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## Science and the Law Symposium: Introduction

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# SCIENCE AND THE LAW SYMPOSIUM

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## INTRODUCTION

*David F. Cavers\**

### I

THIS symposium reflects a growing concern that, in a period when our society is being rapidly transformed by science and technology, increasing attention be directed to the bearing of this development on law as our society's primary control system. Moreover, since law can exert some influence on the rate and direction of scientific and technological change, the examination must extend as well to the bearing of law on the processes of that change.

In its organization, the symposium also reflects a problem that I suspect has perplexed everyone who has sought to embark upon such an examination. The points of contact between these two systems—the legal and the scientific—are so many and so diverse that it is hard to find unifying themes to guide the inquiry. The difficulty is a real one even when one rigorously excludes the social sciences from the array of sciences to be considered. It is not surprising therefore that the present symposium, which has drawn the social sciences within its ambit, is characterized more by diversity than by unity.

I have recently had the responsibility of attempting in an introductory paper presented to a conference on "Law and the Social Role of Science"<sup>1</sup> to identify and comment briefly on what I called some "points of confrontation" between "law" and "science," using the latter terms to embrace, as the context required, not only the respective bodies of learning but also the methods by which they are ascertained and applied and the persons engaging in those activities.<sup>2</sup> My undertaking led to the composition of a list of arenas of confrontation which, although not all-inclusive, may now serve, with some emendations, as a framework to which the contributions to the

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1. Held at the Rockefeller Institute, New York City, April 8-9, 1965, under the auspices of the Institute and the Walter E. Meyer Research Institute of Law. The proceedings will be published.

2. I shall usually adhere to this convenient loose practice in this introductory comment. Unfortunately, "confrontation" suggests a rather bellicose relationship. In using the term, I mean no more than to denote a situation wherein law and science must take each other into account.

present symposium may be related. The articles included in it will not, of course, be co-extensive with my list; neither, I should add, were the papers presented to the conference.

This list does not include that arena of contact between law and science which is at once the most venerable and the most direct of them all: namely, that created by the patent laws. However, I believe today the most consequential points of confrontation which could be allocated to that arena may be more usefully distributed among various of the arenas of confrontation that I am listing below. To be sure, there may be social and economic trends underway which will alter materially the importance of the patent laws in this country, trends to which the antitrust laws and the great expansion in government-supported research may be contributing. However, it is still too early to forecast where, in the interaction of law and science, the effects of such trends are most likely to give rise to new confrontations. In presenting each of the arenas in my list, I shall note one or two examples of points of confrontation, present or prospective, and shall also call attention to the type of problem that appears to me most characteristic and consequential of those that lie within the arena.

(1) *Points at which the law, in discharging its traditional adjudicatory function, must draw on scientific knowledge to reach its decisions.* Here we encounter the hostility which our adversary system of civil and criminal procedure arouses in the expert witness. This reaction manifests itself in a wide gamut of cases but is probably most pronounced in damage suits for personal injuries and in criminal cases in which the defense of insanity is raised. In both types of case, there has been experimentation with the device of the court-appointed impartial witness,<sup>3</sup> but I am doubtful that that remedy will be widely accepted. More progress may be made in relaxing the restraints which the law has long placed on the form of the expert's testimony. These confrontations in the adjudicatory process pose procedural problems; but they are sometimes intertwined with problems in the formulation of substantive standards, especially in the insanity defense cases. The questions cut deep, and the devising of satisfactory solutions will be neither easy nor soon completed.

(2) *Points at which scientific developments are compelling us to re-examine the adequacy of established legal doctrines.* Despite the amazing ability of the common law to accommodate change in

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3. For a recent survey of these plans as developed for personal injury litigation, see Comment, 47 MARQ. L. REV. 523 (1964).

the activities on which its doctrines impinge, situations develop from time to time which strike at the premises of existing rules and principles and thereby require legislative action in response. The development of workmen's compensation laws and of zoning laws exemplifies such major readjustments in the past. Looking to the future for developments that may require legislative action, one sees, as one example, the emergence of those electronic devices that are permitting their users to invade the privacy of other people with little or no risk of detection.<sup>4</sup> The varied legal defenses against invasion of privacy in the past have been predicated on the supposition that the invasions would be overt. If this is no longer to be true, some new point must be found at which an effective legal protection of privacy can be introduced.

The technology of electronics is presenting us with another set of problems. The value of the computer program to persons other than the programmer and his employer raises questions as to the kind and degree of protection the law should afford this form of intellectual property.<sup>5</sup> Moreover, a related problem will arise as increasingly the contents of libraries are reduced to machine-readable, readily reproducible forms. What protection should the copyright-holder be accorded with respect to this material?

Both of these arenas of confrontation create problems of basic policy for which existing law has no pat answers.

(3) *Points at which scientific developments have created new hazards that have led the state to intervene, thereby creating new points of confrontation.* Examples may be found in several amendments to the Food, Drug, and Cosmetic Act which have been enacted in the past decade or so. These have imposed on the Food and Drug Administration the responsibility of setting tolerances for chemicals in or on foods, drugs, and cosmetics and of approving new drugs for safety and effectiveness.<sup>6</sup> The difficult judgments that must be

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4. The problem is discussed in DASH, SCHWARTZ & KNOWLTON, *THE EAVESDROPPERS* (1959); PACKARD, *THE NAKED SOCIETY* (1964); King, *Electronic Surveillance and Constitutional Rights—Some Recent Developments and Observations*, 33 GEO. WASH. L. REV. 240 (1964).

5. The problem is discussed in Note, 64 COLUM. L. REV. 1274 (1964); Note, 38 N.Y.U.L. REV. 891 (1963). A symposium of four articles on the subject in the *Bulletin of the Copyright Society*, 11 BULL. CR. SOC. 361 (1964), was prefaced by an announcement from the Copyright Office that computer programs meeting certain conditions might be registered as "books." The announcement recognized that its action was subject to favorable resolution of two basic legal questions, both of which it characterized as "doubtful."

6. See the following sections of the Food, Drug & Cosmetics Act: §§ 201(q), 408, 68 Stat. 511 (1954), 21 U.S.C. §§ 321(q), 346(a) (1958) (authorizing regulations to establish tolerances for pesticide residues on raw foods); §§ 201(d), 409, 72 Stat. 1784 (1958), 21 U.S.C. §§ 321(s), 348 (to prescribe restrictions on the use of chemical additives in foods); §§ 201(t), 706, 74 Stat. 399 (1960), 21 U.S.C. §§ 321(t), 376 (Supp. V, 1964) (to

reached in the application of these provisions pose ultimately the problem that seems to me basic in this arena: in whose hands should the decision-making power rest: in the hands of scientists or of the administrator (often a lawyer)? Or should there be some combination of these different forms of expertise in the making of decisions? An example of such a combination is to be found in the procedure developed by statute and regulation for the licensing of power reactors by the Atomic Energy Commission.<sup>7</sup>

(4) *Points at which government, acting through the legal mechanisms of appropriation, executive order, and contract, must choose scientific objectives, ration scarce research resources, and seek to maximize the contributions of the scientific community.* Here the lawyer is charged with establishing both a framework within which the government's scientific programs can be carried out and a set of controls, regulatory and contractual, to guide those programs in conformity to the government's policy objectives. Important in this arena, of course, are the government's policies concerning the patent rights and privileges of the parties contracting with it. There are many legal problems in shaping these and other aspects of the relations between the government and the persons on whom it must rely for the execution of its programs. Underlying these problems, however, is a difficult problem of communication among three groups, the policy-makers in the Executive Branch, the Congress, and the scientific community. In aiding in the resolution of that problem, in serving as a mediator among these groups, and in helping to work out viable compromises with due regard for their economic and social as well as legal implications, the lawyer can make his most important contribution.<sup>8</sup>

(5) *Points at which government, acting through its power of taxation, is able to give or withhold encouragement to scientific and technological development.* Here it is the federal government that is chiefly concerned, partly through the tax exemptions it accords to private foundations<sup>9</sup> and partly through the favorable tax treatment it grants to patents and to expenditures for research and develop-

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prescribe restrictions on the use of color additives in or on foods, drugs, and cosmetics); §§ 201(p), 505, 76 Stat. 781 (1962), 21 U.S.C. §§ 321(p), 355 (Supp. V, 1964) (to provide for the approval of "new drugs" for safety and effectiveness).

7. Atomic Energy Law of 1954, §§ 181-91, 68 Stat. 953, 42 U.S.C. §§ 2232-39 (1958), as amended, 42 U.S.C. §§ 2232(b), 2239, 2240, 2241 (Supp. V, 1964).

8. This concept of the lawyer's role is developed in Beresford, *Lawyers, Science, and the Government*, 33 GEO. WASH. L. REV. 181 (1964).

9. The problems of preventing the exploitation for private purposes of charitable foundations (including those created to foster scientific research) are examined in TREASURY DEPARTMENT REPORT ON PRIVATE FOUNDATIONS, SENATE COMM. ON FINANCE, Comm. Print, 89th Cong., 1st Sess. (1965).

ment by private industry. The desirability of encouraging these activities must be appraised in the light of the objectives of the tax system as such. The basic problem here seems one of weighing and striking a proper balance between conflicting values.

(6) *Points at which scientific developments are bringing us into new contacts with our neighbors on the planet, thereby creating a need for new legal relationships.* Recent years have provided a number of examples in this arena, among them the test ban treaty;<sup>10</sup> the efforts, as yet only partly successful, to demilitarize outer space;<sup>11</sup> the scheme of international cooperation for the exploration and study of Antarctica;<sup>12</sup> and the global pattern of arrangements in the process of development for Comsat's communication system.<sup>13</sup> The basic problem here is to meet the demand for creativity; lawyers and scientists in each participating country have to join with their fellows in other countries in the design of, or adaptation to, new legal instrumentalities and relationships to advance and secure the common interests of all nations.

## II

Adopting, for the purposes of this introduction at least, the foregoing incomplete and essentially suggestive scheme of classification, where within it do the contributions to the symposium fit? Plainly two of them, the article by Professors Diamond and Louisell and that by Dr. Bock, are concerned with problems that lie within the first of the arenas of confrontation which I have listed: the problems engendered in the adjudicatory process. Both articles bear directly on one of the law's least successful procedures in that process: the procedure for drawing on the expertise of the scientist and transmitting it effectively to the decision-maker, be it court or jury.

Although among the three authors of these two articles are scientists from disciplines as disparate as psychiatry and economics, I think it significant that each of them manifests concern as to the

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10. Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Under Water, signed at Moscow, August 5, 1963. For its text, see 57 AM. J. INT'L L. 1026 (1963), T.I.A.S. No. 5433.

11. See Gen. Ass. Off. Rec., 18th Sess., Supp. No. 15, Res. 1884 (A/5571), Res. 1962 (A/5656), 58 AM. J. INT'L L. 477 (1964).

12. Antarctic Treaty, signed at Washington, Dec. 1, 1959. For its text, see 54 AM. J. INT'L L. 477 (1960), T.I.A.S. No. 4780.

13. See Agreement Establishing Interim Arrangements for a Global Commercial Communications Satellite System and Special Agreement (containing technical and financial arrangements to which communication entities designated by signatory governments are also parties), Aug. 20, 1965, T.I.A.S. No. 5646, 3 INT'L LEGAL MATERIALS 806, 810 (1964). The arrangements are discussed, and Soviet objections to them reported, in Simsarian, *Interim Arrangements for a Global Commercial Communications Satellite System*, 59 AM. J. INT'L L. 344 (1965).

relationship of the experts in his field to the lawyer advocates with whom they are associated in litigation. Dr. Bernard L. Diamond is a psychoanalyst who is a Professor of Criminology and Law at the University of California at Berkeley, where he is a colleague of his co-author, Professor D. W. Louisell, whose field is Procedure. In their article, "The Psychiatrist as an Expert Witness: Some Ruminations and Speculations," they join in stressing the importance of a candid recognition in trial procedure that the psychiatrist's partisanship is inseparable from his need to achieve a genuine understanding of the defendant as a human being if he is to evaluate the defendant's mental state for the purpose of the criminal law.

In "The Relativity of Economic Evidence in Merger Cases," Dr. Betty Bock, an economist and manager of the Antitrust Department of the National Industrial Conference Board, views the problems of the economic expert in antitrust litigation against the broadening demands of the courts in merger cases for an evaluation of risks to competition, actual or potential, that may be laid at the door of the merger under attack. She emphasizes the importance that the economist, who must work closely with counsel in developing the case, preserve a degree of independence in the collaboration. Apparently, the danger for the expert in economics is not that he will have attributed to himself in the courtroom a spurious, or at least artificial, objectivity, but rather that he will be converted by counsel into a specialized law clerk or a highly specialized pleader and thereby lose the ability to make a distinctive contribution to an understanding of the problem at issue.

Many of the procedural impediments against which Dr. Diamond and Professor Louisell direct their comments would be removed or mitigated if more state legislatures were to adopt the 1937 Model Expert Testimony Act,<sup>14</sup> the 1953 Uniform Rules of Evidence,<sup>15</sup> or, for criminal cases, the 1962 Model Penal Code.<sup>16</sup> Some little progress in this direction is apparent. In the interim, I think we can take encouragement from the authors' observation that more and more trial courts are freeing the defendant's psychiatric witness from old evidentiary restraints, thereby enabling him to testify more intelligibly. Although this indulgence has not been tested in the appellate courts, it suggests that the scientific advances in the

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14. 9A U.L.A. 353 (1957).

15. 9A U.L.A. 207 (Supp. 1964).

16. The Code, sponsored by the American Law Institute, was influential in the drafting of the Illinois Criminal Code of 1961 and is likely to influence the draftsmen in the considerable number of states, including New York, in which revision of the criminal laws is in progress.

understanding of "mental disease or defect"<sup>17</sup> are coming to be comprehended more widely in the courts. If so, one may expect that in time this will be reflected in legislation.

Does the article, "Noise and the Law" by Mr. George A. Spater, which is directed specifically to the legal questions created by the impact of airport noise on neighboring householders, provide an example that might be brought within my second arena of confrontation? Has the noise-making capacity of the jet airplane reached such a point that it requires the re-examination of received doctrines, including doctrines limiting the responsibility for damage inflicted by governments and the private instrumentalities they authorize to serve the public? As I have already noted, one of the extraordinary achievements of our common-law system has been its adaptation to change, and this adaptability manifests itself also in our processes of constitutional interpretation.

A reading of Mr. Spater's article leaves one with the impression that, in the view of the courts, the noise hazard of the airplane has not exceeded the limits of doctrinal absorption. Although as General Counsel of American Airlines, Mr. Spater is concerned with solutions to the practical problems that jet noise has created for the major airports, he approaches these problems in the lawyer's traditional fashion: by a close analysis and evaluation of case law, drawing as readily on 19th Century precedent as on the most contemporary. His ability to rely on received doctrine has been disturbed, however, by two recent cases he discusses in which the courts of Oregon and Washington (the latter in interpreting its atypical state constitution) have reached decisions that take a new look at the concept of a "taking" for which compensation is constitutionally required. If these are followed, the repercussions of the resulting change might prove so consequential as to induce far-reaching changes in the technology and operating practices of the air transport industry.

What do developments of the sort foreshadowed in these articles portend for law schools and legal education? Do the rise of science, both basic and applied, and the pervasiveness of its effects on our society carry with them not only a rise in the prestige of the scientist's calling but also a corresponding diminution in the importance of the functions of law in American society and of the influential place in that society which the lawyer has long enjoyed? If such

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17. This phrase is used both in the Model Penal Code's provision § 401(1), dealing with criminal responsibility and in the much-discussed "Durham rule," adopted in the District of Columbia as a test for the defense of insanity. *Durham v. United States*, 214 F.2d 862 (D.C. Cir. 1954).



a development seems at all possible, what should be its consequences for legal education; and how, if at all, have the law schools been adapting their curricula and instructional methods to cope with the new or impending developments?

These are questions to which Professor George A. Frampton of the University of Illinois Law School addresses himself in his article on "Scientific Éclat and Technological Change: Some Implications for Legal Education." Professor Frampton gives little reason to suppose that the important functions of the lawyer, the special fortes he contributes to the operation of our complex society, are in danger of falling into desuetude. On the contrary, he sees a growing need for the lawyer to exercise these fortes in meeting many of the new problems that are now emerging.

Turning to the law schools, Professor Frampton sees evidence of their response to technologically-induced social change in an array of second- and third-year courses and seminars that are newcomers to law school catalogs. When these are added to the diverse activities of many law professors outside the classroom, he finds impressive evidence of adaptation by law schools to new social needs. However, he finds these responses unevenly distributed among the law schools of the land, with progress being concentrated in a relatively small number of the nation's schools.

I believe readers of Professor Frampton's article will find in it, as I have found, more evidence of the law schools' responses to the results of technological change in terms of social change, national and international, than he will find evidence of law school efforts to study directly the processes whereby these results are brought about, to examine some of the specific ways in which scientific and technological developments actually affect, or are affected by, law, its institutions, and its processes. Much of the little instruction that may involve the latter is, I suspect, incidental to the pursuit of other ends. However, it is easy to underestimate the difficulty of the law schools' educational problem; the very diversity in points of confrontation that I noted at the start of this introductory comment makes it very hard to design places for their consideration within a crowded curriculum—except by resort to that ever-ready outlet for a faculty that is uneasy as to the coverage of its curriculum, the creation of a new seminar. Moreover, in the study of the interaction of law and science, another problem must also be reckoned with: student preparation—or the lack of it.

Given the stage which legal instruction directed to this subject has thus far reached, I find it hard to decide whether the concern

as to the unevenness of the resources and offerings among the law schools that Professor Frampton expresses is directed to an issue of consequence. Certain subjects which are or will probably be confined to a relatively small number of schools are likely in practice to remain the concern of only a limited number of lawyers. By and large, these lawyers will be graduates of the schools with the widest range of curricular offerings, but not because of these offerings. However, if one takes a less practice-oriented view, this fact does not relieve the law schools of their problem. Few lawyers have constitutional cases and still fewer practice international law; yet, the law schools have recognized the importance of these subjects in training the future lawyer for his role as citizen and leader of citizens. Perhaps the study of the interactions of law and science should be recognized as having a corresponding place in the training of tomorrow's lawyers. If so, ways must be found to extend the reach of the curricular experimentation that is now confined to a relatively few law students in a relatively few law schools.

One aspect of such a development which needs preliminary exploration is the question to what extent the law student needs instruction in the language of the computer. Within the past thirty years we have seen a few pioneering courses in Accounting for Lawyers expand until they are now a commonplace in law school curricula. This was done, not because the lawyer needed to be trained as an accountant, but because he needed to know the accountant's language. For those who would like to test their capacity to follow what would doubtless be viewed by the initiate as a rather elementary discourse using computer calculations for the solution of a problem in prediction, the article, "Predicting Court Cases Quantitatively," by Assistant Professor Stuart S. Nagel, a lawyer who teaches political science at the University of Illinois, may prove revealing.

The particular subject which Professor Nagel has chosen for his paper brings a scientific technique to the aid of the lawyer in a traditional professional task: predicting the outcome of future cases in the light of past cases. On the basis of a statistical study of the recurrence of certain factors in a sample of 149 civil liberties cases in the United States Supreme Court, Professor Nagel found that he could "postdict" the results of the cases in the sample with an accuracy of from seventy to seventy-four per cent, depending on the method used. This may be a useful tool for a social scientist investigating the relative importance of different types of recurrent factors in the decision of related cases, but, for the lawyer seeking to predict

the result of a particular case in which he is engaged, its utility seems questionable. In that lawyer's case, as in any other, there will be variables present that a statistical system of forecasting cannot be expected to take into account. The lawyer may know on the basis of a conventional evaluation of the precedents that, absent the variables which are peculiar to his case, the odds are against success. But both he and the judges before whom he argues his case will have to evaluate those distinguishing characteristics of the case, and in this process the computer can scarcely be expected to help.

Be that as it may, studies of the sort Professor Nagel reports might provide a form of exercise which the law teacher of the not distant future could use in introducing his students to the vocabulary and syntax of computers. Too many processes in science, business, and government are resorting to these extraordinary devices to allow the legal profession to remain illiterate in their tongues.<sup>18</sup>

As one observes the law challenged in these and other ways by the need to meet exigencies created by new forces operating in and upon our society, the law may seem condemned to a chronic catching-up process. The law may seem always behind. But that is where law's place should be—except in rare instances as, for example, when the need arose to provide a legal framework to enable a private atomic industry to come into being. Ordinarily, it is the law's task to respond to, and to build on, social experience. A response that is too hasty is likely to result in jerry-built law. When viewed in this perspective, the growth of the law has not been slow. Indeed, if one were to take as a bench-mark the law of 1900, I suspect that the subsequent changes not merely in the law in books, but even more in the work of the lawyer, have not fallen far short of those occurring in most of our social institutions in the same period. By those changes, the law has been able to provide the necessary degree of stability in a society that science has been subjecting to extraordinary stress.

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18. Computers may be important in the study of the work of the lower courts or in measuring responses to changes in legal rules, matters which involve the correlation of large bodies of data. Their potentialities for information retrieval as an aid to legal research have been the subject of much discussion. For a consideration of various techniques which are becoming available, see the *Symposium on Jurimetrics*, 28 *LAW & CONTEMP. PROB.* 1 (1963).