IN THIS ISSUE GENETIC TESTS • CONCUSSIONS • EVIDENCE

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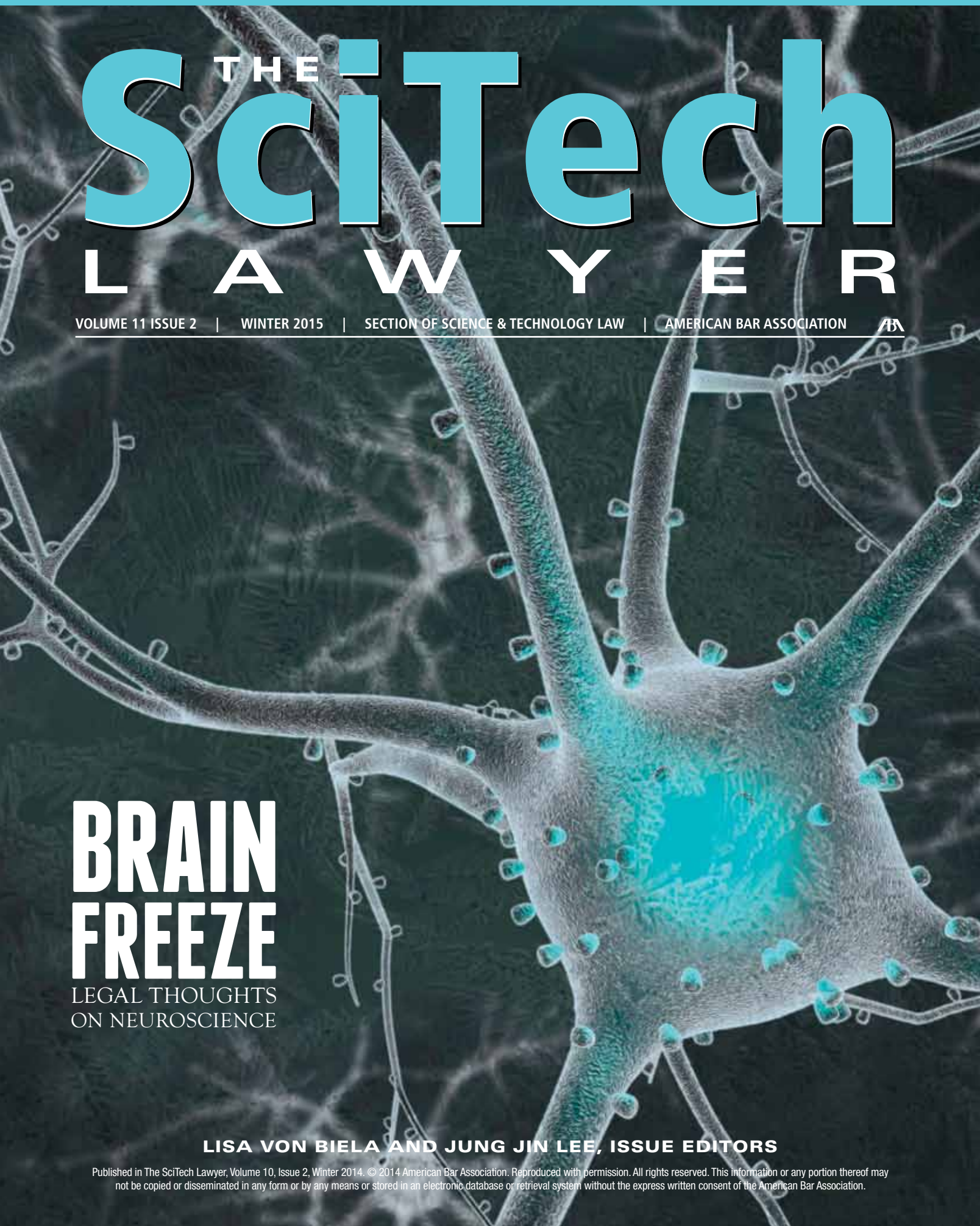

BRAIN FREEZE

LEGAL THOUGHTS ON NEUROSCIENCE

LISA VON BIELA AND JUNG JIN LEE, ISSUE EDITORS

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BOOK**REVIEW:** *LAW AND NEUROSCIENCE*

Reviewed by Andre M. Davis

Owen D. Jones, the Chancellor's Professor of Law & Professor of Biological Sciences at Vanderbilt University; his colleague at Vanderbilt, Jeffrey D. Schall, Professor of Neuroscience; and Francis X. Shen, the McKnight Land-Grant Professor at the University of Minnesota Law School, have collaborated to deliver a breakthrough textbook, *Law and Neuroscience*. *Law and Neuroscience* will surely take its rightful place as a practical, deeply informative, and imminently readable contribution to this evolving field of inquiry. It seems not a week goes by but that we judges and lawyers receive invitations from this or that law school, bar association, or similar entity proclaiming an upcoming continuing legal education seminar or program in this field of emerging knowledge. *Law and Neuroscience* has arrived at a propitious moment.

For nearly a decade, the MacArthur Foundation, through its *Research Network on Law and Neuroscience* (of which Professor Jones is the director and Professor Shen is a member), and other organizations, have provided substantial funding to enable neurologists, neuroscientists, psychologists, and other researchers, together with legal scholars and social scientists, to foster awareness that brain science will have an enormous impact on our conceptions of criminal responsibility, just punishments, and public policy, more generally. This book will contribute significantly to those efforts.

The need for a comprehensive and scholarly treatment of the subject could not be doubted. "Neuroscience Is Getting Its Day in Court, Whether It's Ready or Not" screams the headline from a recent article in a popular and widely read magazine. *Law and Neuroscience* fills a gaping void. Despite being an interdisciplinary treatment at the intersection of these two massive domains, *Law and Neuroscience* is encyclopedic without being dense or pedantic. To the contrary, the editors have achieved the remarkable feat of synthesizing strands of doctrine, settled scientific learning, and emerging legal and scientific conundrums in a manner that everyone and anyone interested in the topics, from law students and teachers, researchers, judges, practitioners, and the curious lay public alike, will find everything they could hope to find in a single volume.

The book provides an extraordinary survey of the wide array of issues surrounding the sometimes intractable questions posed by scientific advances on legal doctrine. The book breaks the admittedly foreboding subjects into digestible chunks and is faithful throughout to its promise, set out in the preface: "The materials—which span subjects such as lie-detection, judging, brain injury, emotions, memory, and the adolescent brain—are accessible, informative, and provocative. No prior knowledge of neuroscience is assumed or necessary." Unquestionably, keeping that promise posed a major challenge for the editors. They kept it and then some. How did they do it?

They did it by creating a veritable Google Maps of law and neuroscience. Ingeniously, the book is divided into five distinct parts, each labeled descriptively to reveal its contents: (1) an Introduction (providing an overview of issues, with separate chapters focused on individuals and groups); (2) "Brain, Behavior, and Responsibility" (featuring a fulsome dialogue between science and law, together with extended treatment of courtroom evidentiary issues); (3) "Fundamentals of Cognitive Neuroscience" (providing a taxonomy of the evolving knowledge of brain science); (4) "Core Themes in Law and Neuroscience" (usefully describing legal issues surrounding "the injured brain," "the thinking and feeling brain," and the "developing and addicted brain"); and (5) "The Future." Each chapter opens with a chapter summary followed by an introduction, which serves as a "cognitive bridge" between what preceded it and what is to follow.

After laying the groundwork for their topics in the three chapters of the volume's Part One, the Introduction, the editors' second set of chapters

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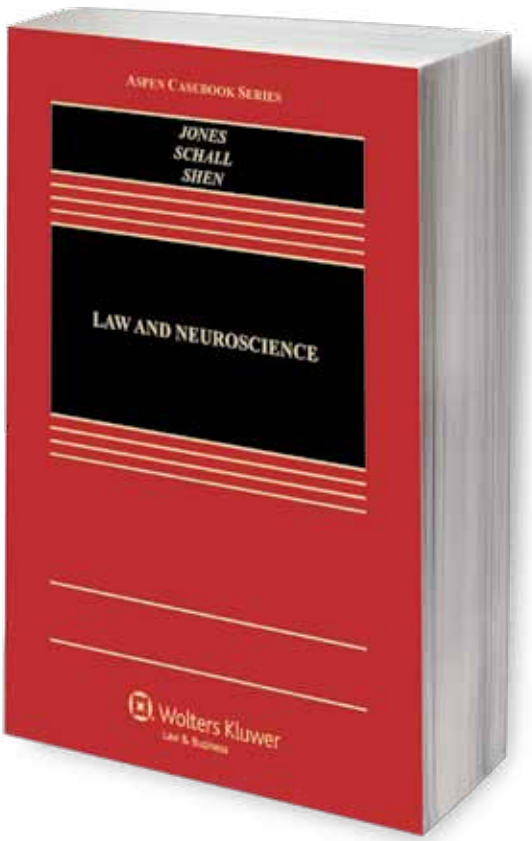
(four through six, comprising Part Two of the volume) detail issues surrounding specific legal questions arising in the context of litigation. The subjects range from free will and determinism as legal and moral constructs, to the application of formal legal rules respecting the admissibility of scientific evidence. Needless to say, we here become reacquainted with our old friend, the 90-year-old *Frye v. United States* and its "general acceptance" test of admissibility of expert scientific evidence, and we are introduced to the well-known new kids on the block, "the trilogy" of *Daubert v. Merrill Dow Pharmaceuticals, General Electric v. Joiner, and Kumho Tire Co., Ltd. v. Carmichael*, which have entirely displaced *Frye* in federal court litigation and in many if not the majority of state jurisdictions. This part of the book will be especially relevant to everyday practitioners, as it contains material specific to admissibility issues, criminal sentencing, and civil damages claims, such as those arising out of motor torts. Especially intriguing to your reviewer is the material on the "Effect of Brain Imaging Evidence on Judges and Jurors."

In Part Three, covering chapters seven through nine, the editors turn to the heavy lifting of brain structure and brain function, brain monitoring and manipulation, and the highly salient "limits and cautions" inherent in this evolving science. There are diagrams and charts, but no differential equations. Here, as elsewhere, the editors have easily kept their promise that the reader will require "no prior knowledge."

Part Four, covering chapters 10 through 18, will be of special interest to attorneys from across the entire legal profession: (1) those bringing or defending claims asserting brain injuries and/or involving suspicion or evidence of brain death, and, more generally, those involved with "pain and suffering" jurisprudence; (2) those eager cross-examiners seeking greater insight into the vagaries of memory, credibility-testing, and juror decision-making; and (3) those concerned with implicit bias and its role in litigation outcomes. Thus, here as elsewhere throughout the book, the materials include a panoply of case studies, accessible scientific literature, legal rulings, and insightful commentary by an array of experts. Three discrete features of likely brain science advances are examined in considerable depth: (1) the role and impact of emotions on decision-making; (2) lie detection, including significant treatment of the few cases so far that have encountered (and rejected) efforts to establish truth or falsity by way of brain imaging; and (3) the special problems and challenges presented in representing adolescents and clients suffering from substance abuse.

The final 90 pages of the book, Part Five, "The Future," helpfully set out some of the emerging issues generally of interest to researchers, college deans, and parents, as well as policy makers and ethicists generally: cognitive enhancement, neuroprosthetics (brain implants), and artificial intelligence.

Law and Neuroscience is a major undertaking; it succeeds beyond any reasonable expectation harbored by its editors and publisher. Anyone, including thousands upon thousands of lawyers, who seeks a deeper understanding of human behavior will benefit from its availability. Human behavior, in all its wondrous and inexplicable permutations, after all, as the editors correctly point out, is what the law is most concerned about. This work uniquely brings together a compendium of legal, scientific, philosophical, and moral teaching that will greatly enhance the practitioner's quest for a deeper understanding of the law's singular concern. ◆



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