Science and Law: An Essential Alliance

edited by
William A. Thomas

A Westview Special Study

Science and Law: An Essential Alliance

edited by William A. Thomas

Westview Press / Boulder, Colorado

A Westview Special Study

Published in 1983 in the United States of America by
Westview Press, Inc.
5500 Central Avenue
Boulder, Colorado 80301
Frederick A. Praeger, President and Publisher

Library of Congress Cataloging in Publication Data
Main entry under title:
Science and law.
(A Westview special study)
Includes index.
1. Science and law—Addresses, essays, lectures.
I. Thomas, William A., 1939–
K487.S3Z97 1983 344'.095 83-1209
ISBN 0-86531-442-X 342.495

Printed and bound in the United States of America

Preface

Law and science are pervasive in society, and we depend upon their fruitful collaboration to promote stability and progress. The substance and procedures of law guide our judicial, legislative, and administrative systems. Science and technology stimulate our imagination and contribute to the production and distribution of virtually all goods and services. The need for scientists and lawyers to understand the strengths and limitations of each other's profession has never been more apparent.

In recognition of this essential alliance, the American Bar Association and the American Association for the Advancement of Science in 1974 organized a joint committee—known as the National Conference of Lawyers and Scientists—to facilitate communication and cooperation between the professions. Both parent organizations commit funds to this endeavor and support it at the highest association levels. To further its objectives, the National Conference received a grant from the National Science Foundation to publish a series of articles in *Science* and in the *American Bar Association Journal* on topics common to science, law, and technology.

With this collection of reprinted articles, we hope to reach those who might not otherwise be made aware of the increasingly interconnected nature of complex issues facing society. The authors of these far-reaching essays are experienced practitioners of science and law and firm proponents of multidisciplinary solutions to multidisciplinary problems. None of the authors would suggest that this collection provides a complete survey of the subject, but this sampler will have achieved its purpose if it promotes greater awareness of the vitality of the law-science alliance.

Special acknowledgment is due Arthur F. Konopka, who encouraged and monitored the grant at the National Science Foundation; Philip H. Abelson, editor of *Science;* and Richard B. Allen, editor of the *American Bar Association Journal.* The American Bar Foundation contributed support throughout the duration of the project. The materials published here were developed with the financial support of National Science Foundation Grant SES77-21294. The opinions, findings, conclusions, or recommendations expressed herein are those of the authors and do not necessarily reflect the views of the National Science Foundation, the American Association for the Advancement of Science, the American Bar Association, or the American Bar Foundation.

W.A.T.

Science and Law: An Essential Alliance

Contents

1
Law and Science: A Dialogue on Understanding

Howard T. Markey

Once upon a time, a scheduling error caused the Spirit of Science to be assigned a room in the convention hotel of the American Bar Association (ABA) and the Spirit of Law a room at the scene of the American Association for the Advancement of Science's (AAAS) annual meeting. Each decided to attend the first day of meetings in the assigned hotel. That evening, en route to their proper hotels, they happened to select the same restaurant for dinner. When Science entered, Law was seated alone in a booth.

Science: *(smiling, but uneffusive)* Hello, Law. Haven't seen you in ages. Mind if I join you for dinner? We need to talk, you and I.

Reprinted from *American Bar Association Journal* 68:154–158 (1982) with permission of the journal and the author.

Law: *(rising)* Hello, yourself. I hardly recognized you, it's been so long, and you've changed. By all means, sit down. It's always a pleasure to talk with you. But you seem so intent. Why do we need to talk just now?

Science: *(frowning)* Because in this age of technology, I have, as you say, changed—mostly in my growing influence on humanity. But the main reason we have to talk is because I have just come from an ABA meeting, and I'll tell you something—your followers don't understand me.

Law: Nor yours me. I saw that when I spent the day with your followers at your AAAS meeting.

Science: Fair enough. But whom do you include among my followers?

Law: Oh, scientists, physicists, medical doctors, engineers, and technicians—those at the AAAS meeting. Whom do you include among mine?

Science: Well, the lawyers, judges, and law professors I saw, plus politicians, philosophers, and theologians.

Law: O.K. As spirits, we understand each other. The problem is with our followers. But say, aren't we ignoring the vast majority of people? They "follow" neither of us and understand us even less.

Science: Yes, but we can't hope for understanding by the general public until your followers begin to understand me and vice versa. Our common enemy is the Spirit of Ignorance. To defeat him we have to start somewhere, and I think the starting place is among our followers.

Law: That's true. Most people center attention on that from which they earn their livelihood. Most of our followers have become so specialized that keeping up means running all day in their own bushel baskets. What makes you think mine should take the time to understand you and your role?

Science: *(raising an eyebrow)* Because they could do better at their profession if they understood me. Not to understand me is to understand the world only in part. I am the servant of humanity. As the seeker of physical knowledge, I make discoveries that allow development of the technology to sustain humanity on a planet of finite resources. I free humans from a lifetime of scratching in the dirt for food. Some would say I enable them to walk among the stars. Your followers' ignorance of me, my role, and my methods is appalling. Now, I'll put to you the same question, why should my followers, who are busy doing so much for mankind, take the time to try to understand you and your role?

Law: *(sternly)* Because you are not "the" servant of humanity; you are but one; I am another. Your followers, who deal mainly with things seen, would contribute so much more if they understood that I deal with things no less real—like mercy, compassion, philosophy, freedom, and justice—although only the effects of those are seen. I am the only activity that can assure that you do produce a truly higher, not a cruel, standard of living. Your followers must understand me if perverted uses of that knowledge are to be avoided. If you were humanity's only servant, you would create a society ruled entirely by cold, hard, despotic, physical facts.

Science: *(triumphantly)* And if you were humanity's only servant, you would create a society of the wise unable to leave their caves!

Law: *(smiling)* Touché! You move humanity onto new plateaus of technical knowledge. I control and tame the use of that knowledge. When held to our proper roles, we ancient forces are complementary and not conflicting. People need you to prod them into new eras and me to keep them from becoming what Thoreau called "the tool

of their tools." Together we can do so much for all people, our masters.

Science: Yes. When we are strangers, Ignorance triumphs. Maybe your followers don't understand me because you have been selling the idea that written laws will solve all our masters' problems. Witness the more than two million statutes, regulations, and ordinances issued in a decade. And that doesn't include thousands of decisions your judges crank out.

Law: Look who's talking! You've been selling the idea that science is a savior, that by freeing people from all labor you can make them gods. For a while there, your chariot ranged far and wide. Our masters, thinking you infallible, objective, dedicated, able to remake the world, enthroned you with no felt need to understand you. Now, when the need for understanding is even greater, your technological juggernaut is moving too fast. Many of our masters are ambivalent about technology. Unthinking awe has become uninformed antipathy. Well-publicized concerns for health, the environment, and quality of living—remember Love Canal, Three Mile Island, Thalidomide—have caused many of our masters to turn from awestruck adulation to cynical skepticism.

Science: *(thoughtfully)* True, but sad. That attitude may impede my search for the technology to solve our masters' problems of energy, pollution, and overpopulation. But the pendulum swings for you also. Many of our masters seem to be losing faith in written laws and government—witness Watergate, Abscam, and a lowest-ever voter turnout.

Law: You're probably right. Still my law schools are crowded, while one of your leading magazines, *Science,* has editorialized on the post-1965 downturn in scientific literacy in the United States and its growth in other

countries. For example, the editorial pointed to the science and mathematics courses required of all students in Japan from first grade on.

Science: And wisely so. Throughout history nations have divided between those that advanced science and technology and those that supplied only raw materials.

Law: True, but incomplete. Never in history has superior technology or a higher standard of living been able to preserve freedom and justice for a society that abandoned its ideals. Our masters need us both, but they are not well served by philosophically illiterate technologists and technologically illiterate lawyers. Where do we start in trying to encourage mutual understanding?

Science: Ah, yes. I think understanding begins with recognizing differences. My purpose is to increase physical knowledge and ways to use it. Yours is to resolve disputes, provide justice, and exercise social control. I rest on the material; you on the moral, ethical, and philosophical. I say what can be done; you say whether it should. I determine; you compare. I describe; you prescribe. I equip; you guide.

Law: Yes, and I emphasize the particular; you the general. My justice can be tempered with mercy; not so your facts. My proof varies with circumstances; yours tends to be standardized. I establish rights and duties; you find fixed relationships. I define and protect justice and values; you define and measure energy and matter.

Science: *(fingers entwined)* Even our methods are directly opposite. Few of your followers understand my empiric method. My scientific process evolves a general scientific "law" from repeatedly and experimentally tested hypotheses.

Law: *(pointing)* And few of your followers understand my dialectic method. My judicial process normally applies

an already evolved legal principle to a legally proved individual set of facts. Incidentally, your use of my name as a label for scientific phenomena—like gravitation, motion, and thermodynamics—may impede understanding. Our masters can disregard my principles, but your so-called laws are inviolable. The outlaw gets punished, not the falling rock.

Science: Just so, and some of my followers think understanding may be impeded when my name is used by social, economic, behavioral, and political "scientists." Many of my followers are concerned by some of the decisions yours have made on scientific questions. Often there are no reliable data to support what appear to be science-based decisions by your judges, many of whom do not understand science and scientists. Often your judges demand an answer when there is none, not realizing that science is search or that there are many scientific questions for which no answer has yet been found. Most of your followers don't understand that virtually nothing is ever finally certain to science. Science deals primarily in theories. No one, final, all-encompassing theory has yet been devised. The found answer is of interest only as background to the searcher, although it may be of major interest to the technologist. Some of your followers stand in awe of science and technology. Others are intimidated by a fear of the unknown. Some are reluctant to admit ignorance, masking it with a pretended omniscience seen by my followers as arrogance.

Law: Yes, but what is my judge to do? Unlike your never-ending searches, my judges' cases are there and must be decided. Yet my judge gets little help when two of your "expert" followers testify in direct opposition to each other. And, in a growing number of risk-benefit, socioscientific cases, some of our masters are asking that

my judges rely on technological fact predictions to prevent otherwise perfectly legal action. The last thing I want is a judicial decision resting solely on a transient, popular, and often mistaken scientific theory.

Science: Well, in the first place, if your judges understood me, they would insist on greater proof of my expert's expertise and would decline to hear the ersatz expert. In the second place, I am not so sure that many of the risk-benefit "cases" should be "there." Assuming they can't say, "This is a political, non-judicial question," judges confronting a scientific-technological case should say, "I don't know." Those words are the formula for judicial salvation, because the judge then can say to your lawyer followers, "Educate me." After all, isn't that what they're paid to do?

Law: Yes, some are. But most of my followers are not scientists or technologists. Nor do I want my judges to become primarily technologists. That could destroy my supremacy in the courtroom. There are already too many efforts to "scientize" me. My judicial process cannot become like your mechanical, technical, value-free scientific process and remain judicial. As pure search for knowledge, you must never be humanistic. To remain law, I must be humanistic. Remember, my philosophy is jurisprudence, not "juriscience."

Science: See how difficult understanding can be? I know you must remain supreme in the courtroom. I know I must not be substituted for you, but your judges and lawyers could learn about science and scientists—their foibles, failures, and soaring successes—and about the scientific method and how it works. And they could learn the tiny portion of my chemistry, physics, or biology necessary to decide the case. I know that most court cases should not be decided solely on what I say and that

technological evidence must normally be but one element in the judicial matrix of decision, but there is no wisdom in total isolation of your followers from an increasingly technical world. What is to be gained from that?

Law: *(with a slight touch of arrogance)* Maybe your followers who are superspecialized should remain isolated until they acquire an understanding of me and the nonscientific world. Some have entered science-intensive public policy disputes in adversarial roles, thereby risking their credibility as scientists. Conclusions and opinions supposedly based on scientific studies are suspect when passionately pressed. Some of your followers have propounded solutions that seem to ignore me.

Science: *(aggressively)* By the same token, some of my best-qualified experts consider your adversarial process so distasteful that they refuse to testify in court. Adversariness, and all it implies, may be applicable to your normal judicial process when private disputes are resolved through traditional rules of law, but my followers see adversariness as not only useless but also harmful in socioscientific, risk-benefit controversies, in which public interests are paramount. My followers are citizens, with every right to express their views on public policy.

Law: *(firmly)* Certainly—but as citizens, not as scientists. Scientists have no special expertise in making public policy. The failure to understand me has caused some of your followers to act as though technology, as well as science, must always be autonomous, free from all social regulation, no matter the public concern about the social implications. Your followers don't seem to understand that my business is justice, not objective "truth." It is my metaphysics, not your physics, that is needed to decide on limits to fetal and animal research, the use of privacy-invading surveil-

lance and life-maintenance devices, and other similar questions.

Science: Come now. My followers, as well as yours, have struggled with those questions, both without much success. Anyway, my followers have always been expected only to produce physical knowledge.

Law: That's the point! The nonunderstanding that causes an inability to ask value questions, continually and openly, can risk governmental restriction of something I am ready to fight for—your freedom to learn. Like all freedoms in all ages, that freedom is fragile. To date, you have had to rely on First Amendment rights to publish and the derivative right to gather the needed data. And even that needs constant guarding. Witness the local government's attempted prohibition of recombinant DNA research in Cambridge, Massachusetts, and the suggestion that such a subject "was not for man to investigate."

Science: I know. Fear of science is as old as man. Part of the misunderstanding lies in a failure to distinguish between science as search, which cannot hurt, and technology—that is, the use of what is learned and the technique of searching—which can hurt. I shudder when one of our masters says, "If we can land a man on the moon, why can't we solve our urban problems?" as though solving purely technical problems were identical with solving value-intensive problems. My followers are not value-free, but, when it comes to the search for knowledge, I am. If you were value-free, you would be nothing. It will take a combination of my technological offspring and your values to solve so many problems of today's society.

Law: We have touched on some of the problems created by the reign of our common enemy, Ignorance. Now, how can my followers understand you better, and vice versa?