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The "Nuts and Bolts" of Testifying as a Forensic Scientist

When the forensic scientist leaves the laboratory and enters the courtroom anticipating presentation of the results of his long and detailed scientific analysis to a judge and jury, he may be shocked in confronting a defense lawyer not only versed in the skills of the courtroom, but also possessing substantial expertise in the scientific field about which the expert witness is testifying. More and more lawyers are becoming knowledgeable in the varied fields of forensic science. Many have been prosecutors who have "switched sides" and take with them the knowledge that they have gained from professional association with forensic scientists. Others are attending seminars and symposiums or engaging in independent research with the assistance of a retained scientific expert. A review of any professional legal magazine will show a battery of experts in all fields of science for hire. Lawyers are also being encouraged by state and local bar associations to attend continuing education programs.

The purpose of this effort is to guarantee that a client receive an optimal legal defense because attorneys are obligated to represent their clients zealously within the bounds of the law [*1*]. Lawyers who in the past were willing to stipulate to the qualifications of the forensic witness and perhaps, after reviewing his written report, to the accuracy of the procedure and conclusions are now refusing to stipulate and are conducting vigorous examination of the witness not only on the procedure followed and the conclusion reached, but also on his professional qualifications. Lawyers are trained to "not give an inch" where this will guarantee a client his constitutional right to a complete legal defense. Even for those lawyers who lack substantial skills and knowledge, if they can succeed in "rattling the expert" they have taken a step in the direction of providing an optimal defense for their client.

The forensic scientist should see the defense lawyer not as his enemy but as an officer of the court sworn to do the best job possible for his client, regardless of whether the client has retained the lawyer or whether the defense lawyer has been appointed by the court or is a public defender. Just as the lawyer has a job to do in the courtroom, so does the scientist. The job of the forensic expert is only half done after the scientific tests have been done and the written reports have been prepared. The other half is to present the results of the tests in a form that is legally admissible and in a manner that is understandable to the judge and jury. The purpose of this article is to discuss some of the situations a forensic expert will face when in court.

The key to testifying as an expert is to remember that one's trial credibility is being scrutinized. Note that I did not say professional credibility, because, although important, the most important goal any witness can have is to establish his trial credibility. Most

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likely the jury will understand little of the scientific terminology or analysis about which the expert will testify. However, this may by immaterial if they believe that the witness is a professional forensic scientist performing his job in the most efficient manner possible. The following are some suggestions in establishing one's trial credibility.

Maintain Your Composure

While in court, an expert should reflect confidence and assurance that the tests he conducted and the results that he reached were correct. Many lawyers will rattle an expert by suggesting the possibility that other procedures could have been followed or that other results could have occurred with minor variables. I believe it wise to admit possibilities openly but to then counter with testimony that the procedure that was followed and the results that were reached are based on probabilities. A technique used by prepared counsel is to suggest the possibility of error, either in procedure or conclusion. Always admit the possibility of error, but counter with credible assurance that in the case in issue there was no error.

At times you may not be able to make this counterargument without the objection being raised, "The witness is volunteering answers, the question could be answered 'yes' or 'no'." If the judge sustains this objection, you will be required to respond directly to the interrogation either in the affirmative or the negative. However, you will be given the opportunity on redirect to explain your answer. Of course, this assumes that the prosecutor asks questions on redirect that will permit you to fully explain your answer. I have seen many experts, before the trial judge rules on the defense lawyer's motion, promptly explain that because of the nature of the question a negative or affirmative answer would not be accurate. By answering in this manner you have explained to the judge and jury that the nature of the question will not permit a truthful answer without an explanation. Notice that the response suggested places the impossibility of a "yes" or "no" reply on the nature of the question rather than on the inability of the witness. For example, the witness should not say, "I cannot answer that question 'yes' or 'no'."

Another way a witness has to establish his trial credibility is frequent eye contact with the jury or, if the case is tried without veniremen, with the judge. Once a question has been asked by the prosecutor, a slight gyration of the witness chair will have you eye to eye with the most important person or persons in the courtroom. Even on cross-examination, a slight movement of the witness chair may relieve some tension and pressure, particularly if the defense is engaging in what you consider "dirty tricks." Remember, the law permits substantial latitude on cross-examination of witnesses, but it cannot be stretched to the point of being argumentative or rude. Empathic eye contact by the witness with the jury or judge at the point of the improper interrogation may be harmful to the interrogating attorney.

Prove Your Qualifications

Before an expert witness is permitted to give his conclusion or opinion, he must convince the trial judge that as a matter of law he is professionally competent. This is normally a prelude to explaining the results and conclusions reached. While looking at the jury, explain your personal history—where you were born, where you went to high school, college, graduate school, military service, and so forth. Also explain any on-the-job experience received. Do not feel handicapped by a lack of graduate degrees or association in professional organizations; if you have had experience in the military, private industry, or in a police laboratory this should be explained to the jury. If you have recently entered the forensic field, admit the inexperience, but follow the admission with

a record of the persons under whom you have studied and worked or anything else that goes to establish your qualifications. A successful technique frequently employed to undermine the composure of a witness is to make him believe that because he is inexperienced he is not credible or qualified to testify. Any witness who is not confident in himself or his work will be unable to establish his trial credibility with the judge or jury.

Once you have established your qualifications, you will be asked to give your personal opinion as to the quality or quantity of the substance in issue, or any other relevant fact issue essential to the prosecution's case. The law in most states requires the witness to tell what steps were followed and what tests were conducted before giving the results of those tests. However, under the new Federal Rules of Evidence [*2*] an expert witness, after proving his qualifications, can give his results, leaving the defense, on cross-examination, with the option to elicit the steps and procedure followed. Regardless of the practice in your jurisdiction, you should be thoroughly prepared to explain step-by-step how you arrived at your ultimate conclusion.

Testify on the Level of the Jury

Many experts try to dazzle a jury by their use of esoteric scientific terms and procedures. I believe that a jury will be more persuaded by a witness who expresses himself on a level they can understand. This requires some thought before you go into the courtroom. Most professionals are so accustomed to talking to colleagues and other members of their profession that they forget that the public at large is ignorant of their specialized field. You should realize that the average juror has never had anything to do with a laboratory, unless perhaps to have a blood test or urine analysis. It is a foreign field, but one in which they are very interested. Most judges express the opinion that juries take their trial responsibilities very seriously and although at times they appear inattentive, it is probably because of the manner of presentation by the lawyer or the delivery and demeanor of the witness and not because they lack interest in the lawsuit.

The forensic witness should assume that the jury knows nothing of his field of expertise but is nevertheless very interested in learning about his vocation. You should set out to explain your profession and particularly what you did in the case in issue. Tell them how the evidence in question came into your possession. Explain the technique your laboratory uses to insure proper identification and handling of evidence. Describe the place where all evidence is stored and the steps that are taken to avoid contamination or loss. Most jurors have watched enough television to know something about a police laboratory, but they want to know about their local criminal laboratory. A forensic witness who fails to explain the operation of the laboratory in the jurisdiction from which the jury is impaneled misses an important opportunity to establish his trial credibility.

A forensic expert, whenever possible, should refer to metric measurements and calculations in day-to-day terms. A jury appreciates the consideration of a witness who relates millilitres to ounces or centimetres to inches. At times this may be difficult but it will go a long way to proving one's trial credibility. If possible, refer to around-the-house experiences that will facilitate the jury's understanding the techniques used in a laboratory. For example, if the defense attorney suggests the possibility that the laboratory equipment that was used was contaminated, a reply that you are positive that the instruments were not contaminated could be more cogently answered by a retort, "It's contrary to science and everyday experience to use dirty instruments and utensils. Laboratory techniques are much like a kitchen. You wouldn't think to prepare a meal with dirty pots and pans, or serve a meal on soiled plates," This reply is reasonable and demonstrates the illogic of a scientist's conducting complicated experiments only to have the final result be inaccurate because of contaminated instruments.

Review Your Testimony with the Prosecutor

Because of the increasing occurrence of vigorous cross-examination of the forensic expert, it is prudent to review your anticipated testimony with the prosecutor. Unless he is an experienced attorney, he will probably lack sufficient information to assist adequately and fully in establishing your trial credibility. Do not hesitate to offer assistance on the technical testimony which will have to be elicited to convict the defendant. The general practice in most courts requires that a witness be asked preliminary questions directed to proving the witness's qualifications as an expert. The questions are to be answered succinctly, without elaboration. During the prosecution's case in chief (that portion of the trial where the prosecution must prove a prima facie case against the defendant), narrative answers by the witness are not permitted. Thus, unless the prosecutor knows something of your background and experience he will be unable to ask critical preliminary questions directed to your personal and academic background and laboratory experience.

It is even more important that the prosecutor fully understand the laboratory procedure followed in conducting your quantitative or qualitative analysis. You should be candid with the prosecutor. If the quantity or quality of evidence is insufficient to warrant a violation of the criminal statute, he should know this fact before you take the stand. You should also discuss any problems of scientific procedure that you anticipate may arise in the course of cross-examination because once the cross-examination is ended the prosecution has an opportunity on redirect examination to rehabilitate your trial credibility if by chance it has been impeached. Unless there is a full understanding by the prosecutor of not only what you did, but also why you followed a particular procedure, he will be unable to ask the necessary rehabilitation questions that will enable you to give the answers which will restore your credibility. Just as narrative answers are not permitted on direct examination, they are also taboo on redirect. Your opportunity to clarify or further explain laboratory procedures will depend on the correct phrasing of questions on redirect by the prosecutor.

Many prosecutors do not have a regular procedure of pretrial conference with experts, so it may be up to the expert testifying to suggest the conference. Few prosecutors would go to trial without talking to the arresting officer or an eyewitness to the crime. They should afford the forensic expert the same opportunity. If a prosecutor continually refuses the suggested pretrial conference with the forensic witness, maybe an official memorandum from the laboratory supervisor may serve the purpose of letting the prosecutor know the importance of conducting pretrial conferences.

Be a Professional Scientist

Many persons involved in the criminal justice system develop a bias or prejudice against anyone who stands charged with a crime. This can prove disastrous because the defense counsel will attempt to prove that any test or analysis performed and any conclusion held is biased because of the forensic scientist's role in law enforcement. You should testify as an independent, objective witness without motivation or bias. Although your salary may originate from a governmental agency, you should insist that you are not a law enforcement officer. Do not "lose your cool" if the suggestion is made that forensic laboratory procedure is less than proper because of the identity and association of the laboratory with law enforcement personnel. Loss of composure can undermine a witness's credibility.

One possible method of avoiding the appearance of impropriety is to testify that although you are a forensic scientist, working primarily in a criminal investigation labo-

ratory, you are a professional chemist, botanist, pathologist, or whatever. Some other suggestions can also be employed. For example, state how many times you have testified for the defense or been an expert witness in civil litigation. One might also emphasize that the greater portion (perhaps 95%) of the forensic witness's time is spent in the laboratory as an analytic scientist and not testifying for the prosecution.

Another caveat: if the defense attorney ever seeks to talk to you while you are waiting to testify, talk to him. Normally, you have nothing to hide. Furnish him copies of your report, if this has not already been done pursuant to a court order. I remember a personal experience that I was able to use effectively against a witness. During a recess I sought to ask my opponent's expert about his upcoming testimony. He replied, "I am not to talk to you." Where he got this idea I am still curious; however, I was able to ask him on the stand in the presence of the jury of his refusal to talk to me and thereby cast a serious doubt on his professional judgment because of his bias. It would perhaps be advisable to consult with the prosecutor on his procedures in permitting prosecution witnesses to talk to the defense counsel because some have a policy of discouraging such conversations.

Another important technique that a forensic scientist can use in establishing his trial credibility as a professional scientist is to explain the purpose of corroborative scientific tests. If you have conducted a variety of tests to verify the accuracy of your results you would explain the reason for doing so. An able attorney may make it appear that the verification tests are conducted because of the opportunity for error and mistake. Anticipating this, the forensic witness, during the prosecutor's direct examination, should explain that the corroborative tests are performed to eliminate the possibility of error and although the possibility always exists, the continuous process of checking and rechecking of scientific results reduces, if not eliminates, the error factor.

Resort to the Customary Practices of Your Discipline

During cross-examination the defense attorney may insinuate that the procedure followed in analyzing or comparing the questioned evidence was not the most effective method that could have been used. Sometimes because of limitations of time and money a shortcut may have been taken, or a different method may have produced a more conclusive answer. If you or your laboratory follow the routine practice of your scientific discipline, even if that routine practice is not the most effective under the circumstances, the jury is entitled to know this fact [*3*]. The fact that other scientists use the same method and procedures serves to bolster your laboratory procedure. Normally, a prosecutor will ask the witness on direct, "And was that the routine or customary procedure in the field of chemistry?" (or whatever your field is). However, if he does not he may have to interrogate the witness on redirect as to scientific routine in order to demonstrate that the procedure used by the witness is not as unusual or unorthodox as the defense lawyer suggests.

The practice and routine of a particular scientific laboratory is generally not admissible because it is hearsay. Nevertheless, the prosecutor may want to ask, "And is that the routine procedure used by the chemists in the Drug Enforcement Administration or the chemists in the Alcohol, Tobacco, and Firearms laboratory?" If no objection is made, it can be answered and considered by the jury for all purposes. Of course, if an objection is raised and sustained by the trial judge, the witness cannot answer. However, if the tactic of the defense attorney is to suggest irregularity or impropriety in the procedure of the expert testifying he has "opened the door," and on redirect the witness, if asked by the prosecutor, can corroborate the procedure he used with the routine procedure of another forensic or independent laboratory.

Avoid the Use of Personal Notes

The rules of evidence in most jurisdictions give a defense attorney the absolute right to examine any notes that a witness uses to refresh his recollection prior to testifying. Even though the notes may have been left at the office, if they were viewed prior to taking the stand the defense attorney will be entitled to inspect them and use them on cross-examination. Generally, the notes conform with the oral testimony given from the witness stand. However, if there is a variance between the documents and the testimony it could serve to cloud the trial credibility of the forensic witness, besides being very embarrassing. Therefore, be absolutely sure that your trial testimony is in strict conformity with any memorandum that you bring into the courtroom or use to refresh your memory. Also, do not bring notes or laboratory results from other cases to avoid the possibility that the facts about which you have testified pertain to another case of another defendant. Screen the folder that you take to the stand and remove any extraneous documents.

Many forensic experts prepare a prefabricated set of questions and furnish them to the prosecutor to aid him in asking questions. If not reviewed by the witness as an aid to refreshing his recollection and intended solely as a trial aid for the prosecutor, they are considered work product and the defendant's attorney is not entitled to inspect them. However, if the judge does order production, they may be able to be used to the defense attorney's advantage. Therefore, I would suggest that you discuss this procedure with the prosecutor because he may prefer to draft his own questions based on your advice and suggestions. These questions cannot be obtained by the defense because they were prepared by the prosecutor and not by the witness on the stand.

Preserve the Best Evidence

It is advisable to retain in original form the determinative chemicals, samples, or printout sheets that were used to arrive at the conclusion about which you testify. Most forensic laboratories do not retain the original chemical compounds because the compounds deteriorate and no longer have any scientific value, or simple problems of space prevent long-term storage. However, by refusing to produce the best evidence of the analysis you leave yourself open on cross-examination for the attack that the jury or judge should also have an opportunity to examine this most important phase of the criminal process, that is, the determination of the quality and quantity of the evidence.

The law of evidence requires the production of original evidence unless a sufficient explanation is given as to the failure to produce the original. (Federal Rule of Evidence 1002 [*4*] and the state decisions interpreting "the best evidence rule" do not specifically mention chemical compounds used in laboratory testing. The rule normally applies to written documents or photographs.) Normally, an explanation that the original or best evidence has been lost or was destroyed in good faith will be adequate and the judge will permit the next best evidence or secondary evidence [*5*]. If this happens to be the personal opinion or interpretation of the forensic witness, the best evidence rule will have been satisfied. However, as more attorneys begin cross-examining the forensic scientist on the scientific procedure, I anticipate this technique of challenge will be used more frequently. Therefore, I suggest that each laboratory formulate a policy whether to retain or destroy the original material used to arrive at the opinion about which the witness will testify. If the decision is to destroy the best evidence, an adequate explanation must be given to the trial judge. If this is done, most judges will permit the introduction of the next form of best evidence or secondary evidence: the personal interpretation of the forensic witness.

I believe many judges will not excuse the destruction of the original printout sheets

used by many forensic personnel in the operation of laboratory equipment. These printouts can be easily retained in the office folder or evidence packet. There is no risk of deterioration or breakdown. Original photographs used to make comparative examinations should also be retained. An explanation that comparative photographs are not conclusive is not an adequate reason for not producing them. I also predict that some judges may require the production of the comparative chemical samples used by the forensic witness.

These suggestions are by no means exhaustive; however, if they are followed, I believe they will serve to facilitate the prompt and efficient testimony needed in crowded courts. Also, they will operate to establish the professional expertise and trial credibility of the forensic scientist called to testify.

References

[1] Canon of Ethics 7, available from the American Bar Association, Chicago, Ill.
[2] Federal Rule of Evidence 705 (1975), available from West Publishing Co., St. Paul, Minn.
[3] Federal Rule of Evidence 406 (1975), available from West Publishing Co., St. Paul, Minn.
[4] Federal Rule of Evidence 1002 (1975), available from West Publishing Co., St. Paul, Minn.
[5] *People v. Hitch*, 520 P.2d 1974 (Cal. Sup. Ct. 1974)—the prosecution must exercise good faith in preserving the ampoule used in a breathalyzer test.

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