

Cambridge University Press

978-0-521-86182-3 - Toxic Torts: Science, Law, and the Possibility of Justice

Carl F. Cranor

Frontmatter

[More information](#)

TOXIC TORTS

The U.S. tort, or personal injury law, cloaked behind increased judicial review of science, is changing before our eyes, except we cannot see it. U.S. Supreme Court decisions beginning with *Daubert v. Merrell Dow Pharmaceutical* altered how courts review scientific testimony and its foundation in the law. The complexity of both science and the law mask the overall social consequences of these decisions. Yet they are too important to remain hidden. Mistaken reviews of scientific evidence can decrease citizen access to the law, increase incentives for firms not to test their products, lower deterrence for wrongful conduct and harmful products, and decrease the possibility of justice for citizens injured by toxic substances. Even if courts review evidence well, greater judicial scrutiny increases litigation costs and attorney screening of clients and decreases citizens' access to the law. This book introduces these issues, reveals the relationships that can deny citizens just restitution for harms suffered, and shows how justice can be enhanced in toxic tort cases.

Carl F. Cranor is Professor of Philosophy at the University of California, Riverside. His work focuses on issues concerning the legal and scientific adjudication of risks from toxic substances and from the new genetic technologies. He has written *Regulating Toxic Substances: A Philosophy of Science and the Law* (1993), edited *Are Genes Us? The Social Consequences of the New Genetics* (1994), and coauthored the U.S. Congress' Office of Technology Assessment report, *Identifying and Regulating Carcinogens* (1987). His articles have appeared in diverse journals such as *The American Philosophical Quarterly*, *Ethics*, *Law and Contemporary Problems*, *Risk Analysis*, and the *American Journal of Public Health*. He is a Fellow of the American Association for the Advancement of Science and the Collegium Ramazzini and a member of the Center for Progressive Reform, a nonprofit think tank of legal scholars committed to protecting the public health and the environment.

Cambridge University Press

978-0-521-86182-3 - Toxic Torts: Science, Law, and the Possibility of Justice

Carl F. Cranor

Frontmatter

[More information](#)

Toxic Torts

Science, Law, and the
Possibility of Justice

Carl F. Cranor

University of California, Riverside



CAMBRIDGE
UNIVERSITY PRESS

Cambridge University Press

978-0-521-86182-3 - Toxic Torts: Science, Law, and the Possibility of Justice

Carl F. Cranor

Frontmatter

[More information](#)

CAMBRIDGE UNIVERSITY PRESS

Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo

Cambridge University Press

32 Avenue of the Americas, New York, NY 10013-2473, USA

www.cambridge.org

Information on this title: www.cambridge.org/9780521861823

© Carl F. Cranor 2006

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2006

Printed in the United States of America

A catalog record for this publication is available from the British Library.

Library of Congress Cataloging in Publication Data

Cranor, Carl F.

Toxic torts : science, law, and the possibility of justice / Carl F. Cranor

p. cm.

Includes bibliographical references and index.

ISBN 0-521-86182-9 (hardback : alk. paper)

1. Toxic torts – United States. 2. Hazardous substances – Law and legislation – United States.

3. Chemicals – Law and legislation – United States. I. Title.

KF1299.H39C73 2006

346.7303'8 – dc22 2006015960

ISBN-13 978-0-521-86182-3 hardback

ISBN-10 0-521-86182-9 hardback

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party Internet Web sites referred to in this publication and does not guarantee that any content on such Web sites is, or will remain, accurate or appropriate.

Cambridge University Press

978-0-521-86182-3 - Toxic Torts: Science, Law, and the Possibility of Justice

Carl F. Cranor

Frontmatter

[More information](#)

For Crystal, Chris, and Taylor

Contents

<i>Preface</i>	<i>page xiii</i>
1. The Veil of Science over Tort Law Policy	1
INTRODUCTION	1
THE LEGAL ADMISSIBILITY OF EXPERT TESTIMONY	
AND SCIENTIFIC EVIDENCE	7
The Need for Scientific Studies	8
Special Features of Toxic Substances	9
INJURIES MAY LONG PRECEDE THE SCIENTIFIC	
UNDERSTANDING OF THE CAUSES OF INJURY	13
THE SCIENCE-LAW INTERACTION	16
SOME SOCIAL IMPACTS OF THE SCIENCE-LAW INTERACTION	18
Walter Allen	18
Lisa Soldo	20
Melissa Globetti	22
Ruby Quinn	23
Robert Joiner	25
SUMMARY	28
2. Legal Background	31
INTRODUCTION	31
THE TORT LAW	31
A LEGAL CASE IN OUTLINE	33
Complaint and Answer	33
Discovery	34
	vii

viii – Contents

Pretrial Conferences	34
Plaintiff’s Case-in-Chief	36
Defendant’s Case-in-Chief	36
Closing Arguments and Proposed Jury Instructions	36
Plaintiff’s Burden of Persuasion	36
Plaintiff’s Standard of Proof	37
SUBSTANTIVE ISSUES IN THE TORT LAW	37
Causation in Toxic Tort Suits	38
The Role of Scientific Evidence and Expert Witnesses in Establishing Causation	39
The Admissibility of Evidence	40
Summary Judgment	41
Judgment as a Matter of Law	42
Some Procedural Puzzles	42
RECENT DEVELOPMENTS IN THE ADMISSIBILITY OF EXPERT TESTIMONY	45
The Bendectin Litigation and Related Cases	45
Concerns about the Companies	45
Perception of a Tort Law Crisis	46
The Supreme Court <i>Daubert</i> Litigation	47
Daubert v. Merrell Dow Pharmaceuticals, Inc.	47
Joiner v. General Electric and Kumho Tire v. Carmichael	52
The Admissibility Picture after the <i>Daubert</i> Trilogy	56
THE AFTERMATH OF THE BENDECTIN LITIGATION	58
Critiques	58
Correctives	59
CONCLUSION	61
3. Institutional Concerns about the Supreme Court’s Trilogy	62
OBVIOUS LESSONS	63
MORE TROUBLING ISSUES	68
Epistemic Presuppositions	68
Judge-Jury Responsibilities and the Right to a Jury Trial	70
The Intellectual Rigor Test	72
Review of Weight-of-the-Evidence Methodology	75
The Distinction between Methodology and Conclusions	79

	Contents – ix
“Fit”	82
Access and Process Bias in Toxic Tort Suits	83
Pursuit of Truth and Justice in Torts	88
CONCLUSION	90
4. Studies of Toxicity and Scientific Reasoning	91
FEATURES OF BIOCHEMICAL RISKS THAT HINDER IDENTIFICATION AND ASSESSMENT OF HARMS	92
STUDIES THAT ASSIST CAUSAL UNDERSTANDING	94
Human Studies	95
Randomized Clinical Trials	95
Epidemiological Studies	96
From Statistical Association to Causal Conclusion	102
Animal Studies	105
Other Data Relevant to Toxicity Assessments	111
SCIENTIFIC REASONING	115
Case Studies	115
The Scientific Data	117
Scientific Reasoning in Good Case Studies	125
Principles of Reasoning Underlying Causal <i>Inference</i>	128
Integrating Evidence	136
Causal Inferences in Epidemiology	140
The Importance of Scientific Judgment	142
Scientific Disagreement	144
Scientific Disagreement about Fundamental Issues	145
Scientific Disagreement about More Practical Issues	147
Disagreement at the Frontiers of Scientific Knowledge	149
The Fact of Reasonable Scientific Disagreement	151
THE METHODOLOGY-CONCLUSION DISTINCTION	152
CONCLUSION	155
5. Excellent Evidence Makes Bad Law: Pragmatic Barriers to the Discovery of Harm and Fair Admissibility Decisions	157
SCIENTIFIC IGNORANCE ABOUT THE CHEMICAL UNIVERSE	160
Resource Limitations	165
Corporate Failure to Determine the Safety of Their Products	166

x – Contents

FEATURES OF SUBSTANCES THAT FRUSTRATE THE DISCOVERY	
OF TOXICITY	170
Low Concentrations Can Be Toxic	170
Long Latency Periods	173
Rare Diseases	173
Common Diseases	175
Lack of Signature Effects	175
Weak vs. Strong Causal Effects of a Substance	176
Lack of Mechanistic Understanding	178
Novel Scientific Detective Problems	180
Substances That Are of Little Research Interest	180
SCIENTIFIC EPISTEMOLOGY BURDENS THE DISCOVERY	
OF TOXIC EFFECTS	182
General Considerations	182
Interpretive Issues	183
Inattention to the Distribution of Mistakes in Scientific Research	190
HEDGING IN SCIENTIFIC COMMUNICATION	192
Content-Oriented Hedging	192
Writer-Oriented Hedging	193
Reader-Oriented Hedging	194
COMMUNICATION BETWEEN SCIENCE AND THE LAW	197
CONCLUSION	200
Excellent Evidence Makes Bad Law	202
Injuries Can Long Precede the Scientific Understanding of Their Causes	202
6. Science and Law in Conflict	205
GENERIC TENSIONS BETWEEN SCIENCE AND THE LAW	207
Tensions in Goals	207
Tensions between Scientific and Legal Epistemic Practices	212
Critical Stresses	215
JUDICIAL RESPONSES TO THE SCIENCE-LAW INTERACTION	218
THE RISK OF SIMPLIFIED ADMISSIBILITY RULES	220
SPECIFIC CONCERNS FROM COURT DECISIONS	220

Demands for Particular Kinds of Evidence	221
Ideal Evidence Is the Enemy of the Good	221
Demands for Human Epidemiological Evidence	224
Special Restrictions on Epidemiological Studies	227
<i>Statistical Significance Requirements</i>	227
<i>Relative Risk Rules</i>	232
<i>Sample Size and Duration of Studies</i>	238
<i>Extrapolation from Women to Men and Middle-Aged to Old and Young Persons</i>	239
<i>Using “Hill’s Factors” for Excluding Evidence</i>	240
The Unfortunate Consequences of “No Effect” Studies	243
Demanding Mechanistic Evidence	245
The Mistaken Exclusion of Evidence	248
The Denigration of Animal Evidence	248
Discriminating among Animal Studies	252
Target-Site Arguments	254
Chemical Structure–Biological Activity Evidence	255
The Exclusion of Case Studies as Evidence	256
Never Throw Evidence Away	259
Requiring Detailed Exposure Information	260
Lumping vs. Splitting Toxicological Evidence	262
Further Confusions about Weight-of-the-Evidence Arguments	264
Confusing the Form of the Argument with the Standard of Proof	264
Confusing the Likelihood of Causation with Statistical Evidence for It	266
General and Specific Causation	267
DEFENSE CONTRIBUTIONS TO THE ABOVE ARGUMENTS	270
THE INTELLECTUAL RIGOR TEST	272
PURSUIT OF TRUTH AND JUSTICE IN TORTS	273
CONCLUSION	279
 7. Enhancing the Possibility of Justice under <i>Daubert</i>	 283
THE USE OF COURT-APPOINTED EXPERTS	284
TOWARD A SOLUTION FOR REVIEWING EXPERT TESTIMONY	286
A Proposal	286
Some Consequences of the Proposal	294

xii – Contents

PATTERNS OF TOXICOLOGICAL EVIDENCE	296
The International Agency for Research on Cancer	297
The National Toxicology Program	300
Toxicologically Reliable Patterns of Evidence	302
LEARNING FROM RELIABLE PATTERNS OF EVIDENCE	313
PRINCIPLES OF TOXICOLOGY UNDERLYING THE EVIDENTIARY PATTERNS	315
LEGAL DECISIONS EXEMPLIFYING SENSITIVE SCIENTIFIC REVIEWS	319
THE SOCIAL CONSEQUENCES OF ADMISSIBILITY DECISIONS REVISITED	324
<i>Allen v. Pennsylvania Engineering, Inc.</i>	324
The Parlodel Cases	328
<i>General Electric v. Joiner</i>	330
CONCLUSION	335
8. Is <i>Daubert</i> the Solution?	337
ACCESS AND PROCESS BIAS IN TOXIC TORT SUITS	338
HOW <i>DAUBERT</i> CAN UNDERMINE THE ACCEPTABILITY OF JUDICIAL DECISIONS AND CORRUPT SCIENCE	343
The Acceptability of Verdicts vs. a Focus on the Evidence	343
<i>Daubert</i> and the Acceptability of Verdicts	346
<i>DAUBERT</i> AND CAUSATION REQUIREMENTS	353
WHERE MIGHT THE LAW GO FROM HERE?	357
A Return to <i>Frye</i> ?	359
Is There a Need for Tort Liability Reform?	363
CONCLUSION	366
<i>Bibliography</i>	371
<i>Index</i>	391

Cambridge University Press

978-0-521-86182-3 - Toxic Torts: Science, Law, and the Possibility of Justice

Carl F. Cranor

Frontmatter

[More information](#)

Preface

It is tempting to say that our tort, or personal injury, law is changing before our eyes, except we cannot see it. These modifications are occurring because of Supreme Court decisions that increased the screening of expert (largely scientific) testimony in the law, but it is difficult for all but the best informed to comprehend them. Some who understand them welcome them, some do not, and some will have more mixed assessments of them. However, most citizens cannot even have an opinion on the relevant issues because they are unaware of them and because the topics themselves are not easily accessible. The barriers to understanding this important legal institution are the result of subtleties most of us never think about – issues about scientific evidence and reasoning, and legal procedures that are complex and inaccessible to most of us.

The actual and potential transformations of this part of our legal system are too important, however, to remain hidden and too important for an informed citizenry to be left in the dark about them. Citizens risk having their realistic access to the tort law and the possibility of justice within it reduced and they will not know it. Judges and lawyers are at risk of being manipulated by slogans about “sound science,” not realizing there are more scientifically accurate and legitimate ways to think about science, law, and the interaction between the two. There is even a risk to the legitimacy of the law itself, if mistaken scientific arguments are used to frustrate its aims. The issues posed by the potential changes in our legal system are not easy, however. In order to “see” and come to have a better appreciation of them, we must understand more about some of the procedures in the law that occur before trial, not something most of us are aware of. We also must understand some basics of the sciences that assist in revealing human harm from exposure to toxic substances. In addition, there are subtleties about these sciences and different evidentiary patterns of harm that must be appreciated. Too simplistic a view of the subjects will inadvertently skew the science, the law, and our protections under it.

This book seeks to make some progress on these issues. I have sought to introduce those not familiar with legal procedures to some of the basics of

Cambridge University Press

978-0-521-86182-3 - Toxic Torts: Science, Law, and the Possibility of Justice

Carl F. Cranor

Frontmatter

[More information](#)

xiv – Preface

the law to locate the legal issues. I also have sought to introduce those not familiar with some of the basics in the relevant sciences to such information. However, in order to understand subtler points about law and science and their joint consequences for the law, the discussion must go further. Consequently, it is necessary to discuss details of legal procedure as well as legal decisions that have brought the changes or that have implemented them. We should understand what judges have said about science in adjudicating alleged personal injuries from exposure to toxic substances. However, to assess the impact of their decisions and the reasons they have given for reviewing the science as they did, we also need to appreciate some of the finer points about different kinds of scientific evidence, how it can be integrated to show harm, and how scientists utilize studies in order to arrive at judgments that a substance has contributed to harm. In short, one cannot shrink from grappling with some of the details of scientific evidence and reasoning. I have tried to address these issues, but in a way that provides the reader with an understanding of how the interaction between science and the tort law can profoundly affect our realistic access to the legal system, our possibilities of justice within it, and deterrence of wrongful behavior or harmful products.

In writing this book, I have learned and had various kinds of assistance from many. I will no doubt forget some whose comments, insights, contributions, or conversations have been of value, but I hope not. If I have, I hope they will forgive my faulty memory. Three people ably assisted research on and the preparation of the final manuscript. David Strauss provided excellent research assistance, including research on case reports (Chapter 4), many useful conversations, and fine editorial skills in earlier stages of the project. Richard Doan, Shannon Polchow, and Laura Lawrie gave excellent, detailed help in preparing the manuscript for publication. In the intellectual gestation that is needed for a project such as this, I received invitations to contribute to a variety of conferences, journals, or volumes that facilitated the development of some of the ideas that found their way into the book. Invitations from John Conley, Susan Haack, Sharon Lloyd, Michael Moore, Lee Tilson, David Shier, David Michaels, Celeste Monforton, Tom McGarity, Raphael Metzger, Wendy Wagner, and Rena Steinzor were particularly important. They provided quite helpful comments on drafts of earlier papers or on the book itself over the years. I also learned from Margaret Berger, Michael Green, Peter Graham, Paul Hoffman, Joe Sanders, Katherine Squibb, Vern Walker, Lauren Zeise, and numerous others. I had the opportunity to present much earlier versions of some of the chapters of the book (which would now be unrecognizable) to the Southern California Law and Philosophy Discussion Group. Comments by Gregory Keating, Larry Solum, Sharon Lloyd, Steve Munzer, Marshall Cohen, Aaron James, Cynthia Stark, and Chris Naticchia early on assisted the development of the ideas in the text.

I have had the good fortune to deepen my understanding of science, scientific reasoning, and aspects of the law as a result of several kinds of experiences.

Cambridge University Press

978-0-521-86182-3 - Toxic Torts: Science, Law, and the Possibility of Justice

Carl F. Cranor

Frontmatter

[More information](#)

Preface – xv

Early research on risk assessment and an appointment as a Congressional Fellow in 1987, where I served at Congress's Office of Technology Assessment, provided important background. Service on California's Proposition 65 Science Panel in the early 1990s, a recent appointment to California's Electric and Magnetic Fields Science Advisory Panel (1999–2002), and membership on the University of California, Irvine's, Scholars Committee to Evaluate Perchlorate (2003–2004) gave me the opportunity to see up close numerous examples of scientific studies, scientific reasoning, interpretations of evidence, and even legitimate disagreements between well-respected scientists. I was a participant on these panels but also an observer of them. I gained much from both roles. Attendance at annual meetings of the Collegium Ramazzini and conversations with Fellows of the Collegium have kept me in touch with leading researchers and developments in cancer research. Considerable contact with members of the University of California scientific community also has been invaluable. Jerry Last, long-time director of the University of California's Toxic Substances Research and Teaching Program, should be mentioned, not so much for particular contributions to this project, but for enticing me down this path, trenchant comments along the way, and a good deal of financial and other support over the years. Raymond Neutra pointed me toward important methodological research that was ultimately quite valuable. I owe special thanks to David Eastmond, Chair of the Environmental Toxicology Program, a coauthor and collaborator. I could always call on him to provide examples or references, to make suggestions for extending the ideas, to read something I had written, and to ensure that I understood scientific points and had expressed them correctly. A joint research project with Dave funded by National Science Foundation Grant No. 99–10952 ("A Philosophic and Scientific Investigation of the Use of Scientific Evidence in Toxic Tort Law") together with grants from the University of California's Toxic Substances Research and Teaching Program greatly facilitated background research as well as work on the book itself. Intramural funds from the University of California, Riverside, assisted along the way. The writings of and many conversations with my colleague Larry Wright, a nearly career-long student of nondeductive inferences, have deepened my understanding of the forms of argument that are central to science.

Contacts with practicing lawyers and scientific witnesses and brief involvement in some litigation have provided more ground-level views of the law and some of the hurdles faced by lawyers and experts in presenting science in toxic tort cases. Many, many conversations with Joe Cecil over the years have challenged and clarified my thinking on these issues. Joe and several anonymous reviewers provided immensely valuable comments on the submitted version of the manuscript that greatly improved the final version. John Berger of Cambridge University Press has been a supportive and imaginative editor for this project. Although I have learned from many in working on this book, none of them is responsible for any errors or shortcomings in the final product. The

Cambridge University Press
978-0-521-86182-3 - Toxic Torts: Science, Law, and the Possibility of Justice
Carl F. Cranor
Frontmatter
[More information](#)

xvi – Preface

love and support of my family – Crystal, Chris, and Taylor – have made the task much easier (although their patience with discussions of toxicants, law, or science may be approaching a limit).

I have tried to present some of the actual and potential transformations in toxic tort law as a result of recent legal decisions and how it could better incorporate and utilize complex scientific evidence in the future to achieve its goals. I hope this helps others to think further about the issues and to better understand this part of our legal system.