

Article

Open Access

Lena Wahlberg

Legal Ontology, Scientific Expertise and The Factual World

DOI 10.1515/jso-2015-0022

Abstract: This article analyses the role of scientific information in legal proceedings by exploring the relationship of law, science and the factual world. The article compares legal and scientific ontology, and discusses how they relate to each other. The comparison is used to explain previous controversies between legal and scientific experts. Special consideration is devoted to the legal notion of cause-in-fact, which is discussed at length. The article distinguishes among different meanings of “facticity” in the legal discourse on causation, and discusses the bearing that these meanings have on the legal relevance of scientific information.

Keywords: Legal ontology; Law and science; Causation; Expert testimony; Questions of fact.

1 Introduction

Scientific information plays a crucial role in many legal proceedings. However, the encounter between law and science creates various complications and is a notorious source of frustration for lawyers and scientists alike. Some problems relate to scientific quality. There are numerous examples of how scientific expert testimony of poor quality has made its way into the courtrooms, and it is a much-discussed problem how “junk science” can be prevented from distorting the legal fact-finding process (see e.g. Hand 1901; Huber 1993; Angell 1996; Walton 1997; Goldman 2001; Meester et al. 2006; and Råstam 2013). Other problems arise instead independently of scientific quality and are due to disciplinary differences, emanating from the different aims and functions that science and law have. For example, it has been argued that law is a system with its own unique coding: whereas the sci-

Lena Wahlberg, Department of Law, Lund University, Lund, Sweden,
e-mail: lena.wahlberg@jur.lu.se

 ©2016, Lena Wahlberg, published by De Gruyter.

This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 3.0 License.

entific system applies the code true/false, the legal system applies the code legal/illegal and has developed specific criteria for its use (Luhmann 2004).

The proper use of scientific information in a legal context requires that disciplinary differences be adequately managed. This, in turn, requires that these differences are made visible. To begin with, it is useful to distinguish between “epistemological” and “ontological” differences.¹ *Epistemological* differences relate to legal and scientific conceptions of evidence and proof. It is readily seen that what is at stake in a legal fact-finding process (e.g. the risk of convicting an innocent person vs. the risk of acquitting a guilty one) differs considerably from what is at stake in scientific inquiries (e.g. the risk of accepting a false hypothesis vs. the risk of rejecting a true hypothesis or suspending judgement). Consequently, and for good reasons, law and science make use of different standards of proof. Epistemological differences must not be ignored when scientific information is used as legal evidence: if legal and scientific standards of proof differ, evidence that does not amount to scientific proof can in theory nevertheless reach the standards set for legal proof, and vice versa (Black 1988; Cranor 1993; Shrader-Frechette and McCoy 1993; Wahlberg 2010).

Epistemological differences, which pertain to legal and scientific conceptions of proof, can be distinguished from differences that pertain instead to *what* law and science set out to prove. It is easy to see that the languages of statute books, which designate legally relevant states of affairs, differ considerably from the languages of scientific theories and hypotheses. These differences are not merely terminological but mirror the different ways in which law and science conceptualise the factual world. In this article, the term “ontology” is used to refer to these different conceptualisations.² Just like epistemological differences, *ontological* differences reflect the distinct aims and functions that law and science have.

¹ See Wahlberg (2010), in which I examine the ways in which epistemological and ontological differences hamper attempts to establish legally relevant causal relations through the application of scientific information.

² The term “ontology” (derived from *ontos*, the Greek word for *being*) is often used to refer to the study of what kinds of stuff (objects, properties, relations, events) *really* exist. Undoubtedly, many would question the claim that legally recognised entities such as property, negligent behaviour and – beware – rights, *really* exist. The more relaxed sense of the term “ontology” that is used in this article does not require that a particular conceptualisation is the only possible one, or even that it is the most fundamental or “truest”. The weaker sense of “ontology” used here is instead similar to that used in computer science, where the term has been defined as “a specification of a conceptualization” (Gruber 1993), and allows us to speak of a distinct legal ontology without first settling the ontological, and on-going, debate about what there *really* is (or what it even means to say that something really exist, for that matter). What the precise relation would be between these seemingly different usages of the word “ontology” is in itself an intricate ontological question (See e.g. Searle 1996; Munn 2008).

This article investigates the ontological differences between law and science and discusses the bearing that these differences have on the use of scientific information in a legal context. Ontological differences between law and science are intriguing precisely because legal and scientific ontology set out to conceptualise the very same and real world – but do so differently. Moreover, the law applies to – and is meant to have effects in – the real world. Facts about the world are hence relevant to the law. Therefore, preconceptions about how legal and scientific ontology relate to the real world are likely to affect the relevance that jurists and scientific experts attach to scientific information and ontology in a legal context. Because law is predominantly prescriptive, whereas science is mainly descriptive, it is a plausible assumption that scientific ontology is “truer”, and – in legal terms – more “factual” than legal ontology. As will be shown below, however, this is a simplistic assumption, which – unless nuanced – risks leading to an over-estimation of the legal relevance of scientific ontology and evidence.

The article makes use of examples from Swedish law and insights from philosophy to compare legal and scientific ontology. Based on the comparison, it is observed that legal and scientific ontology are relative to different interests, but that both legal and scientific ontology can form the basis of descriptive statements. These observations are then used to assess the legal relevance of scientific ontology and evidence, and – using two Swedish cases as illustration – to explain typical problems and controversies that arise when scientific expertise is called upon in legal procedures. Special consideration is devoted to the legal notion of causation, and the claim that this notion is “factual”. The article discusses what “factual” might mean in this context, and examines the bearing that the existence of “factual” notions in the law have on how science, law and the factual world relate to each other.

2 Legal and Scientific Ontology – A Comparison

Legal rules make use of expressions such as “negligent behaviour”, “fingerprint” and “environmental damage”. Most of these are not uniquely legal but occur in other contexts as well. Often, however, their legal meaning diverges from the meaning that these expressions have in non-legal contexts. This is most clearly seen in the many stipulative definitions that legal rules provide. The purpose of these definitions is not to *describe* the meaning that some defined terms have in ordinary life, but rather to *prescribe* what meanings shall be given to some terms in the application of particular legal rules. Thus, the legally defined meaning of a

term can depart significantly from its ordinary meaning. Here are three examples from Swedish law:

- The Swedish Police Data Act defines “fingerprint” as “fingerprint or handprint” (Swedish Police Data Act [2010:361], Chapter 2, Section 3).
- The Swedish Act on Road Traffic Definitions defines “car” as a “motor vehicle furnished with three or four wheels or runners or belts, and which is not regarded as a motorcycle or a moped” (Swedish Act [2001:559] on Road Traffic Definitions, Section 2).
- The Swedish Act on Lottery defines “lottery” as a kind of activity in which some participant(s) can win a larger prize than some other participant(s), including, for example, bingo, roulette and card games (Swedish Lotteries Act [1994:1000] Section 3).

These legal definitions differ from how most of us understand the defined terms in the context of ordinary life. It is important to see that it is not only terms that have been subjected to explicit legal definitions that acquire a uniquely legal meaning once they become part of the legal system. In fact, all terms that appear in legal norms tend to acquire a meaning that departs from their meaning in ordinary life. Consider, for example, the term “negligence” in Swedish tort law. The Swedish legislator has deliberately abstained from giving this term an explicit legal definition; the task of determining its precise meaning has been delegated to the courts (Swedish Govt. Bill 1972:5, p. 21). Hence the meaning of “negligence” is shaped by the way courts interpret the rules that make use of the notion. Here the courts are influenced by legally relevant considerations of different kinds. When deciding whether or not certain behaviour should trigger tort liability, Swedish courts balance considerations pertaining to predictability, economic efficiency, restitution, security and other legally relevant interests (Dahlman 2000). It is highly unlikely that this balancing takes precisely the same form in non-legal contexts, and that (say) economic considerations have the same impact on the way we understand “negligence” in ordinary life.

The differences between legal and ordinary language discussed above are not merely terminological; instead, they show that the law makes its own, uniquely legal categorisation of the world. Recall, for example, the above-mentioned legal definition of “car”. In ordinary life, it makes a significant difference whether a vehicle is furnished with wheels or runners or whether it serves to transport human beings or is an instrument of warfare. In ordinary life, therefore, the various motor vehicles that the legal definition of the term “car” bunches together are referred to by distinct categories (cars, lorries, tanks, trucks and so on). From a legal perspective, these motor vehicles are all considered to be relevantly similar vis-à-vis the distribution of legal rights and duties, which the statutes associated with

this definition imply (Swedish Govt. Bill 2000/01:95, p. 93). By bunching together these motor vehicles into one legally relevant category, the law thus recognises a *kind* of entity, a legal car, which is not so recognised outside the legal context. Similarly, the law recognises uniquely legal *individual* entities, i.e. instances of legally relevant kinds. Consider, for example, the legal notion *activity*, which plays a central role in Swedish environmental law (Swedish Environmental Code 1998:808). This notion, which refers to paper mills, mining, dam construction works and so on, not only designates a legally relevant kind of entity, but also defines the members of this kind – the individual activities – in a uniquely legal way. More precisely, the Code’s demarcation of individual activities is a function of considerations pertaining to the scope of responsibility that the regulation attaches to this entity. For example, an activity in the Code’s sense might include some of the transports that are causally linked to the activity, while excluding those that are deemed to fall beyond the owner’s responsibility. Because the legal demarcation of an activity is a result of considerations pertaining to the boundaries of legal responsibility, its borders are a product of the legal order: neither the legal activity as an individual nor as a kind is necessarily recognised as a relevant entity in non-legal contexts, where these considerations do not have the same relevance. These demarcations are subject to adjustment and constant fine-tuning in case law.

Two important observations about legal ontology can be made at this stage:

- 1) Legal ontology is relative to legal interests. As already observed, the demarcation of legally recognised entities – individuals as well as kinds – is a function of legally relevant considerations. Economic considerations are but one example; considerations pertaining to predictability, morality, the legislator’s intention, coherence and the rule of law are some other examples. The way that legal ontology categorises the world is hence a reflection of these legally relevant considerations.
- 2) Despite its interest-relativity, legal ontology can form the basis of descriptive statements that can be true or false. Although the legal *definition* of terms such as “negligent behaviour”, “lottery”, “activity”, and “fingerprint” is relative to legal interests, these terms *refer* to events, facts and states of affairs in the real world. Legal statements such as “The defendant’s negligent behaviour caused the plaintiff’s injury” are hence factual statements *qua* referring to facts in the real world (See also Searle 1996, p. 191, according to whom the institutional facts in statements like this “bottom out” in “brute facts”).

How then, if at all, do these aspects of legal ontology differ from scientific ontology? Modern science has shown that our world is a more complex place than our ancestors could ever have imagined. Not only has the Earth proven to be but an

infinitesimal part of a universe that is incomprehensibly large, perhaps infinite; but this universe also seems to have causally active parts that are so fine-grained that some of them cannot be detected by even our most powerful instruments. Scientific disciplines approach this complex place from different perspectives. Whereas some scientific disciplines and theories (such as quantum physics) focus on the micro-level, others (such as epidemiology and ecology) seek to understand phenomena that are often better explained and predicted at the meso or macro level. Thus, modern science is a multifaceted endeavour, carried out jointly by a multitude of disciplines each with their own task and perspective. It is readily seen that these disciplines and theories recognise and relate entities of various kinds. For example, entities that are recognised by physical theories, such as electrons and forces, differ considerably from species, cells and other entities that are recognised by biological theories. These differences reflect the different interests of the theories and disciplines: while the kinds of entities that are recognised by physical theories reflect the interest in physical properties of physics, the kinds of entities that are recognised by biology are relative to biology's interest in living beings (Hennig 2008, p. 39). Philosophers of science engage in an on-going discussion about whether or not niches, species, kidneys, depressions and other kinds of entities that are recognised by meso- and macro-level theories really exist. Some philosophers and scientists hold that only elementary particles are real (See e.g. Merricks 2001). Others have argued that our highly complex natural world can be parsed in many different and equally correct ways, and that these ways reflect both the interests of the inquirers and what the world is like (Mitchell 2009, p. 13; see also Dupré 1993 and Kuhn 1991).

Like legal ontology, scientific ontology is hence relative to disciplinary interests. Due to the different aims and functions that law and science have, scientific ontology can be expected to reflect descriptive and epistemic interests to a greater extent than does legal ontology, which essentially mirrors law's prescriptive interests. In Section 5 below, I will discuss whether and how this difference in kind between legal and scientific interests affects the legal relevance of scientific ontology. For now, it suffices to note that a) differences between legal and scientific ontology reflect the different interests at stake in law and scientific disciplines respectively, and b) legal ontology too can form the basis of descriptive statements that are factual in the sense that they are made true by facts about the world.

Based on these observations, and the recognition that it is science's job – and not the law's – systematically to describe and explain what happens in the world, it is plausible to draw the following preliminary conclusions: Scientists are often better suited than jurists to judge *whether* a certain state of affairs obtains. However, because legal ontology is relative to legal interests, it takes insight

into the legal theoretical framework to say what state of affairs a legal statement indeed describes, and what kinds of entities form part of it – i.e. what the relevant facts are. And so, jurists are better suited than scientists to judge *what* state of affairs a legal descriptive statement refers to. It is hence important to keep in mind that this latter question – *what the relevant facts are* in contrast to appearance – is not primarily about the factual world, but rather about the interests and function of law. Therefore, scientific information does not provide the meaning of a legal question such as “Did *B*’s behaviour cause *A*’s injury?”. Instead, the meaning of this question must be settled by legal expertise taking into account legally relevant considerations pertaining to the kind of legal responsibility that an affirmative answer to the question will trigger.

3 Practical Implications: Two Examples from Swedish Case Law

The relationship between legal and scientific ontology has normative implications and is relevant to explain, solve or prevent controversies that might arise when scientific information is used in a legal context. This will be illustrated next with the help of two examples from Swedish case law.

The first example is a tort case decided by the Swedish Supreme Court in 1969.³ In this case, a car driven by *B* had struck *A*. *A* sustained a skull injury in the accident and it was indisputable that *B* alone caused it. After the accident, *A* suffered from effects such as severe headaches, double vision and loss of memory, and became disabled. The legal question was whether or not the accident had caused the disability. Several medical experts testified that the disability had not been entirely caused by the skull injury sustained in the accident. Rather, they speculated, some other injury must have existed before the accident – perhaps dating back to the years *A* spent in concentration camps during the Second World War. Nevertheless, the Swedish Supreme Court awarded full compensation. The legal reasoning in brief was that irrespective of the existence of an earlier injury, the skull injury contracted in the accident contributed to and triggered the subsequent disability. The case was followed by a vigorous interdisciplinary debate. Several medical experts criticised the Supreme Court’s judgement, arguing that the disability in the case was caused mainly by the existing injury, not the injury to *A* in the accident.

3 NJA 1969 p. 311.

The second example is a criminal case decided by Helsingborg's district court in 2014.⁴ In this case, *D* had slapped *C* in the face. *C* fell to the ground, hit his head on the paving and died. The legal question was whether the slap had caused *C*'s death. The autopsy report stated that the cause of *C*'s death was uncertain. When heard by the court, the medical expert *E* (who had written the report) explained that he had found no skull or brain injuries that could explain *C*'s death. *C* was overweight and intoxicated at the time and hence very vulnerable. According to *E*, there were at least three alternative explanations for *C*'s death: a) the violence might have triggered an emotional stress reaction that led to *C*'s death, b) *C* might have contracted serious brain injuries that were invisible at the time of the autopsy, or c) an invisible "minor head trauma" might have caused cardiac arrhythmia and thereby led to *C*'s death. According to the medical expert, then, there was no univocal causal relation but only causal hypotheses, none of which could be proven true. The district court, however, found that *D*'s slap had caused *C*'s death.

As illustrated by the case from 1969, courts' departures from the opinions of appointed experts are sometimes met with disbelief. In a symposium on the relationship between law and medicine, a frustrated physician complained (Rydell 1976, p. 222):

All right, you ask us physicians "What do you think?" and we respond that in this particular case there are pathological changes; due to their characteristics we do not regard the injury as being a consequence of the accident. But during recent years the courts have always ruled in favour of the plaintiff. I do not mind that. *But then why ask us?* (my translation)

Prima facie, it is easy to understand the quoted physician's frustration. However, if we recall the above-made comparison between legal and scientific ontology, we can readily see not only why controversies of this kind arise, but also how they should be approached. The correct answers to the questions whether the accident in the 1969 case indeed caused *A*'s disability, and whether the slap in the 2014 case indeed caused *C*'s death depend, *inter alia*, on how the human brain and body work. This is a matter that medical experts have better competence to judge than jurists. Still, the correct answers to these questions ultimately depend on the very meaning of the questions, and hence on how the relevant terms used are defined. In other words: the correct answer to the legal question "Did *x* cause *y*?" depends not only on how the world works but also on *what* facts need to obtain for there to be a legally relevant causal relation between *x* and *y*.

⁴ Helsingborg's district court, 1969-14. The decision was appealed to the Court of Appeal in Scania and Blekinge, which agreed with the district court's judgment (B 2084-14).

In both cases now described, the courts' causal judgements differed from those of the experts. It is important to see that the disagreements cannot be explained by different beliefs about what had been going on. Instead, there appears to have been a discrepancy in the notion of causation that the experts and the jurists employed. In (Swedish) law, causation is normally regarded as a counterfactual matter, where the key question is whether the cause was a necessary condition, which triggered the effect. The medical experts in these cases defined "causation" differently: In the decision from 1969, the experts were openly reluctant to recognise merely triggering factors as causes. The subsequent discussion in the Swedish medical literature suggests that the expert's reluctance was due to the fact that rehabilitation was an essential part of the experts' normal brief, and that these experts knew that the establishment of causal relations between a condition and external factors generally has a negative effect on the patient's willingness to take active part in the rehabilitation process (Silfver-sköld 1973). In the case decided in 2014, the medical expert was instead looking for a causal mechanism in C's brain or body to explain C's death. To this expert, as to scientists in many other fields, finding such a mechanism appears to have been an essential part of providing a causal explanation (Machamer et al. 2000, p. 1). By contrast, the legal conception of causation, which is a result of a great deal of jurisprudential discussion on how to demarcate the boundaries of legal liability, does *not* require the finding of a mechanism between the cause and the effect, nor does it care about *how much* the alleged cause has contributed to the occurrence of the effect (Peczenik 1979, p. 269). The cases now discussed also illustrate that it often is scientific practitioners who serve as scientific experts in court. The conceptual apparatus – including the notion of causation – which a practitioner employs, is likely to be more affected by non-epistemic values than the conceptual apparatus of a theoretical scientist. However, no matter whether the expert's ontology is shaped by epistemic or non-epistemic concerns, it is the legal ontology shaped by legal concerns that must prevail in court if the law is to be purposefully applied.

It is important to see that the fact that the notion of causation applied by a court differs from that applied by a testifying expert does not imply that the court discards the expert's opinion. For example, in the 2014 decision, the district court clearly stated that each of the alternative causal explanations that the expert proposed were compatible with there being a legally relevant causal relation between the slap and C's death (i.e. the slap was a necessary condition for C's death). Hence, the court found A guilty of involuntary manslaughter. Had the autopsy instead detected a mechanism showing that the slap was *not* a necessary condition for C's death, the court would probably have reached another verdict and acquitted D. Expert opinion based on scientific ontology is

hence not legally irrelevant. However, to avoid misunderstandings and unnecessary controversies attention must be paid to ontological differences between law and science, and expert opinion must be carefully translated into legal ontology.

The take-home message of this is that legal notions can be used in descriptive statements that are factual in the sense that they are made true or false by facts in the world. Scientific experts can be called upon to provide information on whether these facts obtain, but it takes someone versed in the legal theoretical framework to decide what the legal notions mean and what facts they refer to.

4 The Legal Notion of Cause-in-Fact – A Counterexample?

The conclusion that it takes someone versed in the legal theoretical framework to decide what legal notions like causation mean is implicitly challenged by claims in the legal scholarly literature on causation. Indeed, many have claimed that the law's very *notion* of causation is factual in the sense that *the notion's meaning is not shaped by the law*. In this section, I will investigate this claim and its implications for the relationship between law, science and the factual world.

Although different jurisdictions employ slightly different notions of causation, many jurisdictions – Sweden included – have in common that they often take the causal requirement to comprise a factual element: the so-called “factual causation” or “cause-in-fact” requirement (see e.g. Schultz 2007; Honoré 2010). This factual requirement is then distinguished from policy-based limitations on the scope of legal responsibility. Policy-based limitations too are often referred to in causal terms (as “adequate causation” or “proximate cause”), but are said to constitute the “legal”, “non-factual” part of the legal notion of causation. This conceptual division between factual and policy-based notions suggests that there are parts of legal ontology (e.g. cause-in-fact) that have not been shaped by law. It is therefore important to investigate more thoroughly: 1) what this claim means, and 2) what implications the alleged facticity has for the division of labour between scientific and legal expertise. The latter question will be discussed in Section 5 below. In the remainder of the current section, I will address the first question by discussing the views of legal theorists who have stressed the factual nature of the legal requirement of causation. I begin by examining the views that Herbert Hart and Anthony Honoré presented in their seminal work *Causation in the Law*.

In the preface to the second edition, Hart and Honoré stress that “it would be seriously misleading to suggest that the issue of causal relevance is not a factual one in the vast majority of cases” (Hart and Honoré 1985, p. lxii). At a closer look, this claim seems to imply not only that legal causal questions are descriptive, but also that the *notion* of causation these questions employ has not been shaped by law (Hart and Honoré 1985, p. 91). Specifically, Hart and Honoré argue that the legal notion of causation derives its meaning from the “plain man’s” notion of causation and hence is shaped by lay interests that, allegedly, have “deep roots in [...] common ideas of when it is just or fair to punish or exact compensation” (Hart and Honoré 1985, p. 1). Hence, Hart and Honoré do not deny that contextual interests have shaped the legal notion of causation; they deny, however, that it is law that has shaped this notion.

Part of Hart and Honoré’s notion of causation has been emphasised and made more explicit by Richard Wright. Like Hart and Honoré, Wright holds that causal inquiry is factual inquiry (Wright 1985, p. 1803). Wright, however, stresses that causation must be carefully distinguished from responsibility (Wright 1985, p. 1758) and he holds that his more minimalist notion of causation “is not just a test for causation, but is itself the meaning of causation” (Wright 1985, p. 1802). Now, Wright and Hart and Honoré do not seem to mean quite the same thing when they say that questions about causation are factual questions. Whereas Hart and Honoré argue that the legal notion of causation originates from the lay notion, they explicitly say that this notion need not be important in every context (Hart and Honoré 1985, p. 250). Wright appears to make a stronger claim than this when he says that the minimalist notion of causation that he proposes captures *the meaning of causation*, and thereby indicates that this is the notion of causation that is (or at least should be) used in *every* context, irrespective of the interests at stake. In a similar vein, Michael Moore holds that “cause is univocal; it means the same thing in contexts of attributing responsibility as in contexts of explanation: it refers to a natural relation that holds between events or states of affairs. Because moral responsibility is tied to such a natural relation, and because the law is tied to morality, the law also is tied to this natural relation” (Moore 2009, p. 5). Like Wright, Moore hence makes a stronger claim than Hart and Honoré, and holds that there is a true meaning of causation, which is independent of disciplinary interests.⁵

⁵ It can be mentioned in passing that Moore and Wright disagree about *what* the true meaning of causation is: whereas Wright advocates a regularist analysis of causation, Moore advocates a singularist analysis.

5 The Relevance of Facticity

At the end of Section 2, I drew the preliminary conclusion that whereas scientists often are better suited than jurists to judge *whether* a certain state of affairs obtains, jurists are better suited than scientists to judge *what* state of affairs a legal statement describes. This conclusion rested on the observations that legal ontology is relative to legal interests, but at the same time forms the basis of descriptive statements that can be true or false depending on what the world is like. Clearly the observation that legal ontology is relative to legal interests does not imply that information about the factual world and about non-legal ontologies is irrelevant to legal ontology. In this section, I will discuss the potential bearing that scientific information and ontology might have on legal ontology, and examine its implications for the division of labour between law and science. I will begin by addressing the implications of the claim that there are parts of legal ontology (e.g. the notion of cause-in-fact) that have not been shaped by law.

What would it imply for the division of labour between law and science if there were notions in law, which (like Hart and Honoré's notion of causation) have not been shaped by law but by the interests of some other discipline or context? Undoubtedly, the best-suited person to ascertain the precise meaning of such notions would be one who is well acquainted with the particular discipline or context. If – as implied by Hart and Honoré's claim that the legal notion of causation is factual – the relevant context is that of ordinary life,⁶ the typical scientific expert is no more of an expert on the legal notion of causation than is the judge. The analysis might differ, however, if the relevant context were that of a particular scientific discipline. As an illustrative example, we might consider the psychiatric diagnostic term "autism", which has become part of Swedish law, where it serves to demarcate legal rights to state support (Act 1993:387 on Support and Service for Persons with Certain Functional Disabilities). It is often said that psychiatric diagnoses do not reflect any natural boundaries, but that their main function is to provide information that can be of help to clinicians in their decisions about management and treatment (Kendell and Jablensky 2003). This suggests that the notion of autism is a factual notion in the same sense as Hart and Honoré's notion of causation is factual, but that the former is shaped by the interests of clinical psychiatry, whereas the latter, according to Hart and Honoré, is shaped by lay people's interests. Does this mean that psychiatrists should decide what autism means in a legal context? In my opinion, there are good reasons to answer this question in the negative. Clearly psychiatrists are better suited

⁶ This fits well with Hart and Honoré's view that legal questions about causation, *qua* factual questions, are to be settled by a layman jury (Hart and Honoré 1985, p. 428).

than jurists to decide how diagnostic terms ought to be interpreted *in psychiatry*. However, things become more complicated once terms like these become part of *the law*. This is so because the law has its own legal reasons for making use of the terms. Thus, in the example just given, the law uses psychiatric diagnoses as a precondition for the right to state support. Obviously, the legal interest in a just distribution of the right to state support is not identical to the clinicians' interests in managing and treating illnesses. From a strictly legal point of view, therefore, it might be beneficial to demarcate the notions that these diagnostic terms designate differently in law than in psychiatry. This does not mean that the law should *never* stay true to the meaning that a term has in another discipline. To ensure that legal rules serve their intended purpose, *all* legally relevant interests need to be carefully balanced in the interpretation of law. Some legal interests pertaining to, say, predictability and simplicity might indeed speak in favour of retaining the original scientific definition in a legal context too. However, even so and no matter how the final balance is struck amongst these interests, the balancing itself is legal and can be carried out only by someone vested in the legal theoretical framework.

It seems, then, as if the very idea of law using notions whose meanings it has not shaped is a contradiction in terms. As assumed throughout this article, if the law should be applied so as to serve legally recognised interests, then notions from other disciplines become relative to legal interests once these notions become part of the legal system. Indeed, Hart and Honoré seem to agree. Thus, in pointing out that “in legal contexts [the lay] conception [of cause] has to be refined and modified in various ways” (Hart and Honoré 1985, p. xxxiv), they explicitly recognise that the legal reworking of relevant notions applies to their factual notion of causation too. Accordingly, even if profound common ideas about human responsibility have informed the lay notion of causation, it is the interests of law that make this notion relevant for the attribution of legal responsibility in the first place. It does not seem to make a relevant difference whether the notion is factual in a stronger sense, as suggested by Wright and Moore. Thus, even if some notions indeed have “true” meanings, there is no conclusive or definitive reason why these notions would or should not be modified when used in law. For example, even if moral responsibility (as Moore argues) is tied to a natural causal relation and even if law is tied to morality, legal considerations pertaining to morality need to share space with other considerations in the legal system (pertaining to efficiency, the rule of law and so on). The legal meanings of notions with an allegedly “true” meaning emerge from processes in which all of these considerations are taken into account. Therefore, legal meanings need not be identical to the notions' “true” meanings. And legal interests can justify modifications of these notions too.

Now, the discussion above shows that scientific information cannot determine the meaning of legal notions. However, the discussion also shows that scientific information and scientific ontology can be of importance to legal ontology. For example, the meaning of psychiatric diagnoses and metaphysical theories of causation can certainly be relevant to what are legally suitable conceptualisations of autism and causation. Similarly, considerations and knowledge that have helped shape scientific ontology can be legally relevant too. Consider, for example, the medical experience that admitting a patient's suffering is caused by external factors slows down the patient's rehabilitation process; this experience was speculated to have shaped the medical experts' notion of causation in the discussion of the 1969 case. Information of this kind might certainly be legally relevant too and it might affect the law and the scope of a tortfeasor's legal responsibility. Simply put: legal interests are not all that matters. If the law is to serve its purposes, it must be sensitive to the workings of the world to which it applies and that is science's task to describe. Moreover, if the law is to be effective, legal rules must be operationalisable. Therefore, it is in law's interest that its questions can be answered by scientific information and that the law makes use of an ontology that can be translated from scientific ontology. Hence, scientific information is of importance not only to *whether* a certain legally relevant state of affair obtains; such information can be of importance also to deciding *what* the legally relevant states of affairs are and should be.

However, and this is the bottom line, to admit that scientific information is relevant to legal ontology does not mean that it *always* is relevant, or that the law can or should adopt scientific ontology. To begin with, it is often not the scientific ontology itself that is legally relevant but rather the knowledge that underlies it. For example, when considering the example from the 1969 case, it should be noted that it was medical information about human rehabilitation, and not information about the meaning of causation as a medical notion, that was assumed to be relevant to legal ontology. Moreover, it is an open question of *how* precisely scientific information ought to affect the law. For example, in contrast to what seems to have been the case for the medical experts in this case, information about rehabilitation need not affect the legal notion of causation, but might instead shape the meaning of other legal notions such as the notions of adequacy or contributory negligence. *How* scientific information about the world ought to affect the law depends on what fits best with the legal system. This is a legal question, which depends on interests and considerations of relevance in the particular legal system and branch of law. Furthermore, it is a question that cannot be answered *prima facie*, but essentially needs to be addressed and – in the light of new knowledge – re-addressed for each type and token of the legal ontology. Finally, scientific information is relevant primarily to the formation of law that

takes place in law *making*, i.e. in the legislative process, and in the higher courts' interpretation of hard cases. Scientific information does not have the same relevance to the content of law in regular law *application*, since in this process the room for unorthodox interpretations is highly constrained by considerations pertaining to the rule of law and legal predictability. The relevance of scientific expertise in law application consists instead of providing information on whether legally relevant facts obtain. This reaffirms the conclusions reached at the end of Section 2, namely that while the scientific experts that are called upon in particular cases often are better suited than jurists to judge *whether* a certain state of affairs obtains, the jurists in these cases are better suited than scientists to judge *what* state of affairs are legally relevant.

6 Concluding Remarks

I conclude that legal notions and statements are *always* relative to legal interests. The law needs to be sensitive to scientific information and to take such information into proper account, but it needs to do so only to the extent that the information is legally relevant and in a manner that is consistent with the aims and functions of the law itself. To admit that scientific information is relevant to legal ontology therefore does not mean that scientific ontology determines the content of legal notions and ontology but merely that legal ontology too is a function of both disciplinary interests and what the world out there is like.

Acknowledgments: This research was funded by Riksbankens Jubileumsfond, The Swedish Foundation for Humanities and Social Sciences, Grant M14:0139:11. I would like to express my gratitude to Johan Brännmark, Christian Dahlman, Tobias Hansson Wahlberg, Charlotta Levay, Annika Nilsson, Johannes Persson, Nils-Eric Sahlin, Niklas Vareman, Annika Wallin and two anonymous referees for valuable comments.

Bibliography

- Angell, Marcia (1996): *Science on Trial: The Clash of Medical Evidence and the Law in the Breast Implant Case*. New York: W.W. Norton.
- Black, Bert (1988): "Evolving Legal Standards for the Admissibility of Scientific Evidence". In: *Science* 239. No. 4847, p. 1508–1512.
- Cranor, Carl (1993): *Regulating Toxic Substances: a Philosophy of Science and the Law*, New York: Oxford University Press.

- Dahlman, Christian (2000): *Konkurrerande Culpakriterier*. Lund: Studentlitteratur.
- Dupré, John (1993): *The Disorder of Things: Metaphysical Foundations of the Disunity of Science*. Cambridge Massachusetts: Harvard University Press.
- Goldman, Alvin (2001): "Experts: Which Ones Should You Trust?". In: *Philosophy and Phenomenological Research* 63. No. 1, p. 85–110.
- Gruber, Thomas (1993): "A Translation Approach to Portable Ontology Specifications". In: *Knowledge Acquisition* 5. No. 2, p. 199–220.
- Hand, Billings Learned (1901): "Historical and Practical Considerations Regarding Expert Testimony". In: *Harvard Law Review* 15. No. 1, p. 40–58.
- Hart, Herbert and Antony Honoré (1985): *Causation in the Law*. Oxford: Clarendon.
- Helsingborg district court: B 1989-14.
- Hennig, Boris (2008): "What is Formal Ontology?". In: Katherine Munn and Barry Smith (Eds.): *Applied Ontology: an Introduction*. Heusenstamm: Ontos.
- Honoré, Antony (2010): "Causation in the Law", *The Stanford Encyclopedia of Philosophy*, Winter 2010 Edition, <http://plato.stanford.edu/archives/win2010/entries/causation-law/> (retrieved September 2, 2016).
- Huber, Peter (1993): *Galileo's Revenge: Junk Science in the Courtroom*. New York: Basic Books.
- Kendell, Robert and Assen Jablensky (2003): "Distinguishing between the Validity and Utility of Psychiatric Diagnoses". In: *American Journal of Psychiatry* 160. No. 1, p. 4–12.
- Kuhn, Thomas (1991): "The Natural and the Human Sciences". In: David Hiley, James Boman and Richard Shusterman (Eds.): *The Interpretive Turn: Philosophy, Science, Culture*. Ithaca New York: Cornell University Press, p. 17–24.
- Luhmann, Niklas (2004): *Law as a Social System*. Translated by Klaus Ziegert. Oxford: Oxford University Press.
- Machamer, Peter, Lindley Darden and Carl Craver (2000): "Thinking about Mechanisms". In: *Philosophy of Science* 67. No. 1, p. 1–25.
- Meester, Ronald, Mareike Collings, Richard Gill and M. Michiel van Lambalgen (2006): "On the (ab)Use of Statistics in the Legal Case Against Nurse Lucia de B". In: *Law, Probability and Risk* 5. No. 3–4, p. 233–250.
- Merricks, Trenton (2001): *Objects and Persons*. Oxford: Clarendon Press.
- Mitchell, Sandra (2009): *Unsimple Truths: Science, Complexity and Policy*. Chicago: University of Chicago Press.
- Moore, Michael (2009): *Causation and Responsibility: An Essay in Law, Morals and Metaphysics*. Oxford: Oxford University Press.
- Munn, Katherine (2008): "Introduction: What is Ontology for?". In: Katherine Munn and Barry Smith (Eds.): *Applied Ontology: an Introduction*. Heusenstamm: Ontos, p. 7–19.
- Peczenik, Aleksander (1979): *Causes and Damages*. Lund: Juridiska Föreningen.
- Rydell, Nils (1976): "Medicin och juridik på kollisionskurs?". *Nordisk försäkringstidskrift* 2.
- Råstam, Hannes (2013): *Thomas Quick – the Making of a Serial Killer*. Edinburgh: Canongate books.
- Scania and Blekinge Court of Appeal: B 2084-14.
- Schultz, Mårten (2007): *Kausalitet: Studier i skadeståndsrättslig argumentation*. Stockholm: Jure.
- Searle, John (1996): *The Construction of Social Reality*. London: Penguin Books.
- Shrader-Frechette, Kristin and Earl McCoy (1993): *Method in Ecology: Strategies for Conservation*. Cambridge: Cambridge University Press.
- Silfverskiöld, Boris (1973): "Ersättning vid långvariga besvär efter lätt skalltrauma". In: *Läkartidningen* 70, p. 276–278.

- Swedish Act (1993:387) on Support and Service for Persons with Certain functional Disabilities.
Swedish Government Bill 1972:5, Kungl. Maj:ts proposition med förslag till skadeståndslag
m.m.
- Swedish Government Bill 2000/01: 95, Lag om vägtrafikregister m.m.
- Swedish Lotteries Act (1994:1000).
- Swedish Environmental Code (1998:808).
- Swedish Act (2001:559) on Road Traffic Definitions.
- Swedish Police Data Act (2010:361).
- Swedish Supreme Court: NJA 1969 p. 311.
- Wahlberg, Lena (2010): *Legal Questions and Scientific Answers: Ontological Differences and Epistemic Gaps in the Assessment of Causal Relations*. Lund: Mediatryck.
- Walton, Douglas (1997): *Appeal to Expert Opinion*. University Park: Pennsylvania State University Press.
- Wright, Richard (1985): "Causation in Tort Law". In: *California Law Review* 73. No. 6, p. 1735–1828.