Expert witnesses take the stand

Historians of science can play an important role in US public health litigation.

Robert N. Proctor

Science and the law have never been easy bedfellows. Both rely on evidence and reasoned judgement to arrive at truth, but the methods used and the end results are generally very different. For example, legal proceedings must arrive at a kind of satisfactory closure, but a scientific conclusion is at least theoretically provisional, and open forever to revision.

Experts have been called into court as witnesses for centuries: in France, for example, following Roman law, some of the earliest experts were handwriting analysts, brought in to distinguish genuine from forged signatures. The use of historians in the court, however, is rather new. Science historians are increasingly being asked to serve as expert witnesses, especially in cases of product litigation, where the question is often "who knew what when?" about the nature or extent of a hazard.

Contemporary knowledge

The reason science historians are in demand is that science does not invariably progress in a strictly linear or cumulative fashion. Scientific knowledge is accepted (or ignored) in different ways at different times and places, making it important to establish what was known concretely by specific individuals at a given place and time. It could be of great legal import to know, for example, whether the tobacco aetiology of lung cancer was first recognized in the 1930s or in the 1960s. Such a question is often at the heart of class-action suits seeking compensation for negligence.

Historians of science are particularly adept at making such assessments, especially when the question is how a theory or conviction moved from one community to another, filtered into public consciousness, and was accepted or rejected. In the courtroom, one often needs to provide testimony on when a scientific consensus was achieved, or whether one could have expected the public or a company to be aware of a particular hazard. This could cover such issues as whether a particular hazard (say asbestos or radiation emitted from mobile phones) was widely recognized or sharply contested; whether estimates of the magnitude of that hazard were based on mainstream or marginal ideas; whether steps taken to advertise the hazard were consistent with prevailing practices, and so forth.

I have been employed in three such cases during the past few years, the questions in each being: was it reasonable to have known at such and such a time that a particular substance or procedure was hazardous? And did the people responsible for causing the injury in question act responsibly, given the scientific and ethical standards of the time?

The first was a fairly straightforward class-action suit brought on behalf of 2,800 women from Alberta, Canada, who were forcibly sterilized as part of that province's eugenics legislation, from the late 1920s until the early 1970s. I had originally been asked whether I could evaluate the science behind the legislation; I told the lawyers involved that this was probably not such a good line of comparison, since many other countries had had similar laws, and Alberta in this respect did not seem out of step with other parts of the world. I suggested instead that I might compare the Canadian legislation with the sterilization legislation of Nazi Germany — as Alberta had actually sterilized a higher proportion of its population than the Nazis, which surely would help the defence. I prepared a written testimony for the plaintiffs, who eventually won the case.

The second was the 'Vanderbilt case', a widely publicized class-action suit on behalf of 830 pregnant women who were fed radioactive iron from 1945 to 1947 as part of a 'nutrition experiment' sponsored by the Rockefeller Foundation, the Atomic Energy Commission and Vanderbilt University. The key question here was whether the organizers and administrators of this experiment acted responsibly and in accordance with contemporary ethical standards. The university had already admitted that at least four of the women had given birth to children who had died at an early age from blood cancers, a rate judged statistically significant even by Vanderbilt university scholars (the expected value for this population was 0.6). None of the women had ever been informed that their children might have died as a result of their participation in the experiment.

The Vanderbilt case was complicated and involved many other kinds of experts than historians. My job was to explore whether the experimenters could have known about the potential hazards before administering the radionuclides. Dosage was one issue of dispute, as was the question of whether the 'zero tolerance' theory of dose-response was accepted, as one key question was whether the doses involved could reasonably have been seen as unsafe. I showed, for example, that the 'single-hit' theory of carcinogenesis, devel-

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Emma Craft, whose daughter died of cancer aged 11, won compensation for the Vanderbilt experiment.

oped by Nikolai Timofeeff-Ressovsky and Max Delbrück in Germany in 1935, should have been familiar to the US investigators, as Delbrück had emigrated to the United States in the late 1930s and had ended up as head of the very department where Paul Hahn, the principal investigator of the Vanderbilt experiment, was employed. The plaintiffs won that case — a $10 million settlement plus a formal apology from the president of the university to the women who had lost their children.

The third trial was a 1999 class-action suit on behalf of the pension funds of trade-union workers in Ohio, seeking damages for injuries to the membership caused by tobacco. One of the questions I was asked to address was how early the medical case against tobacco had developed and how the tobacco industry had responded. I also provided testimony on how quickly this was accepted within the US medical establishment, and how quickly the public had accepted these findings. A further question was whether the industry itself had been aware of the cancer hazard, and whether it had taken steps to inform consumers.

Important in this was the timing of the discovery and popularization of the tobacco hazard. I knew that German physicians had established clinical experimental evidence of a lung-cancer hazard in the 1930s and 1940s, that British and US scientists had nailed down the link in the 1950s, and that by the middle of the 1950s it was possible to talk about a 'scientific consensus' over the major dangers of cigarettes — especially lung cancer and heart disease.

I could also document, though, that the industry had devoted considerable time and money to convincing the public that the case against cigarettes was "merely statistical", that action against cigarettes should wait until "further research" proved the precise nature of the hazard beyond any shadow of doubt, and so forth. The tobacco industry spent hundreds of millions of dollars on purported 'research', one function of which was to insinuate doubt concerning the scientific consensus.

Though the tobacco industry for many years maintained that cigarettes were safe, its legal stance for the past few years has been that by the 1950s an informed consumer should already have been fully aware of the nature of the risk. So it was important for the plaintiffs to show that the industry played a crucial part in maintaining the idea that the scientific case against tobacco was still open. A central question was the role played by the industry in fostering public doubts about tobacco's hazards; the plaintiff's position was that, despite the scientific consensus, it took quite some time for that consensus to be adopted by the public, because the industry was doing everything it could to convince the public otherwise.

A further issue was whether any cancers and heart disease had actually been caused by the industry's failure to notify the public of what it knew about the nature of the risk. In my written testimony, and under cross-examination in the courtroom, I produced a quantitative estimate of how many cigarettes would not have been smoked in the United States had the industry admitted what it knew in a timely fashion. This was obviously a somewhat speculative activity, but not without historical foundation: I calculated that roughly 8 trillion fewer cigarettes would have been smoked from 1954 to 1994, based on the assumption that the decline in US per capita consumption which began in 1964 could and should have begun ten years earlier than it did. Hence it was possible to estimate how many lung cancers could have been prevented, given that one lung cancer will be produced for every 2 million to 4 million cigarettes smoked in a given society.

> But how does one determine a historian's rate of error?

I was apparently the first historian ever to testify for the plaintiffs in a federal tobacco trial; the tobacco industry, by contrast, has often used historians in its defence, especially to show that knowledge of tobacco hazards was widespread in the 1950s and 1960s.

Status of expert evidence

The theoretical and practical questions raised by giving evidence as a historical expert are myriad and complex. There is also the question of bias, because the expert is paid. The sums can be huge: I got $150 per hour for my work, but I know that one of the statisticians testifying for the defence in my tobacco case (a Harvard professor) was paid ten times this rate. Is the neutrality of experts compromised by the fact that they are highly paid? How does the expertise produced in a US court differ from that of European courts, where experts are hired by the judge and paid very little?

There is also the interesting question of what is or is not admissible. In Anglo–American law, witnesses are normally expected to state only facts, not to express opinions. But expert witnesses can express opinions, if those opinions are considered to have emerged from their expertise. Ordinary witnesses are confined to what they themselves have seen or heard; experts can draw from a larger fund of established knowledge, the logic being that their knowledge or skills can help determine matters of fact or perspective that cannot be obtained through direct observation. (They cannot, however, expressly cite the work of other scholars, as that would be 'hearsay'.)

In the United States, official rules of evidence require expert opinions to be consistent with established methods. Standards of admissibility for expert testimony have changed recently: the Frye rule of 1923 required only that the opinions expressed be consistent with established views of the relevant expert community; this was modified in 1993 by the Daubert rule, which now allows judges to decide whether the methods used by experts are accepted within their relevant communities, considering whether they are peer-reviewed, have demonstrable rates of error, and so forth. Opinions differ on whether the new standard makes it harder to admit expert evidence. Observers seem to agree, though, that it gives judges greater power to rule out certain kinds of expertise (for example 'junk science') as inadmissible.

In the tobacco trial, one central question became whether the historical reconstruction I had offered was consistent with the kinds of history that historians actually write. Was it really standard practice for a historian to say how history might have been different, if circumstances had been different?

I argued that it was legitimate for historians to say how particular actions or policies had affected history; that implicit in any such attribution of causality was the assumption that human history is not predetermined in any deep sense; that human affairs could have turned out differently if the forces pushing us one way or another had been different. It was an older, outmoded, Marxist-positivist notion from the nineteenth century, I argued, that held that people are just puppets of their environments. The plaintiffs lost that case, though the lawyers who hired me say the case had probably already been lost in jury selection.

Role of historians

Historians may well come to play a growing role as expert witnesses in the US courts, especially in product liability, where it is often crucial to establish whether or not it was reasonable to have known that a product could have posed a hazard. Scientific practices change over time, as do perceptions of what is an acceptable risk; historians are often in a good position to judge how and perhaps even why such changes have occurred.

But there may come a time when courts will have to decide what kinds of historical expertise are admissible. The criteria developed for scientific expertise in the Daubert rule do not clearly apply to historians. Peer review might be used as a yardstick, but how does one determine a historian's rate of error? Historical methodologies are diverse, and it may be difficult to find agreement on what methods are to be regarded as conventional.

There is much debate today about the nature and limits of expert witnessing — perhaps an unavoidably politicized issue in the adversarial legal system. The more that courts recognize the value of a historical perspective, the more likely we are to see further struggles over the question of what should count as legitimate expertise. ■

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