lindsey v. People,* 892 P.2d 281; *Fishback v. People,* 851 P.2d 884; *People v. Hampton,* 746 P.2d 947; *Campbell v. People,* 814 P.2d 1; (4) focus of inquiry under that rule should be

on reliability and relevance; (5) trial court may, but need not, consider factors listed in *Daubert* in determining reliability; and (6) trial court must issue specific findings on the record as to helpfulness and reliability of proffered scientific evidence.

Rule made absolute.

1. Courts ⇐207.1

Relief from trial court order barring admission of certain DNA evidence in prosecution for sexual assault and other offenses was appropriate under rule governing Supreme Court's original jurisdiction to issue writs; prosecution's ability to present its case has been impaired by that order, no other adequate remedy existed because double jeopardy would bar a retrial if the defendant were acquitted, and exclusion of evidence in question was abuse of discretion. U.S.C.A. Const.Amend. 5; Rules App.Proc., Rule 21.

2. Criminal Law ⇐472

Evidence rule applicable to expert testimony, rather than *Frye* test, represents the appropriate standard for determining the admissibility of scientific evidence; abrogating *People v. Anderson*, 637 P.2d 354; *Lindsey v. People*, 892 P.2d 281; *Fishback v. People*, 851 P.2d 884; *People v. Hampton*, 746 P.2d 947; *Campbell v. People*, 814 P.2d 1. Rules of Evid., Rule 702.

3. Criminal Law ⇐472

Focus of inquiry into admissibility of proffered scientific evidence under evidence rule relating to expert testimony is whether the evidence is both reliable and relevant. Rules of Evid., Rule 702.

4. Criminal Law ⇐472, 478(1)

In determining whether profferred scientific evidence is reliable under evidence rule governing expert testimony, a trial court should consider (1) whether the scientific principles as to which the witness is testifying are reasonably reliable, and (2) whether the witness is qualified to opine on such matters. Rules of Evid., Rule 702.

5. Criminal Law ⇐472

In determining whether proffered scientific evidence is relevant under evidence rule governing expert testimony, a trial court should consider whether the testimony would be useful to the jury. Rules of Evid., Rule 702.

6. Criminal Law ⇐472

A trial court's reliability inquiry under evidence rule governing admissibility of expert testimony as to scientific knowledge should be broad in nature and consider the totality of the circumstances of each specific case. Rules of Evid., Rule 702.

7. Criminal Law ⇐472

Reliability inquiry under evidence rule governing admission of expert testimony as to scientific knowledge contemplates a wide range of considerations that may be pertinent to the evidence at issue. Rules of Evid., Rule 702.

8. Criminal Law ⇐472

In determining reliability of proffered scientific evidence under rule governing expert testimony, trial court may, but need not, consider factors mentioned in *Daubert*, depending on the totality of the circumstances of a given case; trial court may also consider other factors to the extent that it finds them helpful in determining reliability of proffered evidence. Rules of Evid., Rule 702.

9. Criminal Law ⇐472

A trial court, in applying evidence rule relating to expert testimony to determine admissibility of proffered scientific evidence, must also apply its discretionary authority under separate rule to ensure that the probative value of the evidence is not substantially outweighed by unfair prejudice. Rules of Evid., Rules 403, 702.

10. Criminal Law ⇐695.5, 1086.11

A trial court's decision as to admissibility of proffered scientific evidence under evidence rule governing expert testimony must be based upon specific findings on the record as to the helpfulness and reliability of the evidence proffered. Rules of Evid., Rule 702.

11. Criminal Law ⇐475.2(3)

DNA evidence derived from testing based on polymerase chain reaction (PCR)

process, and specifically such evidence derived from the short tandem repeats (STR) method, is sufficiently reliable for admissibility under evidence rule governing expert testimony. Rules of Evid., Rule 702.

12. Criminal Law ⇐475.2(3)

DNA evidence derived from polymerase chain reaction (PCR) testing using sixplex and nineplex short tandem repeats (STR) system was sufficiently reliable, under evidence rule relating to expert testimony, for admission in prosecution for sexual assault and other offenses; multiplex systems were generally reliable, questions as to reliability of a specific type of multiplex kit went to weight rather than admissibility, and specific multiplex kits used in present case had been deemed reliable by other courts. Rules of Evid., Rule 702.

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Justice RICE delivered the Opinion of the Court.

The prosecution in this case initiated this original proceeding pursuant to C.A.R. 21, seeking relief from a trial court order granting the defendant's motion to bar DNA evidence. The trial court held that under *Frye v. United States*, 293 F. 1013, 1014 (D.C.Cir. 1923), the multiplex technique employed by the commercial testing kits used by the Colorado Bureau of Investigation ("CBI") in 1999 was not yet generally accepted at that time by the relevant scientific community. Thus, the trial court ruled that the DNA evidence at issue in this case, which was derived from those kits, was not admissible against the defendant. We issued a rule to show cause why the trial court's order should not be vacated, and the defendant responded.

We now hold that CRE 702, rather than *Frye*, governs a trial court's determination as to whether scientific or other expert testimony should be admitted. Such an inquiry should focus on the reliability and relevance of the proffered evidence and requires a determination as to (1) the reliability of the scientific principles, (2) the qualifications of the witness, and (3) the usefulness of the testimony to the jury. We also hold that when a trial court applies CRE 702 to determine the reliability of scientific evidence, its inquiry should be broad in nature and consider the totality of the circumstances of each specific case. In doing so, a trial court may consider a wide range of factors pertinent to the case at bar. The factors mentioned in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 593–94, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993), and by other courts may or may not be pertinent, and thus are not necessary to every CRE 702 inquiry. In light of this liberal inquiry, a trial court should also apply its discretionary authority under CRE 403 to ensure that the probative value of the evidence is not substantially outweighed by unfair prejudice. Finally, we hold that under CRE 702, a trial court must issue specific findings as it applies the CRE 702 and 403 analyses.

We further hold that under CRE 702, the multiplex testing techniques at issue in this case were sufficiently reliable to warrant admission of the DNA evidence derived from their use. Accordingly, we make the rule absolute and direct the trial court to vacate its order barring such evidence.

I. SCIENTIFIC BACKGROUND

We described the scientific principles and techniques underlying DNA typing in *Fishback v. People*, 851 P.2d 884, 885 (Colo.1993). We now review those principles and techniques in the context of the particular method of DNA typing at issue in this case.

Within the nucleus of each human cell are twenty-three pairs of chromosomes composed of deoxyribonucleic acid ("DNA"), which contains the coded information that

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provides the genetic material determining the physical structure and characteristics for each individual. No two individuals, except identical twins, have the same DNA structure. A DNA molecule is shaped like a double helix, which resembles a twisted ladder. The sides of the ladder are composed of phosphate and sugar molecules and the rungs are composed of a pair of organic compounds called bases. Two bases form a single rung called a base pair. The order in which these base pairs appear in the ladder is the genetic code of that individual. There are approximately three billion base pairs in a human being, 99% of which are the same in each person. However, certain sections of DNA vary from person to person. These areas are called polymorphisms. DNA typing concerns the examination of two types of polymorphisms: length and sequence.

One method of detecting and measuring length variations is called restriction fragment length polymorphism ("RFLP") analysis. The RFLP procedure isolates DNA in a blood sample so that certain polymorphisms can be located in the DNA. RFLP is a widely accepted and scientifically validated method of testing that has generally been found to be admissible in state and federal courts. *United States v. Hicks*, 103 F.3d 837, 846–47 (9th Cir.1996); *United States v. Chischilly*, 30 F.3d 1144, 1153–56 (9th Cir.1994); *United States v. Lowe*, 954 F.Supp. 401, 416 (D.Mass.1996); *Fishback*, 851 P.2d at 893.

Polymerase chain reaction ("PCR") is a process by which DNA fragments too small to be suitable for RFLP analysis can be analyzed. Under the PCR process, these DNA fragments are duplicated many times, thus allowing very small samples to be accurately tested. PCR also permits testing in a relatively short time in comparison to prior methods that required the decay of radioactive materials. Finally, unlike RFLP testing, which destroys the sample, PCR processing allows a technician to reproduce and verify test results by creating a larger sample for testing.

The D1S80 test is a hybrid of the PCR and RFLP methods. It detects fragment length polymorphisms once the DNA fragment has been amplified through the PCR procedure.

Another form of PCR testing involves the use of locations on the DNA strand containing short tandem repeats ("STR") of baseline patterns. STR testing reveals length differences between chromosomes on different people with the same base pair sequences. There are thirteen locations at which the number of STRs are known to vary from person to person. Thus, if all thirteen locations of the known and questioned sample are identical, a match is considered to have been made.

When STR loci are amplified through the PCR process separately and run on a separate gel, the system is called "monoplex." Multiplex systems add more than one set of PCR primers to a reaction so as to be able to amplify several loci together and run them simultaneously. Monoplex systems and multiplex systems that amplify and run three loci simultaneously, ("triplex"), have been in use for many years.

The commercial kits used to perform the STR testing at issue in this case were manufactured by Perkins Elmer Biosystems ("PE"). These kits, called AmpFLSTR Profiler Plus ("Profiler Plus") and AmpFLSTR Cofiler ("Cofiler"), employ a combination six-plex and nine-plex system that is able to read all thirteen locations at the same time.[1] In January 1999, when they were used in this case, the kits were relatively new to the market.

II. FACTS AND PROCEDURAL HISTORY

The defendant in this case has been in and out of jail since 1983. In April 1990, he was on parole and living in the Boulder area when a University of Colorado student was sexually assaulted. Although a rape kit was used on the victim, the crime was never solved. In 1998, the case was reopened and the CBI performed a DNA analysis using

1. The Profiler Plus kit reads nine loci while the Cofiler kit reads six loci, two of which are also read by the Profiler Plus kit.

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several PCR-based tests on the rape kit samples. A 1991 blood sample from the defendant was analyzed against the rape kit results. The CBI concluded that the probability that the contributor to the rape kit sample was not the defendant was one in 11,000. An analysis of a new blood sample from the defendant revealed identical results.

Several months later, the CBI performed more tests on the samples, this time using the Profiler Plus and Cofiler kits. By combining the Profiler Plus and Cofiler results with the earlier tests, the CBI determined that the defendant could not be excluded as a contributor to the rape kit sample. The CBI also determined that the probability that the contributor was not the defendant but a random third person was one in 5.3 quadrillion.[2] Based on the DNA results, a positive photo line-up identification by the victim, and the fact that the defendant had been on parole and living in the area at the time of the crime, the defendant was arrested and charged with second degree kidnapping, two counts of sexual assault in the first degree, two counts of criminal attempt to commit murder in the first degree, assault in the second degree, and as a habitual criminal.

The defendant moved to bar the use of the DNA evidence at trial on the grounds that (1) PCR and the PCR-based tests employed in this case were not generally accepted as reliable by the relevant scientific community; (2) STR tests in general and the STR multiplex technique employed by the Profiler Plus and Cofiler kits were not generally accepted; and (3) the methods of collection, preservation and handling of the samples, and the statistical methods used to determine the probability of a match were not generally accepted.

Applying the *Frye* standard as adopted in Colorado by *People v. Anderson*, 637 P.2d 354, 358 (Colo.1981), and as explained in *Lindsey v. People*, 892 P.2d 281, 288–89 (Colo.1995), and *Fishback v. People*, 851 P.2d 884, 890 (Colo.1993), the trial court held that admissibility of the DNA evidence at issue required a showing that the technologies and methods used were generally accepted in the relevant scientific community. After reviewing the evidence, rulings from other jurisdictions, and scientific commentary and journals, the trial court concluded that PCR and the PCR-based tests used in this case, as well as the handling and statistical methods used, were generally accepted in the scientific community. The court also concluded that although PCR-based STR testing is different from other PCR-based tests, it is generally accepted as to monoplex and triplex applications.

The court, however, ruled that because the multiplex system at issue in this case involves a combination nineplex and sixplex system using new loci and primers, it differs from previous STR tests in a critical way, thus triggering a new *Frye* analysis. The trial court determined that the evidence of validation and peer review offered by the prosecution failed to meet guidelines published by the Technical Working Group on DNA Analysis Methods ("TWGDAM"). Thus, the court concluded that the multiplex technique employed by the Profiler Plus and Cofiler systems is not generally accepted and that the DNA evidence resulting from its use is therefore inadmissible. Alternatively, the trial court concluded under *Daubert*, that the Profiler Plus and Cofiler systems were not sufficiently reliable under CRE 702 to warrant admission of the DNA evidence derived from their use.

The prosecution petitioned for a writ in the nature of prohibition pursuant to C.A.R. 21. We issued a rule to show cause why the trial court's order should not be vacated, and the defendant responded. We now hold that CRE 702 governs a trial court's determination as to whether scientific evidence should be admitted. Under CRE 702, we hold that the multiplex STR testing techniques at issue in this case are sufficiently reliable and relevant to warrant admission. Accordingly, we make the rule absolute and direct the trial court to vacate its order barring the DNA evidence derived from these tests.

III. ANALYSIS

We have not previously addressed the admissibility of PCR or STR-based DNA test-

2. 5.3 quadrillion = 5,300,000,000,000,000 = 5.3×10^{15}

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ing, or the specific multiplex testing systems at issue here. Thus, this case presents us with the opportunity to address these matters of first impression. In doing so, we consider the appropriate standard governing the admissibility of scientific evidence. Our review includes an analysis of relevant Colorado case law, similar cases in other jurisdictions, and academic commentary.

A. Standard of Review

[1] Under C.A.R. 21, we may, in our discretion, grant relief when (1) the trial court is proceeding without or in excess of its jurisdiction, or (2) it has abused its discretion, and (3) when no other adequate remedy exists. C.A.R. 21; *People v. District Court*, 898 P.2d 1058, 1060 (Colo.1995). In this case, the prosecution's ability to present its case has been impaired by the exclusion of the DNA evidence in question. *Id.* Because double jeopardy would bar a retrial if the defendant were acquitted, no other adequate remedy exists. *People v. District Court*, 664 P.2d 247, 251 (Colo.1983). As discussed below, we hold that the trial court erred in finding that the DNA evidence derived from the multiplex STR systems at issue in this case was inadmissible, and that its exclusion of the evidence was an abuse of discretion. Thus, relief under C.A.R. 21 is appropriate here.

B. Admissibility of Scientific Evidence Generally

Prior to 1993, the widely accepted standard for admitting novel scientific evidence in both federal and state courts was the standard articulated in *Frye*. *Daubert*, 509 U.S. at 585, 113 S.Ct. 2786 (noting that, "In the 70 years since its formulation in the *Frye* case, the 'general acceptance' test has been the dominant standard for determining the admissibility of novel scientific evidence at trial."). This standard requires that "the thing from which [expert testimony is deduced] be sufficiently established to have gained general acceptance in the particular field to which it belongs." *Frye*, 293 F. at 1014. Applying this standard, the *Frye* court concluded that the systolic blood pressure deception test had not yet gained enough recognition among scientific authorities to warrant admission of its results. *Id.*

Most courts have interpreted *Frye* as requiring general acceptance of both (1) the underlying theory supporting the scientific conclusion and, (2) the techniques and experiments employing that theory.[3] The court in *People v. Castro*, 144 Misc.2d 956, 545 N.Y.S.2d 985, 986 (N.Y.Sup.Ct.1989), however, held that a third requirement should apply in the complex area of DNA identification: that the actual testing procedures employed properly apply the accepted scientific techniques in analyzing the forensic samples at issue. Other courts have held that questions concerning testing procedures and the accuracy of particular test results go to the weight, rather than admissibility of the evidence. *See, e.g., Chischilly*, 30 F.3d at 1154; *United States v. Bonds*, 12 F.3d 540, 563 (6th Cir.1993); *United States v. Shea*, 957 F.Supp. 331, 341 (D.N.H.1997), *aff'd*, 159 F.3d 37 (1st Cir.1998).

In 1993, the United States Supreme Court held in *Daubert v. Merrell Dow Pharmaceuticals, Inc.* that *Frye*'s general acceptance test had been superseded by the adoption of Federal Rule of Evidence 702.[4] 509 U.S. at 587, 113 S.Ct. 2786. The Court reasoned that *Frye*'s "rigid general acceptance requirement is at odds with the liberal thrust of the Federal Rules and their general approach of relaxing the traditional barriers to opinion testimony." *Id.* at 588, 113 S.Ct. 2786. The *Daubert* Court held that admissi-

3. *United States v. Yee*, 134 F.R.D. 161, 194 (N.D.Ohio 1991); *Fishback*, 851 P.2d at 891; *State v. Vandebogart*, 136 N.H. 365, 616 A.2d 483, 490 (1992); *State v. Ford*, 301 S.C. 485, 392 S.E.2d 781, 783 (1990).

4. Federal Rule of Evidence 702 provides: "If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise." Fed. R.Evid. 702 (amended Dec. 2000 to add: "a witness qualified ... may testify ... if (1) testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.").

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bility of scientific evidence under the Federal Rules of Evidence requires that the trial judge ensure that the evidence be both relevant and reliable. *Id.* at 589, 113 S.Ct. 2786. The Court thus held that under Rule 702, the reasoning or methodology underlying the testimony must be scientifically valid, and that such reasoning or methodology may properly be applied to the facts of the case. *Id.* at 592, 113 S.Ct. 2786. The Court then set forth a non-exclusive list of factors, including general acceptance, to guide a trial court in making this determination. *Id.* at 593–94, 113 S.Ct. 2786. The Court concluded its analysis by noting that the "inquiry envisioned by Rule 702 is . . . a flexible one," and that the focus of the inquiry should be scientific validity as it pertains to evidentiary relevance and reliability. *Id.* at 594, 113 S.Ct. 2786.

Recently, the United States Supreme Court expanded *Daubert*'s general holding concerning the trial judge's gatekeeping function to testimony based not only on scientific knowledge, but also to testimony based on technical and "other specialized" knowledge. *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 142, 119 S.Ct. 1167, 143 L.Ed.2d 238 (1999). The Court stressed, however, that the inquiry was a flexible one, and held that the factors listed in *Daubert* were neither exclusive nor mandatory. *Id.*

C. Admissibility of Scientific Evidence in Colorado

Before reaching the relative merits of *Frye* and Rule 702 for determining the admissibility of scientific evidence, we review our previous treatment of these standards in Colorado. The *Frye* standard was first adopted in Colorado in *People v. Anderson*, 637 P.2d at 358. In *Anderson*, this court held that polygraph results and the testimony of polygraph examiners were per se inadmissible in a criminal trial because the scientific theory or technique of the polygraph was not sufficiently advanced to permit its use at trial as competent evidence of credibility. *Id.*

We limited the applicability of *Frye*, however, in *People v. Hampton*, 746 P.2d 947, 951 (Colo.1987), where we applied CRE 702, rather than *Frye*, to determine the admissibility of rape trauma syndrome evidence. There, we reasoned that *Frye* was only applicable to novel scientific devices and processes involving the manipulation of physical evidence, and that *Frye* had only been applied in Colorado to polygraph tests. *Id.* at 950–51. Thus, we held that CRE 702, rather than *Frye*, governed the admission of testimony regarding rape trauma syndrome. *Id.*

Similarly, in *Campbell v. People*, 814 P.2d 1, 7 (Colo.1991), we applied CRE 702, rather than *Frye*, in determining whether eyewitness identification evidence should be admitted. In that case, we explicitly held that *Frye* was only applicable to cases involving novel scientific devices or processes involving the evaluation of physical evidence. *Id.* at 8. Because no such scientific device or process was at issue in *Campbell*, we held that CRE 702's more liberal standard for admissibility should have been applied to the eyewitness identification evidence. *Id.*

We first addressed the admissibility of DNA evidence in Colorado in *Fishback v. People*, where we held that DNA evidence, unlike the evidence at issue in *Hampton* and *Campbell*, is "precisely the sort of scientific evidence which requires application of the *Frye* test." 851 P.2d at 890. In concluding that the *Frye* test governed our inquiry, we reasoned that the highly technical and sophisticated techniques involved in DNA typing, and its relative novelty at the time, qualified it as "a novel scientific process involving the evaluation of physical evidence." *Id.* We also held that general acceptance of both the underlying theory or principle, and of the techniques used to apply that principle was required under *Frye*. *Id.* at 891. Applying this standard, we concluded that the theory underlying DNA typing, the techniques employed in RFLP analysis, and the statistical techniques employed in that case were generally accepted among the relevant scientific communities. *Id.* at 892–93.

In *Lindsey v. People*, we again considered the admissibility of DNA evidence in Colorado courts. 892 P.2d at 281. At issue in that case was the statistical method used to analyze DNA results. *Id.* at 285. Although we acknowledged that the United States Supreme Court had abandoned *Frye*'s general

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acceptance test in *Daubert*, we concluded that we were not bound by *Daubert*'s non-constitutional construction of the Federal Rules of Evidence. *Id.* at 288. Thus, we applied *Frye*, as interpreted in *Fishback*, to hold that the DNA statistical frequency analysis employed in that case was generally accepted. *Id.* at 288–95. In doing so, we noted that general acceptance could be considered broadly to mean accepted in a reasonably inclusive manner, and including a consideration of rulings from other jurisdictions and the general state of science. *Id.* at 289. We expressly declined, however, to evaluate the relative merits of *Frye* and CRE 702 in determining the admissibility of scientific evidence, noting that the issue was not before us in that case. *Id.* at 288.

In *Brooks v. People*, 975 P.2d 1105, 1106 (Colo.1999), we declined to apply either *Frye* or *Daubert* to the determination as to whether testimony on the subject of scent tracking evidence was admissible. In doing so, we reasoned that the evidence in question did not involve the type of scientific devices, processes, or theories that are properly subject to *Frye* scrutiny. *Id.* at 1111–12. We were also unwilling to apply *Daubert* for the first time in that case, because we found that the scent-tracking evidence was experience-based specialized knowledge that was not dependent on scientific explanation, remarking that *Daubert* itself limited its holding to the scientific realm. *Id.* at 1113; *see Daubert*, 509 U.S. at 590 n. 8, 113 S.Ct. 2786. We noted that the decision in *Kumho* applied *Daubert* to technical and other specialized knowledge and that it provided that the *Daubert* factors were not exclusive. However, we opined that it was preferable to avoid debating whether or to what extent *Daubert* was applicable and held instead that CRE 702 and CRE 403 governed our determination as to whether the experience-based knowledge at issue in that case was admissible. *Brooks*, 975 P.2d at 1115.

A review of our previous treatment of *Frye* indicates that we have not fully endorsed its general acceptance standard as the appropriate test for determining the admissibility of scientific evidence in Colorado. After initially adopting *Frye* in the context of *Anderson*, which, like *Frye*, concerned the admissibility of polygraph evidence, we later limited its applicability in *Hampton*, 746 P.2d at 951, and in *Campbell*, 814 P.2d at 7, to novel scientific devices or processes involving the evaluation of physical evidence.

Although we later applied *Frye* in both *Fishback* and *Lindsey* to determine the admissibility of DNA evidence, we did so without evaluating the relative merits of *Frye* and CRE 702.[5] In *Brooks*, we applied the rules of evidence, specifically Rules 702 and 403, rather than *Daubert* or *Frye* to determine the admissibility of experience-based scent-tracking evidence. 975 P.2d at 1106.

In order to determine whether the DNA evidence derived from the multiplex technique at issue here was properly barred, we must first address the proper standard governing the admissibility of scientific evidence in Colorado. Because we have never addressed the relative merits of *Frye* and CRE 702, we now undertake that analysis in an effort to clearly set forth the standard for admitting scientific evidence in Colorado.[6]

5. In *Fishback*, we noted that the parties did not seriously dispute the applicability of *Frye* in determining the admissibility of DNA typing evidence. *Fishback*, 851 P.2d at 891 (noting also, however, that the notion that *Frye* was superceded by CRE 702 lacked merit because CRE 702 became effective in January 1980 and we adopted *Frye* in *Anderson*, which was decided in November 1981). Similarly, in *Lindsey*, we expressly stated that, "We do not consider the relative merits of the *Frye* test or our corollary state rules of evidence for the simple reason [that] the issue is not now before us." *Lindsey*, 892 P.2d at 288–89 (noting also that *Frye*'s general acceptance test is "not far removed from evaluation required under FRE 702" in that under CRE 702, a court must still screen the evidence to ensure its reliability, which may include consideration of the evidence's general acceptance).

6. In the absence of such a clear standard, the trial court below applied both a *Frye* and a *Daubert* analysis in determining the admissibility of the DNA evidence at issue. *See Fishback*, 851 P.2d at 896 (Mullarkey, J., concurring in the result only) (noting that, in light of the trial court's analysis under both *Frye* and CRE 702, "the time has come for this court to set forth clearly the standard by which novel scientific evidence should be assessed").

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Proponents of *Frye*'s general acceptance test argue that it insulates juries from unreliable evidence that has not yet been found reliable by a sufficient number of experts. Joseph G. Petrosinelli, Note, *The Admissibility of DNA Typing: A New Methodology*, 79 Geo. L.J. 313, 317 (1990). Another justification for the *Frye* test is that it provides a method by which courts can assess the reliability of novel scientific expert testimony. *United States v. Downing*, 753 F.2d 1224, 1235 (3d Cir.1985). Finally, proponents of *Frye* also argue that the general acceptance test safeguards against the possible prejudicial effects of testimony based upon questionable scientific evidence. *Id.*

Frye's general acceptance test has also, however, been heavily criticized on several grounds. Lawrence B. Ebert, *Frye after Daubert: The Role of Scientists in Admissibility Issues as Seen through Analysis of the DNA Profiling Cases*, The University of Chicago Law School Rountable, 219 (1993); Petrosinelli, *supra*, at 318; Paul C. Giannelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, a Half-Century Later*, 80 Colum.L.Rev. 1197, 1208–23 (1980). Generally, critics have been concerned with *Frye*'s vagueness and its conservatism. *Downing*, 753 F.2d at 1236.

Commentators have found vagueness and ambiguity under *Frye* in determining, for example, (1) precisely what must be generally accepted, (2) the relevant scientific community, (3) how much agreement constitutes general acceptance, and (4) the extent to which *Frye* applies. Ebert, *supra*, at 225; Petrosinelli, *supra*, at 320; Giannelli, *supra*, at 1208–23. Such ambiguity yields inconsistent results and creates uncertainty in decision-making. *Fishback*, 851 P.2d at 896–97 (Mullarkey, J., concurring in the result only).[7]

Furthermore, while some critics have argued that the *Frye* inquiry is too malleable,[8] others have concluded that the *Frye* standard is too rigid and that it unduly restricts the admission of probative evidence from a jury's consideration. *See, e.g., Downing*, 753 F.2d at 1236–37 (noting that some have argued that under *Frye*, courts may be required to exclude much probative and reliable information from the jury's consideration, thereby unnecessarily impeding the truth-seeking function of litigation); *United States v. Sample*, 378 F.Supp. 44, 53 (E.D.Pa.1974) (noting that general acceptance is a proper requirement for taking judicial notice of scientific facts, but should not be a criterion for the admissibility of scientific evidence); *People v. Leahy*, 8 Cal.4th 587, 34 Cal.Rptr.2d 663, 882 P.2d 321, 330 (1994) (acknowledging that a reliable, readily provable technique could remain unknown and untested by the relevant scientific community, thus delaying its use in the courtroom). We agree that *Frye*'s rigidity may exclude evidence with strong support within the community but that may fall short of "general acceptance" under *Frye*. *Fishback*, 851 P.2d at 897 (Mullarkey, J., concurring in the result only); *Lindsey*, 892 P.2d at 296 (Mullarkey, J., concurring in the result only).

We also find that this rigidity is ill-suited for determining the admissibility of scientific evidence, which, by its nature, is ever-evolving. Under *Frye*, once a scientific principle or discovery becomes generally accepted, it forever remains accepted, despite improvements or other developments in scientific technologies. *Fishback*, 851 P.2d at 897 (Mullarkey, J., concurring in the result only); *Lindsey*, 892 P.2d at 296 (Mullarkey, J., concurring in the result only). Conversely, because it will take time for any scientific technique to become generally accepted, the *Frye* test restricts the admissibility of reliable evidence that may not yet qualify as "generally accepted" under *Frye*. *Brooks*, 975 P.2d at 1112 (noting that *Frye* fails to "address the tough questions that arise on the cutting edge of science, [in that it] requires that the courts wait until science itself determines the validity of the scientific proposition in ques-

7. Courts have found that *Frye*'s ambiguity provides an opportunity to manipulate the terms "scientific community" and "general acceptance" in order to reach a desired result. *Downing*, 753 F.2d at 1236.

8. *Castro*, 545 N.Y.S.2d at 987.

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tion."); *Downing*, 753 F.2d at 1236–37; Petrosinelli, *supra*, at 320 (describing this problem with the *Frye* test as a "cultural lag"). Thus, we conclude that *Frye*'s general acceptance test, particularly when viewed rigidly, is unsuitable as the sole dispositive standard for determining the admissibility of scientific evidence in Colorado.[9]

[2] We therefore hold that the rules of evidence, particularly CRE 702[10] and CRE 403, represent a better standard, because their flexibility is consistent with a liberal approach that considers a wide range of issues. *See Downing*, 753 F.2d at 1237 (noting that the language of Rule 702, the spirit of the rules of evidence, and the problems with applying *Frye* "suggest the appropriateness of a more flexible approach to the admissibility of . . . scientific evidence").

[3–5] The focus of a Rule 702 inquiry is whether the scientific evidence proffered is both reliable and relevant. *Daubert*, 509 U.S. at 589, 113 S.Ct. 2786; *see Brooks*, 975 P.2d at 1114 (holding that under CRE 702, evidence that is reasonably reliable and that will assist the trier of fact should be admitted). In determining whether the evidence is reliable, a trial court should consider (1) whether the scientific principles as to which the witness is testifying are reasonably reliable, and (2) whether the witness is qualified to opine on such matters. *Brooks*, 975 P.2d at 1114. In determining whether the evidence is relevant, a trial court should consider whether the testimony would be useful to the jury. *Id.*

[6] A trial court's reliability inquiry under CRE 702 should be broad in nature and consider the totality of the circumstances of each specific case. *Brooks*, 975 P.2d at 1114 (noting that "the relevant factors applicable to a CRE 702 inquiry will likely vary depending on the particular subject matter at hand"); *Campbell*, 814 P.2d at 7–8 (holding that the trial court retains its broad discretion to evaluate on a case-by-case basis whether the testimony in question would assist the trier of fact to understand the evidence or to determine a fact in issue); *see also Kumho*, 526 U.S. at 150, 119 S.Ct. 1167 (holding that a trial court's gatekeeping inquiry under Rule 702 must be tied to the facts of a particular case).

[7] Given the flexible, fact-specific nature of the inquiry, we decline to mandate that a trial court consider any particular set of factors when making its determination of reliability. Instead, we hold that the CRE 702 inquiry contemplates a wide range of considerations that may be pertinent to the evidence at issue. *Downing*, 753 F.2d at 1238 ("The reliability inquiry that we envision is flexible and may turn on a number of considerations, in contrast to the process of 'nose-counting' that would appear to be compelled by a careful reading of *Frye*.").

By way of illustration, however, we recite here the wide range of issues other courts have considered when making a Rule 702 determination. For example, in *Daubert*, the Court articulated the following nonexclusive list of general observations that a trial court might consider: (1) whether the technique can and has been tested; (2) whether the theory or technique has been subjected to peer review and publication; (3) the scientific technique's known or potential rate of error, and the existence and maintenance of standards controlling the technique's operation; and (4) whether the technique has been generally accepted. 509 U.S. at 593–94, 113 S.Ct. 2786. The Third Circuit has articulated yet other considerations: (1) the relationship of the proffered technique to more established modes of scientific analysis; (2) the existence of specialized literature dealing with the technique; (3) the non-judicial uses to which the technique are put; (4) the frequency and type of error generated by the technique; and (5) whether such evidence has been offered in previous cases to support

9. As discussed above, although our decisions in *Fishback* and *Lindsey* relied on *Frye*'s general acceptance test to determine the admissibility of the DNA evidence at issue in those cases, we did not specifically evaluate the merits of *Frye* in relation to CRE 702. To the extent that these decisions are relied upon to argue that *Frye* is the appropriate standard governing the admissibility of scientific evidence, we disapprove.

10. CRE 702 is identical to the former federal rule of the same number. *See supra* note 4.

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or dispute the merits of a particular scientific procedure. *Downing*, 753 F.2d at 1238–39.

[8] We hold that a trial court making a CRE 702 reliability determination may, but need not consider any or all of these factors, depending on the totality of the circumstances of a given case. A trial court may also consider other factors not listed here, to the extent that it finds them helpful in determining the reliability of the proffered evidence.

Our determination that a trial court may, but need not consider the factors listed in *Daubert* is consistent with the United States Supreme Court's reasoning in *Kumho Tire Co. v. Carmichael*: "[T]he factors identified in *Daubert* may or may not be pertinent in assessing reliability, depending on the nature of the issue, the expert's particular expertise, and the subject of his testimony." 526 U.S. at 150, 119 S.Ct. 1167. The Supreme Court in *Kumho* further held that:

> we can neither rule out, nor rule in, for all cases and for all time the applicability of the factors mentioned in *Daubert*, nor can we now do so for subsets of cases categorized by category of expert or by kind of evidence. Too much depends on the circumstances of the particular case at issue.

Id.[11]

Such reasoning is also consistent with our previous declination to "give any special significance to the *Daubert* factors," in the context of considering evidence we considered to be experience-based specialized knowledge. *Brooks*, 975 P.2d at 1114. In *Brooks*, we held that it was preferable to avoid discussing "whether or to what extent a court should apply the *Daubert* factors," and concluded instead, that the proper focus should be on "whether the evidence is reasonably reliable information that will assist the trier of fact." *Id.*

[9, 10] Any concerns that invalid scientific assertions will be admitted under this liberal standard are assuaged by Rule 702's overarching mandate of reliability and relevance. *See Daubert*, 509 U.S. at 595, 113 S.Ct. 2786. Such concerns are also mitigated by "[v]igorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof." *Id.* at 596, 113 S.Ct. 2786. In addition, a trial court making a CRE 702 determination must apply its discretionary authority under CRE 403 to ensure that the probative value of the evidence is not substantially outweighed by the danger of unfair prejudice, confusion of the issues, undue delay, waste of time, or needless presentation of cumulative evidence. *Id.; Campbell*, 814 P.2d at 8; *Hampton*, 746 P.2d at 951 n. 8. Finally, a trial court's CRE 702 determination must be based upon specific findings on the record as to the helpfulness and reliability of the evidence proffered. *Brooks*, 975 P.2d at 1114; *Campbell*, 814 P.2d at 8. The trial court must also issue specific findings as to its consideration under CRE 403 as to whether the probative value of the evidence is substantially outweighed by its prejudicial effect. *Brooks*, 975 P.2d at 1114; *Campbell*, 814 P.2d at 8.

To summarize, we conclude that CRE 702, rather than *Frye*, represents the appropriate standard for determining the admissibility of scientific evidence.[12] We hold that under this standard, the focus of a trial court's inquiry should be on the reliability and relevance of the scientific evidence, and that such an inquiry requires a determination as to (1) the reliability of the scientific principles; (2) the qualifications of the witness; and (3) the usefulness of the testimony to the jury. We also hold that when a trial court applies CRE 702 to determine the reliability of scientific evidence, its inquiry should be broad in nature and consider the totality of the circumstances of each specific case. In doing so, a

11. Commentators have also criticized *Daubert*'s list of factors for its "amorphous structure, [in that it creates] various laundry lists of factors [that] are combined in arbitrary ways by nonexperts to produce unknown probabilities of accuracy to be balanced against unmeasured prejudices." Ebert, *supra*, at 230.

12. We decline to limit the applicability of CRE 702 to only the *novel* scientific evidence governed previously by *Frye*. Nothing in the text of the rule requires such a limitation, and our holding is consistent with that of the United States Supreme Court in *Daubert*, which expressly applied its holding to all scientific evidence. *Daubert*, 509 U.S. at 593 n. 11, 113 S.Ct. 2786.

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trial court may consider a wide range of factors pertinent to the case at bar. The factors mentioned in *Daubert* and by other courts may or may not be pertinent, and thus are not necessary to every CRE 702 inquiry. In light of this liberal standard, a trial court should also apply its discretionary authority under CRE 403 to ensure that the probative value of the evidence is not substantially outweighed by unfair prejudice. Finally, we hold that under CRE 702, a trial court must issue specific findings as it applies the CRE 702 and 403 analyses.

D. Application of CRE 702 to Evidence at Issue

Having determined that CRE 702 represents the proper standard, we now turn to the issue of whether the evidence derived from the DNA testing techniques at issue in this case is admissible under that standard. The trial court below did not have the benefit of our ruling and instead employed a thorough *Frye* analysis to conclude that the evidence was inadmissible. Alternatively, the trial court applied the *Daubert* factors to reach the same result.[13] Thus, a determination of admissibility under our new standard is required.

Because the record in this case is sufficient for a determination of admissibility under CRE 702, we need not remand the case to the trial court. Instead, we conclude that, under CRE 702's liberal standard for admissibility, the evidence derived from the PE kits at issue here is admissible.

As discussed above, admissibility under CRE 702 is appropriate when (1) the scientific principles at issue are reasonably reliable, (2) the witness is qualified to opine on such principles, and (3) the testimony will be useful to the jury. In this case, the parties do not question the qualification of the witness, nor do they dispute that the evidence will assist the jury. Thus, our main concern is whether the PCR-based multiplex STR system from which the evidence here was derived is sufficiently reliable.

We begin by discussing the admissibility of PCR and STR-based DNA testing, as we have not previously addressed this issue.[14] The majority of courts in other jurisdictions that have considered the issue have held that DNA evidence derived from the PCR testing method satisfies the standards for admissibility under either *Frye* or Rule 702.[15] Indeed, the National Research Council's Committee on Forensic DNA Science has concluded that the molecular technology on which PCR is

13. The trial court analyzed the evidence under the *Daubert* factors without any discussion of CRE 702's reliability or relevance prongs. After a brief discussion of each *Daubert* factor, the trial court concluded that several of them were not met and therefore, the evidence was inadmissible under *Daubert*.

14. The trial court determined, based on the evidence before it, and rulings from other jurisdictions, that DNA evidence derived from PCR-based STR testing is generally accepted under *Frye* and is thus admissible. As discussed below, we agree that such evidence is admissible, but make our determination under CRE 702.

15. *Shea*, 957 F.Supp. at 339 (holding that because PCR is based on sound scientific methods and has been generally accepted in both forensic and non-forensic settings, it readily satisfies Rule 702's reliability requirement); *Harmon v. State*, 908 P.2d 434, 440 (Alaska Ct.App.1995) (holding that under *Frye*, there seems to be little question concerning the scientific acceptance of the theory underlying PCR DNA typing), *overruled on other grounds by, State v. Coon*, 974 P.2d 386, 391 (Alaska 1999); *People v. Wright*, 62 Cal. App.4th 31, 72 Cal.Rptr.2d 246, 250 (1998) (holding that DNA evidence derived from PCR testing was admissible under *Frye*); *People v. Pope*, 284 Ill.App.3d 695, 220 Ill.Dec. 309, 672 N.E.2d 1321, 1327 (1996) (holding that PCR-based methods of DQ typing and polymarker typing for DNA identification are generally accepted under *Frye*); *State v. Hill*, 257 Kan. 774, 895 P.2d 1238, 1247 (1995) (finding no error in the trial court's determination that PCR amplification evidence satisfied *Frye*); *State v. Moore*, 268 Mont. 20, 885 P.2d 457, 475 (1994) (upholding trial court's finding that PCR testing is sufficiently reliable under Rule 702 for forensic purposes), *overruled on other grounds by, State v. Gollehon*, 274 Mont. 116, 906 P.2d 697, 700 (1995); *Watts v. State*, 733 So.2d 214, 223 (Miss. 1999) (holding that PCR testing produces reliable results); *State v. Dishon*, 297 N.J.Super. 254, 687 A.2d 1074, 1086 (1997) (holding that PCR was reliable because it was found to be generally accepted under *Frye*); *People v. Morales*, 227 A.D.2d 648, 643 N.Y.S.2d 217, 219 (1996) (holding that PCR method had gained general acceptance under *Frye*); *Campbell v. State*, 910 S.W.2d 475, 478–79 (Tex.Crim.App.1995) (holding that underlying theory of PCR DNA testing is valid under Rule 702).

based is thoroughly sound, and that the results are highly reproducible when appropriate quality-control methods are followed. *Shea*, 957 F.Supp. at 338–39.

[11] Similarly, as the trial court has acknowledged, the National Institute of Standards and Technology ("NIST") has determined that there are several advantages of using STRs over conventional techniques, and that the use of STRs for genetic mapping and identity testing has become widespread among DNA typing laboratories. John M. Butler & Dennis J. Reeder, *Short Tandem Repeat DNA Internet Database*, http://www.cstl.nist.gov/biotech/strbase/intro.htm. As a result, many courts have found that DNA evidence derived from STR-based testing is admissible either under *Frye*'s general acceptance test or under Rule 702's reliability test.[16] The wide acceptance of PCR and STR testing among scientists and courts in various jurisdictions indicates that the use of such systems in DNA analysis is reliable. Furthermore, the evidence in the record demonstrates that unlike RFLP testing, which destroys the sample, PCR processing allows for easy replication of test results by amplifying the sample. We are therefore convinced that DNA evidence derived from PCR-based testing, and specifically such evidence derived from the STR method is sufficiently reliable under CRE 702 to warrant admission in Colorado.[17]

[12] The evidence at issue in this case was derived from a PCR-based STR multiplex system.[18] Specifically, the Profiler Plus and Cofiler kits at issue here employed a combination sixplex and nineplex system. Having determined that PCR and STR-based testing are reliable under CRE 702, the issue before us now is whether the specific multiplex testing performed in this case is sufficiently reliable under CRE 702 to warrant admission of the evidence derived from their use.

We agree with the trial court's conclusion that, in general, evidence derived from multiplex testing should be admitted. However, we reach this conclusion by applying CRE 702, rather than *Frye*. In doing so, we conclude, based on the scientific evidence presented under the totality of circumstances in this case, that multiplex testing is sufficiently reliable to warrant such admission. Evidence in the record of numerous studies concerning multiplex testing, widespread dissemination of multiplex information, and popular use of multiplex systems supports our conclusion.

According to NIST, multiplex, which involves adding more than one set of PCR primers to the reaction in order to target multiple locations, is an ideal technique for DNA typing because the probability of identical alleles in two individuals decreases with an increase in the number of polymorphic loci examined. Butler, *supra* at *http://www.cstl.nist.gov/biotech/strbase/multiplx.htm*. The NIST website indicates that monoplex and multiplex STRs are used extensively in the forensic field, and the site lists over 900 published articles detailing the use of STRs in population studies, medical research and diagnosis, and in the forensic field.

Indeed, the trial court acknowledged that one advantage to multiplexing is its ability to offer greater discrimination. The trial court also noted that multiplexing requires less material, fewer tests and thus is ideal in the

16. *People v. Allen*, 72 Cal.App.4th 1093, 85 Cal. Rptr.2d 655, 659–60 (1999) (holding that STR testing is generally accepted under *Frye*); *State v. Roth*, 2000 WL 970673, at *2, 2000 Del.Super. LEXIS 219, at *5 (Del.Super.Ct. May 12, 2000) (holding that single-source STR DNA evidence is reliable under *Daubert*); *State v. Rokita*, 316 Ill.App.3d 292, 300, 249 Ill.Dec. 363, 736 N.E.2d 205 (2000) (noting that STR-based testing is now generally accepted in the relevant scientific community); *Commonwealth v. Rosier*, 425 Mass. 807, 685 N.E.2d 739, 743 (1997) (holding that PCR-based tests, including STR, are scientifically valid); *State v. Jackson*, 255 Neb. 68, 582 N.W.2d 317, 325 (1998) (holding that the trial court correctly determined that PCR-based STR DNA testing used in that case was generally accepted).

17. *See Brooks*, 975 P.2d at 1114 (holding that evidence is admissible if it is reasonably reliable and will assist the trier of fact).

18. As discussed above, multiplex systems add more than one set of PCR primers to a reaction so as to be able to amplify and run several loci simultaneously. In contrast, monoplex systems run each STR locus separately.

forensic setting and saves time and money. In addition, because fewer tests are required, the risk of contaminating samples is reduced. While testing multiple loci in one test can be problematic because adding more than one set of PCR primers to a reaction may cause primers for one locus to complex with those of other loci, the reproducibility of test results under this process mitigates this risk. Furthermore, the numerous studies concerning multiplex testing and evidence in the record of widespread dissemination of multiplex information support its reliability.

The record indicates that the prosecution submitted fourteen studies addressing the consistency and reliability of the PE kits and their forensic use. Because the majority of the studies were conducted in foreign countries and because they were published in a book that was not well-known, the trial court concluded that they were not sufficiently peer reviewed. The trial court similarly dismissed a study performed in the United States by a well-respected expert in the field, and another validation study included by PE in its user's manual. The record also indicates that information about the multiplex method had been widely disseminated through numerous poster sessions and symposia. Although the trial court found that this failed to establish validation under strict TWGDAM guidelines and thus indicated no general acceptance under *Frye*, we reach a different conclusion under CRE 702. We find that the evidence in the record of numerous studies concerning multiplex, widespread dissemination of multiplex information, and popular use of multiplex systems indicates that multiplex systems are reliable under CRE 702.

The trial court acknowledged that triplexing, which is a form of multiplexing, is generally accepted. However, it nonetheless held that the sixplex and nineplex systems at issue in this case were not sufficiently validated or peer reviewed, and thus evidence derived from their use was inadmissible. We disagree.

As a preliminary matter, we disapprove of the trial court's distinction between the sixplex and nineplex systems at issue in the present case and other multiplex systems not at issue here that have been widely accepted by the scientific community.[19] Such a fine distinction is not required under CRE 702's liberal standard for admissibility. *See Daubert*, 509 U.S. at 594, 113 S.Ct. 2786 ("The inquiry envisioned by Rule 702 is, we emphasize, a flexible one."); *Bonds*, 12 F.3d at 565 (holding that a Rule 702 inquiry is "a flexible and more lenient test that favors the admission of any scientifically valid expert testimony").

We also conclude that questions as to the reliability of the particular type of multiplex kit go to the weight of the evidence, rather than its admissibility. *State v. Russell*, 125 Wash.2d 24, 882 P.2d 747, 768 (1994) (holding that general acceptance under *Frye* of PCR kit was not required because the kit is simply one tool for carrying out generally accepted PCR methodology); *see also Hicks*, 103 F.3d at 848 (holding that challenges to laboratory protocols used in PCR testing do not weigh against the admissibility of PCR); *Shea*, 957 F.Supp. at 340 (concluding that concerns about handling and quality control procedures affect the weight that should be given to evidence, rather than its admissibility).

Finally, we are persuaded that the multiplex systems at issue in this case are sufficiently reliable by their acceptance by several other courts that have considered the issue. Although our research reveals no appellate court decisions discussing the admissibility of DNA evidence derived from a multiplex system, the parties have submitted copies of several trial court rulings from other jurisdictions that have admitted DNA evidence derived from the very multiplex STR systems at issue here. *State v. Lynch*, No. CR 98–11390 (Ariz.Super.Ct. Aug. 17, 1999) (ruling that Profiler Plus and Cofiler kits were generally accepted under *Frye*); *State v. Hill*, No. 232982 (Cal.Super.Ct. Apr. 18, 2000) (ruling that issue as to whether

19. Indeed, while concluding that only monoplex and triplex STR systems are generally accepted, the trial court noted that the NIST website provides a list of fifty-two validation studies including validations of multiplex STRs, and lists of core STR loci, including monoplex, triplex, tetraplex, quintuplex, pentaplex, and heptaplex loci.

PE kit is generally accepted goes to weight, not admissibility and concluding that evidence derived from such kit is admissible under *Frye*); *State v. Bertsch*, No. 94F07255 (Cal.Super.Ct. Oct. 20, 1999) (ruling that PE multiplex kits were admissible under *Frye's* general acceptance test); *Commonwealth v. Gaynor*, No. 98–0965–0966 (Mass.Super.Ct. Apr. 13, 2000) (ruling that evidence derived from Profiler Plus and Cofiler kits was admissible under *Daubert*); *State v. Dishmon*, No. 99047345 (Minn.Dist. Ct. Mar. 2, 2000) (ruling that evidence derived from Profiler Plus and Cofiler kits was admissible under *Frye*).

For example, a Minnesota District Court found recently in *State v. Dishmon* that evidence obtained using the Profiler Plus and Cofiler kits was admissible. *Dishmon*, No. 99047345, slip op. at 13. That court concluded that because PCR STR typing met the *Frye* test, general acceptance of the specific kits used was not required. *Id.* at 8. In the alternative, the court held that evidence presented in that case indicated that the Profiler Plus and Cofiler kits were generally accepted. *Id.* at 9.

Similarly, a Massachusetts court held recently that evidence derived from the Profiler Plus and Cofiler kits was reliable under *Daubert*. *Gaynor*, No. 98–0965–0966, slip op. at 2. That court reasoned, "Because the more recent testing consists of essentially a refinement in the STR system of analysis, which has been determined to be generally accepted in the scientific community, I find the recent test results to be reliable." *Id.* The court also determined that specific concerns about the Profiler Plus and Cofiler kits themselves were issues of weight, rather than admissibility. *Id.* at 5.

We are aware of only one trial court that has found the evidence derived from the Profiler Plus and Cofiler kits to be inadmissible. The Vermont District Court held in *State v. Pfenning* that evidence derived from the Profiler Plus kit was inadmissible because the kit had not been sufficiently validated or subjected to peer review under *Daubert*. No 57–4–96 (Vt.Dist.Ct. Apr. 6, 2000). Because we have determined that compliance with the *Daubert* factors is not determinative as to the question of admissibility, we are not persuaded by *Pfenning* because its analysis focuses on a particular factor under *Daubert*, holding that the absence of that factor defeats admissibility. *See Kumho*, 526 U.S. at 151, 119 S.Ct. 1167 (noting that, "It might not be surprising in a particular case ... that a claim made by a witness has never been the subject of peer review ...."); *Heller v. Shaw Indus., Inc.*, 167 F.3d 146, 155 (3d Cir.1999) (holding that, given the liberal thrust of the rules of evidence and the flexible nature of the *Daubert* inquiry, published studies on general causation are not required for admission of a medical expert's testimony).

Thus, after considering the totality of the circumstances in this case, we conclude that the evidence derived from the PE sixplex and nineplex STR systems is admissible under CRE 702 because (1) multiplex systems are generally reliable; (2) questions as to the reliability of a specific type of multiplex kit go to the weight of the evidence, rather than its admissibility; and (3) the specific multiplex kits used in this case have been deemed reliable by other courts. We also find that the probative value of the evidence derived from the kits used is not substantially outweighed by the danger of unfair prejudice, confusion of the issues, undue delay, waste of time, or needless presentation of cumulative evidence. Therefore, the evidence at issue here meets the requirements of CRE 403 and should be admitted. Accordingly, we make our rule to show cause absolute and order the trial court to vacate its order barring such evidence.

IV. CONCLUSION

We hold that CRE 702, rather than *Frye*, is the appropriate standard for determining the admissibility of scientific evidence in Colorado. We hold that under this standard, the focus of a trial court's inquiry should be on whether the scientific evidence is reasonably reliable and whether it will assist the trier of fact, and that such an inquiry requires a determination as to (1) the reliability of the scientific principles, (2) the qualifications of the witness, and (3) the usefulness of the testimony to the jury. We also hold that

when a trial court applies CRE 702 to determine the reliability of scientific evidence, its inquiry should be broad in nature and consider the totality of the circumstances of each specific case. In doing so, a trial court may consider a wide range of factors pertinent to the case at bar. The factors mentioned in *Daubert* and by other courts may or may not be pertinent, and thus are not necessary to every CRE 702 inquiry. In light of this liberal standard, a trial court should also apply its discretionary authority under CRE 403 to ensure that the probative value of the evidence is not substantially outweighed by unfair prejudice. Finally, we hold that under CRE 702, a trial court must issue specific findings as it applies the CRE 702 and 403 analyses.

Applying this standard, we hold that DNA evidence derived from PCR-based testing is admissible under CRE 702. Similarly, we hold that evidence derived from STR systems, including STR multiplex systems, is also admissible under CRE 702. Finally, we conclude that the evidence at issue in this case, which was derived from kits employing a combination sixplex and nineplex system, is sufficiently relevant and reliable under CRE 702 to warrant admission. Accordingly, we make our rule to show cause absolute and we order the trial court to vacate its order barring this evidence.