
7. Sociology of law and science

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In this chapter, we interrogate how the interactions between law and science have been approached by the social sciences. In the last three decades in particular, these interactions have been a growing focus of academic interest (Cole 2017; Caudill and Larue 2006; Silbey 2008, 2008b). An increasing body of inter and transdisciplinary empirical research and novel theorisation has sought to inspect and unpack how law and science as institutions and bodies of knowledge shape contemporary societies (Pottage 1998; Strathern 2019). In particular, research has engaged closely with how the interactions between law and science act as accelerants of material and semiotic innovation (Silbey and Ewick 2003; Hayden 2003; Jacob 2012). Yet, it is probably fair to say that these questions have not been as central to the sociology of law as one may expect, emerging instead as a distinct, though overlapping, subfield of inquiry.

Thinking about the relations between law and science (and the multifaceted processes and institutions that these two terms summarise) from a sociological perspective builds onto a series of questions explored by the sociology of law and socio-legal studies, and by the sociology of science and the wider field of science and technology studies (STS). On the one hand, analyses of law and science build on longstanding questions in the sociology of law, such as: how is the authority of legal institutions constituted and how does it operate in the everyday (Ewick and Silbey, 1998)?; what types of sub-cultures and forms of knowledges permeate norm-making institutions (Merry 2012)?; how do different types of normativities co-exist within and alongside those of the State (Galanter 1981; Griffiths, 1986)?; and, fundamentally, what should we consider as ‘law’ (Malinowski 1926)? On the other hand, considerations of law and science pursue lines of inquiry established by STS (and the sociology of science more specifically), such as: how are scientific norms shaped, and how do they shape society (Shapin, 1994); how do experts and expertise come to be determined (Callon, Lescumes and Barthe 2009); and, how does scientific knowledge settle and feed into methods of regulation and governance (Jasanoff 2005)?

Critical attention to how law and science interact also develops problematics that overlap the sociologies of law and science, including the relation between public authority and particular forms of (dis)empowerment (Harding 1986; 1998; Cooper 1998; 1995; Merry 2004). Some core questions of ‘law and science scholarship’ seem recurrent. For example, a key emphasis has been the interrogation of how legal decision-making and institutions respond to scientific knowledge (Jasanoff 1997; Brownsword and Goodwin 2012), or even how the law ‘learns from’ science – be it in the court room or as regulations are being made (Lynch and McNally 2003; Cole and Lynch 2006). At the same time, legal scholars have explored the (actual or potential) framing of new technologies and what the law could do to foster technoscientific research and development (Brownsword and Yeung 2008).

In this chapter, we seek to observe and analyse the heterogenous scholarship situated within what some term the field of ‘law and science’ and its overlaps with the sociology of law. Such a review, though, is complicated by the fact that *how* this

broad topic has been approached has greatly varied. If some scholars have sought to focus on the interaction between law and science as a way to more forcefully unsettle what we may assume of both, it is fair to say that many others have been rather less critical. In particular, legal scholarship that assumes that new scientific discoveries can straightforwardly be embraced by the law and transform its practice, or that law can simply superimpose itself over them, continues to constitute a significant proportion of work in 'law and science'. In our attempt to map this field, we are conscious of the conceptual tensions that inhabit it. Accordingly, we focus primarily on work that has sought to engage critically with both science and law, as well as on their interaction: we are particularly interested in sociological approaches that have taken seriously both the sociology of law and STS.

In what follows, we chart some of the more productive intellectual exchanges of the past few decades that have emerged at the crossroad of the sociology of law and socio-legal studies with STS and the sociology of science. Scholars positioning themselves at this intersection have focused specifically on the joint workings of law and science in the making of a particular type of knowledge, and of particular types of institutions and social relationships (Aronson, 2007; Biagioli 2011; Bora 2008; Cloatre 2019; Shapiro 2015). In so doing, they have also contributed to shifting attention away from 'law' and 'science' as independent objects of analysis towards their inherent interaction – or what Sheila Jasanoff has referred to as 'co-production' (Jasanoff 2004). Indeed, both law and science can, through an STS lens, be seen as inseparable from the broader networks of social (or sociotechnical) practice in which they are inscribed. Even though we may have an instinctive sense of what law or science 'look like', the definition of their boundary has been a contested issue in both the sociologies of law and of science.

In this chapter, we are concerned to introduce the types of questions that most strikingly indicate why the field of 'law and science' is best seen as one of intermingling of knowledge, practices and institutions that essentially shape each other. This is counter to another vision of these domains that regards them as pre-existing independent spheres of practice that only occasionally and aloofly meet. We acknowledge that our focus will, inevitably, elide important work that escapes our framing. This includes scholarship that, for example, touches on how some new technologies are regulated, or ought to be regulated. Here, we privilege social scientific critiques to normative discussion. Our intent is that this will in turn provide a compelling invitation for further and future considerations of a nascent field that has sought to develop a new form of critique.

STS AND LAW

The interdisciplinary field of science and technology studies (STS) has many origin stories, but it is fair to say that it represents the coming together in the 1970s of various strands of sociological, historical and political discourses, originating in a range of countries, on the production and effects of scientific knowledge and technological artefacts (Pickersgill and Jasanoff, 2018). STS is particularly sensitive to the social dimensions of science, considering through robust case studies how micro and macro social currents and processes directly shape epistemic and material innovation, and its societal ramifications. Today, STS scholars approach a range of empirical sites, from classical studies of physics

and genetics, to wide-ranging research on psychological care, environmental health, gambling machines and social media.

Many who work in law, socio-legal studies, and the sociology of law, and who have turned to STS, continue to associate the field most strongly with actor-network theory (ANT) – especially the work of one of the key figures in STS, Bruno Latour (Cloatre 2018; Seear 2020). First, through ANT and later via his later engagement with the making of knowledge and authority in law, Latour has explicitly sought to experiment with what applying the methodological sensitivities of STS to legal institutions might mean (Latour, 2002). His approach, and ANT more generally, has also enabled particular critiques of law's modes of action and enunciation. We leave aside this particular strand of work from our review. This is in part because it has already extensively been commented upon elsewhere (Cloatre 2018; Pottage 2012). It is also because, in reviewing work at the crossroad of law and STS, we seek to maintain our focus on the ways in which the subfield has problematized the interaction between legal and scientific phenomena, rather than broader conceptual avenues.

If the approaches and questions that brought together legal studies and STS have been diverse, the objects and spaces around which scholars have gathered to interrogate the interaction between law and science have also been numerous. This further complicates the possibility of sharply delineating the boundaries of what the field of 'law and science' may, or should, represent. Case studies for empirical scrutiny range from psychological care to environmental crises and from laboratories to hospitals to courtrooms, and involve lawyers, nurses, police officers and 'non-experts'. Much attention has, unsurprisingly, been devoted to significant moments in scientific development: new technologies or major breakdowns of trust that have, for example, reshaped legal and biopolitical relationships (Franklin and Ragoné 1998; Petryna 2002). Work on biotechnology, and genetics in particular, has proven to be especially influential (Pottage 1998; Jasanoff 2011).

In analyses of this kind, the meaning of expertise and modes of its construction have been a particular focus of attention (Prainsack 2015; Raman 2015; Leclerc 2005). Scholars explicitly articulated, or implicitly responded, to the notion that it is important to explore both how law can shape scientific (including biomedical) knowledge (Adams 2002; Cloatre 2019; Pottage 1998), or indeed how legal decisions and processes of decision-making can (or should) answer to or engage with science (Levidow 1998). Further, findings and theories from criminal law and tort law have stimulated numerous debates about what could count as evidence (Prainsack and Kitzberger 2009; Scheffer 2010; Toom 2016). They have also sparked conversations about how particular types of expertise or technologies could help us get closer to the 'facts' that judicial decision-making tends to rely upon (Aronson 2007; Balmer 2015; Lawless 2012; Rees 2015).

Studies allying an attention to law and to technoscience have also reached less obvious fields of practice, such as financial regulation, labour law and counter-terrorism (Alessandrini 2015; de Goede 2012; Grabham 2015, 2016; Riles 2000). Moreover, some strains of law and STS scholarship have been characterized by an attention to the everyday, extending a longer tradition within the sociology of law: analyses of discrete – and often discreet – forms of everyday interactions have been distinct features of the field (Jacob 2012; Riles 2011; Cloatre 2013). How such relations shape and are shaped by complex movements across law and science has been demonstrated through fine-grained empirical scrutiny. An example of this comes from Jacob (2019), who showed how notions

of ethical practices and their regulation within biomedical publishing are made through conversation and committee work (echoing some of the themes otherwise explored by legal pluralism, in its questioning of co-existing and overlapping normative orders, each with their own inner mechanisms). In addition, conceptually, STS scholarship on law has also been extended to much broader and less expected sites, shifting received wisdom about how we may explore the making of legal and political norms and practices themselves (Pottage 1998; Lezaun 2012; Cowan and Carr 2008).

For a long time, and often still, a default mode for imagining the interaction between law and science is as an encounter between two relatively fixed and stable institutions. One of the primary characteristics of the rapprochement between socio-legal and STS scholarship has been a shift to perceiving these institutions as intimately entangled by and within each other, and wider social – often transnational – networks. Scholars have shown how, through these encounters and entanglements, new social and material realities are produced (Edmond 2001; Faulkner 2012; Pickersgill 2013a; Cole and Lynch 2006). Appreciating such co-dependency challenges competing visions of law and science as independent spheres of knowledge that may simply borrow from, or build upon, one another (Jasanoff 1997; Pickersgill 2012). This has enabled, in particular, the charting of the epistemic and legislative dynamics which arise in and through the interactions between legal institutions, scientific knowledge and technological innovation (Aronson and Cole 2009; Brownsword and Yeung 2008; Jasanoff 1997).

These findings have enjoined revised conceptual starting points for studies of law and science which, in turn, have methodological implications. For one, a move is necessitated from a straightforwardly normative to a more critically descriptive approach. This involves close textual analysis to be sure, but also techniques such as qualitative interviewing, focus groups and ethnography. In the future, it will also likely include innovative quantitative techniques of examining and parsing emergent sociality, such as social network analysis and digital issue mapping (Marres 2015).

Although some analysts continue to call for legal systems to be enhanced by learning from science, or seek to argue for a ‘better’ integration of scientific knowledge into law, the scholarship we focus on approaches this encouragement tentatively. It acknowledges from the outset that science is itself subject to negotiations and settlement, and that its framing by law is never just a superimposition. Similarly, rather than law being imagined as ‘learning’ from a fixed body of scientific knowledge, it imagines the type of knowledge produced by law in its encounter with science, or indeed technological innovations, as being based on its own logics and processes of construction (Pickersgill 2011).

Longstanding claims of a ‘culture clash’ between lawyers and scientists continue, still, to endure, with the responsibility for dissipating this curiously and asymmetrically apportioned to lawyers by lawyers. Specifically, lawyers often expect one another to learn from or solemnly acknowledge the supposed objectivity of science. This is perhaps especially the case when regulation is charged with needing to ‘catch up’ with technoscientific developments that are purported to be breathtakingly novel. Of course, there will be instances where legislative practice could or should be made more robust, particularly in instances of potential corporate capture, or where protections for groups might compound existing inequalities, or where innovation has somehow evaded existing regulatory regimes (Muto, 2010). However, propositions for law that romanticise or idealise science have largely been debunked by closer attention to, and the delicate

handling of, the types of knowledge produced jointly by legal and scientific practices (Jasanoff 1997; Caudill and LaRue 2006).

Through the lens of STS, science has become understood as a field of contested practice, and knowledge as a process, from which some social actors and forms of expertise are more likely to be excluded than others. What emerges from its workings is an inevitable partiality, rather than an unmediated access to Truth (Haraway 1988). Paying attention to the patterns of silencing and exclusion that can cut across science makes calls to uncritically seek to improve the legal system through a closer relationship with science, both normatively problematic and analytically unproductive.

Of course, reimagining the relationship of law and science has also been informed by the conceptual challenges that continue to surround legal analysis. Legal scholars have built upon a vast body of work from socio-legal studies, legal anthropology, critical legal scholarship, feminist, or postcolonial legal studies, among others, to articulate the layering of legal processes (Cloatre and Enright 2017; Jacob and Riles 2007; Mawani 2009; Silbey 2005). This has complicated what others may assume of what law or regulation mean for scientific practice or, indeed, how we imagine their relationship and interdependency.

Overall, scholarship at the crossroad of law and STS has opened up debate on thematics and methods that continue to make the field of 'law and science' both difficult to capture and constantly evolving. In what follows, we present and parse scholarship along two sets of questions that has most centrally echoed the concerns of the sociology of law. First, the regulation of science, and the type of social interactions that are at stake in this process. And second, the question of expertise, and how particular forms of authority can be constituted through the joint works of law and science.

REGULATING SCIENCE

A significant part of contemporary scholarship on law and science has been interested in how law responds to scientific and technological innovation – from genetics, to reproductive technologies, to artificial intelligence. Questions have gravitated at one level around normative tensions and challenges, and the balance to be found between the promissory nature of new technologies and the challenges they may pose for social justice or individual rights. At the same time, legal scholars have often sought to interrogate what new technologies may mean for the practice of law. To name one prominent example from the last decade or so: what might developments in neurosciences bring to legal practice (Morse 2004)? Or, more recently, how might AI transform the legal profession (Ashley 2017)? It is probably fair to say that part of this scholarship has remained separated from the social scientific work – in particular, within STS – that has sought to complicate the nature of science, and to problematize how scientific innovation should be imagined. As we noted above, narratives about the fast-changing nature of science and the tendency of law to lag behind continue to persist in some sections of legal scholarship.

Other analysts have more closely engaged with the empirical and conceptual traditions of STS, bringing these in conversation with the concerns of the sociology of law, by exploring more productively the ways in which normative frameworks shape the praxis of scientific innovation. This has opened a more detailed engagement with, for example, the range of interests that get accommodated, replicated, or produced through new scientific

and technological developments, and how law participates in enabling of perpetuating such patterns (Cloatre 2018; Hayden 2003; M'charek et al. 2013; Prainsack 2015). It has also illustrated how the rights and duties of citizens may be realigned and, indeed, how new technologies might restyle varieties of citizenship (Flear and Pickersgill 2013; Flear et al. 2013; Jasanoff 2011). The politics of innovation, and the political choices made in facilitating or restricting legal and material access to particular innovations, have also been made apparent (Cloatre 2013). In so doing, scholars have highlighted how social, gender, or racial inequalities can be enmeshed in both scientific processes and the regulation of their end products (Adams 2002; M'charek 2008; Franklin and Ragoné 1998).

Attention has also turned away from innovation *per se* to look at how law and science can work together to produce particular forms of citizenship through more mundane technologies. For example, Cloatre and Enright (2017; 2018) analysed the struggles that surrounded the making of condoms as 'legal technologies' in Ireland. They emphasized how decades of organized illegal distribution enabled the transformation of condoms from being seen by the state as deviant objects, to being accepted as health devices.

Some working at the interface of STS and law have questioned how particular technologies or forms of scientific knowledge have come to be accepted within regulatory or legal systems as reliable, and the type of politics that this may suggest both for law and for science (Lynch and McNally 2003; Raman 2015; Cloatre 2019). Intellectual property scholars who have engaged with STS have also explored both how pre-existing legal patterns can determine what gets 'made' in science, while assumptions about what science looks like (often loaded with their own politics) continue to shape legal systems (Biagioli 2011; Pottage 2015).

As a whole, these more critical analyses of how legal and technoscientific praxis work alongside and through each other have participated in challenging deterministic ideas about modernity and development that can still be prevalent in more mainstream writings about the law. Rather than being seen as simply framing, enabling or holding back an otherwise linear process of innovation, law has been seen as having a stake in determining the conditions – and, indeed, nature – of science. At the same time, the interaction between law and science can be read as a more openly political process in which patterns of exclusions, silencing and maintenance of power are rewritten, and occasionally challenged (Cloatre and Enright 2017; Cloatre and Salvini Ramas 2020; Pordié and Gaudillière 2012). Viewed in this more critical fashion, the regulation of science – and regulation *with* – science becomes a more interesting site in which to explore how past, presents and futures are jointly narrated and formed by legal and scientific knowledges, institutions and practices. Additionally, the mixing of law and science comes to influence the very possibilities of social justice and (re)distribution. This is perhaps most strikingly evident in debates about intellectual property and its impact on the politics and practice of technological change (for example, Hayden 2003; Pottage 2006).

EXPERTISE, CITIZENS AND THE MAKING OF LAW

A core theme in sociological studies law and science has been that of expert knowledge and its entanglement in legal processes. This has directly built upon a longstanding concern in the sociology of law around the question of what sustains the authority of

legal institutions. The authority of law derives, at least in part, from its ability to mobilise expert knowledge, of which science is often taken as the most reliable example. As STS scholarship has demonstrated, however, the idea of a purely objective and depoliticized form of knowledge does not bear close scrutiny. As a range of historical and contemporary scholarship has clearly demonstrated, knowledge is always the product of particular settlements and constructs (Schiebinger 2004; Shapin 1995). It is always subject to reopening, and shaped by the tools used to scrutinize it.

If studies seeking to interrogate how expert knowledge has been mobilized in law have cut across multiple legal contexts, they have also considered both the making of regulation and courtroom practices (Aronson and Cole 2009; Cole 2004; Biagioli 2011; Bronsword and Yeung 2008; Laurie and Harmon 2015; Kirkland 2016). Further, they have been attentive to the myriad of everyday administrative processes that define contemporary regulation (Jacob and Riles 2011). Research originating within STS has shown how expert knowledge that is used and deployed in the courtroom is subject to processes of selection and translation that are both remade with every encounter, and dependent on external negotiations (Edmond and Mercer 2004; Jasanoff 2007). Such work has illuminated how the simplifications and translations at stake in determining what counts as knowledge for the purpose of the law produces its own forms of politics, and reinforces other relationships of power and disempowerment (Adams 2002; Cloatre 2019).

When brought into the context of lawmaking processes, the issue of expertise has also raised bigger questions around participation in the making of public rules, and indeed about the very nature of democracy. Considering whose knowledge informs regulatory decision-making, and how, contributes to broader debates about how the institutions of law and science can enable or exclude particular groups from participation in civic life (Flear and Pickersgill 2013; Hayden 2003; Levidow 1998; Raman 2015) and the production of local and global regimes of normativity (Pickersgill 2012).

One of the contributions of STS scholarship has been to demonstrate that knowledge is always weighted with the history of its making and that 'regulatory knowledge' is always a translation of science rather than its replication. Expertise is inevitably political and inscribed into particular modes of making that law does not always make apparent. It is also diffuse, with 'lay experts' often seeking to have their voices heard alongside those of traditionally credentialed agents who have been more formally mobilized through established institutional channels (Callon, Lascoumes and Barthes 2009; Epstein 1996; Turkmendag 2015). Networks of knowledge making tend to reflect the privileges and violences of the societies within and across which they are situated, influencing the types of knowledge available to law and delimiting which of these it comes to rely on. Further, these social (and sociotechnical) dynamics operate within and pattern considerations of how to assess, or value, particular forms of knowledge.

Those who are able to speak with the authority of science are also those who already tend to be empowered, and are not necessarily speaking for those that are being regulated. This is strikingly illustrated by – sadly ongoing – struggles around reproductive rights. Thinking of new ways to explore and engage the processes through which experts and expertise are forged through, enrolled by, or silenced via law seems particularly pressing. This is not least given the increasing challenges to the value of expertise to public decision-making within many nations. Such challenges can inadvertently – and sometimes deliberately – ossify established and conservative hierarchies of expertise as a strategy of

resistance to political elision. In turn, spaces for participation by a wider range of experts are further shrunk. Technocratic decision-making and political claims-making disguised as objective knowledge, has certainly contributed to a growing distrust towards experts and their claims. At the same time, more than ever, it is crucial to reconcile a critique of the particular processes at stake in knowledge production and the revaluing of a broadened form of expertise in public decision-making.

MOVING FORWARD IN STUDIES OF LAW AND SCIENCE

By enabling a cross-fertilisation of interdisciplinary legal studies and STS, studies in law and science, or indeed ‘law and STS’, have contributed to providing new forms of critical engagement with both the institutions of law and those of science. In so doing, they have offered new ways to conceptualise the nature, effects and affects of law. The rapprochement these studies represent cannot be characterised as representing merely a linear and one-way influence of STS on law: STS scholarship that takes interest in regulatory movements has been afforded considerable benefit from the conceptual contributions that legal scholars have made to their own objects of study (M’charek et al. 2013, Toom 2016).

Bringing together the critical assessment of legal and scientific endeavours has enabled scholars to break new ground. In particular, new conceptual and methodological engagements have made apparent some of the political dynamics that determine how law functions in societies, and how scientific and legal practices can feed off each other in strengthening pre-existing relationships of institutional power. If STS has to a great extent enabled legal scholars to approach science as a much less certain object than they may have done otherwise, ‘law and STS’ scholarship has also contributed to destabilizing understandings of the ontology of law, adding new insights into the many ways in which legal authority gets constructed, sustained or defined.

Much work, however, continues to be needed in enabling the deeper embedding of critical reflections on science within legal scholarship as a whole – and critical engagements with law and regulation in STS scholarship. Further inquiries across the broad thematics we have sketched may continue to provide new examples that will illustrate why neither objects, nor their interaction, can be approached as taken for granted and stable entities. At the same time, neither interdisciplinary legal studies nor STS have so far been able to influence discussions of law and science as a whole. Significant sections of legal scholarship continue to assume the settled and factually authoritative nature of science, and to simply accept claims about the transformative nature of scientific developments – eliding the fact that novelty is itself a social accomplishment (Pickersgill 2019). Similarly, STS scholarship does not always do justice to the deep politics often at stake in the regulatory adjustments that new technologies are commonly argued to require, do not clearly articulate the theoretical standpoints that they adopt when talking about law, and do not treat law with anywhere near the sophistication with which they approach science.

Where work on law and science continues to offer more critical, interdisciplinary insights, these are both conceptual and methodological: an increasing return to the micro, or aspects of the technical (Riles 2005), coupled with ethnographic accounts of localized interactions, for example. But also, the unpacking of the assumptions, practices and objects that we may have otherwise taken for granted, or the close inspection of how

knowledge is made and travels through both law and science, will continue to require conceptual and methodological innovation and an attention to more diverse sites. In the same way as both legal scholarship and STS have been criticized for not sufficiently paying attention to silenced voices (Puig della Bellacasa 2013; Pollock and Subramaniam 2016), we may also wish to see ‘law and science’ scholarship more openly taking on sites and questions that are less tied into Western contexts, and less focused on the formal institutions of science (and their own biases).

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