The Experts Speak

THERE ARE STILL a lot of dirt roads in Haywood County, Tennessee. When the rains come, any schoolbuses attempting to negotiate these roads get mired in the mud, so children are often required to walk several miles to the highway in foul weather. Most of the people who live up those dirt roads are black, but until recently the Haywood County Road Commission, which decides which roads to pave, was all white. According to J. Morgan Kousser, professor of history and

social science and an expert on voting rights, this was the result of an at-large voting system designed intentionally to exclude blacks. Kousser's expert testimony in court may have succeeded in changing this state of affairs forever.

"I like to think that I helped somebody at least," says Kousser. "Some poor kid who had to walk two miles out and two miles back in the rain probably will not have to do that much longer because the road commission has been changed."

It was a near thing, though. Three weeks before the start of the trial challenging the at-large voting system, a black person was elected to the city board of Brownsville, Haywood's county seat. The defense, notes Kousser, clearly intended to rely on this fact to argue that at-large voting systems are not inherently biased against minorities. "They said, 'This proves that racial block voting is not so overwhelming. The good white citizens of Haywood County *will* vote for a qualified black person.' But if you do a simple statistical analysis of this particular election, it turns out that there was almost complete racial polarization. It happened that there were two white candidates who split the white vote almost in the middle. The black candidate got virtually all of the black votes and virtually no white votes. I had done an analysis of every election since 1966, when blacks first started running in Haywood County, and I was able to show this statistically. It just blew their minds."

Kousser is just one of many Caltech professors who are courtroom-tested experts. You don't get to be a professor at Caltech unless you're an expert in your field, but if your expertise bears on a matter of public importance, you may be called upon to testify in a court of law. Recently a number of Caltech's most experienced experts agreed to describe their time on the stand. Their reactions range from "It was great fun," to "It was hell."

The latter opinion is held by Robert Grubbs, professor of chemistry and an expert on polymers. For the last 10 years he's been testifying in a series of cases that concern the patent for the catalytic process used to synthesize polypropylene, a plastic material whose manufacture is a multi-billion-dollar international business. At least six chemical companies are arguing over who owns the patent and just what that patent covers, and they've been arguing ever since the process was discovered in 1954.

Although Grubbs finds testifying to be extremely grueling — he recently spent four solid days on the stand, being examined and cross-examined in minute detail — he acknowledges that the experience has been valuable. "It's an interesting endeavor for academics to get involved in," says Grubbs, "because it forces you to face what happens outside your field. For example, I'm astounded now at the value of laboratory notebooks. I was always a miserable notebook keeper, and I just hope that none of the stuff I did as a graduate student ever comes up in a patent." Expert testimony also pays very well, with fees sometimes exceeding $1,000 a day. Despite this seductive incentive Grubbs says that he'll probably discontinue this work once his children finish college.

(The role of Caltech faculty members as expert witnesses is covered by the same rules that regulate outside consulting activities. These rules limit the number of days per year that faculty members can spend on such activities and, among other things, they prohibit the use of Caltech facilities without permission from the division chairman.)

John Roberts, Institute Professor of Chemistry, also worked on the polypropylene case, but the trial he remembers best involved a herbicide whose patent was owned by the pharmaceutical company Eli Lilly. U.S. Borax developed what Lilly regarded as a similar herbicide and Lilly brought suit, alleging patent infringement. Roberts was retained by U.S. Borax, and a friend of his, a chemist from the University of Pennsylvania, was retained by Lilly. His friend went on very early, testifying that it would be perfectly

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obvious to one skilled in the art that the Borax herbicide was a trivial modification of Lilly's. His basis for this statement was that the herbicide's activity could be predicted by an equation developed by Corwin Hansch of Pomona College, which is widely used in correlating biological activity with physical properties.

"Well, that wasn't what we expected," recalls Roberts. "I knew about the Hansch equation, but I hadn't put it to any kind of test. I spent quite a few hours trying to figure out what we could say, because it looked as though this would be a reasonable place to use the equation to predict activities and a lot of the needed data were available on related compounds. In the meantime the trial was going on.

"Finally, the night before I was about to testify — I was to be the last witness — I finished my analysis. The Borax lawyers arranged for me to come on the stand after lunch because they didn't want the other guys to have the lunch hour to plan a cross-examination strategy. I went up on the witness stand, and I showed that if you used the Hansch criteria and actually did the calculations, it predicted that Borax's herbicide would be absolutely no good at all. That really took them by surprise. The plaintiffs asked for a recess but were unable to come up with much to cross-examine me about as the trial ended. The next thing I heard was that the parties had settled out of court, after a long trial and great expense. When they do that, they almost never tell you the details of the settlement. I never knew whether I helped Borax get a better deal or not."

"As scientists we cannot walk out of the courtroom feeling toward the opposing expert witness quite the same way lawyers seem to be able to feel toward opposing lawyers," says Clarence Allen, professor of geology and geophysics.

Not knowing how one's testimony affected the outcome of a case is frustrating, but perhaps more frustrating is to have one's expertise ignored. This happened to several Caltech economists when they testified in a case that hinged on the value of the Boston Celtics professional basketball franchise. As Lance Davis, the Mary Stillman Harkness Professor of Social Science, tells the story, he and two other Caltech economists — James Quirk, professor of economics, and Roger Noll, a former Caltech professor and division chairman — were asked to determine the value of the franchise after a dispute arose involving its sale. Following a thorough study, the economists came up with what they believed was the fair market value of the franchise, and both sides in the case pretty much agreed with this figure. (Davis never actually took the stand, although Quirk did. "It's funny," says Davis, "The defense forgot to qualify Red Auerbach, the general manager of the Celtics, as an expert witness. So Jim Quirk was allowed to testify as an expert in basketball but Red Auerbach wasn't.") But the jury chose to ignore the value determined by the experts, finding that the franchise was worth three times as much.

Another expert who has had his expertise ignored is Thayer Scudder, professor of anthropology. An authority on the impact of forced relocation on rural populations, Scudder has testified both in court and before congressional committees on the long-standing Navajo-Hopi land dispute and Congress's plan to resolve it by uprooting entire Navajo communities. "A program involving forced relocation is a bad program, a bad use of options that shouldn't be followed," says Scudder. "In this particular case Congress estimated that fewer than 3,000 people would be involved. We now know that over 10,000 will be relocated. The original cost estimates were something like $50 million. The actual costs are going to be closer to half a billion dollars. It's caused a lot of upset and stress in northern Arizona with political implications. It's undermined the leadership of the Navajo tribe, because they haven't been able to protect these 10,000 people from being forcibly removed.

"On the basis of a theory I've developed I predicted that Congress had underestimated the numbers of people involved, the financial cost, the general stress, and so on. And, in fact, all of these predictions have unfortunately come true. I testified twice before the Senate Select Committee on Indian Affairs and once on the same issue at the district court. It's about the most nerve-wracking thing you can do. Here we're dealing with social science issues, and usually pol-

iticians think they're experts on those issues and that there is no real social science theory. They don't accept your expertise. And when you're talking about relocation, it's a big problem because politicians are highly educated, highly mobile people. Mobility is part of their lifestyle, so to them forced relocation is no big deal."

Having to establish one's expertise before a sometimes hostile audience is not the only heartache that academics testifying in court are heir to. A misstatement, even of the most innocuous kind, can be so magnified by a clever lawyer as to overshadow all the rest of one's testimony. Grubbs tells a story about an opposing expert who made a minor error in arithmetic on the stand. In cross-examination this error was amplified, and the expert's testimony was completely nullified. This ruined the expert's reputation in the legal community, and no lawyer ever again asked him for a consultation.

David Wood, professor of materials science, was once asked to testify for the plaintiff in a case that involved an articulated chair of the kind used in beauty parlors. It was the sort of a chair whose seat moved forward as the person sitting in it leaned back. The plaintiff in the case tipped over in the chair and broke her arm. "I fell into a trap," recalls Wood. "The question was: Is the design of this chair proper? One of the factors that came into this was the weight of the chair compared to the weight of the person in it. I had not weighed the damn chair. I examined the mechanism but I hadn't weighed it. On cross-examination the defense asked me, 'How heavy is this chair?' I made the mistake of just making a guess. I said, 'Oh, about 20 pounds.' Later the guy that designed it testified that it weighed 40 pounds." The plaintiff's lawyer was able to ameliorate the damage somewhat by picking up the chair with one hand and waving it around so the jury could see that even at 40 pounds it wasn't very heavy, but there's no doubt that Wood's mistake compromised his testimony.

The danger of developing an esprit de corps is another pitfall that several of the Caltech experts warn against. As Clarence Allen, professor of geology and geophysics, puts it, "As time goes on the opponents in the two teams tend to develop more and more of a team spirit, which is not necessarily in the cause of good science or good technology. They come more and more to be convinced that, by God, their team is right and the other team is wrong. Quite often by the time the case is over they think that not only is the other team all wet, but that they're a bunch of unethical bastards. As scientists we cannot walk out of the courtroom feeling toward the opposing expert witnesses quite the way lawyers seem to be able to feel toward opposing lawyers." Allen cites one case in which two opposing experts ended up bitter enemies for life because each felt the other was prostituting himself to the cause.

"I'm a professor because it's fun to be a professor," says Lance Davis, the Mary Stillman Harkness Professor of Social Science. "I like to teach. I like to do research. I like to write articles. I like to write books. I don't like to testify."

Most of the experts interviewed for this article compared the court of law unfavorably with respect to traditional scientific forums. Wood, for example, said, "I think that the adversary system is not good for getting at the truth of technical or engineering questions." And Allen said, "Some of the people I've known who have become very much involved in expert witnessing become a little bit more lawyers than scientists. They enjoy it; it's a lot of fun. But it's not science. We fight scientific controversies in a very different way — in the scientific journals. Whether or not our material is published is based on peer review, and ultimately no one person, like a judge, says 'You are right and you are wrong.'"

But Morgan Kousser believes that the academic forum and the legal arena each have their advantages in terms of producing solid scholarship. He makes this point in a 1984 article entitled "Are Expert Witnesses Whores? Reflections on Objectivity in Scholarship and Expert Witnessing" (*The Public Historian,* **6**:5-19). Says Kousser, "One of the great advantages for objectivity in being an expert witness is that you get cross-examined and somebody listens to it. You usually have some pretty smart lawyer who has a very large incentive to destroy your credibility. And as a consequence you overprepare and

you're overcautious about making blanket statements that you're going to have to backtrack on later. That very often doesn't happen in scholarship. There are so many scholarly journals. The vast majority of papers don't get very tough readings, even by the referees. Very few scholarly papers have all the footnotes checked. It's virtually impossible not to make *some* mistakes, and the number of them is sometimes quite high."

"I think we have obligations as people who are scientists to apply our knowledge to important public policy issues," says Thayer Scudder, professor of anthropology.

And Kousser disagrees with the assertion made by many of Caltech's experts that testifying in court is the most stressful thing that academics can do. "It's not nearly as tough as some academic forums," maintains Kousser. "When I was a first-year graduate student, I had a graduate seminar in which I was on the carpet for two hours with very antagonistic questioning by peers. Nothing has ever been that tough again."

Perhaps this difference in perception has partly to do with an individual's personality. Kousser says that he thrives on the verbal sparring in court, but others enjoy the experience far less. After several bad experiences, Lance Davis has vowed never again to testify in court. "I've discovered over the years that I don't think very quickly on my feet. I'm reasonably good at presenting a case that I've thought about for some time, and I'm reasonably good at answering questions I've thought about for some time, but I'm not so good at answering questions on the spur of the moment that aren't directly related to what I'm talking about. Lawyers are very good at asking questions that you would view as off the wall but that a jury would view as pertinent. In one case, for example, I made a statement and the lawyer asked, 'Well, Professor Davis, is that a speculation?' I thought about this and said, 'It depends what you mean by speculation. If you mean do I know this to be a certain answer, the answer is, hell no, I speculated about it. But if you mean is this the best guess I can make on the basis of 20-years experience as an economist, then it's not speculation.' Now if I could answer like that all the time I might stay in the business, but the trouble is that for every one of those I win I find myself losing on three others. And besides, I just find it terribly wearing, so I've decided that I'm not going to testify again."

Davis believes that academics should think long and hard about their professional responsibilities before doing expert witnessing or, indeed, before doing any outside consulting at all. "The trouble is, you've got a job here," says Davis. "Your job is to do research and to teach students. Except for one publication I've never gained much out of any of my consulting. And that means in some sense that what I'm doing is just trying to earn some extra money. I guess that's a good thing to do, but I also would prefer not to do it at all. I'm a professor because it's fun to be a professor. I like to teach. I like to do research. I like to write articles. I like to write books. I don't like to testify."

Thayer Scudder agrees that it's wrong to be an expert witness just for the money. "The money is never worth it," he says. But he points out that there are other reasons to serve as an expert witness, other reasons aside from earning money or getting publications out of it. Says Scudder, "I think we have obligations as people who are scientists to apply our knowledge to important public policy issues. I deal with issues where I feel a major principle is involved: People shouldn't be forced to leave a home without adequate compensation, without proper mitigation methods. I feel obligated, when called upon, to testify."

And Scudder often refuses any payment other than reimbursement of his expenses for such testimony. Lawyers have ways of discrediting witnesses whether or not they are being paid, however. In cross-examination a lawyer will often ask an expert witness about his fee, and when this often sizable fee is revealed, the lawyer implies that the witness is merely a hired gun who will say anything his employers desire. But a witness who says that he has refused a fee is often branded a biased and fanatical supporter of a cause, a person whose objectivity must necessarily be suspect.

Nowadays virtually any scholar may be asked to serve as an expert witness. A discipline whose subject matter has traditionally been far removed from the concerns of the

public forum may at any time suddenly become relevant. Very few biologists, for example, have served as expert witnesses, but with the growth of the biotechnology industry this is certain to change. And the issue of the teaching of evolution in the public schools, dormant since the Scopes trial of the 1920s, is again in the forefront of the public consciousness. Norman Horowitz, professor of biology emeritus, was tapped several years ago to give testimony in a case brought by a group who believed that so-called "creation science" should be given equal time with evolution science in the California public schools. (Horowitz's scheduled appearance on the stand was canceled at the last moment when the plaintiffs dropped the case as long as evolution was not taught "dogmatically.")

Theoretical physics is even further removed from important public issues than is biology, so it's perhaps surprising to learn that Richard Feynman, the Richard Chace Tolman Professor of Theoretical Physics, once served as an expert witness in a local court case. As it turns out, the case did not depend on Feynman's expertise in quantum electrodynamics, but rather on his expertise in community standards as they relate to topless bars. As he writes in his book *"Surely You're Joking, Mr. Feynman!"* (in the chapter entitled "But is it Art?"), Feynman was a frequent habitué of a topless bar called Gianonni's. "I'd sit in one of the booths and work a little physics on the paper placemats with the scalloped edges. . . . I'd watch the girls dance, do a little physics, prepare a lecture, or draw a little bit."

But Gianonni's was raided, and when the case came to court Gianonni asked his regular customers to testify in his behalf. Fearing for their reputations, all of them refused. All, that is, but Feynman. "I didn't consider myself an expert witness, but the lawyers tried to demonstrate that I was one." In court he testified that he frequented Gianonni's five or six times a week, and that Gianonni's other customers included all segments of the community. Gianonni lost his case, but Feynman's fondness for topless bars made all the newspapers. □ — *RF*