ABSTRACT The advent of mass torts in US federal courts in the latter third of the 20th century accelerated a process of modernization in an institution that was unprepared for standardized approaches to dispute resolution. Faced with large-scale technological disasters, in particular, courts struggled to reform both their procedures and their fact-finding approaches in order to deal with multiple claimants in consolidated proceedings. Using silicone gel breast implant litigation as a case study, this paper argues that the attempt to marry judicial concerns for individual justice with administrative concerns for speed, efficiency and economy has produced anomalous results. The testimony of the clinician and the victim has become less relevant as judicial remedies take account of injuries done to classes of plaintiffs. Subjective claims about the body are subordinated to statistical correlations between exposure and grouped complaints. At the same time, the transfer of fact-finding authority from juries to judges under new evidentiary rules has privileged the judiciary’s lay knowledge and experience over that of the jury. While these transformations may hasten the processing of cases, the paper questions whether the courts can legitimately take on board the issues of risk and social justice in contemporary industrial societies.

Keywords clinical expertise, court-appointed experts, jury trials, mass torts, scientific evidence

Science and the Statistical Victim:
Modernizing Knowledge in Breast Implant Litigation

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Victims of Chance

A funny thing happened to American common law on its way to the 21st century. A legal system that historically prided itself on rendering individual justice in well-defined cases found itself confronted by huge, open-ended conflicts involving not single victims but entire classes of plaintiffs. Frequently lodged against large corporations, these ‘mass’ claims reflected the aggregated discontents of employees, property-owners, accident victims or consumers who charged that they, and others like them, had been injured through discrimination, denial of benefits, fraud or unfair trade practices, and, increasingly, technological breakdowns, such as defective products, industrial and transport disasters, workplace hazards or polluted environments. By the turn of the century, the federal judicial process in
particular became the recourse of choice for victims of alleged corporate wrongdoing in proceedings that sometimes drew in up to hundreds of thousands of claimants.

The transformation of the singular case into the mass social controversy threatened the very identity of common law institutions and their fact-finding practices. For centuries, the American legal profession had maintained its autonomy, and its élite artisanal culture, by restricting its gaze, and that of the juries it sought to persuade, to the particularities of the case.¹ The US Constitution, in fact, required federal courts to limit themselves to ‘cases and controversies’ so as to discourage the judiciary from engaging in policymaking in the guise of adjudication. Lawmakers and regulatory agencies were entitled to make policy for entire populations; courts, by contrast, maintained their legitimacy by remedying well-articulated personal grievances within the framework of two-party litigation. Constrained by real conflicts between real people, courts, it was thought, would keep clear of generalized rulemaking and social steering, thus preserving the desired separation between judicial and legislative powers. To be sure, the growth of public law following the New Deal drew the courts into ever more political decisionmaking on a host of subjects, occasioning complaints about judicial imperialism throughout the final decades of the century.² Within the confines of private law, however, courts remained conscious of the need to temper the demands for fair play and social justice that inevitably came their way with meticulous, case-specific fact-finding.

Now in late modernity, this carefully configured institutional rôle threatened to be destabilized by the most unlikely of developments: the displacement of the individual victim, the law’s particular object of concern, by a new kind of claimant – the class member, or the statistical victim. It was not that technological progress had done away with personal harm and hurt, thereby alleviating people’s need for judicial remedies. Quite to the contrary, the forces of industrialization seemed to open up ever more frontiers of risk, creating the potential for injury to populations of indeterminate size and composition.³ In a studiously anti-welfare state, the task of responding to victims of chance fell to the courts. Liability judgments in civil legal actions took the place of possible administrative solutions.

The intensification of industrial activity, the growth of mass markets, and the arrival of endemic risks had begun to influence, so it seemed, the identity of the human subject at the centre of legal controversies. In place of the fully delineated, suffering individual, burdened with her unique troubles and claiming her exclusive ‘day in court’, there appeared the standardized victim, the anonymous cost-bearer of advanced industrialism’s salient successes. Confronted by massed complaints, the court system in many instances took the reformist lead, consolidating like cases which, taken separately, would have engulfed judicial resources. In others, claimants and their attorneys sought out the relatively impersonal, but powerful, strategy of the class action to assert their grievances, recognizing
that grouping claims often produces more pressure on defendants than splitting them. The price, either way, was to subordinate each plaintiff’s individuality to a general template reflecting the common origin and character of grouped complaints. Indeed, under Rule 23 of the Federal Rules of Civil Procedure, which since the mid-1960s has authorized the formal mechanism of the ‘class action’, classes may be certified only if the complaints of those representing the group are both common to and typical of the class as a whole. Members of a class thus bear witness not to a collection of singular calamities but to the aggregated and probabilistic harm that seems always to lurk in modern corporate and industrial systems, no matter what steps have been taken for their control. 

Complex litigation with multiple plaintiffs has challenged judicial authority on several fronts. First, there is the issue of the courts’ institutional capacity. Consolidated and class actions often end in settlements whose details must be crafted and enforced by judges unschooled in large-scale case management. While the federal judicial system has proved adept at procedural innovation, the departure from incremental, precedent-based decisionmaking opens courts to charges of injudicious activism and overstepping the line between adjudication and policymaking. Determining the precise coverage of settlement agreements, including the rights of those who ‘opted out’ of collective solutions, has proved to be a recurrent focus of controversy. Second, and related, the de facto industrialization of tort actions undermines the courts’ moral standing as agents of social closure. Even cases affecting single plaintiffs can no longer be counted on to remain self-contained units of adjudication. How a court behaves in a particular case may have immediate repercussions for other, similarly situated claimants. It is never clear, for instance, at what point one person’s trouble may come to be seen as the prototype for a mass tort – a term with no fixed definition but with growing salience in the legal system. In a highly entrepreneurial legal culture, a plaintiff-friendly decision in one court could start an avalanche of lawsuits around the nation; an unfriendly decision could drive plaintiffs to engage in forum shopping, creating other novel ethical and managerial problems.

Third, and of particular importance to us, there is the question of the courts’ competence in large-scale lawsuits requiring the adjudication of scientific and technical claims. In the late 1980s, US courts were already under attack by conservative policy entrepreneurs for perceived deficiencies in their handling of scientific evidence; through a combination of passivity and lack of sophistication, these critics argued, judges were opening the doors to ‘junk science’, thereby confusing lay juries and prejudicing the fact-finding process. Cases involving multiple claimants, complex and indeterminate causal arguments, and statistical evidence further stretched the resources of the courts, while raising the economic and social stakes for litigants and the public. A judgment contrary to the weight of scientific opinion in a traditional two-party action did only limited economic harm to the defendant, and could be justified as a socially desirable form of risk spreading. A parallel outcome in a mass tort case had altogether different
implications: it could threaten an entire industry’s stability, and entail unforeseen consequences for society as a whole. In the era of technically complex mass torts, critics began to question whether judges were exercising their gatekeeping function with respect to technical evidence responsibly, or whether they were too permissive in admitting testimony by self-proclaimed experts. Pressure grew to raise the bar for the admissibility of scientific evidence and – since higher threshold standards applied de facto mainly to plaintiffs – to protect in this way defendant companies against the chancy results of trial by jury in lawsuits of questionable scientific merit.10

In this paper, I trace the impact of these developments on the framing and resolution of personal injury cases. At the centre of the inquiry is the (some would say delayed) ‘modernization’ of the courts in the face of industrialization, and the attendant tensions that have been created between science and justice, between trials of experts and trials by jury. Using the federal litigation over silicone gel breast implants in the United States as a case study, I ask how an institution whose fact-finding routines were honed within the framework of single-claimant controversies has adapted to the scaling up of ‘the case’ to incorporate indeterminate numbers of claimants, multiple defendants, and evidentiary issues reaching beyond the domain of currently available knowledge. What is the character of the scientific or medical knowledge produced in such proceedings, and how does it compare with the results of traditional case-by-case fact-finding? How is expertise constituted in such cases, and with what implications for the boundary between lay and expert knowledge? What, more specifically, happens to the identity of the claimant in a mass tort action? How do consolidated judicial proceedings shape the subjects they are seeking to serve, and how is the courts’ institutional gaze, as it were, transformed through such a process?

To explore these questions, I will focus on three salient episodes in the recent history of tort litigation that have pushed courts to behave more like administrative agencies of high modernity than like adjudicators of particular cases and controversies. The first is the transition from two-party suits to mass tort actions, a shift that received considerable impetus from burgeoning lawsuits by asbestos victims and caused federal courts in particular to adopt new strategies for consolidating and aggregating claims and claimants. The second centres on three Supreme Court decisions on the admissibility of expert evidence that sought to ‘improve’ the quality of scientific and technical fact-finding in federal courts in the 1990s, mainly by recalibrating the power of judges in relation to juries. The third examines the impact of the foregoing developments on both science and the litigating subject in the federal multidistrict litigation over silicone gel breast implants. At each of these transition points, courts were called upon to adjust their conventional ways of looking at cases in the light of contemporary circumstances of mass production; each exercise involved a struggle, by no means consistently resolved, between alternative approaches to constructing reliable knowledge. I conclude with some observations
about the implications of these developments for the rôle of the courts in managing industrial risks in the United States.

Seeing Like a Court, Seeing Like a State

The industrialization of tort litigation in the United States occurred step by step throughout the 20th century, as legal doctrines, processes and professionals all changed to meet the challenges of new modes of production and new patterns of personal injury. If there is a single episode that can be taken as a proxy for this complex series of transformations, it is the story of legal claims arising from exposure to asbestos.

Starting with a brief report in the *British Medical Journal* in 1924, and gathering steam during the 1930s, medical reports began circulating that asbestos workers were suffering from a variety of lung diseases and cancers. Employers in these early years took few steps to investigate the precise causes or to guard against them. Medical information indicating a connection between exposure and disease was concealed from workers at risk, so that hundreds of thousands were unwittingly exposed through increased manufacture of asbestos products during and after the war years of the 1940s. Thirty years later, the toll of disease and death had grown to epidemic proportions and was still rising; it has been estimated that as many as 200,000 deaths from asbestos exposure had occurred in the United States by the year 2000. As journalists, historians, and social scientists began documenting the results of the employers’ neglect, workers turned to the courts for redress. At first, their efforts were unsuccessful, both because long latency periods for many asbestos-related diseases created problems of proof, and because state workers’ compensation laws barred most suits against employers for job-related injury or disease. By the 1970s, however, the epidemiological evidence of asbestos-induced illness was firm enough to support definite conclusions about different disease aetiologies and dose–response relationships. At the same time, asbestos workers gained some salient legal victories, including a landmark ruling that allowed them to proceed against third-party manufacturers whose products they had used at work. Once the floodgates were opened, cases began streaming into the courts, creating enormous delays, backlogs, repetitive trials, and inequities of compensation. One after another procedural reform initiated by the courts failed to solve these problems.

While few other hazardous products generated caseloads comparable to asbestos, it was clear by the late 1990s that mass torts were there to stay on the American adjudicatory landscape, a necessary by-product of mass production, as played out within the nation’s distinctive legal and policy culture. Other high-volume cases that have occupied the courts since the 1970s include the Agent Orange litigation by Vietnam veterans, and product liability lawsuits over Dalkon Shield, heart valves, infected blood, and silicone gel breast implants. Each of these cases involved many thousands of claimants, and problems arose over whether they were dealt
with sequentially or in groups. Tried separately, they entailed repeated inquiries into similar facts, produced inconsistent results, and clogged the judicial process; aggregated into consolidated proceedings such as class actions, they presented novel problems of justiciability, fairness and ethics. Class certification, in particular, inevitably favoured group interests over individual ones, no matter whether the class was constituted for litigation or settlement. Scientifically, as well, these conflicts proved difficult to adjudicate according to traditional standards of proof. Injuries often post-dated exposure by many years, cases involved multiple plaintiffs with diverse histories and health records, and the pattern of repeated claims from a single incident or type of exposure made it impractical to conduct fact-finding in the contingent, case-specific manner that was historically a strength of common law trial courts.

Mass torts, in sum, created almost insuperable tensions between the courts’ historic commitment to the individual plaintiff and the fairness and efficiency needs of a modern social institution serving an increasingly dispersed, even globalized, system of production. Solving industrial-scale social problems with limited resources drove courts toward the kind of simplifying vision that James C. Scott has evocatively termed ‘seeing like a state’.

In this characteristic move of modernity, state agencies blur or obliterate the details of individual lives so as to create a pattern or an order that can be more easily managed because it becomes, as Scott puts it, ‘legible’. In the litigation context, the rise of managerial judging meant the replacement of particularistic inquiries into individual case histories with vastly more simplified criteria of inclusion and exclusion defining the groups to be compensated. It meant the transformation of the trial court’s passionately personal gaze into the dispassionate processing routines of an administrative agency that puts efficiency and risk mitigation for all above the classic ‘day in court’ for each.

Seeing like a state has not come naturally to institutions accustomed to adversarial methods for delving into the details of cases. Not surprisingly, it was asbestos litigation that generated one of the most wrenching tests of how far the courts were prepared to go in the search for collective solutions. By the late 1980s, asbestos suits were threatening to overwhelm the civil dockets of many US federal courts. As noted in a recent report,

at one point over 2,000 asbestos cases were pending before a single district court for the Eastern District of Texas, and new cases were being filed daily. The court observed that at a rate of 30 cases per month, it would take 6½ years to dispose of the 2,000 cases pending on its docket. Unfortunately, the court noted, 5,000 new cases would have been filed during that period.

In 1991, eight federal judges concerned about the dimensions of the asbestos emergency requested the Judicial Panel on Multidistrict Litigation to seek a global solution to the problem. The Panel consolidated all pending cases in the Eastern District of Pennsylvania, whereupon Judge Charles R. Weiner of the district court stayed the cases and initiated
settlement proceedings. A nationwide steering committee was formed to represent the plaintiffs, while the defendants were represented by a consortium of 20 corporations known as the Center for Claims Resolution (CCR). After months of negotiation, the parties failed to come to an agreement, and a majority of the plaintiffs' committee withdrew from the process. The CCR then entered into separate negotiations with a minority of the committee, and eventually reached what came to be known as the Georgine settlement.

The solution crafted by the parties was breathtaking in scope and complex in detail. One part of the agreement proposed to settle for $215 million all the 'inventory' claims that had been filed against CCR members by January 1993. The second and significantly more controversial part addressed all possible claimants who had not yet filed for compensation as of that date. The 'class' covered by this part of the global agreement included everyone who had been occupationally exposed, or exposed through a spouse, to asbestos produced by any of the CCR defendants, as well as the spouses and family members of all such persons. In sum, this part of the settlement planned to reach a population of between 250,000 and 2 million possible claimants, not one of whom had as yet filed a lawsuit or even knowingly belonged to the population of the asbestos-injured.

A change in the case name signalled how radically this proposal had shifted the scene from the template of the ordinary case or controversy. Originally known as Carlough v. Amchem, the case was renamed Georgine v. Amchem in December 1993, when the parties agreed to substitute Robert A. Georgine for Edward J. Carlough as lead plaintiff. But Georgine, by his own admission, was not suffering any of the physical symptoms of asbestos disease. Under questioning by the dissident plaintiffs' lawyers (those opposing class certification), he readily allowed that he was in the picture only to help secure a settlement, not to seek recompense for injuries that he himself had sustained:

The exposure only class representatives admitted under oath that they would not have continued with the litigation in the absence of a settlement. Robert Georgine responded to questioning:

Q Have you ever gone to a lawyer for your own personal reasons to file a claim for yourself?
A No.
Q – for asbestos related injury?
A No.
Q And why is that?
A I haven’t had a problem.
Q Is that still true today? That you haven’t had a problem?
A Well, I don’t – I breathe normal – I don’t have any problems that I’m aware of. That’s not to say that one can’t develop.\(^{19}\)

Here we see almost an inversion of the classical relationship of plaintiff to claim. Georgine is present not as an individual who has suffered a clear-cut harm and needs a clear-cut remedy; he is only a placeholder for the
shadowy hordes of unnamed claimants who *might* get sick and therefore *might* crowd legal dockets in the future.

To cope with the enormous, though as yet officially unrecorded, class of potential asbestos claimants, the *Georgine* settlement proposed to standardize compensable claims in two ways: by limiting eligibility (in effect, by sorting the claimants into easily recognizable, standard subgroups), and by setting caps on recovery. Compensation, to start with, was restricted to four disease categories reliably linked to asbestos on the basis of existing scientific knowledge: mesothelioma, lung cancers, certain 'other cancers', and certain 'non-malignant' conditions. Diagnostic criteria for each condition, the latency period between exposure and disease, and the necessary duration of exposure for different occupations were also specified. There was no pretense that the settlement process would generate new knowledge or new medical practices pertaining to the health effects of asbestos exposure. With respect to the amount of recovery, minimum, maximum and average amounts were fixed for each condition. The settlement also scheduled a regulated flow of payouts by restricting how many claims in each category the CCR would be required to pay each year. Excess claims in a given year were to be deferred to the following year; if plaintiffs wished to expedite their recovery, they had the option of settling for smaller payments. It was, in sum, an agreement marked by the painful contradictions of modern welfare policy: on the one hand, it recognized the 'asbestos victim' as a deserving recipient of relief; on the other, it afforded the CCR defendants considerable certainty and flexibility while leaving a goodly number of potential claimants either uncompensated or paid at levels considerably lower than they might have expected through the tort system.

Judge Weiner had to decide whether the class encompassed by this sweeping settlement met the requirements of Rule 23 of the Federal Rules of Civil Procedure governing class actions. He concluded that it did, but in *Georgine v. Amchem Products*, the Third Circuit Court of Appeals reversed his decision, and in *Amchem Products, Inc. v. Windsor*, the Supreme Court in its turn sustained the reversal. While a detailed analysis of these decisions would not serve our purposes here, the point to note is that both appellate courts struggled to balance the aggregation needed for fair and efficient resolution with the disaggregation they saw as essential to protect the rights of differently situated claimants. Disaggregation won. In particular, both courts agreed that the proposed settlement did not meet Rule 23(b)(3)'s requirement 'that the questions of law or fact common to the members of the class predominate over any questions affecting only individual members'.

The only commonality among the class members, the Third Circuit held, was that all had been injured by asbestos. This fact alone could not override the many individual differences in their circumstances. They had been exposed to different products, over different periods, for different amounts of time, and in different ways. Some class members had no injuries (the 'exposure only' group), others were pre-symptomatic, and still
others already had serious diseases. Some were smokers, which greatly increased their vulnerability to disease, while others had never smoked. Moreover, there were potential conflicts of interest within the class. Members with disease symptoms had an interest in quicker payouts up front, whereas pre-symptomatic claimants had an interest in preserving more of the settlement for subsequent payments. A settlement agreement that made no provision for representing these interests separately could not, the court concluded, serve the needs of justice. In affirming, the Supreme Court cautioned against overly bold aggregations in the interests of some ‘gestalt judgment or overarching impression of the settlement’s fairness’.

In sum, the district court’s conscientious efforts to see like a (welfare) state in *Georgine* were deemed by both higher courts to be an untenable compromise between judging and legislating. The demands of individualized justice prevailed, but the cost was to deny asbestos-exposed individuals the political satisfaction of gaining from the courts the comprehensive remedy they had failed to win from Congress.

**Thinking Like Scientists**

The 1990s will be remembered as a decade of extraordinary activism in the annals of the US Supreme Court, a period in which many apparently settled legal doctrines were taken out of the closet and given a dusting or a facelift, or even a complete overhaul. Some, including questions of standing, takings, federalism, and separation of powers, were of the gravest constitutional significance; others, though not formally constitutional in import, were no less far-reaching in their implications for justice. Three Supreme Court decisions concerning the judicial treatment of scientific evidence belong in the latter category: *Daubert v. Merrell Dow Pharmaceuticals, Inc.* in 1993; *General Electric Co. v. Joiner* in 1997; and *Kumho Tire Co. v. Carmichael* in 1999. Taken together, these cases can be seen as marking another step in the modernization of the federal judicial system. They posed as profound a challenge to the institutional practices of the courts as did the onslaught of mass torts, but on a different axis: instead of asking judges to ‘see’ like a regulatory state, these decisions asked them to ‘think like scientists’ in admissibility decisions involving scientific evidence. Increasing pressure to ‘get the science right’ altered the carefully nurtured boundaries between judicial, scientific and lay judgements in the courtroom. Although common law courts had long recognized the right of expert witnesses to speak on matters within their special competence, the power to decide who should testify in particular cases clearly belonged to judges, just as the power to ‘find the facts’ ultimately rested with the jury. In trying to reconfigure the relationship between experts and the judiciary, the Supreme Court inevitably also reshaped, and most probably diminished, the rôle of the jury.

The first and most influential of the evidence decisions, *Daubert*, grew out of a product liability lawsuit alleging that the anti-nausea drug Bendectin prescribed to women during pregnancy had caused serious birth
defects in their children. The plaintiffs’ scientific argument rested largely on data from animal studies and on a controversial (and unpublished) meta-analysis of epidemiological data which, in themselves, established no causal connection between Bendectin and birth defects at a level of statistical significance.27 Bendectin lawsuits across the country led to inconsistent results. The manufacturer won virtually all the cases tried before a judge, whereas juries tended to be significantly more favourable toward plaintiffs. In an effort to block cases from proceeding to trial, and hence to consideration by sympathetic juries, the defendant argued that courts should adopt a stricter rule governing the admissibility of scientific evidence, replacing the 70-year-old Frye rule which said that courts should admit such evidence only if it was generally accepted within the relevant scientific community.28 More specifically, the defendants demanded that only peer-reviewed scientific studies should be deemed admissible. If adopted, this criterion would have required an unprecedented degree of prior closure in the scientific basis for lawsuits, thereby raising the bar against the tide of claims calling for context-specific development of knowledge.

The Supreme Court, in an opinion authored by the late Justice Harry Blackmun, held that admissibility in federal cases is governed by the congressionally enacted Federal Rules of Evidence and not by the common law Frye rule. The legislated rules, the Court further noted, require judges to act as gatekeepers with respect to scientific evidence, keeping out any expert testimony that is not reliable as well as relevant. Beyond this, the Court refused to replace the general acceptance test with any checklist or hard-and-fast criteria for evaluating scientific reliability. The key, the Court stressed, was to assess offers of expert testimony using the same principles that scientists themselves would use under the circumstances. If courts were to function as duelling grounds for experts, the combatants’ right to enter the lists should be pre-certified in accordance with standards set by science. To guide the lower courts in fulfilling their newly confirmed proactive rôle, the Daubert majority opinion offered four sample criteria for determining admissibility: whether the science in question was testable and had been tested; whether it was peer reviewed; whether it had a known or potential error rate; and, recapitulating Frye as just one test among others, whether it was generally accepted within the relevant scientific community. Daubert was widely construed as an injunction to federal judges to ‘think like scientists’ in evaluating scientific evidence.29 Less commonly observed was the fact that judges, in practice, gained wide latitude to decide how scientists think.

The extent of the discretion conferred by Daubert became the central issue in Joiner, the second of the Court’s three rulings on evidence. In this case, the plaintiff, a smoker with a family history of cancer, complained that he had contracted small cell lung cancer as a result of exposure to PCBs. In support of his claim, he offered both animal evidence and results from a small number of epidemiological studies pooled in accordance with ‘weight of the evidence methodology’. The district court excluded all of the
plaintiff’s testimony pursuant to Daubert, but the Court of Appeals for the Eleventh Circuit reversed, citing the supposed bias of the Federal Rules in favour of expert testimony, and saying that an unusually strict standard of review should be applied in a case in which the exclusion of expert testimony was ‘outcome determinative’. The Supreme Court flatly rejected this position, denying that the Federal Rules require stricter review of decisions to exclude, as opposed to include, expert testimony, and holding that the appropriate standard for reviewing any evidentiary ruling by a trial court is abuse of discretion.

The Joiner majority reinforced the traditional autonomy of the trial judge on issues of fact-finding. In confirming the trial court’s exclusion of the evidence (the opinion rather unusually reviewed and approved the lower court’s grounds for exclusion), the Supreme Court implicitly ratified the centuries-old belief that matters of fact are best dealt with by the judge closest to all the circumstances of the case. Rulings about evidence are treated as belonging on the fact side of the conceptually important dividing line between law and fact. This is a place that appellate power ordinarily does not reach, since law, not fact, is the preserve of common law appeals courts. Joiner thus left intact the trial judge’s close-to-sovereign authority to determine the boundary between acceptable and unacceptable evidence; scientific evidence for these purposes was to count no differently from any other. To the extent that standardization is an indispensable feature of modernization, Joiner can be seen as a move away from Daubert’s impulse to impose more uniform, ‘science-based’ standards on judging.

At least one member of the Court felt uncomfortable about this reaffirmation of the trial court’s powers. Justice Stephen Breyer, a distinguished administrative lawyer well-known for his faith in expert decision-making, wondered in a concurring opinion whether judges had the training
to make subtle and sophisticated determinations about scientific methodology and its relation to the conclusions an expert witness seeks to offer – particularly when a case arises in an area where the science itself is tentative or uncertain, or where testimony about general risk levels in human beings or animals is offered to prove individual causation.

Breyer proposed a solution that would enable courts to discipline themselves by drawing more aggressively on the institutional authority of science. He quoted with approval a passage from an amicus brief by the New England Journal of Medicine suggesting that judges should turn to established scientific organizations, such as the National Academy of Sciences or the American Association for the Advancement of Science (AAAS), for help in screening expert evidence. He added:

Given this kind of offer of cooperative effort, from the scientific to the legal community, and given the various Rules-authorized methods for facilitating the courts’ task, it seems to me that Daubert’s gatekeeping requirement will not prove inordinately difficult to implement; and that it will help secure the basic objectives of the Federal Rules of Evidence;
which are, to repeat, the ascertainment of truth and the just determination of proceedings.\textsuperscript{33}

Breyer’s olive branch was enthusiastically seized upon by segments of the scientific community. AAAS invited him as a featured speaker to the Association’s celebratory 150th anniversary meeting in Philadelphia in 1998. In turn, Breyer’s endorsement of AAAS as a possible source of help for judges helped generate support for an AAAS demonstration project to provide ‘neutral’ scientific expertise to the courts.\textsuperscript{34} That, however, is another story.

More to the point for our purposes is Breyer’s majority opinion in \textit{Kumho}, the last of the major evidence decisions of the 1990s. Patrick Carmichael, one of the plaintiffs in this case, had been driving a minivan whose right rear tyre blew out, causing an accident that killed one passenger and severely injured others. The plaintiffs charged that the blowout was due to a defect in the design or manufacture of the minivan’s steel-belted radial tyre. In support of their contention, they presented the testimony of an engineer and expert in tyre failure analysis, Dennis Carlson, Jr, who offered his informed opinion that it was a design defect, not misuse or ordinary wear, that was responsible for the blowout. Using methods of visual and tactile inspection, Carlson concluded that the tread had separated from the body (‘carcass’) of the tyre, even though there was evidence that the tyre was badly worn and had been twice repaired for punctures. The district court mechanically applied the four \textit{Daubert} criteria to Carlson’s evidence, and found it inadmissible. The Court of Appeals for the Eleventh Circuit reversed on the ground that \textit{Daubert} applied only to scientific (not technical) evidence, and the Supreme Court granted a writ of \textit{certiorari} to review that decision. The questions before the Court were whether \textit{Daubert}’s gatekeeping standards apply to engineering or other non-scientific expert evidence and, if so, whether the four \textit{Daubert} criteria may appropriately be used to assess its reliability. The Court ruled positively on both counts, although Breyer’s opinion stressed that the \textit{Daubert} criteria should be regarded as merely helpful, not dispositive, and hence should not be rigidly applied to every decision concerning the admissibility of technical evidence.

Let us look more closely, however, at the reasoning that the majority used to determine that the district court had indeed correctly excluded Carlson’s testimony: to decide, in other words, that

\begin{quote}
  it fell outside the range where experts might reasonably differ, and where the jury must decide among the conflicting views of different experts, even though the evidence is ‘shaky’\textsuperscript{35}
\end{quote}

The Supreme Court did not question that Carlson’s qualifications were generally adequate for an expert in tyre failure analysis, nor that visual and tactile inspection, backed by experience, could in principle provide a strong enough basis for reliable judgements about design defects in tyres. Rather, the Court found that the specific tests and causal theories that
Carlson had used in this particular case did not fall within the range of acceptable expert opinion. Consistent with Daubert’s criteria of peer review and general acceptance, it counted against Carlson that there were no published articles or statements from other practitioners validating his particular approach. But, on painstakingly reviewing the record produced by the district court, the Supreme Court also found Carlson’s testimony implausible on more matter-of-fact grounds:

Among other things, the expert could not say whether the tire had traveled more than 10, or 20, or 30, or 40, or 50 thousand miles, adding that 6,000 miles was ‘about how far’ he could ‘say with any certainty’. The court could reasonably have wondered about the reliability of a method of visual and tactile inspection sufficiently precise to ascertain with some certainty the abuse-related significance of minute shoulder/center relative tread wear differences, but insufficiently precise to tell ‘with any certainty’ from the tread wear whether a tire had traveled less than 10,000 or more than 50,000 miles. And these concerns might have been augmented by Carlson’s repeated reliance on the ‘subjective[ness]’ of his mode of analysis in response to questions seeking specific information regarding how he could differentiate between a tire that actually had been over-deflected and a tire that merely looked as though it had been. They would have been further augmented by the fact that Carlson said he had inspected the tire itself for the first time the morning of his first deposition, and then only for a few hours (his initial conclusions were based on photographs).\[^{36}\] [References to the record omitted.]

The last lines are strangely reminiscent of language that courts have historically used in deferring to the knowledge claims of ‘treating physicians’.\[^{37}\] In the innocent, pre-Daubert days, courts asserted time after time that the testimony of a doctor who had personally examined the victim-plaintiff was entitled to greater weight than the word of someone who testified on the basis of mere written records or on purely theoretical scientific grounds. The former was an eye witness of the most dependable sort; the latter perhaps only a self-interested charlatan. Here, in a wholly different diagnostic context, even Justice Breyer, that most technocratic and modern of jurists, unconsciously invokes an age-old repertoire that acknowledges the credibility of the clinician’s touch. It is as if, in Breyer’s trained forensic imagination, the offending tyre metamorphoses into the patient’s body, while the engineer Carlson slips awkwardly and unpersuasively into the rôle of the treating physician. Would it have made a difference to the Court, one wonders, if Carlson had spent days instead of hours inspecting the blown-out tyre? If he had touched and felt it at leisure the night before, rather than quickly on the harried morning of his first deposition? And could not a jury, one rightfully wonders, have applied the same commonsensical standards of credibility to the testimony of the unfortunate tyre-failure expert that Justice Breyer brought to his review?

How then should we sum up the combined impact of Daubert, Joiner and Kumho on deciding cases? Although systematic studies have yet to be made, the threesome are widely regarded as having tilted the balance in the courtroom in favour of conventional science and against marginal claims.
masquerading as expert knowledge. They accomplished this, it is thought, by insisting on the trial judge’s gatekeeping rôle, and by offering criteria such as scientists themselves conventionally use to distinguish between true science and counterfeit knowledge. Turn the lens but a little, though, and a disconcertingly different picture emerges. Instead of calling the score as scientists: 3, charlatans: 0, one might plausibly read it as judges: 3, scientists: 0 – which is not at all the same thing. For Daubert itself, when all is said and done, basically reaffirmed the power of judges to declare, case-by-case and in accordance with criteria that they deem appropriate, what counts as reliable science in the context of litigation. Joiner, with only a murmur of scepticism from Justice Breyer, held that the trial judge’s evidentiary rulings will survive appellate review unless they are shown to be an abuse of discretion. And Kumho extended the judiciary’s gatekeeping rôle to technical evidence, whether or not it is founded on something that can be called ‘science’.

Another way to look at these three cases is to ask how each affected the resources with which judges may discriminate between reliable and unreliable claims of expertise. Again, the scorecard suggests that the big winner was judicial autonomy, particularly through the elevation of judicial expertise above the jury’s supposedly untutored cognitive capacities. The common problem underlying all three cases was to articulate rules of admissibility that would not only satisfy standards of legal reasoning, but would also conform to culturally accredited understandings about the legitimacy of experts. In particular, courts must be careful not to certify as ‘expert’ claims of specialized knowledge that are culturally marked as subjective (as in the oft-cited example of astrology) or biased (as in the case of witnesses repeatedly hired by plaintiffs). The expert’s privileged point of view has been achieved in modernity by being shorn of both personal idiosyncrasy and identifiable bias. Courts, as evolving agents of modernity, are positioned, following Daubert, both to reinscribe and instrumentally employ this dominant construction of the expert.

Expertise, as I have suggested elsewhere, can be claimed in court through the paired rhetorics of experience and objectivity. In the register of experience, the expert shows that her type of knowledge claim is not unique to herself; others with similar experience would look at the situation through similar lenses and come to similar conclusions. Frye’s test of ‘general acceptance’, reaffirmed in Daubert, reflects the legal system’s longstanding willingness to accept shared experience as a foundation for expert claims. Dennis Carlson, for example, failed in his bid to persuade the courts in Kumho partly because he could not show that his particular ways of reading the tyre-tread evidence were shared by others in the community (if one existed) of tyre-failure analysts. Juries, however, should be no less adept than judges in assessing expert testimony according to the register of experience. This is a point frequently overlooked by analysts who call attention to the risk of confusing juries with misleading technical evidence.
Whereas experiential claims stress the depth of familiarity between the observer and the matter observed, the power of objectivity flows in part from detaching the two. An objective image is the ‘view from nowhere’; it is the ideal of a reality unmediated by human intervention. Daubert’s main contribution to the law of evidence arguably was to alert judges to the register of objectivity as an additional resource in admitting or excluding expert claims. This was arguably the territory in which highly educated, professionally trained judges would enjoy a genuine advantage over juries. By holding forth an open-ended list of factors for assessing reliability, Justice Blackmun invited judges to look beyond mere experience-based expertise, and to consider as well the techniques by which science seeks to erase the observer’s presence from the observed world.

In making this move, however, Daubert codified (however imprecisely), and thereby also reinforced, the naïve sociology of science that was already an established component of judicial practice. Even before Daubert, admissibility decisions had tended to favour evidence that bore some of the widely acknowledged markers of objectivity – quantification, instrumental readings, x-rays, photographic representations. To these, Daubert added new resources – testing and lowered error rates – from what, following Nigel Gilbert and Michael Mulkay, we may refer to as the ‘repertoire of empiricism’, that is, the rhetorical toolkit that scientists employ in defending their findings against sceptics. Joiner confirmed that these new resources could be deployed with relative impunity by trial courts, that is, without serious risk of adverse appellate review.

And what of Kumho? Curiously, given its authorship, this case seems almost to revert to a pre-Daubert regime of authorizing expert claims, although not as some have suggested by simply reinstating Frye. Rather, Kumho should be read as a reminder of the very considerable reserve power of judges to declare what will pass for adequate reasoning by expert witnesses in their courts. Judicial ideas of rationality, in other words, continue to provide the ultimate screen for expert testimony, above and beyond any tests that judges claim to derive from science’s repertoires of legitimation.

At stake in Kumho, as often in legal proceedings, was a contest over visual authority. Could Dennis Carlson’s experienced eye claim enough credibility to cross the admissibility threshold and justify sending the case to the jury? Could he line up enough allies, human (‘peer review’ or ‘general acceptance’, for example) or inanimate (published articles, for example) or non-human (the tyre itself, if he had but adequately palpated it), to support his reading of the tread marks and other evidence? Breyer’s sceptical litany quoted above reveals the depth of Carlson’s failure. Not only did this engineer and former Michelin employee mobilize too few of the indicators of scientific objectivity, including those listed in Daubert, but he also failed to win over to his viewpoint the all-powerful lay gaze of the presiding judges. For instance, Carlson’s statements about what he could and could not deduce from the tread marks fell short of meeting Justice Breyer’s commonsense tests of coherence. In contrast to Daubert,
which asks judges in effect to draw upon (what they take to be) scientists’ repertoires of legitimation, *Kumho* seems to remind the judicial experts that they should not be afraid to exercise their own unaided critical faculties in evaluating offers of technical evidence. The judge’s eye remains in this respect very much the ‘the eye of power’ – even after three big decisions in favour of science.

Caught between the anvil of mass torts and the hammer of the Supreme Court’s rulings on evidence, how have courts redesigned their approaches to scientific fact-finding? What has happened in this process to the human subject at the centre of aggregated personal injury claims? Let us turn by way of example to the federal multidistrict litigation involving silicone gel breast implants, one of the most ambitious exercises to date in the use of court-appointed experts to create a tamper-proof body of litigation-relevant expert knowledge.

**Breast Implant Litigation: From Trickle to Torrent**

Depending on one’s point of view, silicone gel breast implants (SGBIs) represent either one of the largest uncontrolled experiments conducted on American women in the 20th century, or else a safe, effective, and confidence-building cosmetic product for hundreds of thousands of women, whose freedom to control their bodies was compromised by a coalition of scientifically uninformed patients, overzealous journalists and greedy lawyers. According to the former view, women were either medically advised or else persuaded through a pervasive marketing culture to reconstruct their breasts with an untested device capable of destroying their immune systems. The latter view, forcefully argued by experts such as Dr Marcia Angell, former executive editor of the *New England Journal of Medicine* and author of a book deploring the misuse of science in SGBI litigation, held that the law had run way ahead of scientific evidence, allowing billions of dollars of damage claims to mount up in a vacuum of reliable evidence.

The main outlines of the controversy can be briefly stated. The implants were first developed in the 1960s, and introduced to great acclaim as a substitute for the less satisfactory products then available. Not only did the gel-filled sacs better simulate the look and feel of women’s breasts than other implant materials, but they also appeared to be physically stable and non-reactive. By the 1980s, they were in widespread use both for breast reconstruction following cancer surgery and for cosmetic breast enlargement. It is estimated that between one and two million women may have undergone breast implant surgery in the United States; numbers in other countries were substantially lower. Marketed before the 1976 federal law mandating testing of medical devices, SGBIs were never clinically tested for their safety. Like other products ‘grandfathered’ under the law, they were reviewed in due course by an advisory panel of the Food and Drug Administration (FDA), the regulatory body in charge of medical devices. The relevant committee, composed mainly of cosmetic surgeons,
found nothing that warranted further testing, and SGBIs remained a popular product well into the 1980s.

Three events in the early 1990s radically altered this picture. First, women began complaining in substantial numbers that their implants ruptured or leaked, causing local pain, inflammation, and uncomfortable hardening of breast tissue. Many opted to repeat the surgery or to have the implants removed altogether. Some also linked the implants to more severe chronic ailments affecting the joints, skin and internal organs that they alleged were the result of silicone-induced injury to their immune systems. In December 1990, the CBS journalist Connie Chung featured this story in her television journal *Face to Face with Connie Chung*, thereby converting fears that had been percolating below the level of public awareness into a visible social problem. Her charges of grievous health injuries and lax regulation led to a sharp increase in the number of SGBI lawsuits, as well as renewed interest from FDA’s activist commissioner, David Kessler. In 1992, following a few well-publicized judgments, including an unprecedented $7.34 million award (of which $6 million were punitive damages) in a 1991 California case, the FDA decided to impose a moratorium on the use of SGBIs while their health impacts were further investigated.

FDA’s action released a further flood of lawsuits, so that breast implant litigation showed the ‘most explosive and meteoric rise’ among major mass tort actions.46 Women’s complaints increasingly featured, besides known diseases, a syndrome that they labelled Atypical Connective Tissue Disease (ACTD), a loosely grouped set of symptoms such as chronic fatigue, headaches, hair loss, night sweats, swelling, joint pains – all of which also commonly occur in the general population. The Federal Panel on Multidistrict Litigation consolidated a number of the federal cases for pre-trial proceedings under the well respected Judge Sam C. Pointer, Jr, in the Northern District of Alabama. As filings in Multidistrict Litigation 926 (MDL 926) grew to around 10,000 cases, Dow Corning, one of the leading SGBI manufacturers, and two other companies, entered into a settlement negotiation. By 1994, Dow Corning had declared bankruptcy and a roughly $4.25 billion global settlement agreement had been crafted to cover an estimated 60,000 claimants. Judge Pointer certified the class for settlement in accordance with Rule 23, but within a year the agreement broke down as the number of claims ballooned to about 440,000, far beyond the manufacturers’ original expectations. At the same time, many thousands of claimants opted out of the settlement, leaving the manufacturers with an unacceptably high risk of continuing liability. In yet a third development, early published results from epidemiological studies on breast implant wearers showed no significant correlation between the implants and any clinically certifiable immune system disease. This pattern of scientific findings, which made the original settlement seem premature, was to become more definite over the next few years.47

With hundreds of thousands of claimants and billions of dollars at stake, it was perhaps inevitable that judicial case-management would have
to encompass not merely the flow of litigation but also the production of evidence on which judgments would be based. To expedite the reopened litigation process, Judge Pointer decided, with the parties' approval, to create a body of authoritative scientific opinion for use in future trials around the country.\textsuperscript{48} For this purpose, he turned to Rule 706 of the Federal Rules of Evidence, which authorizes the use of court-appointed experts to assist in fact-finding. Expert witnesses appointed under Rule 706 do not replace any witnesses whom the parties themselves may wish to call. The court's experts do not enjoy any specially favoured status in the proceedings and, like party experts, they are not formally insulated from the adversary process. Indeed, Rule 706 provides that the parties may both depose and cross-examine court-appointed experts. Judge Pointer's widely watched strategy in the breast implant litigation was to appoint a four-member National Science Panel – chosen for expertise in the fields of toxicology, immunology, epidemiology and rheumatology – to deal with the most contested, recurrent evidentiary issues in these cases.\textsuperscript{49} Their task was to produce, if possible, a set of scientific conclusions that would withstand future adversarial deconstruction, and could be transported more or less unchallenged through successive SGBI cases.

Let us turn now to the process of using Rule 706 experts in MDL 926 in the effort to create a science transcending party interests. Three aspects of the National Science Panel's activities merit special attention from the standpoint of fulfilling this goal. The first concerns the concept of neutral expertise as constructed and elaborated throughout the proceedings. The second relates to the erasure of the woman's body in this most corporeal of products liability claims. The third has to do with the rhetoric of science as it evolved in and around the litigation on breast implants.

\textit{Mastering Knowledge: The Elevation of the Court-Appointed Expert}

Rule 706, authorizing the use of court-appointed experts, is a pragmatic instrument that permits judges to correct serious deficiencies in fact-finding without repudiating the common law's commitment to party sovereignty or the adversary process. Court-appointed experts may play a variety of rôles consistent with the needs of the individual case: they may educate judges on matters outside their competence, provide missing expertise, develop consensus positions, or offer relatively impartial opinion on divisive issues. In MDL 926, the National Science Panel's duties fell somewhere between those of a mediator and a consensus panel. Judge Pointer's charge instructed the panel to evaluate, on the basis of existing knowledge, whether there was a plausible causal connection between silicone gel and various named conditions, including both 'classic' and 'atypical' connective tissue diseases. In the course of preparing their report, the panelists heard from experts selected by the parties, as well as from their own invited experts. They received over 2000 documents, from which they each reviewed approximately 40 of the most important selected by each side. On 1 December 1998, the panel presented its report to the
court, finding no definite correlation between SGBIs and any identified disease. The only connection that the panel did not rule out was Sjögren’s syndrome, a condition marked by unusual dryness of the mouth, but even this was a nonspecific symptom and relatively common in the general population. How did these findings achieve credibility?

Desperately Seeking Neutrality. Judge Pointer was intensely aware that the National Science Panel’s authority would rise or sink with the perceived neutrality of its members, but his conception of bias was tied to conventional notions of monetary and employment interests. He therefore went to extraordinary lengths, building walls around walls, to ensure that scientists nominated to the panel would have no conceivable financial or research connections to breast implant manufacturers. First, Pointer appointed a six-member Selection Panel whose task was to submit ‘names of neutral, impartial persons who have the indicated expertise, [and] who would be able to communicate effectively with judges and jurors’; he appropriated for this purpose a three-person panel already appointed by a New York district court and added three members from other states (California, Oregon, Texas) that had also had extensive experience with SGBI litigation. Selection panel members had to disclose their own and even their spouses’ financial interests, leading in at least one case to the divestment of some spousal holdings in a defendant company. Nominees for the National Science Panel, in turn, were questioned by the selection panel members and then by party representatives under the court’s supervision. They had to fill out a detailed questionnaire and submit additional information, if requested, about the sponsorship of their recent and current research. The goal of this elaborate screening was to identify experts who were unassailably knowledgeable about their respective fields, but who lacked any perceptible connection to breast implant litigation.

Science in a Non-Neutral Space. Ironically, given the intense efforts to assure neutrality, the panelists, once appointed, had to operate in a space that was far from neutral. Indeed, a good part of the dynamics of fact-finding in MDL 926 centred on attempts to carve out a protected space for the court-appointed experts within the normally no-holds-barred framework of adversarial litigation. Part of the effort was devoted to insulating the experts against partisan communication, and part to safeguarding their personal and professional liberty. The court ordered the litigants, their counsel, and their witnesses not to communicate with the panel except through its designated counsel; communications between the panel and its counsel were entitled, for their part, to the attorney–client privilege. The panelists, moreover, had to be protected against the danger that they might eventually be called upon to testify in hundreds or even thousands of breast implant trials around the country – a form of involuntary servitude that few scientists would have equanimously contemplated. To guard against this possibility, the court provided for a single, videotaped ‘trial-perpetuation deposition’ by each expert, preceded by an informal
‘discovery-type’ deposition. Copies of the video testimony would then be used in subsequent trials, leaving the persons of the actual experts free to continue with their pre-SGBI existence.

The awkwardness of these procedural accommodations was always apparent to the court and the party representatives, members of a shared legal culture, if not to the scientists themselves. Some extracts from the transcript of the National Science Panel’s meeting with party experts on 22 July 1997 illustrate the point. Tension was evident in Judge Pointer’s opening remarks:

Good morning to each of you. We are doing something in a courtroom that’s not however like what ordinarily goes on in a courtroom. We are trying to emulate to the extent we can the type of presentations that might occur at a scientific meeting. There are some modifications obviously to that.

The judge called attention to the novel rules of the game in these extraordinary proceedings, cautioning that they would not come easily to all the players:

I do not anticipate that there will be any objections raised by the attorneys. Now, this is really going to be tough. And if you observe them twitching, it’s because they know that if this was a regular courtroom proceeding they would be up saying I object and raising issues. The fact that they don’t object does not mean that they would not make objections if a particular item or topic was being presented during a courtroom proceeding.

In turn, the plaintiffs’ lawyer, the Texan Tommy Jacks, echoed the theme of enforced restraint:

[A)s Judge Pointer mentioned, those of us certainly on the side of the courtroom that I am speaking for this morning are going to do our very best to see that this process this week is driven by the scientists and by the physicians and not by the lawyers. We are going to do our best to stay out of your way. We may have to put seat belts on a couple of these chairs over here to keep lawyers from rising to make a point or an objection but we are going to try to do that and let that be your process and not ours.52

The truce, such as it was, broke down, as we see below, almost immediately after the panel presented its report.

_Limits of Neutrality: The Tugwell Controversy._ There were signs from early on that it would be especially difficult to identify a neutral rheumatologist, defined as someone not previously consulted or retained by any of the parties. Yet the centrality of rheumatology to the ‘atypical’ or ACTD claims made it imperative to identify such a person. The order establishing the National Science Panel devoted an entire paragraph to the process for selecting a specialist in this field. As an initial matter, the parties were each asked to nominate a rheumatologist whom they had not retained (and did not intend to retain) to advise the Selection Panel on possible nominees.
Pointer cautioned the parties that undue partisanship at this preliminary stage could adversely affect their interests:

While the parties are not precluded from designating for this purpose a rheumatologist with known and strong views concerning potential issues or with whom they may have previously consulted, they are cautioned that the members of the Selection Panel are likely to give less attention and weight to suggestions expressed by rheumatologists who themselves appear to be partisan or lacking in objectivity.53

With this caveat, the judge shifted to the parties some of the responsibility for striking the delicate balance between self-interested advocacy and the production of a scientific record that would stand up to future charges of bias or interest.

Somewhat surprisingly, in spite of all the precautions, the plaintiffs’ side discovered during the discovery deposition that Peter Tugwell, the panel’s rheumatology expert, had participated (while still serving on the panel) in a half-day meeting arranged by Bristol Myers-Squibb, one of the defendant companies. Tugwell had been paid a fairly paltry $750 for his expenses, but had agreed to take part in Canadian clinical trials of two of the company’s non-breast implant products. Further digging unearthed payments by Bristol-Myers, along with several other companies, to a biennial conference series of which Tugwell was a prime organizer, and also the involvement of one of his colleagues, George Wells, in a research project funded by Zimmer Canada Ltd, a Bristol-Myers subsidiary. On 13 April 1999, armed with these findings, the plaintiffs asked the court to vacate both Tugwell’s appointment and, on a theory of taint by association, the entire National Panel. In an order dated 25 April 1999, Pointer refused the plaintiffs’ request, providing extensive reasons that cast an interesting light on the court’s conception of ‘neutrality’. Pointer made it clear that he did not necessarily consider it a disqualification for a court-appointed expert, or the expert’s departmental colleagues, to participate in non-breast implant research funded by an implant manufacturer:

The court concluded, and it continues to believe, that a scientist can act neutrally and objectively in conducting research even if the outcome of that study may adversely affect some company that has been or potentially may be a source of funding for other research or activities. The more remote and the less substantial in amount the past or potential financial support from such a company, the less justified is any inference that the research will be affected or influenced by such considerations.

In conformity with this reasoning, Pointer’s order prohibiting communications between the panel and the litigants (except through the panel’s attorneys) explicitly did not cover matters unrelated to breast implants. Consequently, the judge found that Tugwell’s attendance at the Bristol-Myers meeting was harmless because ‘the topic to be discussed related to therapies for rheumatoid arthritis, a matter unrelated to breast implants, which have never been claimed to act as a therapeutic agent’. Similarly, he held innocent the participation of Tugwell’s colleague Wells on an advisory
committee that dealt with saline rather than silicone implants. However, while Pointer detected no substantive conflicts of interest, he did concede that the question of appearances was more difficult. With admirable candour, he admitted that he probably would have asked for the nomination of rheumatology experts other than Tugwell had he known of the Bristol-Myers engagements before the summer of 1996. As it is, however, the court had Tugwell’s actual performance on the panel to counterbalance mere intimations of impropriety. The scientist’s work, Pointer observed, had been ‘impartial, unbiased, neutral, objective, and unaffected by any relationship or contact with the defendants’. The reality that the court had seen with its own eyes took precedence over the hypothetical taint urged by the plaintiffs.54

We thus see resurfacing in this most uncase-like of cases the fine-grained empiricism characteristic of common law reasoning. Pointer’s ruling calls attention to the profound failure of connection between the critique of neutrality sought by the plaintiffs and the kind of critique that can be successfully formulated within the discursive limits of the law. From the plaintiffs’ standpoint, the disturbing factor was the pervasiveness of contacts between a supposedly neutral expert and the pharmaceutical industry that made and marketed silicone gel breast implants. Theirs is an argument about the political economy of contemporary biomedical science and technology, about the cumulative impact of capital and its unequal distribution in the world on the objectivity of the scientist’s gaze. But such structural arguments are difficult to translate into the empiricist discourse of the courts, where the ‘smoking gun’ is in many respects still the gold standard of proof. The only language the plaintiffs could latch on to in this case was the ‘appearance’ of bias, but on this point they had to contend with the countermanding power of the judge’s eye. Pointer himself had become a de facto character witness for Tugwell. To shake his conviction of Tugwell’s neutrality would have required positive evidence of wrongdoing of a sort that the plaintiffs could not muster.

**Disembodied Victims**

Women’s bodies are at the centre of the implant saga, a point that has not gone unnoticed in the mass media. Connie Chung clearly understood how widely the story would resonate with women’s dreams and fears in her controversial televised segment on breast implants. And, in May 1999, Britain’s Channel 4 TV aired a brilliantly conceived, generally pro-implant programme with the stunningly politically incorrect title ‘Storm in a D-Cup’. The opening scene showed a curvaceous young woman undressing and then, confronting the camera photographed from the waist up, addressing her audience as follows:

Hi, I’m Vickie [undressing], and I live in California. I have breast implants.
I’ve had them for about 5 years now.
And – umm – getting my implants is probably one of the best things I’ve ever done in my life.
If not the best [laugh]... 

I know that it's the thing that makes me the happiest that I've done for myself. 55

By contrast, Marcia Angell, one of the show's featured experts, was shown in markedly scholastic poses, mostly as a talking head against a backdrop of books. The remainder of the show, choreographed to the tune of evocative songs from the Beatles and the Beach Boys, featured not only images of breasts in profusion—clothed and unclothed, human and inanimate, whole and cut open for surgery—but also bouncing balls, oranges and lemons, and other rounded reminders of the physicality of the subject under discussion. Yet breasts and bodies, remarkably, were kept more or less out of the picture in the deliberations of the National Science Panel. How was this erasure achieved?

Technically, the MDL 926 panel was asked to deal only with the question of 'general causation': that is, whether silicone in general could cause the kinds of symptoms and syndromes that the litigants complained of. At this pre-trial phase, questions of 'specific causation'—whether particular women had been affected by implants—were not at issue. Nor was the issue of local complications caused by the implants, which could not have been addressed without focusing attention on the body. Judge Pointer made this demarcation clear in his original charge to the panel: 'You are not being asked to consider purely local complications, such as breast disfigurement, tenderness, or capsular contracture'. 56 Similarly, he noted in his opening remarks at the July 1997 panel meeting that local injuries which were not directly before the panel might crop up, but only incidentally. The choice of fields represented on the expert panel also downplayed clinical knowledge of actual human bodies in favour of statistical knowledge about aggregate trends.

But the demarcation between local and systemic, particular and statistical, was not one that the plaintiffs' side, at least, was prepared to accept without a struggle. At the July meeting, for example, Tommy Jacks questioned the very idea that local complications could be kept entirely separate from effects on the system as a whole:

You will hear the presenters talk about some phenomenon [sic] that take place with the implants or at or near the implant site, such as site, such as implant rupture, the rate at which implants rupture, bleed.

And while these are local phenomena, I think if you will bear with us, and after you have heard the presentations of all the presenters and see how the information correlates between the presentations, you will see that in many cases these local events have implications or have effects that are not local at all. 57

Though the victims themselves were not part of the line-up at the July meetings, they were represented by treating physicians familiar with their complaints. To make the suffering bodies speak for themselves, these plaintiffs' experts had to find a scientific envelope that would justify
bringing individual complaints into a hearing room focused upon issues of
general causation. ‘Thinking in cases’, the clinician’s (and typically the
jurist’s) preserve, had to be repackaged as ‘thinking like scientists’, the new,
post-Daubert preoccupation of courts. An exchange between one such
expert, Dr Gary Solomon, and a defense lawyer, Mary Wells, illustrates the
problematic character of this bridging exercise:

Ms Wells: Doctor, you’ve told us before that you, in fact, believe that you
can determine whether or not an exposure to a substance caused disease
in a particular patient without having it scientifically established that the
substance is capable of causing disease in people in general; isn’t that
right?

Dr Solomon: Well, again, a little bit out of context. You have a habit of that.
But as clinicians faced with individual patients, you have to often make
determinations of what is likely and what is not based on the evidence you
have, which is the signs and symptoms and laboratory tests in front of
you.58

In his replies to this and subsequent questions, Solomon explained in
detail how clinicians can reason backward from a set of symptoms to a
plausible cause, a method that goes by the name of ‘differential diagnosis’
in clinical parlance. Unhappy with these answers, Wells soon requested
the court to curtail the expert’s lengthy responses to her own ‘short’
questions.

Women’s bodies, of course, could never be wholly excluded from the
implant proceedings, but for the MDL 926 panel, there was no necessary
correspondence (as there would have been in a traditional jury trial)
between the science under review and the bodies that the implants affected.
Instead, as I have suggested elsewhere, the presence of women in the
proceedings, for example as competent defense lawyers and scientific
experts, was stage-managed in ways that sought to break the link between
‘woman’ and ‘victim’ that spoke so powerfully to juries in the early breast
implant trials.59

In Defence of Science

The third striking aspect of the MDL 926 proceedings from the standpoint
of the politics and sociology of knowledge is the variety of ways in which
both the judge and the defense drew upon the notion of science as a source
of authority apart from the specifics of the National Science Panel and its
particular technical judgements. The desire to constitute a transcendental,
non-case-specific body of knowledge is apparent in the curious third
element of the charge that Judge Pointer gave to the panel. Beyond out-
lining the issues they were to consider and the scope of their deliberations,
Pointer also asked the panelists to consider the possibility of legitimate
dissent from the views expressed in their report:

Contrary Opinions. To what extent, if any, should any of your opinions
referred to in (a) above be considered as subject to sufficient genuine
dispute as would permit other persons, generally qualified in your field of
expertise, to express opinions that, though contrary to yours, would likely
be viewed by others in the field as representing legitimate and responsible
disagreement within your profession.\textsuperscript{660}

This question in effect turned Frye inside out: instead of trying to fit one or
another expert witness’s scientific views inside a pre-existing category of
general acceptance (the admissibility criterion in Frye), the panel was
instructed to manufacture a consensus that would function as general
acceptance – and then to rule out the possibility that ‘genuine dispute’
could exist outside the four corners of their report. Not surprisingly, the
panellists were somewhat uncomfortable with this request, which seemed
to ask for a foreclosure of future scientific possibilities, but they did their
best to oblige:

The panel members are in agreement on the findings and interpretations
of the data on silicone breast implants and connective tissue diseases, and
their immunologic correlates, as presented in this report. The material
presented represents an analysis of the most rigorous and relevant scient-
ific information currently available. It is our informed opinion that the
large majority of scientists in our respective disciplines would find merit in
our reviews and analyses. Nevertheless, as in every field of endeavor, a few
individuals may find disagreements with our statements. As individual
scientists and as a group, we have taken no predetermined position on the
issues, nor have we designed the report to refute or enhance any point of
view. On the contrary, we have allowed the existing research data to lead
us to the conclusions presented. We cannot anticipate what research
findings may appear in the future.\textsuperscript{61}

The final sentence leaves open a very small crack for prospective develop-
ments. For the present, the panellists were prepared to declare the case
closed.

The proceedings before the panel show that the plaintiffs’ side was
arguing for a more situated, case-specific, and practice-based theory of
knowledge than were the defendants, for whom ‘science’ was more of
an impersonal and sharp-edged sword. Again, extracts from two sides’
presentations to the panel may help to clarify the point. Thus, Tommy
Jacks, the plaintiffs’ representative, promoted the notion that causation in
breast implant cases could not be determined without taking into account
the body’s specific responses – a position that necessarily privileged the
knowledge of the clinician and, indirectly, the human subject:

You will hear this afternoon from Dr Lu-Jean Feng, a plastic surgeon who
has vast experience in studying the body’s response to materials involved
with these implants. And she will be reporting to you about her findings
concerning such matters as implant ruptures, about the migration of
silicone within the body, about the body’s response to the formal granu-
lomas and so forth.

And you may find that you haven’t done the things she has done and don’t
practice in the field she practices, but nevertheless feel that there is a
sound scientific – reasonable scientific basis for the conclusions she has
reached.\textsuperscript{62}
The defense, as we have already seen in the exchange between Wells and Solomon, was not prepared to concede the possibility of a sound science based only on clinical knowledge. Its strategy, instead, was to insist on a univocal and impersonal science, amenable to assessment according to exogenous criteria that neatly assimilated both the Daubert factors and other elements from the repertoire of empiricism. An extract from the opening statement by Debra Pole, the high-flying, African-American defense lawyer for Baxter Healthcare Corporation, underscores the differences between the two sides’ conceptions of reliable knowledge:

The scientists that Baxter and Bristol and 3M will introduce to you will stress a principle that is second nature to you as scientists, namely the scientific method. That principle is supplied and followed by true scientists which [sic; when?] considering any issues and before reaching any proper conclusion about medical causation... A genuine dispute or a legitimate and responsible disagreement can only exist if such contrary view is premised upon the familiar scientific principles that guide you as scientists, such as precision, such as scientific methodology, such as testing of hypotheses, peer review, absence of flaws in method and reasoning, control mechanisms and absence of high rates of error. Consistency with accepted theories and absence of bias.53

Whereas the plaintiffs presented the complexities of situated knowledge, which called for the clinician’s particularized expertise, the defense offered the reassuring picture of a ‘true’ scientific method that was ‘second nature’ to scientists — by implication to all scientists. In the latter model, even disagreement could be neatly classified as responsible or irresponsible in accordance with widely accepted, communal criteria of acceptability. Was there any question which picture would find more favour with the panel members, who themselves had been selected to embody the impartiality and universality of science?

To conclude this section, let us return to Judge Pointer’s reflections on the Tugwell controversy. Explaining why he was rejecting the plaintiffs’ motion to vacate the panellist’s appointment, Pointer ruminated on the differences he perceived between the cultures of law and science:

One last observation can be made. The questions raised by the PSC’s motion, and indeed the examinations of the other three experts which have already been conducted, indicate perhaps some cultural chasm, when considering scientific research, between the approach of those in the scientific community and that of those involved in litigation. It appears that the approach of scientists is to critique research largely confined to the four corners of the reported research; ‘ad hominem’ considerations directed at the individuals involved in that research generally are to be disregarded and may be viewed as inappropriate attacks upon the integrity of those individuals. On the other hand, the approach of those involved in litigation, at least in this country’s adversarial system, tends to be one of skepticism and distrust, ready to consider possible motivations and influences that may have affected, even subconsciously, the conduct or conclusions of a study or, indeed, even the reported observations upon which the study is based.
This attitudinal difference, if the court is correct in its assessment, can produce some dysfunction when, as here, persons from the scientific community with little or no experience in litigation are co-opted into the legal system via court-appointment under Rule 706. This is a matter that deserves greater consideration and exploration as persons from both perspectives consider further use of Rule 706.

These remarks capture the essence of the common law jurisprudence, warts and all: Pointer is humble, reflective, case-centred, willing to admit imperfect knowledge and to learn from incremental experience, but he lacks the resources to critique widely held assumptions regarding the nature of scientific knowledge, culture and power. In invoking the ‘culture clash’ between law and science, the judge at once reaffirms the existence of a sharp demarcation between the practices of law and science, and reinforces taken-for-granted notions about the impersonality and value-neutrality of science. In the future, Pointer concludes, courts should consider bridging the cultural gap between research and litigation by giving ‘more detailed instructions as to what should and should not be permitted while a scientist serves as a court-appointed expert’.

Conclusion

Mass torts, and the case of silicone gel breast implant litigation in particular, underscore the fact that the effects of industrialization have worked their way into one of the last bastions of personalized social problem-solving. Forced largely by failures of political will in the other branches of government, courts are under pressure to see more like a state and to think more like scientists, thereby embracing two of the most powerful ordering paradigms of modernity. At the same time, judges’ training in situated, context-sensitive reasoning — casuistry, if you will — keeps resurfacing at unexpected moments, so that the legal gaze is never completely transformed into the administrative gaze, and notions of individual justice are never wholly subsumed under notions of efficiency. A similarly unresolved tension holds sway in the courts’ relations with institutionalized science. While judges will go far in borrowing, and so legitimating science’s own rhetorics of justification, the ultimate test of what passes for persuasive reasoning in court remains, as Justice Breyer demonstrated in *Kumho*, the judge’s own experientially informed sense of rationality. It is the judicial idea of facticity that governs, especially when the truth can be ascertained, as it were, by the naked eye. In the wake of *Daubert*, then, the shift of witnessing capacity from juries to judges seems more clearly manifest than the shift of cognitive authority from the courts to ‘mainstream science’.

Reviewing the progress of MDL 926, at one level an exemplary case of industrialized tort litigation, one cannot help being struck by the persistently case-centred dynamics of much of its scientific process. From Judge Pointer’s essentially *ad hoc* decisions about which fields to represent on the National Science Panel, through the particularistic rules governing hearings and depositions, to the unexpected debate over the rheumatologist Peter Tugwell’s integrity, there never was a moment when knowledge-
making or the certification of expertise occurred in accordance with preordained, canonical rules of scientific inquiry. The panellists were creating a product for legal consumption, in a market framed and hemmed in by the discursive and procedural demands of the law, which happened to include, almost as an anomaly, the injunction that their determinations should pass muster as ‘reliable science’ about the health impacts of SGBIs.

These dynamics prompt several further observations with respect to the strategies of modernization currently at play in American tort litigation. The first concerns the relationship between science and subjectivity in the resolution of aggregated personal injury claims. The MDL 926 process indicates that producing a single body of accredited evidence in cases where the science is contested, particularly in the post-Daubert era, may involve the courts in many novel, collateral practices of knowledge-making: for example, designating the experts, assessing their credibility, creating ad hoc discursive practices, and demarcating relevant from irrelevant knowledge. Inevitably, such a process produces sharper, more black-and-white demarcations where individualized adjudication might have retained more shades of grey. The MDL 926 experience highlights the vulnerability of the clinical gaze, with its holistic perspective on the human body, when it comes into conflict with epidemiology’s statistical vision. The impersonality that ‘good’ science demands produces as its afterimage an equally impersonal legal subject – the statistical victim. This plaintiff’s claim stands or falls in accordance with the administrative state’s calculus of probabilities, untempered by consideration of her individual circumstances.

The consolidated approach to knowledge creation notably reverses some traditional presumptions about the burden of scientific uncertainty in the US legal system. Judicial remedies have long been regarded as compensating, to some degree, for the imperfections of regulation, and through much of the 20th century US courts functioned as the place where the unavoidable harms of an increasingly technological society could be appraised and alleviated. Lawsuits have provided a spur for the production of case-specific information to fill gaps in pre-existing knowledge; they have offered remedies to the residual victims of otherwise beneficial technologies, and thus helped spread the costs of uncertainty to manufacturers and wider consuming publics. In the SGBI case, however, the science panel did more to codify existing knowledge about typical connective tissue disorders than to produce new understandings about the status of the ‘atypical’ disease claims. Ironically, this highly constructed and specifically tailored process produced conclusions that were thereafter taken to be the ‘generally accepted’ expertise on the subject. What emerged was a species of defensive science that supported the status quo. It never fully engaged with the knowledge gaps produced by marketing an untested medical device to several million women.

The third observation has to do with the implications of the technocratic turn in litigation for accountability in contemporary risk societies. There is cause for worry that the hybridizing of adjudicatory and administrative approaches in mass tort litigation may squeeze out the opportunity
for broad-gauged social and cultural criticism of technological change, without offering countervailing gains in the form of increased social justice. Courts, as we have seen, remain unsatisfactory places in which to advance large arguments about the political economy of knowledge, innovation and power; even when judges operate like mini-states to address alleged failures of industrialization, their practices tend to remain craft-bound and their modes of reasoning tied to the specifics of cases. One of the jury’s unsung rôles arguably has been to reintroduce the dimension of social critique within the parameters of the individual case. If so, the industrialization of tort law and the courts’ attendant dependency on an institutionally validated science have restricted the space for such post hoc micro-politics. Closure reached through litigation may operate, then, to silence debate about the downsides of production, with added legitimacy because the results were seemingly obtained on the basis of ‘good science’. If the jury has lost power and the victim has lost definition in the new era of tort litigation, then the same cannot be said of the court-appointed expert. Here is a newly confident, judicially empowered actor whose attempts to establish autonomy and agency within the partisan context of litigation will bear careful watching. In this spirit, perhaps we should give the last word on the MDL 926 science panel to Nancy Kerkvliet, the toxicologist from Oregon State University:

It was a very valuable process, and those of us in science would like to see scientific panels be relied on more in terms of getting unbiased opinions, really look at the science and not be swayed by litigation.66

Notes

An earlier version of this paper was prepared for a panel on ‘The Case’ at the 1999 Summer Academy of the Max-Planck Institute for the History of Science in Berlin. The paper has benefitted greatly from the responses of participants at the Academy, as well as from later presentations at Princeton University and the University of Minnesota Law School. Particular thanks are due to John Forrester, Elisabeth Lunbeck and Susan Wolf for their perceptive comments. I am also extremely grateful to the Wellcome Trust’s Medical Film and Video Library and to its extraordinarily helpful head, Dr Michael Clark, for permission to use their resources. The responsibility for any errors or infelicities in the paper remains, of course, entirely mine.

1. In American legal culture, the ‘case’ came to stand for a particular way of reasoning about the law that was highly context-specific and not reducible to general principles. The status of the case was solidified through the invention of the ‘case method’ as a pedagogical technique at Harvard Law School in the 1870s. See John Forrester, ‘If p, then what? Thinking in Cases’, History of the Human Sciences, Vol. 9, No. 3 (August 1996), 1–25.

2. Two cases decided just months apart in 2000 and 2001 illustrate the reach of the US Supreme Court into questions of high politics. In George W. Bush v. Albert Gore, No. 00–949, 531 US 98 (2000), a bitterly divided Court decided to invalidate the recount procedure ordered by the Florida Supreme Court, thereby in effect handing the victory in a closely contested presidential election to Bush. In Whitman v. American Trucking Associations, Inc., No. 99–1257, 531 US 457 (2001), the Court unanimously reaffirmed that the US Environmental Protection Agency should not consider implementation costs in setting standards for air pollutants. It also held that the scope of delegation
under the Clean Air Act was adequately constrained, thus beating back a challenge to
the constitutionality of this most basic piece of environmental legislation.

3. Some social theorists regard the spread of risk, often in apparent disregard of class or
socioeconomic status, as one of the salient features of post-modernity. See Ulrich Beck,
Beck, Anthony Giddens and Scott Lash, * Reflexive Modernization: Politics, Tradition and


One or more members of a class may sue or be sued as representative parties
on behalf of all only if (1) the class is so numerous that joinder of all
members is impracticable, (2) there are questions of law or fact common to
the class, (3) the claims or defenses of the representative parties are typical of
the claims or defenses of the class, and (4) the representative parties will
fairly and adequately protect the interests of the class.

For the complete text of Rule 23, see <http://www.law.cornell.edu/rules/frcp/overview.htm>.

5. Individual differences that are submerged for the purpose of initiating legal action often
resurface in conflicts over how to award any settlements that are achieved. A tragic
reminder that aggregate awards cannot solve the justice problem of demarcating like
cases from unlike ones emerged in the wake of the 11 September 2001 terrorist attacks
in the United States. Although Congress appropriated and private donors contributed
large sums of money for the relief of victims and their relatives, fissures soon appeared
over who would be classified as a 'victim', and even over the fact that the 11 September
victims would receive more aid than had been awarded to the US victims of prior
terrorist incidents: see Diana B. Henriquez and David Barstow, 'Fund for Victims'

6. For a review of judicial innovation over the long history of asbestos litigation, see Tom
Durkin and William L.F. Felstiner, 'Bad Arithmetic: Disaster as Less Than The Sum of
its Parts', in Sheila Jasanoff (ed.), *Learning from Disaster: Risk Management After Bhopal*

7. For a gripping account of one such case, replete with unforeseen procedural twists and
turns and an extraordinary amount of active judicial management, see Peter H.
Schuck, *Agent Orange on Trial: Mass Toxic Disasters in the Courts* (Cambridge, MA:

8. The definition of 'mass tort litigation' accepted by the American Bar Association is 'at
least 100 civil tort actions arising from a single accident or use of or exposure to the
same product or substance, each of which involves a claim in excess of $50,000 for
wrongful death, personal injury, or physical damage to or destruction of tangible
property': American Bar Association, Commission on Mass Torts, *Report to the House of
Delegates* (1989), 5. At that time, a claim had to be worth at least $50,000 to be
entitled to diversity jurisdiction (based on claimants being residents of different states)
in federal courts; that amount was raised to $75,000 in 1997. Another criterion of
classification for mass torts is whether they are 'single event' or 'dispersed'. Roughly
speaking, the former, more determinate type results from single catastrophic events,
causing injury to a large but identifiable set of people; the latter, more indeterminate
type occurs at many sites and, if it involves a latent disease, may accrue over many
years. In practice, the two categories are not so cleanly divided. A single toxic release,
for example, may cause injury down the line to the unborn children and even
grandchildren of those exposed, and its latent effects may not become known till
decades have gone by.

9. See, for example, Peter W. Huber, *Galileo's Revenge: Junk Science in the Courtroom* (New
think tank, the Manhattan Institute, popularized the term 'junk science' to significant
political effect.

10. See, for example, Joseph A. Sanders, *Bendict on Trial: A Study of Mass Tort Litigation*
(Ann Arbor: University of Michigan Press, 1998). Documenting the fact that pro-
plaintiff verdicts were awarded only in those cases where the plaintiff’s evidence was allowed to reach the jury, Sanders concluded: ‘If there is one lesson to be drawn from these cases, one single, overarching problem revealed by the Bendectin litigation, it is that in cases involving complex scientific evidence juries have a difficult time reaching the truth’ (ibid., 193).


12. *Report of the Judicial Conference Ad Hoc Committee on Asbestos Litigation* (March 1991), 2–3, as quoted in *Amchem Products, Inc. v. Windsor*, 526 US 137 (1999), at 598. Of course, numbers such as these are bound to be disputed, and some American trial lawyers have estimated considerably larger numbers of fatalities.


16. American litigiousness is, of course, proverbial: see, for example, Jethro K. Lieberman, *The Litigious Society* (New York: Basic Books, 1981). It is, however, supported by a number of important structural features, such as contingency fees for attorneys, punitive damages, and the absence of a requirement that losers pay the winners’ costs. At the same time, as the asbestos case itself illustrates, public policy in America has proved resistant to administrative remedies for industrial and product-related injuries, leaving litigation as the only practical choice for many victims.

17. James C. Scott, *Seeing Like a State* (New Haven, CT: Yale University Press, 1998). Scott uses the term to refer to ‘high-modernist’ planning states, which simplified and standardized their subjects in order to control them more efficiently. Such simplifications, however, accompany even the most benign efforts of modern states to understand and address mass social problems: see, for example, Theodore M. Porter, *The Rise of Statistical Thinking, 1820–1990* (Princeton, NJ: Princeton University Press, 1986).


20. Ibid.


22. Ibid., 621.


26. The history of this rule is conventionally traced to a 1782 English case, in which Lord Mansfield observed that ‘the opinion of scientific men upon proven facts may be given by men of science within their own science’: *Folkes v. Chad*, 3 Doug. 157 (1782), as quoted by Lawton, L.J. in *R. v. Turner*.

27. For a detailed review of the scientific arguments, see Sanders, *Bendectin on Trial*, op. cit. note 10, 45–89.

28. The rule was named after an appellate court decision to exclude lie detector testimony in a federal murder trial: *Frye v. United States*, 293 F. 1013 (DC Cir. 1923).

30. Exclusion of expert testimony was outcome determinative in *Joiner* because it left the plaintiff with no evidence in support for his causal claim, thus permitting the case to be dismissed on summary judgment.

31. Breyer was the author of a much praised, but practically disregarded, recommendation that risk assessment functions in the federal government should be centralized in an insulated and highly-trained special bureaucracy: Stephen Breyer, *Breaking the Vicious Circle: Toward Effective Risk Regulation* (Cambridge, MA: Harvard University Press, 1993). Interestingly as well, Breyer was the sole member of the Court who felt that the *Georgine* settlement (see above) did not necessarily transgress the borderline between seeing like a state and seeing like a court.


33. Ibid., at 150.


39. See, for example, Sanders, *Bendectin on Trial*, op. cit. note 10, 193–211.


41. For example, in *People v. Marx*, 54 Cal.App.3d 100 (1975), a California court admitted evidence of bite marks on the victim’s body, although such testimony was not supported by an ‘established science of identifying persons from bite marks’ (ibid., 107). The court found especially persuasive the fact that the experts relied on ‘scientifically and professionally established techniques – X-rays, models, microscopy, photography to produce data that were independently verifiable by the court’ (ibid., 111). See also: Jennifer Mnookin, ‘The Image of Truth: Photographic Evidence and the Power of Analogy’, *Yale Journal of Law and the Humanities*, Vol. 10 (1998), 1–74.


47. For further details, see Angell, *Science on Trial*, op. cit. note 45, esp. 100–08.

48. Judge Pointer concluded that ‘it would be preferable to have a single set of nationally-appointed experts, whose testimony might be potentially usable in the many federal courts to which breast-implant cases have been (or in the future may be) remanded’: *In re Silicone Gel Breast Implant Products Liability Litigation* (MDL 926), Order No. 31 (30 May 1996).
49. The four panelists were Dr Nancy I. Kerkvliet (toxicology), Dr Betty A. Diamond (immunology), Dr Barbara S. Hulka (epidemiology) and Dr Peter Tugwell (rheumatology).

50. MDL 926, Order No. 31, ¶2(b).

51. MDL 926, Order Nos 31D, 31F.

52. In re Silicone Gel Breast Implant Products Liability Litigation, Master File No. CV-92–10000–S (22 July 1997), Transcript, quotes at 3, 5–6 and 10. This document will hereafter be cited as SGBI Transcript.

53. MDL 926, Order No. 31, ¶2(b)(4).

54. All the quotations in this paragraph are taken from MDL 926, Order No. 31L.


56. MDL 926, Order No. 31E (31 October 1996), ¶1(b).

57. SGBI Transcript (22 July 1997), 20.


59. Stage managing was especially obvious in the deployment of women professionals to present the defendants’ case in an Oregon pre-trial proceeding that also used an expert panel: see Jasanoff, ‘Expert Games’, op. cit. note 38.

60. MDL 926, Order No. 31E, ¶1(c).

61. MDL 926, Report of National Science Panel, Executive Summary.

62. SGBI Transcript (22 July 1997), 16.

63. Ibid., 30–31.

64. MDL 926, Order No. 31L.

65. On this point, see also Jasanoff, Science at the Bar, op. cit. note 37, 7–11.


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