

On Reasoning in Law and Science^{*}

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Abstract

The purpose of this paper is fundamental examination of difficult issues that law faces, in dealing with scientifically unforeseeable problems in “Science Court”. Expectation for law’s role differs in lawyers and scientists, and that makes difficult their cooperation. In particular, I will discuss why modern “adversary system” has difficulties in scientific issues. Not only the forms of courts, but also the differences of reasoning between law and science are critical. Legal reasoning is often characterized as “requirements and effects” schemes subject to existing law, and is supposed to balance cost and benefit for dispute settlement, in time restriction. Scientific reasoning always leaves doors open, and is often characterized as infinite dynamic process for the discovery of truth. Both are common in reasoning in certain truth condition, but differ in their purpose and time factor. To reconcile both in courts, what is necessary, or is it possible at all? In this paper, I will discuss these questions based on legal philosophy, and Science, Technology Society (STS) studies.

Keywords: Law and Science, Expert Evidence, Scientific Uncertainty, Precautionary Principle, Cumulative Legitimacy, Adversary System

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I. Preface

In this paper, I would like to examine the problems of the “science court,” in which advanced science and technology have become issues. Scientific problems have long raised legal issues worldwide, but recent rapid developments in science and technology are fueling pressure to change the relations between law and science. These “law and science” problems include many concrete issues such as harmful chemical substances, genetically-engineered foods, nanotechnology, medical reproductive technology, and nuclear power. It is important that these scientific problems inevitably include “uncertainty,” which means difficulty in foreseeing outcomes or its fundamental impossibility. This uncertainty also means that even experts disagree about the significance or proper framing of the issues.

Due to scientific uncertainty with regard to the future, in cases where prevention/precaution of these problematic technologies become issues, adjudication becomes increasingly difficult. Ordinary fact-finding in suit is *ex post* judgment to compensate for damages that have already occurred, which is why it is relatively incompatible with *ex ante* judgment for prevention/precaution against damages that may occur in the future.

In the following sections, I’d like to discuss how law and science should construct desirable relations faced with such precautionary problems under uncertain conditions, or whether it is possible at all. In particular, two points must be considered: initially, concerning differences in the mindsets of lawyers and scientists, and secondly, relations of institutional problems of adversarial legal system. The number of “science courts” is rapidly increasing worldwide, including in East Asia, and will probably continue to do so, whereupon related problems will fester. In this paper, I explore the possibility of legal decision-making under uncertain scientific conditions

II. Possibility of co-operation of lawyers and scientists

1. Co-operation with whom: legal legitimatization of science

In a “science court” that treats scientifically “uncertain” problems, lawyers

and scientists must cooperate. However, the greater the uncertainty becomes, the more difficult such co-operation will be. In the case of “certain” problems, on which scientists’ consensus exists, legal decision-making may be permitted to respect the authority and autonomy of the scientific community. Such judgment is a kind of judicial deference. However, if there is disagreement, even among expert scientists, the question of whose opinion should be adopted is controversial and may become the so-called “co-operation with whom” problem.

There is a dilemma that a judge lacking expertise must make decisions on issues even when expert scientists disagree¹. Of course, most of judges have few opportunities for scientific training. Such “amateur judgment” will exercise significant effects on society, which may be an excessive burden on such judges.

There are cases where such legal decision-making may legitimize particular scientific opinions. As it were, scientific expertise is being legally constructed in courts. In such cases, the idea of “republic of science,” in which scientific opinions should be evaluated by peer-reviews in the autonomous scientific community, may be eroded by legal practice. “Law and Science” studies in STS (Science, Technology, and Society) have analyzed the process in great detail².

2. Difference of view about science

Lawyers’ views on science have often been criticized by scientists as too hard. The view is regarded as assuming that science will illuminate all that matters. Lawyers are regarded as over-expectant of science, and as lacking understanding of the inevitable uncertainty in science. As a symbolic example

¹ Teiichiro Nakano, “Der Sachverständige im wissenschaftlichen Prozess,” *Transactions of the Japan Academy*, Vol. 63, No. 3 (in Japanese).

² For example, see Sheila Jasanoff, *Science at the Bar*, Harvard U. P., 1995, and as critical examination of the conception of social constructivism in STS, see also Kira, T., Kobayashi, F., Kawase, T., and Matsubara, K., “Legal Reasoning and Social Constructivism: Toward Productive Co-operation of Legal Philosophy and “Science, Technology, and Society (STS),” *Tokiwa International Studies Review*, No. 16, 2012 (in Japanese).

of this “overly hard” scientific view, so-called “Lumbal Sentence” is sometimes quoted.

*Proof of causation in a suit is not that of natural science that accepts no doubt, but to prove with high probability enough to appreciate that specific facts have specific consequences, through investigating all available evidence with empirical rules. For the judgment, the degree of proof whereby ordinary people can be convinced of the truth beyond all reasonable doubt is necessary and sufficient*³.

Important in this sentence is that proof of causation requires “high probability” and “conviction of truth.” Accordingly, this view of Supreme Court of Japan has been maintained. The “overly hard view of science” is that “proof of natural science beyond any doubt” as cited beforehand is just a preliminary means of saying that scientific and legal causation differ, and legal reasoning is autonomous, sometimes even independent from scientific reasoning. In actual scientific practice, proof “beyond any doubt” is not necessary (if so, for example, there would be no room for epidemiological causation). However, Japanese lawyers (and judges in particular) have been insistently criticized, based on the single phrase, as having a naïve and overly hard view of science. There are probably few lawyers capable of such an anachronistic view of science.

However, as rhetoric like the “Lumbal Sentence,” or as “pretense” as a strategy of suit, some lawyers express such a view of science. Unfortunate misunderstandings come from literal acceptance of it, because the characteristic distinction of “what one says and what one means” in legal practice is difficult for non-lawyers, including scientists, to understand. At this point, rather, scientists’ overly hard view on law may surface. Legal practice is also a mixed process with various purposes and speculations, and is inevitably linked to uncertainty. This is as good as scientific practice. Thus, complaints such as “lawyers misunderstand science,” or “scientists don’t understand the

³ 24 October, 1975, Supreme Court of Japan, *Minshu* 28-9-1471.

autonomous characteristics of legal practice” are unproductive. More important are why such mismatches are generated and how to resolve them.

3. Conflicts of scientific faithfulness and strategy for suit

Where issues concern highly technical problems, scientists are sometimes called to court as witnesses or appraisers. However, such court examinations seem distasteful for scientists as reflected in the following caricatured example⁴.

Attorney: Is the comment of the National Radiological Protection Board correct or not?

Scientist: Before saying whether it is correct or not, I must explain in what sense it is correct or not, scientifically...

Attorney: Do you mean that you cannot say whether it is correct or not?

Scientist: Not at all.

Attorney: Then, tell me which!

Scientist: I mean that I cannot answer without a precondition. Validity is needed in science. Without stating the condition under which it is correct or not, a faithful answer is impossible.

Even if a scientific proposition is very simple, it cannot be true or false without a truth condition posited in advance by meta-statements. This example seems to be a natural reaction of scientists who support a kind of correspondence theory of truth prevalent in many fields of natural science. Thus, it is a faithful attitude for a scientist not to answer “scientifically correct or not” without any preconditions. However, conversely, it is rational for an attorney to urge a simple yes-or-no question. To win the suit, “the golden rules of advocacy⁵” are to make the witness say only advantageous things and not let

⁴ “Science and Court: Legal decision-making under scientific uncertainty” (*Science News*, a video program in Japanese), 15 July, 2011, <http://sc-smn.jst.go.jp/sciencenews/detail/M110001-011.html>, and also see Tsuyoshi Hondou, “Scientific literacy in a court: an expert witness’s experience,” *Journal of Science and Technology Studies*, No. 7, 2010 (in Japanese).

⁵ Keith Evans, *The Golden Rules of Advocacy*, Blackstone Press Ltd., 1993.

him/her say unnecessary things. To choose such a rational strategy is a faithful attitude as an attorney—whether it is compatible with “legal faithfulness” is another matter.

Here, the two kinds of faithfulness as a scientist and attorney clash in court. Lawyers (attorneys in particular) may insist that scientists should learn legal rhetoric to facilitate lawsuits. Conversely, scientists may insist that lawyers should learn “finitudes of science” and become aware of their roles to decide normative issues beyond science. Both are imposing responsibility on each other, which seems unproductive.

III. Structural problem of science court

1 “Truth” in court

Mismatches of lawyers and scientists also result from differences in perception about the purposes of lawsuits. Particularly in the case of civil suits, the purpose is not generalized as the pursuit of truth or justice. Of course, finding the truth is one of the key purposes of lawsuits, but many lawyers wonder what “set” of purposes is the best for the actual case in question. In the “science court,” in which advanced technical problems lead to issues being raised, the court often functions as an instrument with which to further promote the problem within society, rather than win the suit, or find the truth. Such lawyers’ flexible or cold-blooded views often surprise and disappoint those who consider the court a place to shed light on the truth or ensure universal justice.

2. Finitudes of the adversary system?

More fundamental are the structural problems of the adversary system of courts. Because “faithful” attorneys fail to pursue the truth or justice when disadvantageous for their clients, in the adversary system, scientific faithfulness and the structure of courts inevitably clash. One of the purposes of the adversary system was to improve the chance of finding the truth effectively by letting both parties compete with evidence, but it can also spark ironic dilemmas in the science court.

Under Japanese law, these problems are being gradually recognized. In the recent revisions of the Law of Civil Procedure (LCP) and Rules of Civil Procedure (RCP) in 2003, the provision of an examination order (LCP § 215-2), and adjustment of examinations items (RCP § 132-4) may be regarded as examples of slightly closer attention to the faithfulness of scientists. However, apart from the case where “the structurally weak” side is relatively apparent as a consumer suit, in science court, the very distinction between strong and weak becomes complex and problematic. Scientific uncertainty partly depends on the understanding or framing of it, and both parties sometimes disagree at that level.

The degrees or types of scientific uncertainty may vary, and sometimes include non-scientific contexts⁶. For example, with reference to the issue of an advanced technical problem, a plaintiff wishing to prevent the technique often emphasizes its uncertainty and danger. Conversely, a defendant wishing to promote the technique often underestimates such uncertainty. In this situation, the issue of how to frame a legal problem also constitutes part of “scientific uncertainty.” Therefore, scientific uncertainty may ultimately be reduced to parts of “legal uncertainty.” With this in mind, hasty inquisitorial mediations are not necessarily desirable. Here, we must remember the dilemma (previously described in Sec. 2.1) whereby non-experts must judge expertise. However, if “the inconvenient scientific truth” (whether for plaintiff or defendant) fails to appear in the adversary system, the legal decision-making will be performed without adequate information. The effect on society will be enormous, particularly for advanced technical problems.

IV. Conclusion

The contemporary “science court” includes multiple difficulties. Miscommunication among lawyers and scientists, and their different mindsets hamper their efforts to co-operate in court. This is also the structural problem of the adversary legal system. Differences in their views or understandings of

⁶ Andy Stirling, “Keep It Complex,” *Nature*, Vol. 468, 23/30 December, 2010.

scientific/legal uncertainty have complicated and exacerbated the problems in all those aspects.

Here, with reference to the kinds of problems handled by the science court, should we more or less abandon hope for lawsuits? Rather, should we expect the legislative and/or administrative process to resolve such problems? Of course, an excessive burden to the court is undesirable, and a strategy such as loosening adversary system may have side-effects depending on the case. However, it is too hasty to underestimate the role of the science court. For example, the functioning of raising and appealing problems to society can be soundly connected to the legislative and/or administrative process. Alternatively, the accumulation of *idem per idem* cases may result in convergence in legal decision-making⁷, and the acquisition of “cumulative legitimacy.” Ultimately, with various difficulties in mind, it is productive to explore the potential for using the “science court,” while remaining constantly aware of the finitudes.

⁷ Tamiko Nakamura, *Legal Decision-making under Scientific Uncertainty*, (forthcoming) (in Japanese).