

way, then this suggests a violation of the assumptions. It may be that the alleles were assumed to be independent and they are in fact highly correlated in the database being used. (There are many types of correlations. Many are irrelevant in a particular case. A correlation detected in looking at the distribution of LR's in the database is in a sense the only correlation that matters in the case at hand.) Or there may be an important degree of population substructuring. Indeed, a robust alternative to the usual process (robust at least for large databases) is to assume the average LR in the population is the average in the database and apply Bayes' theorem accordingly. For example, such an approach does not require assuming independence. The only concerns with this alternative are statistical: sampling variability, which is more of a problem for smaller databases, and whether the sample is random. I do not mean to minimize the latter concern: for example, population substructuring is still a problem.

#### EXPERTS AND ADVOCACY: BIASED TESTIMONY

Experts appear in court at the behest of the prosecution or defense. An attorney whose client has been charged in a violent crime in which DNA evidence is introduced wants to find scientists who will refute the evidence. An attorney for the prosecution wants to find scientists who will support the evidence. Sufficiently diligent searches will be successful. Opinions vary in every science. It is possible to find an expert with any given opinion who will testify [see Begley

(1993) for examples]. There are various motivations for experts to testify. Some are laudable: science, common good, protecting individual rights. Some are not: money, notoriety, frequent flyer mileage. In any case, testimony of experts is biased. Judges and juries may know this and so discount expert testimony, but why should a legal system encourage testimony that ought to be discounted?

The searches mentioned above are eased by examining testimony in previous cases. As a result, the same experts tend to testify in case after case. In effect they become advocates, advocates for or against a technology. They—their persona, their thinking, their science—become objects of attack and to defend. Biases become more and more serious. Any semblance of objectivity disappears.

There must be a better way, one with less blatant bias. While this venue is hardly appropriate for recommending revisions in practices of jurisprudence, I will do so anyway: Expert testimony should be evaluated by expert witnesses supplied by the court. Court-appointed experts would be required to listen to the testimony of the prosecution and defense experts. Then they would express their reactions and opinions. They would not be paid but would be obliged to serve, with their service counting as jury duty in the municipality of their residence. If a municipality has no qualified experts, the court would import such from nearby municipalities and reimburse travel expenses. No system is bias-free, but this policy would rid the system of some extreme forms of bias.

## Comment: Theory and Practice in DNA Fingerprinting

Richard Lempert

Throughout her useful paper on DNA identification, Professor Roeder properly attends to both theory and practice. Thus she acknowledges the theoretical soundness of certain criticisms that have been made of the standard paradigm used to evaluate DNA random match probabilities but argues that in practice these criticisms matter little. I am thinking here of the arguments that those cau-

tioning against overwhelming DNA evidence have made regarding the undeniable existence of population substructure and its potential implications for independence assumptions supporting the application of the product rule and for the use of convenience samples, such as data garnered from no more than a few local blood banks, to generate estimated allele frequencies for all Caucasians or African-Americans or Mexican-Americans living in the United States. Like Professor Roeder, I believe that these theoretically sound objections have, to date, been shown to be relatively unimportant in practice.

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