The Practical Accomplishment of Novelty in the UK Patent System



Chris Sugden

Worcester College

University of Oxford

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Abstract

Novelty is a widespread notion that has not been given commensurate critical attention. This research is an ethnographically-inclined exploration of practices surrounding the accomplishment of novelty in an institution for which novelty is a central notion: the patent system of the United Kingdom. The research is based on interviews with patent examiners at the UK patent office, interviews with patent attorneys at various legal firms, and documentary analysis of legislation and numerous legal judgments. The thesis brings to bear themes from Science and Technology Studies and ethnomethodology to assess the extent to which they can account for the practices surrounding novelty in the UK patent system. As a fundamental legal requirement for the patentability of inventions, novelty is a central part of the practices of patent composition, assessment and contestation. Rather than being a straightforward technical criterion, however, novelty is shown to be a complex and heterogeneous phenomenon emerging from interwoven legal, bureaucratic and individual practices. The local resolution of whether or not a given invention is new, and the cross-institutional coherence of novelty as a practicable notion, raise questions concerning ontology, accountability, scale and inconcludability, and provide an opportunity for empirically grounded engagement with these longstanding analytical concerns.

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CHAPTER 1

Introduction

Novelty is a central motif of our culture. So much so, that it is hard to imagine a realm of human activity that does not in some way concern, or is not in some way influenced by, the notion of "the new". The rise of discourses of 'innovation' is a particularly noticeable example: we citizens of the European Union find that it is an "Innovation Union" in which we now reside.[1] "The news" is increasingly present, of course, as events can be reported to billions of people in seconds. We are perhaps most brazenly confronted with novelty claims in advertisements of "new and improved" products, but similar claims can easily be found in politics ("New Labour", "neoconservativism" and, more generally, "new policies"), literature ("a fresh voice") and, of course, academia, where a "contribution to knowledge" is paramount. We have, in daily life, become accustomed to the new, habituated to the unhabitual. It is widespread and, moreover, a justification for a variety of activity.

[1] "Innovation Union" is a "flagship initiative" of the European Union's growth strategy to 2020.

Given how widespread and influential the notion of novelty is, there has been a surprising lack of academic attention paid to it. All too frequently, the response to novelty has been to utilise it as a justification for research: the new state of affairs necessitates an investigation, the argument goes. Whether in a journal call for papers, or a conference announcement, or an introduction to an academic text, noting the new state of affairs functions rhetorically to provide the following activity with a sense of purpose. A particularly noticeable instance of this move is in what I term 'implicationist' research: work which justifies its own existence in terms of understanding the (generally social, legal, or ethical) implications of new science and technology. In this thesis I argue that what is required is an investigation *of* novelty, rather than *because of* novelty, an 'explicationist' approach to this important and widespread motif, rather than an implicationist enrolment of it. My research is based empirically in patenting: specifically, the composition, examination and litigation of patents in the UK patent system. Novelty is a central, foundational theme in patenting—inventions simply may not be patented unless they are new—and in addition, I argue that patent-related practice is also insufficiently researched given the complexity and importance of the work.

It is hard to distance oneself from novelty. Even in these few paragraphs I have begun to argue for the novelty of this thesis, through a separation from what research there already is. The Critical Literature Review (Chapter 2) is, effectively, precisely an attempt to do just this kind of separation, through the setting out of the existing relevant research and the performance of significant absences, necessitating the research that follows. Throughout

the thesis, and particularly in the Conclusion, I argue that this research is saying something new about novelty, that it makes a significant contribution. The reflexive issue is clear, and I address it in the Conclusion; not as an afterthought, but as a deferred thought. The practitioners described in this thesis make good use of deferral as a strategy for dealing with the complexities novelty presents, and I believe it is sensible to utilise it in this thesis also, not least because the empirical content of the research is, quite frankly, complicated enough.

It was in fact novelty—or my perception of it—that was at the heart of how I came to study novelty as a research topic, although in a rather roundabout way. I began by exploring a topic that I took to be straightforwardly new. I was in Hong Kong, attending a conference for an exciting-seeming new scientific field calling itself synthetic biology. That the organization behind the conference had the resources to pay for me and numerous other social science researchers and research students to fly to Hong Kong and attend this conference was just one of the interesting features of the field. As with many emerging scientific fields, it had an array of astounding promises: in particular, that with increased understanding and the falling price of synthesizing technologies, living organisms could be built up piece by piece using combinations of known genetic components to produce organisms designed for particular purposes. *E. coli* capable of drinking up oil spills and excreting only oxygen, for example, or biosensor bacteria which signal through phosphorescence when the water they are monitoring becomes contaminated. These were the promises of the field. As with any such emerging science, however, there were attendant concerns: that living things could

never safely be deployed in this fashion, that the unknown would happen and we would be unprepared, that instead of the all-consuming nanotechnological 'grey goo' of science fiction, we would (as one scientist put it to me) face a 'green goo' scenario just as terrible.

Looking back, I believe these promises and concerns were a large part of why I had taken an interest in this field in the first place. It was new and exciting and, I thought, just the thing for a doctoral research project: while I was not planning on an 'implicationist' study, I did imagine that the novelty of the scientific field itself would be beneficial in presenting my own work as providing something new. What became clear as the conference progressed, however, and as I spoke to numerous scientists and watched numerous talks and debates, was that there was widespread disagreement about the entire enterprise. Specifically, there was a great deal of doubt about whether this exciting new scientific field was indeed anything new at all, or whether it was simply a rebranded form of molecular biology or biochemistry. It was argued that synthetic biology was just a small subfield of these longstanding fields, which were in any case interested in many of the same techniques and possible outcomes, only—as detractors put it—not quite as hysterically or with such self-promotional skill. If it was a rebranding then it certainly succeeded to a degree. Rumours abounded at the conference about whether the principal organizer, and founding figure of the synthetic biology movement, had indeed consulted with a historian of science at his university to learn how scientific movements fail or succeed, and what is required for a runaway success.

During the days I spent there, I became more and more interested in this problem for these scientists, of whether what they were doing was 'new', and also the second-order question—although not a concern shared by the scientists—of how one could make such judgments. What does it mean for something to be new, I wondered. Yet this question is the abstract stuff of philosophy, a close relative to the questions of identity borne out in well-known paradoxes such as the ship of Theseus, whose boards were gradually but entirely replaced, leading to the question whether or not it was the same ship and, if it was, then whether a ship constructed from the replaced boards was *also* the same ship. Philosophical responses to such problems vary, but are arguably not so much the universal solutions they implicitly claim to be, but rather precariously stable solutions for the local purposes of philosophical contexts. Instead of asking what it means for something to be new, therefore, we ought to ask what it means to a particular group to say something is new. But to ask what something means is also much too broad, and indeed moves further away from the original question of how the task is actually done. How, then, to approach the question of how judgments about novelty are made, and made possible?

1.1 Research case

While at the same conference, I had attended various sessions concerned with the problem of intellectual property. Some of the scientists sought to understand whether what they were creating in their laboratories would be patentable or not; others were concerned with preventing others from

patenting what they were attempting to provide to a shared, semi-protected commons or library of defined biological components modeled on electrical engineering component libraries and the open source software movement. It occurred to me during these discussions that, as for the scientists themselves, patent systems were institutions in which the newness (or otherwise) of matter was a rather important problem. However, while for the scientists novelty was a matter for debate with no real need for conclusion, for practitioners in patent systems the novelty of inventions was a matter for which there must be resolution, since patents are only granted for things that are deemed new. Inventors apply for patents and examiners must determine whether or not what they have claimed to invent is new or already exists. They cannot simply debate about the possibility that the invention is just a rebranding of an old one, but carry on regardless: they must decide. So here was a system for which newness was a practical problem, not just a talking point. The patent system therefore presented a uniquely interesting site for analysing novelty as an object of practice.

I noted that there were two separate, although closely related, issues likely to be involved in novelty practices. First, there is the issue of individual determinations of the novelty of a particular thing. In the case of patents for inventions this will be the granting or refusal to grant of the patent. Second, there is the issue of how it is that such determinations are made possible, of what processes, materials and vocabularies are employed in the business of making such individual novelty determinations. Clearly, in the case of patent certification, novelty is not some abstract philosophical problem but a mundane quotidian one. Novelty is somehow rendered prac-

ticable. The question which must be answered, therefore, is just this: *how?* How is it that novelty is accomplished in practice for practical purposes? This thesis attempts to provide an answer to this question, and while I do not claim it is the final word on the matter, it does go some way towards an understanding of how abstract notions are made concrete, of what can occur and what complexities arise when organizations seek to specify with absolute precision something that is usually taken for granted, and of the cascading patterns of reasoning and the multiplying material resources that are invoked in seemingly endless negotiations over the meaning of apparently simple notions. These are some of the various aspects of the practical accomplishment of novelty in the United Kingdom patent system.

The fieldwork consisted of 30 interviews with patent examiners based at the UK Intellectual Property Office and patent attorneys based in the UK, observation at the patent office, close textual analysis of legislation and transcripts of legal cases, and a great deal of background document analysis using manuals, guidelines, websites, patents, patent applications, and attorney-examiner correspondence. Through the analysis of these materials I present some features of how novelty is, for lack of a better word, done. I show that to make judgments concerning novelty, and to make it possible for such judgments to be made, actors in the patent system make use of a variety of materials and techniques, and that novelty does not simply reside or persist in some abstract fashion but is locally and purposefully rendered an operable category for the actors' various, occasionally conflicting, practices.

1.2 Structure of the thesis

Chapter 2 is the Critical Literature Review of the thesis. More accurately, it is the first one, since in each empirical chapter I begin with an examination of a particular literature that is relevant to one of the key research questions that emerges from analysis of literatures generally relevant to novelty and patenting in the Critical Literature Review chapter. I have structured the thesis in this way so as to allow me to explore different theoretical areas in greater depth than would be possible in a single monolithic literature review chapter. Rather than suggest beforehand that a single theoretical position is the best way to approach the empirical content, I utilise a variety of different literatures throughout the thesis to explore the highly varied aspects of novelty practices in the patent system.

In Chapter 3 I present the methodology and research design of the thesis. In order to address the question of the extent to which novelty in the patent system is practically accomplished, I have used a combination of semi-structured interviews and document analysis, while also maintaining an ethnographic skepticism towards practitioners' accounts of their activities. This combination has allowed me to explore both practices surrounding novelty in patent drafting and assessment, through interviews with attorneys and examiners, and also the activities of legal practice, the longer timescale of which means document analysis is most suitable.

Chapters 4-7 are the empirical chapters of the thesis. While each has its own theoretical focus, the empirical materials are chosen to provide a varied account of the work that goes on in the various parts of the patent system, to

illustrate the different kinds of practices that constitute novelty and the ways they are tied together. Chapters 4, 5, and 6 roughly correspond to the stages of the career of a patent: from drafting by patent attorneys, to assessment and possible grant by patent examiners, to potential litigation in the courts. Chapter 7, however, takes a more historical view and provides an account of the changes in, and controversy over, the legal articulation of novelty over the last 150 years. The Critical Literature Review provides a rationale for the theoretical themes addressed in the chapters, so I introduce them here in terms of their empirical content.

Chapter 4, *The Invention Itself*, centres on the work of patent attorneys, in their drafting and prosecution—shepherding, essentially—of patent applications for their clients' inventions. In contrast with public-facing accounts of the patent process, in which inventions are rendered as patent applications and patents are either granted or refused, I use the details and strategies of patent attorney practice to show that the patent drafting and assessment process is a vital aspect of working out just what it is that the invention is. Because of this focus on determining the object at hand, and its distinction (or failure to be distinct) from other such objects, the chapter draws on a variety of theoretical approaches to objects and boundaries. Showing the opposing approaches to the stability of 'the invention' by patent attorneys and patent examiners, I argue that existing attempts to capture 'ontologically' the messiness and instability of objects in practice do not adequately account for those situations in which the instability and stability of objects is very much a matter of strategic contestation among practitioners, and that an 'ontographic' approach is more suitable for understanding this contesta-

tion.

Chapter 5, *Accounts and Accountabilia*, focuses on the work of patent examiners in the UK Intellectual Property Office, in particular how the abstract generalities of the legislation concerning patents is turned into operable materials and processes for and by the examiners, and how the examiners are monitored and quantified in the name of efficiency and quality. In response to research focusing on quantification and accountability as ways of optimizing the economic value of patents, I address the accountability practices evident in the Intellectual Property Office with respect to four identified emphases in accountability-oriented research. I argue that a Garfinkelian sense of accountability as concerning the availability to practice of suitable, stable objects, is helpful in understanding the work involved in the Office and, in particular, in rendering novelty a practicable notion.

Chapter 6, *The Scale of the Problem and the Problem of Scale*, takes as its empirical focus a recent and important case in UK patent law, *Synthon v SmithKline Beecham*, in which a dispute over the novelty of a patent concerning pharmaceutical compounds became for the most senior judge involved an opportunity explicitly to alter the legal articulation of novelty according to what he saw as its apparent failings earlier in the case. The judge, effectively completing the legal bifurcation of novelty begun around 15 years earlier, is opposed by a lower judge over the correct level of analysis at which to 'defend' the conceptual coherence of novelty. To address this disagreement, the chapter explores theoretical approaches to the problem of scale in the social sciences, and argues for the usefulness of 'dissolutionist' approaches

including methodological symmetry, the scalographic sensibility, and Kwa's (2002) alternative modes of analysis.

Chapter 7, *Deferral, Inconcludability and the Jurist's Regress*, provides an account of the changes in the legal articulation of novelty over the past 150 years, and explores various theoretical tools for understanding why such change might be ongoing. I argue that the problem of articulating novelty can be seen as a regress, similar to that experienced by scientists in certain situations, and that the features of the legal context mean that the problem of inconcludability occurs. I also suggest that recent legal judgments incorporating a known ambiguous term into the articulation of novelty serve as a deferral strategy, and might therefore allow for a more stable articulation than there has been in the past.

In Chapter 8 I offer some conclusions regarding the themes that have emerged throughout the thesis. In particular, I suggest that inversion, (in)stability and deferral are important aspects of the practical accomplishment of novelty. I end with some reflections on my own novelty claims, in the light of what I have argued about the practices explored in the thesis.

CHAPTER 2

Critical Literature Review

2.1 Exploring novelty

In starting out searching for 'novelty' in existing research, one may well first come across two particularly visible trends which, in somewhat different ways, utilize the idea of the new: the increasingly influential discourse of innovation, and the highly pervasive genre of research concerned with the implications of new phenomena, which I shall call 'implicationist' research. The relatively uncritical utilization of the idea of the new in these trends provides a useful starting point.

Implicationist research—in which the appearance of a new (or 'emerging') phenomenon is diligently followed (or anticipated) by research exploring its potential implications—is widespread. Some recent examples include studies of the implications of synthetic biology (Balmer and Martin, 2008), converging technologies (Roco, 2008), genetics (Jones and Salter, 2003), and

the internet (DiMaggio et al., 2001). They appear to make use of a process in which the significance conferred by novelty onto a given new phenomenon cascades onto research focused on it. This relies on the following sort of reasoning: there is (or will be) a new phenomenon; being so new, the phenomenon presents new opportunities and/or dangers;[1] research is therefore required to understand, and potentially enable the influencing of, these opportunities and/or dangers.[2]

The invocation of novelty as warrant is a vital part of the formula, yet this form of research does not confront the idea of newness from which it profits. Invoking novelty justifies a course of action that includes research, and the research acquires a value associated with dealing with the uncertainty over the new phenomenon. As the idea of novelty is never interrogated, implicationist research cannot be said to provide an analytical response to novelty. It does, however, demonstrate just how embedded the idea is: the ease with which research can acquire significance this way is surely of interest, and a first sign that 'new' constitutes not simply an abstract concept but a discourse with consequences in its use.

A similar impression can be found in the discourses of innovation, in which innovation is held up as a good of paramount importance:

"Innovation has acquired an urgent, even quasi-moral, stridency.

[1]Studies of ethical, legal, and social implications are by far the most common, and the grouping of these types of implication into a research package—"ELSI"—has accompanied their institutionalization in funding programmes. Although other types of implication have been spotted—economic and political, for example—these now tend to be subsumed under the banner of ELSI. As an institutionalized requirement for many researchers—an obligatory passage point (Callon, 1986)—ELSI arguably has had a strong effect on the way much research is done.

[2]Optionally, the reasoning claims in addition that what is needed is actually new *forms* of research, because our existing forms aren't up to the task (Elichirigoity, 2000).

> Amid all the turbulence unleashed at present, it is viewed as the crucial process for propelling a country, an industry, a company, a laboratory, a research field, a university or a national science system from its present state into the future. Indeed, without innovation there may be no future."
>
> (Nowotny et al., 2001, p. 67)

The irony in the final sentence nicely captures the hyperbole at work in the discourse. 'Innovation' has become a word which signifies something deemed to be of such high value that its mere invocation is enough to justify a course of action (and the questioning of which is easily rendered illogical, anarchic, or worse). In so doing, 'innovation' has joined similarly forceful words such as 'science' and 'security', the former famously demonstrated by Milgram to be a successful coercive tool (Milgram, 1963, 1975), and the latter increasingly common as justification for all manner of governmental activity.

The sheer pervasiveness of 'implications' and 'innovation' would be enough to suggest that 'novelty' ought to be looked at more closely; in addition, however, we can begin to see that invoking the new has certain consequences. Implicationist research and discourses of innovation show some aspects of what we might call an ethics of novelty: the relied-upon and reliable (yet unexplicated) force of appeals to the value of novelty and the penalties associated with its absence. Whenever a concept acquires significance sufficient to equip it with an ethics—that is, whenever there are moralized consequences to opposition—it is worthwhile to subject the concept to explication. The explication—perhaps showing the contingent social factors leading to the current state of affairs, or the discourses which dominate our understanding of states of affairs—serves to relativize the concept historically and/or

culturally, and so deflate it from an unchallengeable force into something which does not contain its own justification. Such explications have been attempted, for example, in the cases of 'choice' (Mol, 2008), 'creativity' (Osborne, 2003), and 'scale' (Woolgar, forthcoming). Given the force of 'innovation', and the unspoken logic of implicationist research, a similar account of 'novelty' is necessary. With that in mind, let us explore some existing attempts to engage critically with novelty.

2.2 Challenging novelty

Novelty has not gone unchallenged in the social sciences. Arguably, however, it has not been subjected to a sufficiently thoroughgoing critique. The most common challenge to novelty is what could be called the contrarian critique: the straightforward opposition to the claim that the phenomenon under discussion is indeed new. Examples of this are widespread: Watts' (2004) disputing of the 'new science of networks' proposed by Barabasi (2002); Jordan and Wurzel et al.'s (2005) and Marinetto's (2003) doubts over Rhodes' (1996) 'new governance'; the opposition to Melucci's 'new social movements' (Diani, 2000); and Irwin's (2006) concern that the 'new scientific governance' does not differ much from the old kind. One could also include attempts to locate proto-actors for certain academic movements: Whitehead and Nietzsche for post-modernism (Chia, 1995; Koelb, 1990), and Tarde for actor-network theory (Latour, 2002), for example. This contrarian move comes in a variety of forms: the differences between the new phenomenon and the old may be challenged; the differences may be said to be insignificant either in

themselves or in the light of a certain situation; the differences may be said to be outweighed by similarities; an earlier phenomenon may be presented as similar to the new phenomenon. These challenges, however, are limited to the particular cases targeted: the general idea of novelty remains absolute, merely presented as correctly or incorrectly applied to certain phenomena. This is reminiscent of Becker's labeling theory (Becker, 1963), which Pollner (1974) argued displays a hesitancy of the analyst to remove himself from a position of greater knowledge than the subjects doing the labeling. This suggests that, in approaching novelty, we ought to take care not to make our own judgments of what is or is not new. The relativization which comes with demonstrating that the subjects do not know as much as the analysts is a weak form indeed (Woolgar and Pawluch, 1985), and it is better to proceed under the assumption that we do not have a unique position of authority.

Another way of challenging novelty is to question its value. Such a challenge is offered by anti-technology movements and is the (stereo)typical position of political conservatives. Usually these approaches are merely instrumental critiques of the value of particular phenomena, which makes them more akin to the implicationist research discussed earlier (but with the focus being on negative implications in particular); as we saw, there is a lack of critical engagement with novelty here. Occasionally, however, there is a generality to the approach, with a questioning of the notion that "new necessarily means better" (and, frequently, the jump from this to the somewhat related idea that "new is probably worse"). As a critique of novelty, this approach goes further than that of the contrarian, as it is novelty in general which is the target, as opposed to certain phenomena which may or may not

be new. Yet, in focusing on the value of novelty, there is little room to explore the accomplishment of its objectivity, as the valuing of the concept imbues it with an essence that would appear to be beyond the social.

The accomplishment of the objectivity of phenomena is a central concern of the sociology of scientific knowledge (SSK). Indeed, given that what might be thought to be some of the central aspects of scientific practice are the production of new facts, the discovery of new entities, and the development of new knowledge, one could argue that the entire SSK project is concerned with novelty. 'Discovery' is of particular interest as regards novelty. Brannigan (1981) argues that discoveries must be seen as attributional phenomena, which is to say that scientific achievements *count* as discoveries only after their being recognised as such by relevant communities. The attribution is also, of course, revocable: Brannigan gives the example of N-rays in the early 20th Century, where a report was first constituted as a discovery before later being transformed into an artifact, when the actual events of the experiments had not changed. Discoveries must, Brannigan argues, concern the attributions of a scientific community. Furthermore, Brannigan provides four "criteria of intelligibility" that an announcement of discovery must meet before discovery-attribution can occur: it must fit with what is known in the scientific field; it must be perceived as being the result of truly scientific activity (as opposed to fraud or pseudoscience); it must be seen to be correct; and it must be perceived to be unprecedented. It is in the criteria of unprecedentedness, of course, that discoveries relate to the question of novelty. While Brannigan's attributional model provides a useful starting point—we must see how matters are perceived and constituted by relevant

communities—it is, as Lynch (1983) points out, focused on famous discoveries rather than the many ordinary discoveries that make up scientific professional life.

Given its size and variety, it is not practical for me to attempt to summarize here the entire corpus of SSK research (instead see e.g. Shapin, 1982, 1995; Collins, 1983). It is clear, though, that generally speaking, the focus of SSK is not with 'novelty' *per se*, but related aspects of scientific practice such as the accomplishment of the objectivity, orderliness and ownership of discovered phenomena (Woolgar, 1976; Garfinkel et al., 1981; Reeves, 1992), the contingency of experimental findings (Collins, 1975, 1985; Pickering, 1981; Latour and Woolgar, 1986), and even whether the 'asociality' of scientific discovery by computer programs refutes the claim that scientific knowledge can be subjected to sociological analysis at all (Slezak, 1989), or whether this relies on too limited a notion of sociality (Brannigan, 1989; Giere, 1989; Collins, 1989; Woolgar, 1989).

What is needed is an approach that challenges the objective basis for 'novelty' as thoroughly as SSK research does its concerns of truth, fact, consensus, and so on. Rayner (2004) notes that, in the case of some 'new' science and technology, novelty is occasionally highlighted and occasionally backgrounded by the scientists involved. In his example, nanotechnology is presented by scientists as radically new when funding is being sought, but as a mere continuation of earlier, accepted research when under the gaze of regulators. Here we have the possibility of opening up novelty as a target for social explication: by demonstrating the variability of novelty claims,

Rayner shows their contingency, opening up the avenue of exploring the mechanics of their success or failure. In this form of challenge we can find the beginnings of a stronger critique of novelty: an examination of the processes of novelty-attribution.

In practice, however, treating 'new' as an attribution or label restricts the scope of inquiry, as this presupposes an entity that can be indexed (referred to, singled out, named). To focus only on attributing 'new' in this way is to miss the processes of entity formation which are a vital part of understanding how something comes to be new. With his example of nanotechnology, Rayner asks how it is that there is even a single thing to be spoken of as new or not, as opposed to a number of vaguely affiliated scientific fields (leaving aside the equally slippery question of what counts as nanotechnology at all). To understand novelty at the practical level, it seems we must also understand how certain things come to be unified or separated.

As Rayner suggests, the objecthood of the entity under consideration—nanotechnology in his example—is very much part of the problem. Yet this is not because nanotechnology happens to be particularly diverse: if any novelty claim is a claim about some objects differing (and some cohering), then we must, as a central component of an analysis of novelty, understand how sameness and difference is done. Determining whether things are similar is a contentious problem, as has been observed in studies of classification systems (Bowker and Star, 2000; Lakoff, 1987; Foucault, 1970). Furthermore, it has been argued (Collins, 1985; Popper, 1959) that the question of whether two things are the same or different is essentially irresolvable, ex-

cept through contingent social negotiations and decisions. It is worth quoting Popper's reasoning, which is couched in terms of repetitions but relevant nonetheless to our more general interest in sameness and difference:

> "All repetitions which we experience are approximate repetitions; and by saying that a replication is approximate I mean that the repetition B of an event A is not identical with A, or indistinguishable from A, but only more or less similar to A. But if repetition is thus based upon mere similarity, it must share one of the main characteristics of similarity; that is its relativity. Two things which are similar are always similar in certain respects ... The remark may be added that for any finite group or set of things, however variously they may be chosen, we can, with a little ingenuity, find always points of view such that all the things belonging to that set are similar (or partly equal) if considered from one of these points of view; which means that anything can be said to be a repetition of anything, if only we adopt the appropriate point of view. This shows how naive it is to look upon repetition as something ultimate or given." (Popper, 1959, pp. 420-422)

Does novelty share this contingency? A demonstration of novelty will likely have to deal with similar disagreements about what counts as 'different'. Is understanding novelty, then, a matter of understanding what counts as 'different' in certain communities? Further comparison with replication suggests this is unlikely, for even where there is consensus on sameness and difference, a successful replication relies on a balance of the two, a balance also subject to the preferences of the community. As Collins (1985) points out, an experiment designed to confirm the results of another is most forceful when it is neither too similar to nor too dissimilar from the first. It must not be too similar, for otherwise there could be the sense that it is not really a repetition (different experimenters and apparatus are better, for example, and different experimental design better still); similarly, it must not be too dissimilar (a result successfully confirmed in a manner considered to be

pseudoscientific would not help the original scientist's case). So to reach "the same result" a balance must be made between sameness and difference (and this is in the ideal case where agreement is to be found over what counts as either).

Do demonstrations of novelty require this balance? Arguably, some similarity is required to demonstrate novelty successfully. Academic work, for example, and in particular doctoral research,[3] is at least in principle an attempt to provide something new, yet attempts to show novelty in this kind of practice rely fundamentally on ties of similarity, for it is by contrasting the current approach with existing (but superficially similar) approaches that successful differentiation is done. "The literature" is a vital part of academic writing: a piece written without any reference to other works could not itself make a strong claim to be novel (what would it be claiming to be newer than?): others would have to make the claim. Rather than rely on this, academic writing creates links with earlier works and is thereby able to differentiate itself from them.[4] A piece that was entirely different from all others

[3]Would an account of novelty as accomplishment not diminish its value by relativizing its own claims to novelty? Since the beginning of the piece, I have formed similarity ties with earlier literature for the purpose of differentiating my work from them, thus (hopefully) achieving the balance of sameness and difference that goes into a successful demonstration of novelty in academic work. But by not treating novelty as an absolute, is it incoherent of me to attempt to argue that my own work might provide something new? Or can the reflexivity be used to advantage? Woolgar (1988*b*) argues that authors typically manage the 'threat' of reflexivity by highlighting the exoticism of the object; that is, by playing up the differences between the author's practices and the practices of those she observes. This highlighting serves to background potentially useful information about the practices of representation. By contrast, if we played down the exoticism of the object, we would make our own practices seem less privileged, allowing them to be subject to the analysis. In the case of novelty, we admit our own reliance on the methods used by those we plan to study; in so doing, do we provide ourselves with more material to base our understanding on, and so the possibility to improve our account of a logic of newness which is, it seems, highly pervasive and entrenched? The potential for a beneficial reflexivity is an issue I return to in Chapter 8.

[4]The benefits to a text of incorporating references to others is explored in detail by Latour (1987) through the use of the metaphor of mobilizing other texts as 'allies'. According to

would contain no reference to them (nor would it be a simple matter for others to make a link between them, even one of the piece being an improvement) and so a claim to novelty would be seen as weak: novelty, therefore, cannot simply be a matter of total difference. Nor, of course, would a piece entirely similar to another be seen as novel (it would simply be a facsimile of the earlier piece), and strongly similar pieces would be seen not only as not new but as plagiarism. As with replication, therefore, it seems that novelty can require a balance of sameness and difference.

Yet this is to overstate the extent to which the author of a text has control over its success at being new (or, indeed, at being anything: see Barthes (1967)). Whether or not a piece of academic writing adequately incorporates the literature and distinguishes itself from it, or indeed successfully arrives at the end of its own argument, are all matters for readers to determine, most likely with reference to the norms of some particular interpretive communities (Fish, 1980). The balance of sameness and difference just described is therefore not an absolute standard which can be reached for, and by the same token we must in seeking to understand novelty take note of the extent to which it is a quality attributed by agents other than the originator (author, creator). Furthermore, in keeping with post-essentialist currents of social theory, we must also take account of the ongoing nature of these attributions: authors such as Butler (1990), Grint and Woolgar (1997) and Rappert (2001) argue that notions such as 'technological capacity' and 'gender'

Latour, a text is strengthened in this way by demanding of the dissenting reader not just the rejection of the text in question, but of all the other texts it has successfully mobilized as allies. Applied to itself, Latour's text could be said to benefit from the mobilization as ally of the metaphor of ally mobilization, by demanding of the dissenting reader the denial of the usefulness of allies in political, legal and military spheres.

are done and redone repeatedly. Understood in this way, novelty becomes a matter not simply for a single originator or of a single moment of origin: that something is new is a state of affairs to be done and redone over time and across agencies and locations.

2.3 Patent systems

This research interrogates novelty through an exploration of the UK patent system. As mentioned in Chapter 1, this is because novelty is for patent systems an institutionally central notion, by virtue of its foundational status in the requirements for patentability. This section explores existing research on patent systems to determine the extent to which it has been thoroughly examined, particularly with reference to novelty. What emerges from the literature is that, while patent systems have been researched substantially, insufficient attention has been paid to the working practices of the most closely involved actors. In examining the accomplishment of novelty, this thesis provides a necessary understanding of the work of these overlooked—and arguably influential—practitioners.

Patent systems are a common feature of modern, industrialized nations. Being institutional mechanisms for the conferral to the inventor of a temporary monopoly on the sale or licensing of a given invention, coupled with a set of apparatuses for the resolution of disputes regarding this conferral, patent systems are in most contemporary accounts understood and justified as instruments of national economic improvement: the prospect of the

rewards resulting from having a monopoly is intended to encourage innovation, as is the obligatory disclosure of the details of the patent, which allows others to benefit from the increased knowledge the invention embodies. Most patent systems share a core set of requirements which an invention must be deemed to have met in order for a patent to be granted. These requirements are in keeping with current views as to the principal purpose of the patent system: the benefiting of a nation's economy through the encouragement of innovation. Contemporary analysts frequently identify such views with 'the' purpose of patent systems, but the historical contingency of these views, and the alternatives we have left behind, ought not to be forgotten (Hironaka, 2002), as they demonstrate that the purpose of the patent system is always subject to change.

For an invention to be patented it must be, among other things,[5] new, non-obvious, and capable of industrial application. The last criterion reflects the predominant economic instrumentalism: it is not all innovation which is to be encouraged, but rather just that innovation which can provide economic benefit. The first two criteria reflect the underlying bargain upon which patent systems are generally seen to be premised: that a limited monopoly is granted as a reward for a contribution. If an invention is not new, or is only an obvious extension of what already exists, the granting of a monopoly would be for no contribution; worse still, the granting of such a monopoly would be an uncompensated confiscation of what is possessed by other parties or from what is freely available to all.

[5] As well as the positive patentability requirements, most patent systems specify a list of exceptions which may never be patented. These range from specific items such as pieces of music or mathematical proofs, to domains and categories such as 'nature' or 'discoveries'.

In the UK, as in other jurisdictions, the patent system is a heterogeneous arrangement. Patent applications can be written by anyone, but large numbers of professional patent attorneys exist to assist inventors in navigating the complexities of the formal requirements and informal strategies of the composition and other aspects of the application process. Patent attorneys can be found within companies focused on this and related services, and also within dedicated divisions of large research-oriented companies and universities. The application is assessed by the patent office. Decisions can be appealed by the applicant or other interested parties (usually those who deem a granted patent to be an infringement of their own). The patent office performs some dispute resolution functions itself, but some disputes escape the patent office and become legal conflicts, with the potential—as with any other legal conflict—to rise through a number of courts of increasing authority until a final resolution is reached.[6] The result of such a legal determination is often a precedent which is incorporated into the practices of the patent office. Such precedent, together with the legislation itself (Intellectual Property Office, 2010*b*) form the ultimate authority on patents and patentability in the UK.[7] The ambiguity of the law, and the dispersal of precedent, however, are seen by the patent office as warranting further instruction: it provides a set of documents explaining how it interprets and operationalizes

[6]This should not be taken to mean that the law is used as a catch-all for the failures of the patent system. The courts are a designed element: "the patent system itself contemplates a role for the courts that involves reviewing the work of the [patent office]" (Kesan and Banik, 2000). A number of rationales can be given for its involvement, including the economic argument against the increased cost of a patent office in need of no such external review (Lemley, 2001).

[7]Leaving aside for now the relationship between the UK patent system and formal transnational arrangements such as the EPO, WTO and TRIPS, as well as informal harmonization practices (Davies, 2002).

the legal position. Of course, even these documents cannot be taken as truly describing how the patent system works, as there is the question of how these documents are themselves interpreted, operationalized, used as flexible discursive resources, or otherwise manipulated by the individual patent examiners within the patent office. The individual, practical skills and skilfulness of these examiners is an additional issue. Both of these are questions to be explored through research.

The resolution of the seemingly simple question of whether something is 'new', therefore, appears to be distributed widely, throughout heterogeneous domains of practice within the patent system. Is understanding 'new' within this system a matter of taking account of individual, textual, bureaucratic and legal practices, together with the coordination work that holds it all together? How has existing research explored these arrangements?

The economic instrumentality of the current dominant understanding of the purpose of the patent system is reflected in the large body of research oriented around designing instrumental improvements: questions surrounding the features of an ideal or optimal patent system and the optimal strategies for agents negotiating a patent system (with the latter sometimes informing the former). These analyses share with other prescriptive economics the familiar presumptions of widespread rationality and order. For instance, the stringency of patentability requirements (how different something has to be to be 'new', for example) is taken as a variable whose adjustment can be mathematically demonstrated to result in better or worse economic outcomes (van Dijk, 1996; Scotchmer and Green, 1990). Other authors have in-

vestigated the optimal tradeoff between patent breadth (how much can be covered by a single patent) and patent length (the duration of the monopoly) in terms of societal costs and values. Gilbert and Shapiro's (1990) analysis recommends longer, narrower patents in general, whereas Gallini (1992) finds the opposite, that broader patents are optimal. Klemperer (1990), filling out the spectrum of possible recommendations, argues that different types of goods require different balances between these two factors, with some being best served by a narrow, long-lived patent, and others by a brief but very broad patent. Similarly, Denicolo (1996) argues that the optimal length/breadth tradeoff in patent policy is dependent on the underlying economic conditions of the product market, with less efficient markets necessitating broader and shorter patents. Other variables studied in such instrumentalist analyses include: the discretion involved in the assessment of patent scope (Merges and Nelson, 1990); the possibility of technological areas being underdeveloped because of the perception that innovations could not avoid inadvertently infringing existing patents (Kesan and Ball, 2006); the phenomenon of competitors 'inventing around' a given patent (Kesan and Banik, 2000), lessening the value of the original patent and increasing the costs to the competitors, thereby doubly hindering innovation; and the resulting tendency of companies not to patent what they could, because of the fear of losing their advantage through disclosure (Scherer, 1983; Cohen et al., 2000).

These analyses pose interesting dilemmas for a designer of a patent system: a strong novelty requirement creates incentives to do research (because it protects against imitation), but a weak novelty requirement could result in

greater disclosure of incremental technical knowledge. And for any particular balance of patent breadth and length, there is an economic proof of its optimality over the others (a convincing demonstration of the power of economic analyses, if not their helpfulness). For the instrumentalist approach, the question is just this: what are the optimal conditions for the patent system? There are, however, two problems with this approach. Firstly, there are the rather questionable assumptions—raised by the authors—about the world the mathematical models are taken to represent. For example, Gilbert and Shapiro highlight the potential flaws resulting from their assumption that the innovative environment surrounding the inventions in their model is static:

> "We made this assumption to focus attention on a single innovation. In practice, however, inventions build on each other, and a long patent grant may have deleterious effects on the incentives of other firms to engage in related research, for fear that they will be at the mercy of the original patentee. What would have happened in telecommunications, for example, if the telephone were still patented?" (Gilbert and Shapiro, 1990, p. 112)

Even if we ignore these problems, however, and assume that they are technical difficulties that will be ironed out with more sophisticated models, there is a second problem raised by the instrumentalist approach. What is absent from these analyses is attention to the problem of how these optimizing strategies are to be effected in reality. That is, while it is desirable to develop optimizing strategies, the authors of these studies do not explore the degree to which varied patent breadths and lengths (for example) are a policy or even practical possibility; how, for example, are abstract mathematical representations of patent breadth to be translated into guidelines for practition-

ers? Arguably, such analyses could never result in improvements to a patent system without a descriptive analysis of novelty-assessment. For even if a model could demonstrate that a given value of stringency is the optimal one, this would need to be translated into something that could be operationalized by the patent office itself, and indeed by individual patent examiners. An understanding of how degrees of novelty, or metrics of difference, are understood by the agents whose responsibility it would be to implement the mathematically ideal process is likely to be an important part of realizing this optimization. Moreover, it is not necessarily the case that such understandings of novelty and difference could ever be reduced to a single metric, let alone one shared by all concerned. One would need to know how these judgments were made in the patent system before one could hope to effect improvements.

What is interesting about the instrumentalist approaches is their attempt to turn novelty into something measurable and quantifiable, and therefore regulatable. This reflects the increasing institutional prevalence of techniques of enumeration and calculation (Power, 1994, 1997), and on a larger timescale the historical shifts in state rationalities towards the managerial and calculative (Foucault, 1991; Rose, 1996). This raises an important question in understanding the accomplishment of novelty: to what extent are techniques of optimization made use of in the patent system? Is it only a concern of economists, distanced from the practical reality of the business of patenting? Or would a detailed examination of the patent system uncover practices of quantification, calculation and accountability?

Economic analyses are not the only studies of the patent system, of course. Socio-legal studies, sociology and history of science, and anthropology have all provided their own studies. Anthropologists, to begin with, have been particularly interested in the status of patents as entities in themselves, as unique objects of inquiry. Strathern (2001), for example, explores the technological-cultural commonalities between patents and Papua New Guinean 'Malanggan' sculptures. Specifically, Malanggan and patents both fulfil a role of conveying knowledge to the future:

> "The fabrication of Malanggan results in a form which condenses a whole history of interactions, and in the process makes it possible to channel clan powers—the clan and its relationships with others—for future benefit; we might say that the patent results in a form—the potency of information made product—through which technological power is also channelled to the future. Depending on the point in the reproductive cycle, Malanggan transform living and ancestral agency, the one into the other. Patents imply a more linear series of conversions, intangible ideas into enforceable property rights. In the place of the enveloping clan with its ancestral potency, at once inside and outside everyone, English-speakers instead accord nature a similar regenerative and recursive potential. Indeed, patenting is part of a process which continues to regenerate nature as fast as it appears to consume it. A kind of technology within technology, patents thereby augment *the enchantment of technology*."
>
> (Strathern, 2001, p. 9, emphasis in original)

The disclosure of knowledge in patents is one half the 'patent bargain': rather than keeping secret their inventions, inventors reveal them in return for a temporary monopoly. This disclosure of knowledge is what Strathern finds in common with the Malanggan, but it is something of an idealized view of patents. It is an open question just how useful patents are as sources of knowledge, since scientists are not always able to make use of them (Packer and Webster, 1996, pp. 441-2). In addition, whether or not

a particular patent can actually be said to disclose knowledge is not given by the text but rather determined through the negotiations of interested actors (see e.g. Balmer's (2006) study of the controversy over whether or not a patent declassified in the 1970s instructed the reader in how to produce deadly nerve gas). Stathern's idealism over the straightforwardness of the patent bargain is to be expected, however, given the usage as empirical material of 'a couple of textbooks on intellectual property rights' (Strathern, 2001, p. 1).

A thoroughgoing exploration of patents must, at the very least, include some observation of patents and patenting practices outside of the for-the-public discourses of textbooks. De Laet (2000) provides just such an attempt, tracing the travels of patents through numerous locations, including the World Intellectual Property Organization (WIPO) in Geneva, the African Regional Industrial Property Organization (ARIPO) in Harare, and a law school in New York. In exploring the changes, through their travels, in the strength of patents' links to industrialization and in the reliability of their representations, de Laet arrives at the conclusion that patents in different places become different things in terms of their representational significance, but remain the same thing in terms of their connections to other places. While it is not surprising to learn that patents are different in different places—it would perhaps be more surprising to find something of which this was not the case—it is useful to see exactly what significance the patents take in their different places. However, what is being explored by de Laet is patents as finished objects; there is no exploration of patents-in-the-making, i.e. the practices through which patents come into being. For this it is nec-

essary to turn to sociological and historical studies of science and technology: these fields, with their predilection for the contingent, have turned to the practices of patenting on numerous occasions, and through them a great deal can be learned about the contexts in which patents emerge.

Socio-legal studies and sociology and history of science have taken steps towards such an understanding of patents-in-the-making. For Pottage, patent systems worldwide face a crisis far worse than that of inefficiency, namely the threat that biotechnologies will render unworkable the distinctions patent systems rely upon (Pottage, 1998, 2007). The exclusion of 'discovery' mentioned earlier is problematized by the erosion of the 'discovery'/'invention' distinction, along with the related distinctions 'grown'/'made', 'nature'/'technology'. This erosion, Pottage argues, is a result of the liminal character of biotechnologies (or, rather, their uncategorizable position within the terms of our conceptual systems). The well-known U.S. Supreme Court decision in *Diamond v. Chakrabarty* (1980), which first permitted the patenting of genetically engineered microorganisms, is a key element of the process of rendering transparent (exposing as contingent) the 'discovery'/'invention' distinction. By stating that "anything under the sun that is novel and made by man is patentable", the Supreme Court affirmed that the 'natural' origin of an invention was irrelevant, and that if inventiveness had been involved then patentability could not be denied. For our purposes, however, one could note that alongside this move to lessen the focus on the 'nature'/'technology' distinction was the increased prominence of novelty: central already to the administering of patents, novelty became even more

important with this judgment.[8] It also raises the important question of the extent to which novelty is altered as a legal concept, for example in response to technological change, and whether even something as apparently simple as whether or not something is new is answered differently at different times, and whether legal articulations of novelty could ever reach a point of stability.

The issue of how the law resolves conceptual distinctions is also found in studies of areas of intellectual property other than patents, and in studies of property in general. Boyle (1996) argues that certain tensions—between public and private, between equality and status quo, and between conceptualizing property as a bundle of rights and as a defence against oppression—must be balanced in order for decisions in these areas to appear just:

> "Public discourse in general and legal discourse in particular msut appear to mediate these tensions; otherwise particular regimes of information regulation will seem "ungrounded," "contrary to institutional logic," "dangerous in their precedential implications," or simply "wrong."" (Boyle, 1996, p. 96)

Boyle argues that a certain set of three related notions—"the *figure* of the romantic author, the *theme* of originality, and the *conceptual distinction* between idea and expression" (Boyle, 1996, p. 98)—is so convincing a mediation of these tensions that it is found even outside of the realm of copyright, where

[8] This also introduces a potential confusion in studying the patent system as an example of a social enterprise partially organized around 'novelty', which is that 'novelty' in the patent system usually does not correspond to what is meant by the term in other discourses, such as lay or academic-scientific language. These senses of the term correspond to a mix of the patent system's terms 'novelty' and 'non-obviousness'. This unclear correspondence is highlighted in the words of a scientist speaking of the patent system: "When I go into a legal way of thinking then I use novelty-2 instead of novelty-1" (Packer and Webster, 1995). Even excluding outside discourses, and focusing solely on the patent system's senses of 'novelty' and 'non-obviousness', Scotchmer and Green (1990) point out that "in practice they are often difficult to distinguish".

it originated. Boyle uses the case of *Moore v. Regents of the University of California* to argue this. John Moore had undergone treatment for leukemia at the UCLA Medical Center, and his extracted spleen was used by researchers at the Center to establish a cell line that was eventually patented and developed commercially. The case concerned the question whether Moore was entitled to a share of the profits, since the original tissue was his. The Supreme Court of California decided that he was not. The case exemplifies the challenge for jurists in resolving the sometimes contradictory understandings of 'property'.[9]

As Biagioli (2011) notes, the distinction between ideas, which are generally thought not to be protectable, and their expressions (which are), is put under pressure by changes in the technology and media landscapes:

> "[A]s more and more variants of a literary text (the movie rights, the translation rights, the video game rights, and so forth) have come to be comprehended under a single copyright, the focus of protection has inevitably shifted from the highly particular toward the relatively general." (Biagioli et al., 2011, p. 8)

Similarly, Swanson (2011) shows how the professionalisation of patent practice in the nineteenth-century United States led to a muddying of the sense in which the inventor was straightfowardly 'the author' of the patent, while the rhetoric continued to insist on the sole authorship of the inventor: a situation mirroring the tension between the notion of the romantic author in

[9]Boyle argues later for the necessity of a 'cultural environmentalism' movement to combat the increasing reach of intellectual property rights beyond what was ever envisioned necessary or desirable by the originators of the systems, and to put forward the view that the public domain must be viewed by legislatures as a natural resource in need of protection, alongside (now) recognized natural resources such as clean water and air (Boyle, 2008).

copyright and the cultural background of their particular work.[10] For Riles (2004), it is necessary to study just how 'property' is enacted in legal practice, and to do so one must engage with the question how properly to analyze the practices of lawyers:

> "The ethnographic experience of training lawyers in the uses of their tools has taught me that lawyers value their knowledge in a particular way – not simply as a means to an end, or an end in itself, but as pure problem-solving means, as technical instruments. In the telescoped chains of means-ends reversals that constitute property doctrine, what is foregrounded are the means of its manipulation and use. What defines legal knowledge is precisely this commitment to the analytic, the means as means, despite the fact that this analytic is explained and defined by practitioners as a question of ends, that is to say, a question of what doctrines are for." (Riles, 2004, p. 790)

Riles' conclusions are based on observations of (and participation in) the training of lawyers, and while this is an ethnographic context in which the law is enacted, it certainly is not the only one. In the courtroom we find other aspects of legal reasoning, and this is no less true in legal battles over patents. In many cases, the setting provides an opportunity to explore contestations over representations of science and of scientific and technical matters. Cambrosio et al. (1990) find that what could be supposed to be technical matters end up being inextricable from social, historical, economic and philosophical arguments. Swanson (2007) finds that the very notion of a unitary science—encompassing both academic and commercial science—became the subject of legal contestation during a conflict over the validity of a patent relating to the polymerase chain reaction. Swanson traces this conflict back to what she called the 'founding myths' of biotechnology, but in truth it is just one of the

[10] Chapter 4 makes the related argument, not only that inventors are not the sole authors of patents, but that patents are not straightforwardly the result of pre-existing inventions.

latest instantiations of an enduring conflict over the relationship between scientists and inventors (not to mention scientist-inventors), and between knowledge and property.

Lucier's (1996) analysis of a patent dispute in the 1850s and 1860s regarding illuminating coal oil demonstrates that these issues are longstanding, although this is not to say that they have not changed somewhat: it is unlikely that many today would agree with the sentiments of Charles Jackson, in his 'Encouragement of the Sciences':

> "No true man of science will ever disgrace himself by asking for a patent; and if he should, he might not know what to do with it any more than the man did who drew an elephant at a raffle. He cannot and will not leave his scientific pursuits to turn showman, mechanic, or merchant." (Jackson, 1851)

It must be noted, of course, that litigation in general has been a fruitful topic of sociological analysis, and in particular illuminates various themes of interest to Science and Technology Studies. For Jasanoff (1997), legal cases are contexts in which the authority of different knowledges (e.g. 'lay' versus 'expert') is contested: law and science, therefore, "are involved in constructing each other" (Jasanoff, 1997, p. 20). How courts construct expertise, choose between contradictory sets of evidence, and deal with factual uncertainty, are all aspects of the ways in which the legal system has epistemic effects. Moreover, court judgments on matters of knowledge can involve more wide-ranging, and political, decision-making:

> "the issue for the courts in these situations [of incomplete knowledge] is less how to find facts than how to decide who should bear the cost of society's inability to ascertain the relevant facts with any degree of certainty" (Jasanoff, 1997, p 123)

The negotiatedness of norms surrounding knowledge is further demonstrated in Edmond's (2002) analysis of a US Supreme Court ruling on admissibility standards for expert evidence in US federal courts. By studying numerous *amici curiae* briefs, Edmond shows the competing narratives surrounding the prevalence of unreliable experts, the competence of juries to evaluate technical expert evidence, and the reliability of technical evidence. For Edmond, the outcome sets a grave precedent insofar as it demands extremely stringent admissibility standards:

> "The Supreme Court's emphasis on reliability might be understood as an attempt to restrict access to jury trials in ways presented as mundane judicial practice: as ostensibly neutral and rule-governed. In effect, the Supreme Court was re-writing (or re-inscribing) the Seventh Amendment of the US Constitution.[11] In the process, it was surreptitiously advancing a range of corporate and professional aspirations supported by some strategically adumbrated – but controvertible – images of science and technology." (Edmond, 2002, p. 402)

Similarly, Lynch (1998) demonstrates how the credibility of experts is produced and undermined in testimony, in the example of the trial of O.J. Simpson and his 'Dream Team' of defence lawyers. What is particularly interesting about this case is that the arguments put forward by these lawyers as to the unreliability of scientific evidence bear striking similarities to the arguments put forward by analysts in Science and Technology Studies about the contingency of scientific knowledge outcomes. For example: STS demonstrates the differences between ideal science and science in practice, and the lawyers between ideal forensic procedures and actual forensic practices; STS identifies methodological horrors in scientific practice, and the lawyers identify endless uncertainty in forensic practice. For Lynch, "a paradox arises

[11] The Seventh Amendment ensures the right to trial by jury.

from a homology between an analytic position in SSK and modes of inquiry that are embedded in the contested field being analyzed" (Lynch, 1998, p. 856). This case highlights the importance of reflecting on the relationship between our own and our subjects' analytical practices.

It is not only the practices of lawyers and judges that are important to consider when the law is of interest, of course. As Cole (2001) demonstrates, the evidentiary techniques of law enforcement also affect the development of the legal sphere. In his history of criminal identification techniques, Cole argues that the triumph of fingerprinting (over, for example, the *bertillonage* body measurement system) came about not because fingerprinting was technically superior at identifying individuals, nor even because it was more straightforward for untrained police officers to take good fingerprints than to take the measurements necessary under Bertillon's system. For Cole, fingerprints dominated because American law enforcement made the technique its own, its own form of evidentiary scientific expertise separate from the biological sciences. Yet its role is a problematic one even today, as the accused is "vulnerable to unconscious bias or deliberate malfeasance by the police" (Cole, 2001, p. 269). Cole's analysis shows that expertise in legal contexts is not only open to manipulation by lawyers, but that it must be considered as having its own social history.

Other analysts explore the difficulties experienced by scientists themselves as they attempt to enter the world of patenting and, through this, the law. Myers (1995) details the process of translating academic research into patent texts, alongside the education of scientists in legal matters by

their patent attorneys. This does have the effect, as Packer and Webster (1995) note, of suggesting that the worlds of science and the law are very distinct, which does not reflect the increasingly commercial academic-scientific world, nor of course industrial research itself. While there are clear differences between science and the law, Packer and Webster propose that these are understood in terms of different organizational settings between which actors move and play necessarily different roles, rather than distinct worlds requiring translators. Such is the increasing entanglement of the commercial and academic worlds that Packer and Webster propose updating the existing toolkits for understanding scientists sociologically to reflect their patenting activities, with Latour and Woolgar's (1986) credibility-cycle model amended to include patenting, the rewards from which can be tranferred back into greater academic resources, which can in turn lead to more patents (Packer and Webster, 1996).

These amendments of sociological understandings of scientists' activities are valuable, but there are issues in these analyses that demand closer attention. In focusing on the scientists, these analysts background the work of other important actors in the patent process. Firstly, there are the patent attorneys, who are presented simply as assisting scientists in transforming their research into legal property, by serving as 'intermediaries who enabled the researchers to link their language to that of the courts and markets' (Myers, 1995, p. 71). Secondly, neither the patent examiner nor the patent office are investigated in any detail, and instead function as neutral components in a linear system, the background against which the scientist operates. Perhaps unavoidably in research concerned primarily with scientists, these au-

thors neglect the close examination of the working practices of patent attorneys and patent examiners, both of whom it is reasonable to imagine are fairly central to the patenting process. Similarly, the analyses of the courtroom battles over patents are useful, but have the same effect of rather excluding the work that goes on before a patent is even arrived at.

If we are interested primarily in the patent system—specifically, its novelty criterion—we can see that sociological and historical studies of patents and patenting congregate around the edges. In being primarily concerned with scientists engaging with the system, they focus on the translation of scientific research into patent applications and the legal conflicts arising from granted patents. What is conspicuously absent from this is any in-depth analysis of what goes on in between: the working practices of the patent office and its examiners. More generally, what is needed is an analysis of the practices of the patent process, not simply as a part of the lives of scientists but as, in itself, a complex arena of consequential activity.

2.4 Conclusion

The centrality of the idea of novelty in patent systems makes them highly suitable subjects for an empirical analysis of novelty as accomplishment. Furthermore, the in-depth exploration of the working practices of intellectual property regimes would be a contribution to ongoing attempts to open up that field of socio-technical activity to social analysis. The obvious 'property' aspect of intellectual property regimes has sometimes led to the back-

grounding of the epistemic and ontic work taking place there. Rather than follow what I have called the implicationist line, focusing on the consequences of patent decisions, this chapter has argued that we need to engage with patent systems as sites for social explication. In so doing, we can explore the significance and extent of the heterogeneous practices that go into the accomplishment of novelty, in two senses: the proposal-specific achievement of something being new; and the making viable and coherent of the idea of novelty, itself a mélange of activity stretched from invention to trial and from textual arrangement to legal-bureaucratic institutional rationalities.

In summary, the primary question which needs to be answered is how the implication of the idea of novelty in a diverse socio-technical regime—and how the maintenance of 'new' as a workable category across domains of practice—can be provided a social explication. Being in a position to understand novelty not as a given but as something explicable, we will be more able to recognize and critically engage with its invocation as a warrantless warrant, a justification in need of no justification. It is to this end that I explore the extent to which novelty can be understood as a practical accomplishment.

2.5 Key research questions

In this review, we have seen four key questions emerge from the existing literature that must be answered in order to provide the strong engagement

with novelty that I have argued is necessary. These questions are addressed in the four empirical chapters of this thesis. In order to address the questions more thoroughly, each chapter begins by exploring existing research that may be useful, before turning to its substantive topic, which provides empirical material through which to engage with the issues at hand, as well as providing a part of a detailed account of patent practice.

The first question is this: how do members of patent practice communities, in determining novelty, enact the objects of their practices and what are the methods by which objects are given distinctness or joined together? This is the issue with which Chapter 4, *The Invention Itself*, is concerned. To approach this question, I explore theoretical literatures surrounding objects and boundaries: the demarcation problem in the philosophy of science and its sociological reinterpretations; boundary work and boundary objects; and fluid and multiple objects. Because they are key aspects of how a central object of patent practice—the invention—is determined, I then provide an account of the processes of patent composition, prosecution and assessment as practised by patent attorneys and patent examiners. I argue that the strategies of the patent attorneys in particular suggest that the question whether a given object is new is based on an oversimplified conceptualization of these practices, and that the details of the work of these practitioners demonstrate that the process is inverted, with novelty being a vital part of the working out of what the given object is. Novelty, I argue, is therefore more than a matter of certification or attribution, but central to the constitution of the invention itself.

The second question to emerge from the literature is this: to what extent are techniques of quantification, calculation and accountability made use of in the accomplishment of novelty? This issue is the concern of Chapter 5: *Accounts and Accountabilia*. To answer this question, I assess various theoretical approaches to accountability, organised around emphases of representation and control, the alignment of norms, reflexive accountability and accountability as practical availability. In order to explore the substantive matter of the relationship of accountability practices to the accomplishment of novelty, I then provide a detailed account of the assessment work of patent examiners in the UK Intellectual Property Office, as well as the various accountability practices of the organization. As well as finding that accountability concerns are rife throughout the organization, I argue that an important aspect of the practical accomplishment of novelty is the provision for relevant practices of suitable and stable objects, particularly an operable version of the legal articulation of novelty.

The third question is this: since we have seen how novelty in the patent system is distributed across organizations and from individual practices to legal proclamations, how are we to engage with the analytic problem of scale—the 'correct' level of analysis and the right way to bridge multiple such levels—that emerges from this spread and heterogeneity? This issue is addressed in Chapter 6: *The Scale of the Problem and the Problem of Scale*. I explore the various responses to the debate over scale in the social sciences, focusing in particular on what I term the 'dissolutionist' response of theorists seeking to do away with, or move beyond, the classic micro-macro debate, and the various proposed methods for doing so, including methodological

symmetry and ethnographic approaches. I then address the issue of scale by exploring a scalar problem experienced by judges in the legal battles of *Synthon v SmithKline Beecham*, which technically concerned the validity of a pharmaceutical patent but for the judges presented an opportunity to debate controversial alternative understandings of novelty. I discuss the ways in which one of the judges in the case was able to have his actions 'scaled-up', as well as the practical limits of this scaling as evidenced by its failure to be reflected in the practices of the patent office. I argue further that the similarity between the judges' scalar problems and those of we analysts suggests the usefulness of local scalographic investigations, and that the practical accomplishment of novelty can be seen to be the product of the resolution of local contests over the prioritisation of scales of analysis.

The fourth key question to emerge from the literature review is this: is novelty something that can be precisely specified to the satisfaction of all elements of the patent system? This question is explored in Chapter 7: *Deferral, Inconcludability and the Jurist's Regress*. I begin by exploring the literature surrounding various attempts to make sense of situations where conclusion is problematic: specifically, Collins' (1985) 'experimenter's regress' and the ethnomethodological notion of inconcludability. I then provide an account of a controversy in the legal articulation of novelty most recently revived in *Synthon v SmithKline Beecham* but whose origins stretch back at least as far as the middle of the nineteenth century, in order to demonstrate the ever-changing legal understanding of novelty. I then explore the degree to which this controversy can be understood in terms of a 'jurist's regress' and inconcludability, and argue that the deferral strategies employed in recent legal

articulations might serve to provide a concludability to the controversy by deferring further challenges to other arenas. I argue that the practical accomplishment of novelty is illuminated by these notions of regress, inconcludability and deferral, and that novelty is in part constituted through these legal-analytic patterns and strategies.

These four chapters, as well as providing a necessary account of the rich complexities of patent practice, demonstrate the strategies, contingencies, disputes and materials that go into the practical accomplishment of novelty. Before this, however, we must turn to the issue of determining the most suitable methodological approach to adopt in order to provide answers to the questions raised in this chapter.

CHAPTER 3

Methodology

In this chapter I describe the methodology and research design of the thesis. I begin with an account of my attempt to gain access to the United Kingdom's Intellectual Property Office (IPO), and discuss some of the methodological problems that the site presented. I continue by describing how I approached the task of finding patent attorneys to interview, alongside the interviews with patent examiners at the IPO, before discussing the document analysis that was my method for analysing the practices of patent law. Throughout these sections I return to the question of the suitability of methods, arguing for a distinction between ethnographic methods and ethnographic sensibilities. I argue that, even aside from the confidentiality considerations that precluded a period of traditional ethnographic colocatedness in the IPO, the combination of ethnographic skepticism and interview and document analysis methods that I adopted was a suitable way of approaching the research questions. I end the chapter with a description of the format of the empirical chapters that follow.

3.1 The Intellectual Property Office

The Intellectual Property Office is the organization with the responsibility for the certification of United Kingdom patents. Gaining access to the IPO took a number of months to achieve. The IPO is responsible not only for patents, but also trademarks, copyright, and design rights, so I began in June 2009 by emailing the Patents Director. This email was evidently passed along, as it was a Deputy Director of Patents who eventually responded to me. In a telephone call with him I explained the research I wished to do, including the request to be located within the IPO for a prolonged period of observation. The Deputy Director explained to me that this probably would not be possible, and that, moreover, this would almost certainly not be worthwhile. I attempted to change his mind, but it became clear that I could not succeed, and I did not wish to endanger my attempts to gain any kind of access to these professionals.[1] The Deputy Director said that it would probably be possible for me to visit the IPO to conduct interviews, and asked me how many I wished to conduct. Wishing to have as rich a source of interview material to work from, and vaguely aware that the conversation was about to take on the form of a haggle, I said that I wished to interview fifty patent examiners. The Deputy Director replied that it would not be possible for me to take that much time away from the examiners, so we ended up agreeing that I would interview fifteen examiners. I explained to the Deputy Director that it would be best if the examiners were varied in

[1] At the time I imagined that interviews would be satisfactory, if not quite as good as an ethnographic study; when I came to conduct my interviews at the IPO, I realised that the Deputy Director was, in fact, quite correct.

their technology area and in their seniority. The Deputy Director promised to consult with various parties in the IPO to determine whether the research as discussed would be possible. I did not hear back from him for a number of weeks, so I emailed him to follow up on our telephone call. The response finally came about ten days after that, in which I was informed that one of the Senior Examiners would be my point of contact and had found fifteen examiners of varied seniority, from a variety of technology areas, willing to be interviewed. I called the Senior Examiner to make the final arrangements and to find a convenient set of dates for the visit. It was agreed that I would visit for three consecutive days in late October 2009.

On the outskirts of Newport in Wales, next to a chemical refinery, is the Intellectual Property Office of the United Kingdom, having moved to that site from London in 1991. Over lunch during my visit, one examiner would explain to me his theory for the move: "They sent us here to die". Elaborating, he explained that some time after the UK signed up to the European Patent Convention in 1973, somewhat harmonizing its patenting activities with those of some other European nations, some (unnamed) government ministers began to realise that, with a consolidated European patent regime, the role of the national patent offices would eventually diminish and disappear, and that for this to happen to a government department in the centre of London would be an embarrassing political event. The diminishment could not be prevented, but the embarrassing loss of a London organization could, by moving it elsewhere. And so, so the story goes, the Intellectual Property Office was moved out to Newport. The veracity of this story is, of course, highly questionable, despite—or perhaps because of—the fact that

it was just the kind of surprisingly conspiratorial story that might emerge from the lips of a member of an organization as soon as the tape recorder is turned off and the conversation moved to the less formal environment of a canteen. In any case, as the examiner continued to explain, this remote organizational death did not occur. The European harmonization of patent regimes did not continue to the extent predicted by the unnamed ministers—the long-debated unified European Patent remains just a proposal—and the IPO has, according to many of the examiners I spoke to, cultivated a speciality in quick, high-quality patent application searches (the first step of the examination process), which ensures that its services are in demand even when the applicant seeks eventually to make an application to the European Patent Office.

The apparent demand for the IPO's services is reflected in the scale of the organization's patent-related activities. Over 200 examiners work there, although my expectation that there would be large open-plan offices full of examiners turned out to be completely incorrect. The examiners worked in offices of one or two, and this was, according to the examiners themselves, quite necessary for the demands of their work. The work of an examiner, it turns out, is a rather unique combination of highly skilled subject matter and quasi-Fordist mundane repetition and inviolable routine. Examiners must be highly educated in the sciences or mathematics in order to be able to understand the content of the patent applications they must assess. A large part of the work of determining whether or not a patent should be granted, however, consists in skimming anywhere up to a thousand documents, gathered onto the examiner's computer screen through a database

search, and checking each one to see whether it sufficiently resembles and therefore invalidates the patent application at hand. As it may be the one thousandth document which does this, and as each document is separate to the others, this is a task which appears to demand a great deal of concentration across the entire working day (on average, the length of time it takes to complete this task). The sheer difficulty of doing this successfully is, according to a number of the examiners I spoke to, the reason why they must be able to work undisturbed in relative isolation.

Whether or not this was indeed the reason for the separatedness of the examiners, I was on one occasion able to observe the work of an examiner who was very keen to help me understand the work, and in doing so I began to understand why the Deputy Director had suggested to me that a sustained period of ethnography would not necessarily be the best way to understand the practices of patent examination. Materially speaking, and as with many professions today, the work of a patent examiner takes place in a chair in front of a computer screen, all year round. Occasionally a phone call might be made, a reference book referred to, or a letter printed, but otherwise the work was almost entirely virtualized. This would be less than ideal for a richly descriptive ethnography, but it would not be the first to attempt to explore computerised activities. The more serious problems were those of complexity and confidentiality. The highly skilled nature of the job, as well as the confidentiality problem already mentioned, meant that it would not have been possible for me to participate in the work of patent assessment. Although I have, during my research, learnt a great deal about the patent process and the technical issues involved, this almost certainly would not

be sufficient to enable me to actually carry out the work itself. Observation would have been a possibility, and I did in fact have the opportunity to do a small amount of observation. This period of observation I did do allowed me to see that, in order to understand the significance of what was happening on the examiner's screen, I would need to have the examiner explain it to me. While the examiner was happy to do this for a short period, on an old case that he was supervising rather than examining himself, the need to explain the significance of their actions over a longer period of time would have been totally disruptive to the work of the examiners.

I did not wish to disturb the working patterns of the examiners, even it were to have been permitted, particularly given what I learned about the efficiency constraints they were under, and that it was apparently not possible to work faster later to make lost time back (see Chapter 5). The more serious impediment to observation, however, was that of confidentiality. Patent examiners spend much of their day working with documents that are not available to the public. In my conversations and interviews with examiners, any time I asked what they were currently working on, they would never fail to explain to me that I was not allowed to know. Patent applications are made public, but only 18 months after filing. Around half of the work of a patent examiner, however, concerns such unpublished documents: specifically, the 'search' (as opposed to the 'substantive examination', which takes place after publication). It was clear from all conversations I had with the organization's gatekeepers and workers that it would never be permissible for me to have anything to do with these unpubished documents: I could not see them, nor observe someone assessing them, nor discuss them. The

examiners were, however, very willing to talk to me in-depth about such unpublished documents once they had been published. That is, in my interviews the examiners were most forthcoming about the nature of the work of doing searches on applications that had since been published. The confidentiality of these documents while they were unpublished was apparent, which was a serious blow for any attempt to do observation of the work.

For these reasons, I began to understand that interviews would be more suitable than ethnography. This was a rather difficult decision to take, because of the reasons why a researcher might prefer ethnographic methods to interviews. One of the principal analytic appeals of ethnography is that it allows the researcher not to have to take at face value what practitioners say about their practices; rather, these accounts can be contrasted with the researcher's own observations of the practices of interest, including any mess, complexity and contingencies that, for various reasons, might not feature in the accounts of practitioners. This strategy has been used particularly successfully in the 'laboratory studies' of STS and its precursors (Knorr-Cetina, 1981; Lynch, 1985; Latour and Woolgar, 1986) as a way of understanding scientific activity without relying exclusively on scientists' own accounts. This advantage of ethnography is, in short, to do with maintaining distance and skepticism. It is possible to distinguish between the methods of ethnography—extended periods of physical (or virtual) colocatedness together with observation of and participation in relevant activities—and the ethnographic sensibility of skepticism towards the accounts of practitioners. Having done this, it is possible to identify ways of achieving and maintaining this skepticism other than the traditional methods. Virtual ethnography

is one way Hine (2000), an extension of the colocatedness strategy to virtualised activities. My strategy was a style of interviewing that would allow me to maintain a skeptical attitude, not by contrasting participants' accounts with my own observations, but by contrasting them with each other. There were two strands to this approach. Firstly, I encouraged interviewees to describe their activities in ever-greater detail, beginning with a general description of their work, then narrowing down on some aspect of that work, and so on, before moving on to some other aspect. Secondly, while not constraining the flow of the interviews too much (since I knew there would be matters worth discussing that I would not even be aware of prior to the interview), I did make sure that I asked numerous practitioners about the same activities. I hoped that, in combination, these multiple detailed accounts would in some ways prove contradictory, allowing me to maintain a skeptical distance in a similar manner to colocatedness. This turned out to be the case.

The IPO arranged for me to conduct my interviews in various meetings rooms. The interviewees were aware of the timetable and came to meet me in whichever meeting room I was using that day. In the interviews I adopted the role of a friendly, interested person, with some knowledge of the area but wishing to know more. My intentions were presented simply as being to learn about the way they work. With the exception of one or two respondents who were somewhat more distant or reserved—such taciturnity having a variety of possible explanations (Callon and Rabeharisoa, 2004)—I feel that the way I presented myself in these interviews was successful, as respondents were extremely forthcoming, not only with answers to my specific questions about the work, but also less-than-flattering remarks about

the organization and patent attorneys, for example. I do not know why they felt so comfortable telling me these matters. It is possible they were well-known grievances, so there was no danger of anyone learning any personal feelings they should not. In addition, though, I was made to feel by a number of the respondents as if I was being confided in, as if they had not had a way of expressing these sentiments elsewhere. Or perhaps it was not deliberate: they start talking about the organization as one might to an outsider, in its own terms, but then over time the conversation becomes easier, rapport is established, and the sense that I am eliciting information from them fades away. Large sections of responses were couched as stories. These stories were usually the most enlightening with regard to what I considered to be surprising aspects of the job or the organization. Occasionally they would skip over details or technicalities, so I would tell them that I was eager to hear all of these details, no matter how unimportant, and crucially, that I could not be bored, so they weren't to concern themselves with that.

3.2 Patent attorneys

Understanding the working practices of patent examiners was key to understanding the accomplishment of novelty in the patent system, but it was not enough by itself. So much of the work was done as part of a dialogue with patent attorneys that it was clear I would need to understand their work in addition to that of the examiners.

I began by contacting firms of patent attorneys in the local area. One

replied, and I conducted an interview in person at their office. The lack of responses to my other initial inquiries, and the fact that I wanted a broader spectrum of attorneys to speak to, necessitated a different strategy for finding willing interviewees. I contacted the officers of the Chartered Institute of Patent Attorneys to find out whether they could help me find patent attorneys willing to help with my project. They were very interested in the project, and offered to announce it on their mailing list. Given their status as a chartered institute, they have as their members almost all of the approximately 2000 patent attorneys in the United Kingdom. I do not know how many of these are on their mailing list, but I received more than enough responses for the number of interviews I wished to conduct. In the end I conducted interviews with fifteen of these patent attorneys, ensuring that they covered a variety of different technology areas and levels of experience. All but one of these was conducted by telephone, and I used a similar interviewing technique to that I used with examiners at the IPO: beginning with a broad description of the work that they do, before narrowing down into particular activities.

Interviewing the patent attorneys provided me with accounts of the patent process that were quite different to those the examiners provided. These different ways of conceiving of 'what is happening' at various stages is a topic I explore in Chapter 4. As well as there being differences between examiners and attorneys in their accounts of patent processes, there were variations among the attorneys themselves. Different patent attorney companies have different approaches to the work, even different ways of definining what it is they do. This allowed me to maintain an ethnographic skepticism towards

their accounts in a way that would have been more difficult had I, for example, been situated in a single firm of attorneys for an extended period of time.

Because I interviewed both patent attorneys and patent examiners for the thesis, and because at certain points the difference between the two types of practitioner is relevant to the argument, I end each interview extract with the interviewee's profession as well as their (anonymised) name.

3.3 Legal cases

In contrast with the fieldwork focused on patent attorneys and patent examiners, my analysis of novelty in the law is based entirely on document analysis. While being physically situated in legal settings can produce interesting results,[2] it is also possible to learn a great deal from the textual records alone. This is partly because the record for any particular case contains the entire judgments of the judges involved (as opposed to a summary of their conclusions): the reasoning can therefore be studied in detail. Equally, though, the value of legal textual records comes from their comprehensiveness: a researcher can access the records for any case they wish to read (as opposed to, for example, ones deemed interesting by archivists or curators). This latter advantage is, of course, greatly strengthened by the ease of access provided by internet gateways to the archives. These aspects of legal records, in combination, mean that researchers have relatively unencumbered access

[2]See, for example, Latour's account of the day-to-day practices of the French supreme administrative court, the *Conseil d'État* (Latour, 2010)

to a vast corpus of useful data. A clear advantage of textual analysis over, for example, observation of courtoom proceedings, is that one can follow cases that go on for years, and one can study patterns among cases that span decades, both of these possibilities being impractical to study through colocated observation.

One could argue that this reliance on the textual products of the practitioners of interest is as problematic as studies of science focused only on published articles (Gilbert and Mulkay, 1984). I believe the cases are rather different. The rhetorical form of scientific articles is one of closure, in the sense of presenting clear results from experimentation in a way that does not include whatever ambiguities and messiness that were a part of arriving at the results. By contrast, legal judgments (or, at least, the ones I have studied) tend to restate the disagreements at hand, the arguments put forward by the different parties, and the variety of ways of considering these arguments, before resolving the matter somehow and arriving at a conclusion. To the extent that they do this, that they are more 'open' texts.

There remains a rhetoric of inevitability to these texts' conclusions, however. The final ruling is not made arbitrarily or for reasons of judges' personal preferences (not explicitly, at least). Even with the reasoning set out in the text, it is hard to see how to analyse them critically. Before explaining how I did this, I will set out briefly the contents of the two empirical chapters that make use of this material. The first chapter focused on the law (Chapter 6) takes a single legal conflict, *Synthon v SmithKline Beecham*, as it progresses through the various courts of the legal system of the United

Kingdom. My data for this analysis are the statements of the various judges involved in each of the three individual legal cases that make up this conflict: the cases at the Patent Court, the Court of Appeal and the House of Lords. *Synthon v SmithKline Beecham* was chosen in order to be able to study a single case in-depth, and because it was, at the time of writing, the most recent case in which novelty featured as a significant issue. The second chapter focused on the law (Chapter 7) does so by exploring changes in the legal articulation of novelty over approximately 150 years, in order to gain a wider perspective on the issue than can be found by studying a single case. The materials used for this are also the published judgments of cases, in combination with some historical and contemporary commentary by legal analysts. The cases studied in the chapter were chosen through a combination of the historical narratives of various accounts of changes in UK patent law.

It is worth mentioning the style of legal citations I adopt in the thesis. Because some of the cases I explore progress through multiple courts, and because the disagreements between the courts is relevant to my analysis, I have chosen to provide full legal citations (except when discussing an entire sequence of cases, such as with my more informal references to *Synthon v SmithKline Beecham* above). The style of these legal citations follows the Oxford Standard for the Citation of Legal Authorities (Fourth Edition)[3]. An example would be "*Synthon BV v SmithKline plc* [2005] UKHL 59 [22]", with the abbreviation 'UKHL' referring to the House of Lords, '59' being the case number and '[22]' being a paragraph reference. The Oxford Standard contains a list of court abbreviations. I also follow the recommendations of the

[3]http://www.law.ox.ac.uk/published/OSCOLA_4th_edn.pdf

Oxford Standard when referring to judges: 'Mr Justice Smith' or 'Smith J' for a High Court judge; 'Lord Justice Smith' or 'Smith LJ' for a Court of Appeal judge; and 'Lord Smith' for a House of Lords judge.

Maintaining ethnographic skepticism towards the legal judgments was a challenge. There are a number of reasons why this was the case. Firstly, there is the sheer difficulty and subtlety of the legal issues at hand. Reassuringly, I am not the first to experience this as a difficulty (Latour, 2010, p. viii). Perhaps because of the kind of discursive arena found in legal institutions (see Chapter 7), the resulting texts make use of a wide variety of jargon, with the meaning of and relationship between terms being not only complex but also one of the very problems at hand for the practitioners. It is a difficult task simultaneously to become proficient in a complicated language and to maintain sufficient distance to see what other possible forms that language might have taken. The second reason for the difficulty in maintaining ethnographic skepticism was that, as well as the sheer technical difficulty of the legal material, the judges' reasoning was frequently so compelling that it was hard to see how I could pick it apart. Certainly I could not simply say that the judges were incorrect in their judgments. While I was reasonably competent in understanding the points of law that were in question, I could not hope to match these jurists in their command of the legislation and earlier relevant judgments, nor in any other way to show that the judgments were flawed. Moreover, I did not wish simply to make a legal argument, since it is not particularly interesting to show that occasionally judges get it wrong. What is interesting is to find the alternatives that might have emerged, the other possibilities of an underdetermining legal corpus.

In the end I adopted the same technique as I had used with my interviewees: allowing the practitioners' differing accounts to demonstrate the contingency of the outcomes. This was done in slightly different ways in Chapters 6 and 7. In Chapter 6 the focus is on one particular legal conflict, *Synthon v SmithKline Beecham*. In my first attempt at analysing this I began with the final case in the House of Lords. This, I came to realise, was a mistake, as it was only when I studied the earlier cases that it became possible for me to see exactly in what ways the outcome of the final case was not inevitable, and I describe in this chapter the alternative, equally reasonable outcomes that might have shaped the current legal understanding of novelty. Similarly, in the analysis of the materials that make up Chapter 7, while I could see that the legal tests for novelty had changed over the years, I could not find any particular pattern in those changes. I did not wish to produce a Whiggish account based around the journey to the present circumstances, but I did not know what might have been otherwise in this history. In the end, and as with the *Synthon v SmithKline Beecham* case, it was by treating the sequence of legal judgments as not straightforwardly progressive that I found a way of analysing the material: it was possible, instead, to view an ongoing conflict between opposing principles regarding the very purpose of patents, these principles leading to very different understandings of what 'new' must mean.

3.4 Chapter structure

We know as researchers that research, like many complex activities, is messy (Law, 2004). There is rarely a straight line to follow, from initial question, to research design, to empirical work, to data analysis, to writing. There are loops throughout. Empirical work suggests further questions; data analysis suggests more empirical work; and the act of writing, in particular, produces ideas just as frequently as it is simply records them. It is worthwhile, therefore, to spend a little time describing the format of the chapters that are to follow, and why they are organized the way they are. Each of the four empirical chapters in this thesis is arranged as follows: first, an introduction section sets out the chapter and its aims; second; there is a critical review of literature associated with or potentially illuminating for the concerns of the chapter, raising issues and questions to be addressed in the chapter; third, there is a section of empirical material and stories, arranged—depending on the chapter—either thematically or chronologically; and the final section or sections provide an analysis of the empirical material in the light of the issues raised in the literature review, and conclusions are drawn regarding the findings of the chapter and the concerns of the thesis as a whole.

Each chapter has its own critical literature review simply because each chapter is concerned with a different question that touches on different theoretical issues. Rather than attempting to explore all of these diverse literatures at once, I have drawn the relevant literatures into each chapter so as to allow them to be engaged with in close textual proximity to relevant empirical material, thereby allowing each chapter to be a thorough exploration of

certain theoretical and empirical issues.

The separation in the chapters of empirical and analysis sections—as opposed to a format in which they are interwoven throughout—is done primarily for reasons of clarity and ease of exposition. Chapter 4 and Chapter 5 are focused mainly on the structure and processes of the patent system, which can appear inexplicably byzantine: patent assessments take a few days of work but years elapse before they are complete; patent applications are technical documents whose fluidity is used to great advantage by patent attorneys; and the work of patent examiners is quantified to several significant figures according to a regime of calculation the examiners only partly understand themselves. Chapter 6 and Chapter 7 are focused mainly on legal cases which have sought to redefine the very terms in which the technical business of patent assessment and litigation is done, and the arguments used to do so combine the subtleties of legal reasoning with the devilish technical complexities of patenting. In order to provide comprehensible accounts of these events and practices, with their challenging aspects which must be explained in order for the accounts to have meaning, I have moved the analysis of these accounts to a separate section, which dissects them and their relationship to the theoretical concerns raised in the literature review.

In the next chapter I begin my exploration of the practices surrounding novelty by focusing on the work involved in the writing and assessment of patent applications, particularly as regards the different ways of understanding one of the principal objects of these practices: 'the invention'.

CHAPTER 4

The Invention Itself: Strategy and spatiality in the writing and assessment of patent applications

As outlined in Chapter 1, this thesis explores the accomplishment of novelty in the patent system of the United Kingdom by detailing the practices concerned with this task in what might be called, for lack of a better word, the stages of the career of a patent. While it will be seen that attending to the details of these practices reveals the problems with adopting a terminology which carries with it such an implied linearity, I nevertheless follow the order of these stages in order not to overcomplicate the description of a system which is already quite complicated.

This chapter has two objectives, both of which are necessary in order to understand the practical accomplishment of novelty. Firstly, it is necessary to understand the accomplishment of those entities of which novelty is a requirement: namely, the inventions. Since in later chapters I explore the complexities and ambiguities of the writing and following of rules govern-

ing the requirement that patented inventions be new, in this chapter I lay the foundation for understanding these practices by exploring those concerning 'the invention' itself. Secondly, it is vital for the understanding of the accomplishment of novelty in the patent system that the various relevant aspects of this system are understood. While it does not make sense to pretend that these different aspects can be treated as silos independent of one another, for the sake of simplicity the empirical chapters focus primarily on one aspect of the career of a hypothetical patent, rather than attempting to survey all areas at once. In this chapter, the focus is the relationships between patent attorney and inventor, and between patent attorney and patent examiner: two back-and-forth processes that are at the heart of the workings of the patent system. In order to explore both objectives of this chapter, I pose the following question: How is it that 'the invention' is determined by practitioners involved in the seeking and examination of patents?

The chapter is structured as follows. First, a critical literature review explores the different possible theoretical tools for understanding inventions as objects of practice. Second, by exploring the work of patent attorneys and patent examiners in detail, I develop a model for understanding the different factors involved in arriving at an invention. Third, I assess the usefulness of the theoretical options from the literature review in understanding the complexities of the model just arrived at. Finally, I draw conclusions regarding the relationship between this conceptualization of the determination of inventions and the accomplishment of novelty, arguing in particular that novelty is not a neutral criterion against which inventions are measured, but which is actively recruited into the constitution of what inventions are.

4.1 Objects and boundaries

While the details of the novelty criterion in UK patent law and practice are explored fully throughout this dissertation, it is clear from the outset—from any discussion with any participant in the process, or from any reading of any relevant document—that what novelty concerns is whether or not a given invention is distinct from other, prior inventions. As might be expected, and as will be seen, the business of working out whether or not a given invention is novel therefore involves the articulation of what it is that the invention is, and what the differences are between it and other related entities. It is necessary, therefore, to understand and assess the different possible vocabularies and theoretical tools for making sense of objects and, just as importantly, their boundaries. I focus on a set of particularly influential such conceptualizations of objects and boundaries (and the relationship between the two) situated in Science and Technology Studies or its forebears. These conceptualizations are: boundary work (Gieryn, 1983), boundary objects (Star and Griesemer, 1989), fluid objects (de Laet and Mol, 2000) and multiplicity (Mol, 2002). To put them in context, I begin with a discussion of an antecedent conceptualization of a particular boundary—the science/non-science boundary—to which much of what follows could be said to be, to lesser or greater degree, a reaction.

While the origins of the field are multiple, much work in the sociology of scientific knowledge (SSK) concerned a reinterpretation of or challenge to the longstanding 'demarcation problem' in the philosophy of science. The demarcation problem asks how 'science' (or scientific knowledge) and 'non-

science' (or other forms of knowledge) can be precisely defined. In other words, what are the criteria whose satisfaction by a certain practice logically entails its being 'scientific'? Numerous attempts have been made to resolve the demarcation problem (e.g. Popper, 1959), but none have been deemed to have survived the thought experiments of philosophers of science, let alone the messiness of science in practice.

Early work in the sociology of scientific knowledge explored just this practical dimension of science, and in so doing engaged with the demarcation problem in a different way from the philosophers. Latour and Woolgar (1986) showed that the life of a scientific fact is not beyond social analysis. Gilbert and Mulkay (1984) showed that scientists are master of several repertoires which can be drawn upon for different immediate purposes. Collins introduced the notion of the 'experimenter's regress' to describe certain experimental scenarios in which scientific actors must proceed in a way that relies on non-scientific modes of reasoning (Collins, 1985).[1] And the 'Strong Programme' in the sociology of scientific knowledge (Bloor, 1976) did not merely reject the distinction between science and non-science but presented that rejection as a methodological necessity. With the theoretical vocabulary developed in SSK, it became possible to regard science as another area of social reality, a set of epistemic practices not fundamentally different from any other.

From this position, the demarcation problem appears to be a purely theo-

[1]Chapter 7 explores Collins' experimenter's regress in detail, situating it in relation to philosophical skepticism and the ethnomethodological notion of inconcludability, as well as assessing its usefulness in illuminating historical changes in the legal articulation of patent novelty which, I argue, constitute a situation resembling that of a regress.

retical exercise: while it is possible forever to continue attempting to compile a set of necessary and sufficient criteria for knowledge or practice to be 'scientific', this will be in relation to a collection of ideals, and not to science as an observed practice. In the SSK formulation, the prima facie difference between 'science' and 'non-science' is not taken as a fundamental, timeless distinction that can be analyzed and expressed. Yet that there is such an apparent difference suggests exploration of the issue is needed. The demarcation problem is therefore reinterpreted in SSK as the problem of why it is, not only that 'science' appears to be a separate domain of practice from others, but also that it is thought to be distinct on a fundamental, epistemic level. How is it, in other words, that we come to believe that 'science' is so different from everything else?

One answer is provided by the work of Thomas Gieryn, who developed the notion of 'boundary-work' (Gieryn, 1983) to explore how scientists presented science as a distinct mode of activity, a privileged form of reason. The main strategy of the scientists' presentation was to make contrasts with non-scientific activities. The scientists were not simply building a picture of one kind of thing; rather, they were concentrating on the appearance of opposition between science and non-science. Gieryn analysed this as 'boundary-work', the creation and maintenance of a boundary between two ostensibly (or desirably) separate things:

> "'[B]oundary-work' is a sociological parallel to the familiar literary device of the 'foil.' Just as readers come to know Holmes better through contrasts to his foil Watson, so does the public better learn about "science" through contrasts to 'non-science.'"
>
> (Gieryn, 1983, p. 791)

Significantly, Gieryn argues, there was inconsistency between the different presentations of science. What was critical was not what science was, but that it was something different from any other possible sphere. Constructing a coherent object was less important than ensuring it was adequately separated from its various competitors. This is why the importance of the concept of 'boundary-work' is not limited to studies of science: its more far-reaching consequence is that sometimes analysts ought not to begin with the things bounded, but with the bounds themselves (see also Lamont and Molnar, 2002; Zerubavel, 1991).[2]

Legal disputes surrounding patents have also led to the analysis of boundaries. Kevles (2002) details the history of the earliest living organism and animal patents in the USA, and the corresponding boundary work: *Diamond v Chakrabarty* held that whether or not something was living was irrelevant to the question of its patentability; *Ex Parte Allen* ensured that this would not extend to the patenting of humans, since such a patent would mean the ownership of humans, which is prohibited (as slavery) under the 13th Amendment; and the Harvard Oncomouse was the first instance of an invention that was an animal. Similarly, Rabinow (1996) explores the case of *Moore v. Regents of the University of California* as a dispute over how property relations entangle with the boundaries of personhood and the body.

The boundary metaphor itself arguably carries with it connotations of intentionality and intervention—since boundaries are often human creations—

[2] Abbott (1995) takes the primacy of boundaries in another direction, treating them as the proper starting point for a theorization of the creation and development of social fields. It is not always the joining of other areas together, Abbott argues, but the 'joining' of boundaries which results in a new social field.

that are useful in exploring novelty as something done rather than given. Attempting to decide as analysts whether something is 'new' is akin to attempting to solve the demarcation problem. Rather, we should look at the boundaries that are presented in accounts about 'new' things. What kinds of boundaries are being drawn, and how do they define the things on each side?[3] Lezaun (2006) provides a useful disambiguation, reintroducing the distinction between 'delimitation' and 'demarcation' proposed by British military officer Henry McMahon. For McMahon, the distinction is used in the description of geographical boundary creation:

> "'Delimitation' I have taken to comprise the determination of a boundary line by treaty or otherwise, and its definition in written, verbal terms; 'Demarcation', to comprise the actual laying down of a boundary line on the ground, and its definition by boundary pillars or other physical means." (McMahon, 1935, p. 2)

Lezaun updates this distinction for use in the discussion of boundaries of objects: in his example of the creation of a new entity for regulatory purposes, the term 'delimitation' is taken to describe the formal enunciation of the entity in legal or policy texts, and 'demarcation' to describe the administrative and technical work than must be done to provide the entity in the text with a referent. Clearly, the work of creating and maintaining boundaries can be substantial. Equally important for understanding boundaries, however, is the matter of how they are overcome. In their account of the development of a zoology museum, Star and Griesemer (1989) suggest the notion of the 'boundary object' to explain how actors from different social worlds are able to coordinate the results of their work. One example is the repository:

[3]The term 'define' is fruitfully ambiguous in this context, with its two meanings—to mark the limits of, and to state the nature of—entangling to demonstrate the importance of incorporating analyses of both objects and boundaries.

> "These are ordered 'piles' of objects which are indexed in a standardized fashion. Repositories are built to deal with problems of heterogeneity caused by differences in unit of analysis. An example of a repository is a library or museum. It has the advantage of modularity. People from different worlds can use or borrow from the 'pile' for their own purposes without having directly to negotiate differences in purpose."
>
> (Star and Griesemer, 1989, p. 410)

We can see how repositories can enable coordinated work between groups which each understand its contents as something slightly different. Yet is it just the repository which allows this? The 'piles' do not self-order, so work must be done to keep the repository together, and there must be someone to do this or some technology which compels users to co-operate[4]. Someone or some thing must, in addition, ensure that individual items are indexed and that the entire index is maintained with their information. And there must be some way of ensuring that borrowed items are returned. Clearly the repository needs some assistance to remain functioning. It appears that boundary objects do not passively aid the coordination of different social groups; rather, they themselves must be worked upon in order to remain objects that can successfully move between worlds.

One could argue that, in their desire to focus on the complexities of the boundaries, Star and Griesemer did not allow for the shifting nature of the objects. We can see that what counts as 'the repository' may not be entirely clear. As suggested earlier, analyses benefit from treating boundaries and objects as mutually implicated: while 'boundary objects' are valuable in accounting for certain kinds of practices, they carry with them the danger of

[4]See Latour (1992) for an account of attempts to transforms designers' will into irresistible force.

treating them, and the 'social worlds' they link, as unproblematic, clearly defined entities. If anything, this is the opposite of what we want to do: since we are interested in how objects are separated (including the case of where that separation is a novelty claim for one of the objects), it is unhelpful to treat the separation as unproblematic.

The notion of 'fluidity' (de Laet and Mol, 2000) can be seen as an attempt to avoid this kind of problem. In their account of what they see as a uniquely successful water pump, De Laet and Mol use 'fluidity' to articulate the interrelatedness of objects and boundaries. What the pump is, and where it begins and ends, are presented as flexible and negotiable matters. This appears to be potentially useful for understanding how one thing might come to be 'new', separated from what has come before.

The Zimbabwe Bush Pump 'B' type, as presented by De Laet and Mol, is such a 'fluid' object. One can understand the Pump as being a collection of washers, blocks and levers above ground, or as including hydraulic components below ground and the hydraulic principles which govern their behaviour, or as also including the concrete headworks and casing needed to protect the well from contaminants. It can also be thought of as containing the boring device used to create the well, and containing manuals and other material. The possible boundaries continue:

> "And what about the village community? Is it to be included in the Pump—because a Pump has to be set up by a community and cannot be maintained without one? But then again, perhaps the boundaries of the Bush Pump coincide with those of the Zimbabwean nation. For in its modest way this national Bush Pump helps to make Zimbabwe as much as Zimbabwe makes it."
>
> (de Laet and Mol, 2000, p. 237)

While the demonstration of the flexibility of interpretation of objects is effective, De Laet and Mol argue that the fluidity of the Bush Pump is not a result of interpretation but is a quality of the pump itself. This raises two difficulties. Firstly, there is the question whether there is, in this case, anything that is not fluid, for it is hard to imagine something which admits of only one possible definition or boundary (especially if, as with De Laet and Mol's example, boundaries may be drawn around things that are used in the creation, running and maintenance of the object, actors who construct the object, and relevant physical laws).

The second difficulty concerns the attribution of 'fluidity' to the object itself. There is something troubling about arguing that one cannot give a single description of a thing and then claiming that this is a property of the thing itself. It reflects a kind of hesitancy: the desire to claim that an entity becomes what it is through attribution, but also the desire to have this claim somehow fixed in the nature of things, rather than itself opened up to the same analysis. It brings to mind Stanley Fish's demonstrations of the interpretive flexibility of the text on the blackboard (Fish, 1980), but followed by the suggestion that this must be something to do with this particular text.

'Boundary objects' and 'fluidity' suggest useful avenues for exploring the relationship between objects and boundaries in a way that will allow us better to understand how novelty is done. Unfortunately, as we have seen, both approaches have limitations that prevent us using them as they stand. Together, they present a problem: how can we theorize the instability of objects whilst avoiding both the naïve perspectivalism of the boundary objects

approach—that is, suggesting the object is merely understood differently by different actors or groups, which can lead to the problematic stabilization of the object's boundaries and identity—and the boundless redescription of 'fluidity' which, since it is possible of anything, does not help us understand any particular object any more?

Mol proposes the concept of 'multiplicity' to capture the observation that an object can have a unity while being different in different contexts (Mol, 2002). In her example, the medical condition 'atherosclerosis' is not the same during a doctor-patient interview, when it manifests itself in narratives of day to day pain, as it is during surgical procedures in which it is dealt with by, for example, scraping plaque out of arteries. That these different versions of the object—different enactments, to use Mol's terminology—do not fragment entirely into different entities is due to various processes which allow the differences to be managed, in particular the process of 'coordination', in which differing objects are made to cohere. If test outcomes differ in a way that should not be possible with a singular disease, then either one of them is presented as higher in a hierarchy and the others subordinated, or alternatively the tests are taken not as having a common object but simply providing reason for treatment. Even more important are the correlation studies which act as means of translation between different forms of tests in the first place.

Multiplicity is thus a useful tool for thinking about objects enacted differently in different contexts. In this way it is something of a reversal of the problem for which boundary objects are presented as a solution: rather than

several worlds needing to work together, and objects they share being used to allow this, multiplicity begins with the objects shared by several worlds and looks at the work done to keep the objects unified.

The theoretical architecture behind multiplicity is presented as a move from an 'epistemological' (or 'perspectivalist') to an 'ontological' conception of objects. Ashmore, however, suggests an alternative reading (Ashmore, 2005). Multiplicity, he argues, can also be seen as a challenge to a presumed distinction between different periods or contexts, on one side there being the disputes, rhetoric and turf wars of science in the making and on the other side there being the settled, procedural and epistemologically uninteresting day-to-day goings-on of ready-made science. The multiplicity of atherosclerosis demonstrates the weakness of the assumption that science is ever 'finished', and provides a vocabulary for rendering visible the ongoing tensions at play when complex objects are at work.

All this suggests the usefulness of multiplicity as an analytical lens for studying novelty. Yet there is something backgrounded in the multiplicity position that we may wish to focus on in our own analysis. Multiplicity's focus on how an object can hold together in the face of fragmentation means that the identity of the object is fixed, held steady by the analyst. In other words, it may be different atherosclerosis Mol is witnessing, but they are all part of the current medical formulation of atherosclerosis. What is missed out is how that formulation changes, or could change, over time (see e.g. Hacking, 1991). Perhaps a set of complaints comes to be seen as part of the same condition, or perhaps a certain phenomenon is taken as actually

belonging to something else. In these events the object changes, and not in the same way as it changes between the diagnostic conversation and the surgery table. In focusing on how atherosclerosis is a unified entity despite its different enactments, however, Mol backgrounds the ways in which that unity can change.

These are two different analytical approaches to the problem of difference in objects. In one, the state of play is held steady, the object is known, and the differences are the different enactments of the object in different contexts. In the other, the analyst looks at how the state of play itself changes. This is not the same distinction as that between ready-made and in-the-making, or between 'hot' and 'cold' periods of epistemic activity, as Ashmore puts it. As we saw, multiplicity demonstrates that the distinction is unsound. What we are talking about here is not two different periods, but two different analytic approaches: does the analyst hold still the change, freeze the time axis, and look at difference within the object held steady, or does she follow the changes (or failed changes) in the object?

Both are possible to do at any time, and they do not preclude one another. A question which must be addressed is whether multiplicity can accommodate the kinds of unification and distinction work that may be central to demonstrations of novelty (or its absence). Can we use multiplicity to understand change, or only the difference that can be found in the static periods between changes? Are there such periods of changelessness, or are they an analytic simplification, permitting a subtle analysis of certain kinds of difference by backgrounding others? And if a demonstration of novelty involves

a separation of entities, does that mean that the achieving of novelty requires the backgrounding of multiplicity?

Whatever the answer to these questions, the object must be understood as shifting, not merely under the gaze of social groups with different interpretive repertoires, but under the strain of diverse practices between which the object finds not just its meaning changing but its very form and identity. At the same time, in making sense of how this can be achieved and the object remain a unity, the analyst must be careful not to hold it so steady that changes in the object within practices or contexts—not just between them—are missed. Objects can change, and sometimes—as Gieryn showed—it may not be sensible to speak of 'the object' at all.

In the following sections, I explore in detail the part of the patent process known to patent attorneys as 'prosecution': the taking of a client's invention, writing and submitting a patent application and delivering, eventually, a patent for that invention. Because of the complexities of the practices involved, the section begins by setting out a preliminary model of the process—the one I had at the outset of my research, following the public-facing accounts of the process by the patent office—before modifying this model in response to the descriptions that emerged from my fieldwork with the patent attorneys and patent examiners. This modification occurs in four stages: first, the attorneys are seen to be not mere translators from scientific to legal language, but have a great degree of influence in defining the invention; second, the examiners in the patent office turn out to be not simply passive assessors, but rather an active part of defining the invention; third,

the attorneys make use of the pecularities of the examination process to draw external factors such as the commercial landscape into the definition of the invention; fourthly, both sets of professionals—attorneys and examiners—make use of a unique conceptualization of inventions and their relationships, and this conceptualization governs much of the reasoning about the inventions.

4.2 Introducing the patent process

At the outset of my research, I imagined the patent process to consist mainly in a sequence of three stages. This mental model came from accounts I had read of the process, particularly those provided by the UK Intellectual Property Office. While it turns out not to be accurate—indeed, I will argue that its account is something of an inversion of what takes place—it does have the advantage of being relatively straightforward. Firstly, as the result of research, an invention is had, either by an individual inventor (although see e.g. Cotropia, 2009; Lemley, forthcoming) or, more commonly, by an industrial or academic research group. For the sake of simplicity, I use the term 'inventor' when referring both to individuals and to groups. Secondly, in seeking legal protection for the invention, the inventor—perhaps with the assistance of a lawyer—represents the invention in the necessary legal terms—a patent application—and the representation is delivered to the patent office. Thirdly, the patent office assesses the application, and either grants or refuses to grant a patent. This model is represented in Figure 4.1.

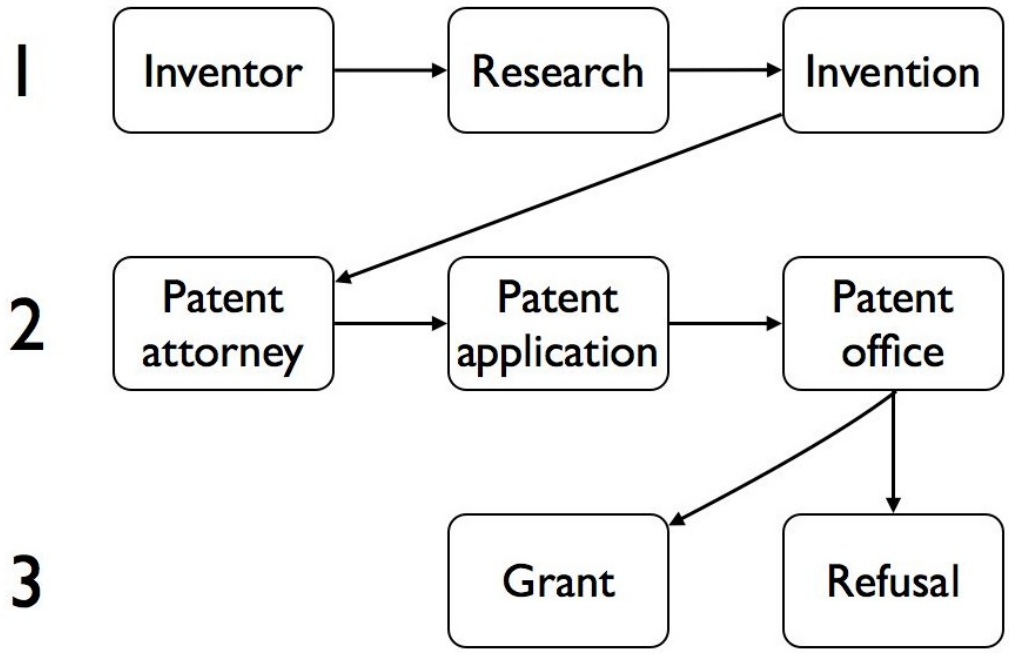


Figure 4.1: A preliminary model of the patent process

While the model is no doubt oversimplistic in a number of ways, what emerges from close examination of the working practices of the practitioners involved is that the model displays a serious conceptual misunderstanding of the process: specifically, the idea that there is an invention prior to the process, which is explored and assessed as it passes through. In fact, and as will become clear from the reports of the patent attorneys and patent examiners themselves, it is through the patent process that the invention is discovered; or, more accurately, it is through this process that it is eventually determined what it is that the invention always was.

To understand this, it is necessary to understand the role of the patent attorneys. In the simple terms of the above model, the patent attorneys are the link between, on one side, the scientific and technological business of research and invention and, on the other side, the legal and bureaucratic

business of patents. It is true that the patent attorneys are links of this sort: they are the intermediaries between inventors and patent examiners. Their influence on the process, however, is much greater than this suggests, and is suggested by the claim that they merely render an invention as a patent application. This will become clear from an exploration of their working practices.

Patent attorneys perform two roles. Firstly, they undertake what they call 'patent prosecution', which is the shepherding of patent applications along to grant. They are responsible for (though do not necessarily themselves do) the writing of the patent application which represents the invention of their client. They submit the application to one or several patent offices on behalf of the client. When the patent examiner assesses the application, the attorney will be their point of contact regarding clarifications, objections and alterations. The attorney will communicate with the examiner, making any necessary changes in order to get the application to the point where the examiner will grant the patent. While the amount of work done will have been in the order of days, the time elapsed from draft to grant will have been around four or five years. This is not a problem for the client, as the monopoly rights conferred by the patent are retrospective to the filing date. Indeed, as will be shown later, the opportunity provided by the examination process to amend applications and still retain the original priority date of the application means that the lengthy period between filing and grant is often relied upon by attorney and client as a strategic advantage over competitors, by allowing for additional research to be conducted and market information to be gathered before the examination process ends.

This leads to the second, more strategic role performed by patent attorneys. They are the client's advisors on corporate strategy, market positioning, competitor analysis and research design, wherever these relate to matters of intellectual property. The attorney will advise the client on a variety of strategic issues: for example, what patents to seek; the potential value of an invention given its market value and usefulness against competitors; whether and how to license the patents of others or sell licenses to them; and whether to avoid the patent process entirely and instead proceed with a trade secret.[5] This instrumental attitude towards patenting is expressed in these examiners' descriptions of the object of their work:

> "The aim is to get the client into the best business position ... [by developing] a patent portfolio which looks sufficiently valid that people will steer clear of it or will take licenses."
>
> - Arthur (attorney)

> "Ultimately, our job is not about patenting particular inventions because they're clever; it's about trying to achieve the client's commercial objectives." - George (attorney)

Patent attorneys are not, in other words, mere intermediaries between client and patent office, or navigators of the patent system on behalf of a client certain of their goals; rather, they take an active role not only in how to proceed but in what to proceed with. That is, patent attorneys help the clients to determine just what the invention is:

[5]The term 'patent' derives from its original form, 'letters patent', meaning 'open letter'. In order to be granted a patent, the details of an invention must be made publicly available (with the exception of those inventions which are classified for reasons of national security). During the term of the monopoly (usually 20 years), other parties are barred from manufacturing the patented invention, but after that time there are no restrictions. For certain companies—for example, Coca Cola, with its recipe for its primary product—it makes sense to attempt to keep the details secret, since this allows them to make use of it for an indefinite period of time.

> "Very often the clients are very focused: they've come up with this new widget. But then it's working with them to understand what's new about it, what actually is the new part. It's quite often much broader or quite different to what they've perceived themselves. So it's trying to flesh out what that is and how it's useful for them in their product range." - Francis (attorney)

> "We are significantly greedier than we were in the 1970s, in terms of trying to cover what the invention is rather than what the client initially tells us. In cases you see from the 1970s ... the patent attorney has been told what the invention is and he's just gone and patented that, rather than working out what the actual scope of the invention was." - Arthur (attorney)

All of the patent attorneys I spoke to made similar claims that a large proportion of their work was to do with helping the inventor understand what it is they had actually invented, although it should be noted that not all agreed that there has been a shift towards this over the years from a different kind of attorney-client relationship. The patent examiners, however, frequently made comments about precisely this shift in the profession, from what used to be known as 'patent agents' to today's patent attorneys. The emphasis today, the examiners argued, was on assisting the client where possible and representing their interests in opposition to the work of the patent office, whereas (they claimed) patent agents in the past were more neutrally involved in the process, helping client and examiner come to an agreement on disputed matters rather than relentlessly arguing the client's case. Examiners generally felt that this was not a beneficial change in working relationships; some attorneys, in addition, while not claiming that the profession had taken a wrong turn, argued that greater emphasis should be placed on finding common ground, and that in any case what might appear to be a fierce pursuit of the client's interests against the patent office was

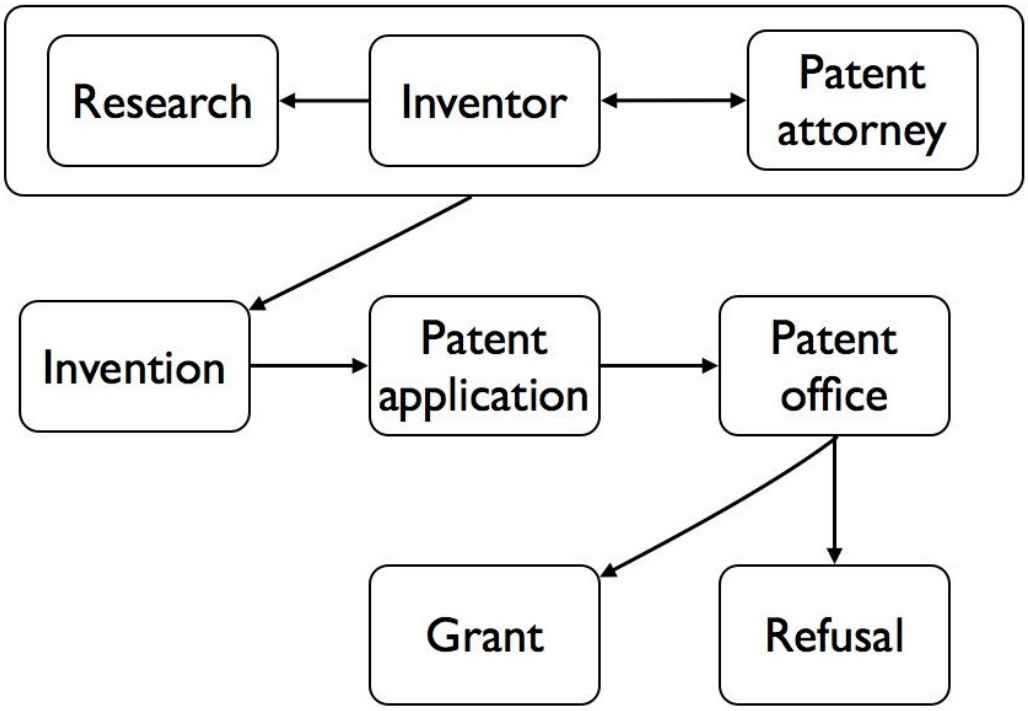
in many cases simply an opportunity to continue billing their clients for the work done in continuing to argue with examiners, when a more compromising attitude by attorneys might often be in the client's best interests.

In any case, the fact that attorneys help inventors to work out what their inventions are presents the first major flaw with our simple patent process model: inventors don't have inventions. Or, they do, but they don't necessarily know what their invention is. They enrol patent attorneys to help them work this out. To the attorneys, the inventor is not necessarily able to tell exactly what they have invented. The invention is, rather, something to be discovered.

With this in mind, we can begin to update our preliminary model of the process. Before, the patent attorney was introduced to take an invention and create a patent application from it. Taking account of the influence the attorneys have over what the invention is, however, we ought to alter the model. Now, we have an inventor who, having through research determined that they may have an invention, consults with a patent attorney, who uncovers its actual extent (as opposed to the limited form the inventor would present). The invention is effectively a result of both inventor and attorney. As before, however, the invention is represented as a patent application and submitted to the patent office for grant or refusal. A diagram of this model can be seen in figure 4.2.

Even as the patent application is submitted to the patent office for assessment, however, the invention is not finalised. A patent application is not a final expression of what the client and their attorney believe to be the inven-

Figure 4.2: The patent attorney as contributor to the invention



tion. It is, instead, just a part of the process of determining the invention, which continues long after the application is submitted to the patent office for consideration.

4.3 Making use of the patent office

The working processes of the patent office are detailed more fully in Chapter 5, but it is worthwhile to outline them here. A patent application, upon receipt by the patent office, is categorized into one of the dozen or so technology areas.[6] After this, it will join the list of applications for that area which are waiting to be assessed. Some months later, it will reach the top of that

[6] At the time of my fieldwork, the exact number of these areas was in the process of being altered, with some areas being split up and others joined together.

list, and it will be allocated to a patent examiner. The examiner will perform the first of two assessments on the application: the 'search'. In the search, the examiner attempts to find records of existing inventions (usually in the form of other patent applications) that would prevent the current application being patented, by virtue of, roughly speaking, demonstrating that the current application's invention is not new (or is new, but only in a trivial sense). The examiner produces a report of the results of this search, which is sent back to the applicant for them to decide whether to continue or to withdraw their application. If they do continue, they will request a 'substantive examination' of the application. This will be performed, possibly but not necessarily by the same examiner, several years later. The examiner will come to a judgment as to whether the patent should be granted, based on the results of the earlier search and a 'top-up' search performed to find documents which were filed before the current application, but which were not published by the time of the earlier search. The examiner will write a report of the results of this examination, which will be sent to the applicant.

Patents are not, generally speaking, refused. The examiner's examination report never simply tells the applicant that they have been unsuccessful in their attempt. Rather, the report specifies exactly what it is about the application that cannot be patented. Usually, some parts of the application will have been anticipated by earlier documents, but other parts of the application will not have been. In the terms of the practitioners themselves, some claims will have been 'found'; that is, the examiner will have found (and cited in the report) documents which he or she believes express the same ideas as those in certain of the current application's claims. The applicant,

however, has the opportunity to amend their application in response to these findings: to claim an invention which, by being of a more limited scope, is no longer prevented from being patented by the anticipating documents found by the examiner:

> "You might find [invalidating citations for] claims one, two, three and seven, eight and nine, but you haven't found claim four. So when you get to the amendment stage [the applicant] could move claim four into claim one, and therefore overcome your prior art. So even if you've got X citations,[7] it might not be against all the claims and therefore they could amend it to overcome the documents that you found. And then they'll have a patent for this new thing that was in claim four. So they just go for a smaller subset of what they were trying to." - Alan (examiner)

This is what the attorneys refer to as being "pushed back": the invention for which they have applied for a patent is deemed by the patent examiner to be unpatentable, because of what is already out there, but that it is possible to proceed with a 'smaller' invention.[8] Indeed, this occurs far more frequently than either of the other possible alternatives: that a patent is denied or granted outright. And the process of being pushed back is, in any case, fully taken into account by the patent attorneys when drafting the application in the first place:

> "You work out that commercially essential field. You start off by being a bit greedier so that during patent prosecution[9] you can voluntarily bring it down to what is commercially feasible. That way the examiner feels like he's done a good job and you're left with exactly what you want." - Arthur (attorney)

[7] 'X' citations represent documents that, individually, reveal the same (or a very similar) invention as the current application. It is considered to be the strongest citation (the others being 'Y', for documents which in combination reveal the invention, or 'A', for documents which do not reveal the invention but are nonetheless relevant).

[8] It is extremely difficult to avoid adopting the spatial metaphors used by participants in the system to describe inventions. The language will be discussed later in this chapter.

[9] 'Patent prosection' is how patent attorneys refer to the process from application to grant.

> "If a case goes straight through, your first reaction is "we made that too narrow, we ought to try again!" (laughter)."
>
> - George (attorney)

After the attorney makes any necessary changes, the amended application is resubmitted to the patent office for re-examination, and the possible results are the same as before: either the patent is granted, or the applicant is informed of what it is about their application that cannot be patented. If the latter outcome occurs, the applicant can once again alter their application and resubmit for re-examination. This process can continue for some time:

> "The agent makes an argument then. So on this one here the agent[10] has actually done what we've asked: he's amended the claim in line with what I asked him to do and he's filed amended claims. So he's made changes to this claim over the original ones . . . and then I'll decide whether I accept those or not. I'll re-examine them, could issue another report, might research it a bit more, and we go through another round of amendments."
>
> - Bert (examiner)

This circle is not without end, however. The period for reply reduces each time the examiner produces a judgment: it starts at four months, then two months, then one month, and if there is still no agreement the applicant may be offered a formal hearing with a senior officer.[11]

Clearly, the patent application is altered by the examination process. It is tempting to parse this as the applicant being forced to alter their invention to one that is more modest, but it is clear from a more detailed exploration of the practices of attorneys and examiners that this is to overstate the degree to which the applicant is even aware of what their invention is:

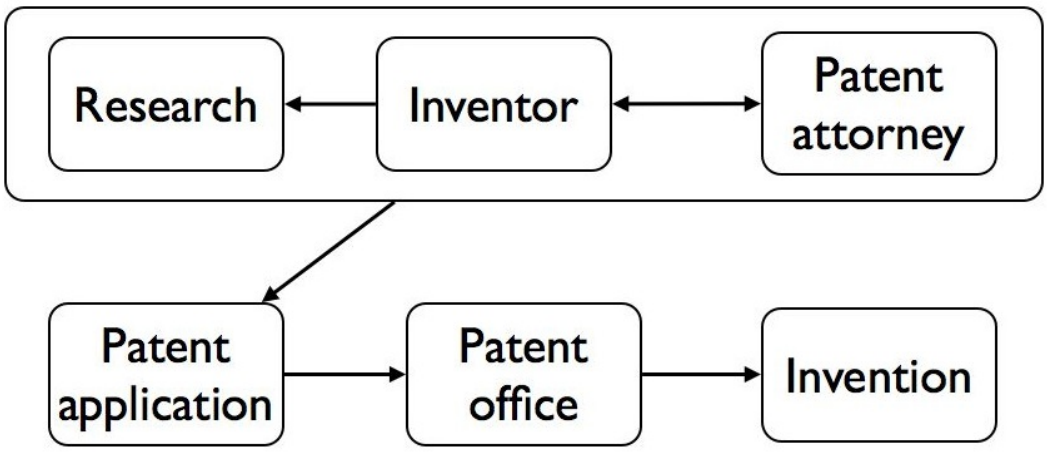
[10] Patent attorneys used to be known as patent agents. Many examiners still refer to them as agents.

[11] The length of time examiners must spend on these reassessments is a source of some frustration to them, as it is not factored into their productivity measures. This is explored in Chapter 5.

> "Quite often when they draw up a set of claims the agents and the applicants won't necessarily know what it is about their thing which is actually going to be even patentable . . . Because they don't know what's out there . . . But you may think that you've invented a device with this new feature . . . but when it's all searched and examined it may turn out that that feature is known but that this other one, which you thought was common sense, isn't."
>
> - Gareth (examiner)

This is something of a reversal of our current model of the process. Rather than having an invention which is assessed by the patent office, the client and attorney make use of the patent office to discover exactly what their invention is. There are two justifications given by the attorneys for this. Firstly, the attorneys are aware that it is more or less impossible for them to know exactly what inventions have already been patented that are similar to, and potentially anticipate, the work of their client. There are simply too many documents, and the work of finding this prior art is a rather challenging skill that makes use of some specialist resources. The attorneys would, therefore, require the assistance of specialists to do this work. This leads directly to the second justification for the attorneys sending the application to the patent office before determining exactly what their invention is: the patent office examiners are experts in exactly this kind of work, and (in the UK at least) perform the work of unearthing the prior art in a matter of months and for a negligible amount of money. Since the applicants are able to alter their application when necessary, and because the examiners perform the work of discovering what parts of the application cannot be patented—thereby revealing exactly what parts of the application are 'the invention'—there is no compelling reason for the attorneys not to submit applications while still unaware of what their client's invention actually is.

Figure 4.3: The invention as product of the patent system



This, of course, changes quite significantly the function of the patent office in our model of the process. It is, clearly, not simply a place where inventions are assessed, but to a certain extent a place where inventions are discovered; that is, where it is determined what an invention is. Figure 4.3 shows an updated model.

4.4 External opportunities

So far, we have seen our model of the patent process altered quite significantly. The invention does not precede the patent office, but is, through the guidance of the examiner's report, a product of it. Alterations to the patent application made after this report are not, however, only made in response to the report itself. The opportunity to change what is being claimed by the applicant is also an opportunity for the applicant to 'update' what is being claimed. The principal sources of information, external to the patent examination process, upon which applicants seek to make such updates to their

application, is the commercial landscape in which the client operates; that is, their competitors and the market. Although this opportunity for change exists in order for alterations to be made in response to patent examiners' reports, this does not affect the degree to which the opportunity is factored into patent attorney's methods for seeking patents on behalf of their clients:

> "Because you file the patent application before you make your idea public, very often that means that you file the patent application before you've got a working prototype. And it may take you two or three years to get your product from even that prototype to what the market really needs. And you need to make sure then that what you filed two or three years beforehand, and how you've claimed that invention, still covers what it is that the client has ended up doing. So there's an iterative process all the time in making sure that the broad claims that we've got on file cover what the client is selling into the market or what his competitors are selling into the market." - Brian (attorney)

> "There's been a licensee which has worked under one of our patents for fifteen years, and in that time, now that they know the patent is coming to the end of its life, they want basically to move away from the stranglehold of my client, so they don't have to pay the license royalty any more. But in the background, we still have other patent applications pending which . . . cover things that we hoped the market would want to take, but the market is now wanting to go in a slightly different direction, and what we're trying to do is amend those pending applications from what we thought the market wanted to what we know that they're going to use now, so that they still have to pay us a license. So long as we sowed the seed for that kind of idea in broad terms before they started working, and we did, some three or four years before them, hopefully we'll be able to configure the wording in the patent application so that it captures where they've got to." - Brian (attorney)

Indeed, it is not only the case that patent attorneys take account of the commercial landscape when making alterations after the examination, but also that the fact that this will occur is part of the patent attorney's strategy from the very beginning.

> "It's wording those [claims] in such a broad way, with lots of potential twists and turns in there, that gives us that wiggle room to make amendments at a later date, which will hopefully catch competitors or licensees when they're trying to get out of what they think we're going to get a patent for." - Brian (attorney)

Of course, it is not only the case that pre-planned inventions are altered in response to market changes, but also that some inventions are thought up and patented solely because of what is going on in the market. Some relate to potential market opportunities:

> "Mostly [clients are] trying to patent inventions that have arisen from specific projects that they're working on ...but there are some clients who approach it from a different perspective. They say, 'What do we want to get patents for, what's going to put us in the best strategic position in a few years' time?' And then they brainstorm that particular area and they come up with inventions that way. So it's not based on any particular project that they're doing, they just think it would be a good area to invent in, to give them the best possible patent position down the line."
> - George (attorney)

From the point of view of patent examiners, this sort of strategy is just as frequently designed to obstruct competitors:

> "Let's say you developed a way of doing something that takes you that way (gestures in one direction) but you realise there's another way of doing it that way (gestures in opposite direction). So you could put a patent in there to stop anyone else doing it the other way, so everyone is then forced to buy your products ...Or say you're IBM and you've come up with a new computer chip. People who are patent mosaicists[12] will see you've invented this and will then put speculative patents around it, knowing that if you want to develop your chip any further you're then going to go into what they've already got, and they can sell you that patent or you'll have to stop development to a promising area."
> - Carl (examiner)

[12]What practitioners call 'patent mosaicing' is the practice of applying for a group of patents, chosen so as to block the research trajectory of a competitor.

The metaphor of 'mosaics' of patents leads us to the final section of our exploration of how inventions are determined in the patent process. This is a critically important aspect of this process of determining the invention that has, for the sake of maintaining a simpler narrative, been left until now. This is the language used by the participants in the process to describe, reason about, and assess the inventions and their relationships.

4.5 Inventions and inventive space

The language of the patent attorneys and patent examiners is laden with a peculiar set of metaphors. These are worth exploring, as they too are part of how it is determined what it is that 'the invention' is. Specifically, these metaphors concern different kinds of space or topology when discussing inventions. The practitioners make use of three different kinds of space: two of these are ways of talking shared by laypersons, but one is peculiar to the business of patent work, and specifically to the business of determining inventions.

The first version of spatiality for inventions is what we might call 'natural space'; that is to say, the three-dimensional schema in which we commonly theorize about the world. When we say that a book is on a table, which is in front of a window, we are making statements about this kind of space. Concepts used to make claims in this space include: left/right, up/down, next to, around/within, above/below, and so on.

Secondly, there is what we might call a 'functional' or 'network' spatial-

ity for inventions. This language is used to make observations relating to the way in which an invention is composed functionally. This includes language such as: connected to, switches on, pushes, lifts, and so on. The relevance of this to patent practice is that if a proposed invention is not unified functionally, it is deemed not to be an invention at all, but rather a combination of inventions which must be patented separately:

> "If you come up with a mobile phone with a mirror at the back, and say this is your invention, they'll rule it out . . . They don't interact at all, you see . . . one is working completely independently of the other." - Ian (attorney)

Functional language is used frequently outside of patent practice, to describe the workings of devices and other systems. When we say that turning a key starts a car, we are making a statement about functional relationality, and perhaps only implicitly about connectedness in natural space.

It is the third kind of spatiality, however, that is most interesting in the context of patent practice: firstly, because it is peculiar to this sort of practice, and secondly because it is so prevalent within it. This is what we might call, with reference to how closely tied it is to the business of determining inventions, 'inventive space'.[13] The language used to define this space is very similar to that of natural space. It is, in fact, entirely consistent with a two-dimensional Euclidean space such as a map.[14] But unlike a map, there

[13]In this we partly follow Klemperer: "What I mean by breadth . . . is the region of (differentiated) product space covered" (Klemperer, 1990, p. 116). Arguably, however, this terminology represents an elision of products and inventions, which given the strategies of applicants it is important to keep distinct. Moreover, close attention to the language of practitioners reveals that when they reason in terms of this spatiality they do so with regard to inventions rather than products. For these reasons we find 'inventive space' a more suitable term.

[14]See van Dijk (1996) for an attempt to promote three-dimensional reasoning with the notion of 'patent height'.

is no real-world physical territory of which the map is a representation.

Most prominent among this type of language is the term *scope*, which is presented by practitioners varyingly as a property of the invention, the patent application, and the monopoly of the patent. The scope of an invention is simply the breadth of its claims. To the patent attorneys, a patent with a larger scope is more valuable, since it embodies a monopoly over a greater number of possible inventions and commercial possibilities. Related to this are the frequently used comparative terms 'broad' and 'narrow', which are, as with 'scope', used to describe inventions, applications and patent monopolies alike:

> "Usually when things progress to examination stage, there might be some aspect of the invention which is novel and inventive, but the applicant is trying to claim a patent that covers a broader area. Most examinations will end up in the scope of that patent application being narrowed to one that is novel and inventive."
>
> - Lisa (examiner)

As we saw earlier when discussing the aims of the patent attorneys, 'scope' is also used to make a distinction between what the invention 'actually' is and what people—particularly the inventors—think it is. Patent attorneys see part of their job as being to determine the 'actual scope' of the invention; that is, the maximum possible region of inventive space, surrounding the idea of the invention, that can be successfully claimed as a monopoly. The skill of patent attorneys in achieving this is recognized by the patent examiners:

> "Lawyers are a lot better [than private applicants] at making things broader . . . You know, 'it's not a leg, it's a member'."
>
> - Alan (examiner)

Regions in inventive space can be combined; it is not only inventions but collections of inventions that can be reasoned about in these terms:

> "I did some work on catalytic converters for a while and we had something like forty applications for catalytic converters come forward on the same day. I got half of them, and they were all essentially similar but had things arranged slightly differently around the system. So then whereas each one only had a small area, by the time you'd taken those forty applications the area they had blanked out was huge." - Carl (examiner)

The spatial language does not end with the size of regions, however. The regions that are used to conceptualize inventions and patent applications also have edges and centres, with the distinction being relevant both to commercial strategy and to examination practice:

> "In the claim itself you have to identify what the core of [the invention] is. It's no use searching for peripheral things when you haven't found the core. And if you do a good search you will search the core part, everything in the core, and then check for the peripheral parts." - Isaac (examiner)

> "The idea [of thicketing] is you have so many patents all around the core idea, it gets difficult for anyone to even get close to it." - Jacob (attorney)

So far, reasoning involving inventive space has been limited to regions and collections of regions. As we saw in the discussion of patent mosaicing, however, a critical feature of this space is that it is possible to conceptualize *trajectories*: regions of inventive space, in combination, can be taken to mark out a direction of travel in which a party is developing or planning to develop, and which therefore it is in competitors' interests to block. This is generally referred to as 'mosaicing', and alongside the other spatial terminology we have seen this metaphor makes perfect sense: inventions are

regions on a plane; in combination, inventions can mark out a trajectory towards further possible inventions; a mosaic of other regions can, therefore, surround the vanguard of an advancing column of invention-regions, thereby preventing further movement in that direction.

4.6 Conclusions

We have seen, through the accounts of those professionals who are most closely involved in the process—patent attorneys and patent examiners—that our original model of that part of the patent process known by patent attorneys as 'prosecution' has turned out to be incorrect in a variety of ways, particularly as relates to the movements of whatever it is we seek to call 'the invention'. It is worth restating both our original model and the one we have arrived at through the reports of the practitioners, in order to draw the differences into stark relief.

In our original model (figure 4.1), the process was a straightforward, linear sequence of individuals, ideas and materials. The inventor, having undertaken some research, has an invention. The inventor seeks the assistance of a patent attorney to translate the scientific and/or technological details of this invention into the legal language required of a patent application. The application is submitted to the patent office, where it is assessed and either granted or refused.

Our updated model is rather different.[15] A client, having some uncertain

[15]For the sake of preventing yet more complexity from entering this model, I am not including the case where a client seeks a patent solely according to a strategy of interfering

knowledge of a potentially inventive scientific or technological development uncovered through their research, seeks the assistance of a patent attorney in order to protect the possible invention commercially. The patent attorney, far more knowledgeable than their client of commercial intellectual property strategies, takes the accounts of their client as marking out part, but not nearly all, of some region of inventive space. The patent attorney does what he or she can to determine just what it is that the client has invented, by restating the client's own account of the invention in much broader terms and submitting it to the patent office where, as part of the assessment process, the attorney discovers through the examiner's report the unpatentable parts of the application and, through this, the maximum region of inventive space it is possible to patent. In other words, through what is ostensibly the assessment of the patentability of a stated invention, the attorney and client discover what it is that the client's invention 'actually' always was. The attorney alters the application as required by the examiner's report—taking the opportunity to alter the invention with respect to perceived changes in the market and competitive landscape—and the patent examiner grants the patent.

There are numerous differences to be found in these models: differences of timing, of roles and of outlooks. One clear difference is that the term 'inventor' utterly fails to capture the plurality of factors that lead to an invention. But the most striking difference concerns the place of the invention itself. In one model, the invention is something on which the patent process operates, by transforming it into a suitable text, assessing it, and then

with a competitor's research trajectory.

awarding a monopoly over it to its inventor. In the other, the invention is very much a product of the patent process itself; not at all finished by the time the patent office gets involved, and only determined in the end through the work of the examiners.

Where does this leave us in our attempt to understand 'the invention'? How should we answer the question of what inventions actually are, given what we have learned about how they come about? We have seen, through the details of the patent prosecution process, the variety of ways that inventions are conceptualized. These fall under four broad types:

Firstly, the invention is at some points a scientific or technical entity: while not necessarily visible or tangible, it is conceptualized in terms connoting a physical device or technical artefact. It must be noted, however, that while inventions are often discussed in the patent system as being this sort of thing, with physical properties and a material relationship to the world, these physical instantiations are entirely removed from the process. At no point in the process is the invention identified with a particular tangible entity, some locally demonstrable 'this'. Inventions as physical instantiations were only mentioned by practitioners as oddities and rare occurrences: one examiner, for example, mentioned that an applicant sent him examples of certain kinds of traffic cones in order to clarify a feature that had not been communicated well textually, and one attorney said that he had been forced to take a model of the invention to an examiner in order to clear up a misunderstanding more quickly. This agrees with Pottage's analysis of the historical shift of the canonical form of the invention from device to text (Pottage,

2011).

In fact, the backgrounding of the physical goes further than its mere absence. It is relegated to a secondary status in the reasoning of the professionals concerned, below the text ostensibly arranged to represent it. This is the second conceptualization of inventions we encountered. To many of the participants involved, the invention *is* the text: specifically, claim one of the application. It is to the letter of the text of the claims that objections are raised, regardless of what is intended by the inventor (as perceived through the patent application's description). It is through the use of this text that the patent office can perform its role of 'pushing back' what is claimed until the invention is discovered. Yet it is for precisely this reason that we cannot say that the invention *is* this text, or is whatever it is the text could be said to represent. The patent application appears to represent an invention, but from the practices of the attorneys we know that 'the invention' is what one arrives at after being pushed back; that is, the invention is not the text, but is discovered by allowing the patent examiner to operate on the text. So while, to the examiners, the invention is the text, to the attorneys, this very fact is part of the reasoning behind using the text as a lure to discover the invention, which is only partially related to the text.

It is through this strategising of the attorneys that we discover the third conceptualization of the invention: a region of inventive space. That is, a region within a hypothesized plane providing a metaphorical organization for all possible inventions. To the attorney, the client's invention is the largest possible region surrounding some part of what the client thought it was he

or she had invented. The client begins with a description of what they believe they have invented and the attorney drafts an application representing a broader idea, with the intention of arriving at the 'largest possible area' for the invention after being pushed back by the patent office.

Is the region of inventive space conceptualized and reasoned about during the patent prosecution process less real than the technical device thought to be represented by the patent? The region is a very real part of the commercial strategy of the client, which takes us to the fourth conceptualization of the invention we encountered during our exploration of the practices of those involved in determining the invention: that of an invention as commercial-strategic tool. For a client seeking to ensure that, when one patent expires, a licensee must find themselves in need of a license for another of the client's patents, the patented invention is as much an abstract commercial-strategic tool as it is any particular physical device. Indeed, the device is arguably quite secondary to the abstraction, since the licenseholder need never even create the invention in order to benefit from its use. With patent mosaicing, the relationship to any particular device is even more confused: the intention of patenting an invention may be to prevent it from ever coming into existence, damaging competitors who would otherwise benefit from it. The invention, in these cases, is a strategic weapon at least as much as it is a technical artefact.

We have also seen how, in addition to being conceptualized in multiple ways, the invention is an unstable, indeterminate entity for much of its career through the patent system. The attorney and client begin with some-

thing, but it is not the invention itself, since as far as the attorney is concerned the invention is discovered through the process. It is difficult to specify exactly what this something is in relation to the invention that the client ends up with, particularly as what is found to be the invention is frequently not the part that the client thought was new or most inventive, but rather some part thought by them to be known or obvious. It is only when the patent is examined that the invention takes shape, as it is only through that that the client and attorney discover what the inventive part of their application is. And given the multiple rounds of alterations, and the changes made by the attorney in response to market conditions and the competitive landscape, it is only when the patent is granted that it can be said that the invention is determined with any finality or stability. This is, of course, only a temporary stability, since it is possible at any moment for a competitor to take the client to court, where it may be demonstrated that what was at the time of patenting thought to be the invention was not, in fact, new or inventive. The invention is always open to being unraveled like this, so its stability is only ever temporary, at the mercy of the motivations and resources of competitors.

So how are we to understand this indefiniteness, this instability of the invention only ever temporarily held stable? How do we make sense of such a thing? And how do we make sense of the different ways in which the invention is reasoned about and mobilised? An invention is, according to what we have seen, an entity with an unstable, ever-changing identity and multiple forms. If we wished to make an ontological claim, we could say that an invention is a multiple or fluid or otherwise plural and unstable object.

We could say that it is a uniquely interesting kind of thing, with properties of messiness, contradiction and instability, and continue the trend of foraging through the English language for metaphors indicative of disunity and change. But it is not clear that this kind of ontological claim adds anything worthwhile to the analysis. It is not even clear that it makes much sense to talk about 'the invention' as one thing at all—even as a single thing with properties of plurality—rather than simply a single term used during a multitude of practices in such a way as to make it possible to consider them all as having a single object.

It is better, instead, to be ontologically parsimonious and talk about only what is available to us: different practices ostensibly oriented around the same entity, but making use of different language, of different theories of what an invention is, at different times. Rather than following an ontological programme, that is, it is better to follow an *ontographic* one (Lynch, 2008): to treat members' ontologies as a vital part of understanding the complexities of their working practices. So, to amend our original question, we should ask not 'What is an invention?', but rather 'What is an invention to certain practitioners, at certain moments, and with certain objectives in mind?' While it would be possible to write an entire thesis on this question alone, I have attempted to provide a partial answer in the form of this chapter.

Furthermore, if we restrict ourselves to the ontologies of the practitioners themselves, we can note that to say the invention objects are uniquely unstable kinds of entities would be to miss the opposing ontological work of the different practitioners at work during patent assessment. I have shown that

the assessment and determination of inventions features opposing practices of stabilising and destabilising of objects. Patent attorneys make use of the opportunity to make ongoing alterations to the invention they are seeking to patent; in other words, they deliberately destabilise, or resist the stabilisation of, the invention. Patent examiners, on the other hand, seek to stabilise the object, to pin down precisely what it is that is being claimed, so as to make an assessment of that precisely specified object. 'Ontological' theoretizations of objects aiming to situate stability or instability within the objects themselves are seriously brought into question by cases such as this where both stable and unstable versions of the objects are practiced simultaneously by different actors engaging in different activities.

Where does this leave us with understanding novelty? This chapter has explored 'the invention' in order to provide a foundation with which to understand novelty which, in the patent system, is a basic requirement of inventions. What we have discovered through the detailing of the practices associated with determining inventions, however, is that it is not simply the case that novelty is a requirement of inventions, or a criterion used to assess inventions, or some other property of or relationship between inventions. In fact, the invention does not precede its testing for novelty. One does not simply have an invention, which is then assessed for whether or not it is new and therefore patentable. This was the assumption of the preliminary model, but it does not reflect the details of the practices of those closest to the process. It is only through a novelty assessment that it is discovered what the invention is. The attorneys use the patent office's examinations to discover what it is the client invented. Novelty is not just a criterion for inventions,

therefore, but a vital part of the process through which they are constituted.

CHAPTER 5

Accounts and Accountabilia: Varieties of accountability in the UK Intellectual Property Office

In the previous chapter I showed that novelty in patent systems is related to the inventions of which it is a requirement in a way that is rather more complicated than might be supposed from the public representations of the patenting process. Specifically, novelty is not merely something that is tested of pre-defined, stable inventions, but rather is implicated in the determination of those inventions and, more broadly, in the strategies of patent attorneys and their clients. The chapter was primarily based on the perspective of the patent attorneys and their work; it is necessary, for a full account of the practical accomplishment of novelty, to turn now to the patent office and its examiners, whose work I have briefly introduced. In order to do this, I provide in this chapter a detailed account of the working practices of patent examiners.

In Chapter 2 I argued that it is necessary to explore the extent to which

novelty in the patent system is connected to practices of enumeration, calculation, and accountability. Economists have provided models of the variables one might tweak in patent systems to produce certain desired outcomes, in keeping with what Hironaka observed to be a major modern justificatory discourse surrounding patent systems: that they are instruments of national economic improvement Hironaka (2002). This raises the question of the extent to which these kinds of optimization concerns are to be found within the patent system itself, as opposed to being simply a concern of economists and policymakers. Furthermore, since economists' analyses displayed a lack of attention to the problem of translating mathematical models into bureaucratic practices, the question arises as to whether any optimization concerns rest solely with the tweaking of intangible variables—as in the economists' models—or whether the actors themselves, the local executors of these variables, find themselves subject to quantification and other techniques of accountability. In short, does the UK Intellectual Property Office (IPO) concern itself with the issue of accountability and, if so, how is this concern realised? To what extent do theories of accountability allow us to understand the work that goes on in the certification of patents? To what degree can different understandings of accountability be understood in relation to one another? And how is the practical accomplishment of novelty in the patent system related to issues of accountability?

These are questions which must be answered in order fully to understand how novelty is practically accomplished, and it is on these questions that this chapter is focused. First, I review existing research on accountability, arguing that it is possible to observe three emphases such research tends

to exhibit: the first two being emphases that I term 'representation and control' and 'normative alignment', and the third being the ethnomethodological notion of reflexive accountability. I argue in addition that an additional understanding of accountability from the work of Garfinkel appears to have fallen into disuse next to other ethnomethodological understandings of accountability, and that it may be worthwhile to revisit it. This review of the accountability research is followed by three sections describing in detail the working practices of patent examiners, including the various relations of accountability in which they are enmeshed. The first section introduces the work of examiners, places it in context with the legal framework in which it operates, and details the variety of materials that go into the day-to-day work of patent assessment. The second section describes the regime of efficiency concerns in which patent examiners operate, including their reduction to a single arithmetic efficency figure. The third section describes how patent examiners are monitored during their work, ostensibly in order to ensure quality but complicated by demonstrations the organization makes to further, external observers. Following these empirical sections, I provide an analysis of the material presented, with reference to the different emphases in accountability research, in order to determine the usefulness of the different emphases in providing insight into the empirical material, as well as the degree to which the empirical material illuminates the emphases and their relationships. I argue specifically that the Garfinkelian notion of accountability as practical availability provides a way of understanding the commonalities between the various emphases in accountability research, and that, as well as being tied together with a variety of accountability practices and re-

lations, the accomplishment of novelty in the UK patent system relies on the heterogeneous provision for multiple practices of suitable, stable objects.

5.1 Varieties of accountability

Accountability is, arguably, a rather longstanding idea. Von Dornum notes that the ancient Greeks were "obsessed with keeping their officials legally accountable for their actions in office" (von Dornum, 1997, p. 1473). Yet one can also argue that it is a notion somewhat particular to our time. Hoskin (1996) describes it as an 'invention of modernity', and notes that the word only appeared in our language around 1800, with the first usage being—some might argue fittingly—the "awful idea of accountability". In any case, the existing research on accountability is rather varied. The research of individual authors in this area is not entirely idiosyncratic, but neither is it possible unproblematically to partition accountability research into a number of strongly grouped 'approaches'. It is possible, however, to identify three different emphases in research in accountability, with some authors firmly at the centre of a single emphasis and others adopting several. These three emphases are: (i) techniques of representation and control; (ii) the alignment of norms; and (iii) the reflexive accountability of all social interaction. I also argue that the work of Garfinkel reveals an additional and somewhat overlooked understanding of accountability that I term 'accountability as practical availability'

The first emphasis of accountability research is the focus on represen-

tation and control. The relationship between these can be found in quite diverse areas. In his study of the relationship between organization and accounting among Jesuits in the 16th and 17th centuries, Quattrone (2004) argues for the strong relationship between the two, and their shared reliance on methods of 'panoptic' (Foucault, 1977) technologies of representation and reduction: "hierarchies as well as accounting systems are incomplete attempts to reduce the irreducible complexity of human beings and relations to a trace of ink on a sheet of white paper" (Quattrone, 2004, p. 674). Making a more general observation, Espeland and Vannebo (2007) note that "increasingly, pressures for accountability are linked to formalized quantitative measures that are designed to evaluate performances, facilitate decision making, or constrain discretion" (Espeland and Vannebo, 2007, p. 24). Not all representation is of the quantitative kind however. In their study of electronic patient records, Winthereik et al. (2007) draw on the notion of 'punctualization' (Latour, 1990) to argue that at the heart of accountability practices lie processes of purposive 'summing up', with accountability to be understood as "a kind of representational activity that has profound effects on the involved actors and their relations" (Winthereik et al., 2007, p. 9).[1] The electronic patient records are able to prompt doctors while they are being filled out, influencing further clinical activities during the consultation, in keeping with reports of the success of even the most basic checklists at leading to strong positive changes in behaviour among surgeons, pilots, and other complex professions (Gawande, 2010). Power's analysis of the proliferation of systems of audit as "an indirect form of 'control of control' which

[1]See Chapter 6 for an critical assessment of the notion of 'punctualization' in relation to analytical description.

acts on systems whose role is to provide observable traces" (Power, 1994, p. 48) suggests that the representation-control relationship is even employed as a second order technique against other instances of the relationship. These accounts suggest that the boundaries between representing and controlling activities can be thoroughly blurred, and that a productive object of accountability research is the relationship between these two activities.

A second and somewhat different emphasis in accountability research relates to the increasingly frequent usage of the language of accountability as a property of a position or office; that is to say, one can be in a position of accountability when one can in principle be held to account. Frequently, the position is described using some version of Munro's (1996) three-place predicate formulation: *X is accountable to Y for Z*. To be in a position of accountability is to be responsible for explaining, repairing and/or preventing a gap between observed and prescribed or expected events. It is, in other words, the alignment of two sets of norms: how one should or must act and how things should or must be. Such alignments manifest themselves in relation both to one's professional, group or official life, and to one's interpersonal interactions. Arribas-Ayllon et al. (2010), for example, discuss what they call the 'professional accountability' of researchers in the field of psychiatric genetics, in particular in their invocation of the notion of complexity to account for past and potential future failures of the field to provide predictive tests for psychiatric conditions. Accountability in this view is closely related to the management of expectations (van Lente, 1993; Brown et al., 2000) but in particular as regards their repair or reconstruction. This kind of accountability need not implicate entire professions, of course, but can con-

cern more mundanely the immediate practical responsibilities of workers.[2] For example, Suchman (1993, 1997) describes the 'center of coordination' of an airport ground control center, and the accountability of the workers there for the orderliness of the movement of planes.

Accountability in the sense of normative alignment can also be witnessed in unofficial social interactions. Scott and Lyman (1968) propose that accounts — encompassing excuses and justifications — are fundamental techniques of sociality "since they prevent conflicts from arising by verbally bridging the gap between action and expectation." (Scott and Lyman, 1968, p. 46). While we ought to be careful not to conflate 'order' and 'peace', we can admit that certain background expectations ("what everybody knows") govern interactions, with transgressors legitimately[3] held to account and, failing the delivery of an appropriate account, legitimately sanctionable. Garfinkel's (1967) 'breaching experiments' provide various examples of how one may discover the strength of such background 'expectancies' by repeatedly failing both to abide by them and to account for such failure. In one experiment, for example, the experimenter asks someone who has just said something to them—and who is unaware of their participation in an experiment—to clarify what they meant, to clarify the clarifications, and so on. The ferocity of the condemnations of the experimenter for his or her actions, after

[2]Hoskin, by contrast, argues that accountability is a historically situated notion that differs from mere responsibility: in accountability, "[n]ot only are duties specified, but the means of evaluating the level of their performance is already prescribed, in implicit or explicit norms, standards and targets of performance; wherefore surveillance over and judgement of performance is vastly widened and deepened." (Hoskin, 1996). I do not claim that responsibility and accountability are identical, or even that either notion is stable or unitary; my intention is simply to provide a gloss of one particular usage of the latter term, for which the former term is useful.

[3]That is, "within participants' shared standards of legitimacy".

even a small number of repeated failures to understand "what is obviously meant", provides evidence of the strength of the background expectations governing conversational behaviour. How one should act in a conversation is tied together with how conversations should be: progressive as opposed to circular, and for the most part self-explanatory, among other things.[4]

Garfinkel's work also provides the canonical examples of the third emphasis in accountability research: that of accountability as an omnipresent feature of social interaction. In particular 'reflexive accountability' is for Garfinkel one of the fundamental characteristics of the ethnomethodological movement of which he was the originator:

> "Ethnomethodological studies ... analyze everyday activities as members' methods for making those same activities visibly-rational-and-reportable-for-all-practical-purposes, i.e., "accountable," as organizations of commonplace everyday activities ... These studies are directed to the tasks of learning how members' actual, ordinary activities consist of methods to make practical actions ... analyzeable." (Garfinkel, 1967, p. vii)

> "[T]he activities whereby members produce and manage settings of organized everyday affairs are identical with members' procedures for making those settings "account-able.""" (Garfinkel, 1967, p. 1)

The reflexive accountability of everyday activities is for the ethnomethodologist at the root of social order, as it provides the basis for mutual intelligibility and the security for actors that their actions are understandable. With activities made "reciprocally recognizable" (Button and Sharrock, 1998, p. 74), actors can understand each others' actions and know that their own actions are understandable.

[4]Conversations as important subjects for sociological analysis is, of course, the starting point for the field of Conversation Analysis (Sacks, 1992).

The accountability of actions need not result entirely from 'within' the actions; the organizational context is often relied upon:

> "Action is intrinsically meaningful, not because it is meaningful outside of any concrete situation, but because it is always embedded in a concrete situation. Action always participates in an a priori organized state of affairs which is already meaningful in its organization." (Peyrot, 1982, p. 12)

To return to an earlier example, this helps us understand why it is that the breaching experiment of asking for repeated clarification results in such frustration: for the unaware participant, the conversation is already meaningful, if not through the meanings of the words themselves then through their obvious exemplification of "what everybody knows" about the organization of this particular type of activity. Particularly instructive in this regard is the case where a participant was asked to clarify the greeting "How are you?" (Garfinkel, 1967, p. 44). His furious response, "Look! I was just trying to be polite. Frankly, I don't give a damn how you are" shows that, even beyond the fact that his question was to him obviously understandable, he views the request for clarification as an unacceptable conversational turn given his intentions (and, no doubt, the fact that "everyone knows" that that is the intention of one who asks that question).

While it may be a useful avenue for exploring certain aspects of sociality, we must ask to what extent the ethnomethodological focus on reflexive accountability has been accompanied by the exclusion of other, more general Garfinkelian notions of accountability. Garfinkel also writes, for example, that for something to be accountable it is "detectable, countable, recordable, reportable, tell-a-story-aboutable, analyzeable" (Garfinkel, 1967, p. 33). Ac-

countability, in other words, concerns a thing's *availability* to certain practices, and this availability must actively be provided:

> "[A]t the Los Angeles Suicide Prevention Center, that deaths are made accountable-for-all-practical-purposes are practical organizational accomplishments. Organizationally, the Suicide Prevention Center consists of practical procedures for accomplishing the rational accountability of suicidal deaths as recognizable features of the settings in which that accountability occurs."
>
> (Garfinkel, 1967, p. 9)

At the Suicide Prevention Center, deaths are transformed into things of which accounts—stories, reports, calculations, analyses—can be made; they are, in other words, made available to the practices of the Center. From this point of view, the common ethnomethodological focus on reflexive accountability is a particular example of what we might call accountability as practical availability, but specifically focused on ways in which phenomena make *themselves* available to practice.[5]

A turn away from reflexive accountability is perhaps not ethnomethodological. If it is indeed the case that "[e]thnomethodology is concerned with the accountability of an indexical particular from within the activity in which that particular participates, not in an external accountability which is indifferent to that organization and its particulars" (Peyrot, 1982, p. 12), then it is reasonable to wonder whether this choice of concern is at the root of charges that ethnomethodology has nothing useful to say on matters beyond the interactional. Indeed, we must ask to what extent the suggestion that accounts

[5]The prevention of such availability is also possible. See, for example, Lynch and Bogen's (1996, pp. 184ff) discussion of the "practical unavailability" (Graham, 1978, p. 170) of Oliver North during his testimony in the "Iran Contra" hearings, during which he organised his accounts so as to avoid not only lies and admissions of wrongdoing, but also to avoid such moves being incriminatingly evasive.

external to the activities made accountable are not "[t]he interesting type of account" (Peyrot, 1982, p. 13) has led to the neglect of certain fruitful aspects of Garfinkelian accountability, namely the processes through which the practical availability of phenomena is accomplished.[6]

Existing theories of accountability are, it can be seen, quite varied. Does accountability concern a particular normative relationality, techniques of summary and control, or is it a fundamental feature of all social life? And if it is all of these, is there anything that binds them together, or must we understand them simply as ideas related only coincidentally by a certain term? In order to answer these questions, and to continue to provide a thorough exploration of how novelty is practically accomplished, the following three sections provides an account of the working practices of examiners in the UK Intellectual Property Office (IPO). The first section provides an overview of the role of the IPO, before detailing the principal aspects of examiners' assessment work, including how the work of the patent examiners is made to relate to and cohere with a sequence of bureaucratic, legal and legislative articulations of novelty. The second and third sections explore the most striking examples of accountability practices in the IPO: respectively, the 'efficiency' scores each examiner is given, and the recording techniques used in the name of 'quality'.

[6]This is not to say that there has been no ethnomethodological research in this vein. See, for example, Garfinkel's "'Good' organizational reasons for 'bad' clinic records" (Garfinkel, 1967, ch. 6), Bittner's (1965) study of organizations, and Zimmerman (1969) on bureaucratic processes. I argue only against the overemphasis on reflexive accountability.

5.2 Assessment practices in the Intellectual Property Office

The UK Intellectual Property Office (IPO)—the operating name since 2007 of what continues officially to be named "The Patent Office"—is the government organization responsible for issuing intellectual property rights in the United Kingdom. The IPO presents its domain of concern as a set of four separate aspects of intellectual property: patent, copyright, trademark and design. This separation of concerns is reflected in the organizational structure of the office, with patent examiners, for example, grouped together in the hierarchy under 'Patents'. When I visited the IPO in 2009—at their location since 1991 on the outskirts of the city of Newport in Wales—I noticed that this organizational separation of intellectual property areas was reflected in the physical distribution of workers, who were clustered together in offices on corridors colour-coded according to what domain of intellectual property those corridors represented. While I was not surprised that the organisation was split up this way, I was surprised to discover that each of the four parts was not gathered around any distinct hub of activity; that is, even within the patents organisational grouping, workers were not pooled together in a common, open working environment, but rather were scattered, two people per room, along numerous non-contiguous corridors designated 'green'. I can only account for my prior belief that workers would be grouped into shared working environments in terms of organization-financial assumptions, i.e. that individual offices for the many hundreds of workers would be an unacceptable cost. Far from being a luxury, however, the almost-individual

offices were presented to me by the examiners as quite necessary for the work, which I was assured—an assurance supported by my observations—involved extremely long periods of concentration, to which the distractions of a communal working environment would be, as discussed in Chapter 3, rather unconducive.

As regards patents, the work of the IPO primarily concerns the assessment of applications, providing opinions for potential applicants about their likelihood of success, providing a dispute resolution service for parties aggrieved by a decision, and publishing advice and information about the patent application and assessment process for both laypersons and patent professionals. Laypersons and patent professionals are treated as entirely different audiences by the patent office and its examiners: the official website has an 'IP Professional' section with entirely different contents, and examiners frequently told me how they had to maintain a separate vocabulary and set of explanatory examples for when they had to interact with independent inventors, whom they saw as relatively unknowledgeable next to professional patent attorneys. The assessment of patent applications comprises the bulk of the work of the patent office if one measures by person-hours: the office employs hundreds of examiners, of varying levels of seniority, all with relatively high levels of scientific training. The assessment work of the examiners can be split into 'searches' and 'substantive examinations', distinct processes which are encountered by patent applications at different stages of their careers through the office. A search is the first stage of assessment and involves the examiner[7] attempting to find existing material

[7]While a patent application may encounter several different examiners on its career

which is relevant to the question whether the invention is patentable; that is, documents that are sufficiently similar to raise doubts over the novelty or inventiveness of the invention in the patent application. It is not strictly an assessment of whether a patent may be granted, this being the purpose of the later substantive examination; rather, the emphasis of the search is on gathering information for the applicant about the likely impediments to granting the patent.

Before providing the details of how patent examiners go about doing searches and substantive examinations, it is necessary to provide the background to this work. What is it that examiners are attempting to do during these processes, and why? Why is it deemed important that patent applications be compared with existing materials, and why is it thought that closely similar materials might constitute impediments to granting a patent? As far as the examiners are concerned, their business is ensuring that patents meet various requirements, the most basic of which being that the invention must be new. If one asks patent examiners *why* they are concerned with whether or not an invention is new, one received the following answer: *it's in the legislation*. "The legislation", it turns out, is not one law, but a collection of different laws, specifically the Patents Act 1977 and a number of other Acts that each amend it in some way. The IPO gathers these together into a consolidatory document called "The Patents Act 1977 (as amended)" (Intellectual Property Office, 2010*b*). Very early on in this document, one can find the source of the examiners' claim that "it's in the legislation":

through the office, the tasks of searching and examination are organizationally atomic, in the sense that they are completed by a single examiner and, as will be discussed shortly, comprise a single 'work unit'.

> "A patent may be granted only for an invention in respect of which the following conditions are satisfied, that is to say —
>
> (a) the invention is new;
>
> (b) it involves an inventive step;
>
> (c) it is capable of industrial application;
>
> (d) the grant of a patent for it is not excluded by subsections (2) and (3) or section 4A below;
>
> and references in this Act to a patentable invention shall be construed accordingly."
>
> (Intellectual Property Office, 2010*b*, I:1(1))

So we can see that it is expressed unambiguously that an invention must be new in order for a patent for that invention to be granted. Reading on, one can see that the requirement (a) does not stand alone: 'new' is not taken to be a primitive term, but is defined in the following way:

> "(1) An invention shall be taken to be new if it does not form part of the state of the art.
>
> (2) The state of the art in the case of an invention shall be taken to comprise all matter (whether a product, a process, information about either, or anything else) which has at any time before the priority date of that invention been made available to the public (whether in the United Kingdom or elsewhere) by written or oral description, by use or in any other way."
>
> (Intellectual Property Office, 2010*b*, I:2)

Here we have a description of what is meant by 'new', defined in terms of whether or not the invention is part of the 'state of the art', as defined in (2). This definition, however, leaves a problem for examiners, because it does not explain how one is to decide whether an invention is part of the 'state of the art'. Specifically, if an examiner has an application for an invention, and some material from the state of the art, how is he or she to know whether the former 'is' the latter? In principle, this could be left up to the judgment of the examiner. In practice, however, examiners' judgment is exercised within the

context of the latest legal thinking on the matter: the opinions of judges that have been produced during trials over disputed patents. Once made, these opinions are taken by other legal actors and by patent examiners to be *the way things are*: not so much authoritative views on what counts as novelty as the very definition of it. The 'tests' that these judges have produced have, in different ways, turned the issue of whether one thing is another (in the jargon, whether an earlier publication 'anticipates' a later publication, thereby negating its novelty) into a question concerning the satisfaction of a set of other criteria. These tests have changed somewhat over the years in ways that might appear quite inconsequential but are to interested practitioners quite profound:

> "[For one thing to anticipate another], the antecedent statement must be such that a person of ordinary knowledge of the subject would at once perceive, understand and be able practically to apply the discovery without the necessity of making further experiments and gaining further information before the invention can be made useful."[8]

> 'To anticipate the patentee's claim the prior publication must contain clear and unmistakable directions to do what the patentee claims to have invented ... A signpost, however clear, upon the road to the patentee's invention will not suffice. The prior inventor must be clearly shown to have planted his flag at the precise destination before the patentee."[9] '

> "[A]n enabling disclosure [seems to be] a requisite to constitute an anticipation."[10]

> "[I]t is very important to keep in mind that disclosure and enablement are distinct concepts, each of which has to be satisfied and each of which has its own rules."[11]

[8] *Hill v Evans* [1862] 31 LJCh 457 [463]

[9] *The General Tire & Rubber Company v The Firestone Tyre and Rubber Company Limited and Others* [1972] RPC 457 [486]

[10] *Genentech Inc's (Human Growth Hormone) Patent* [1989] RPC 613 [630]

[11] *Synthon BV v SmithKline Beecham plc* [2005] UKHL 59 [28]

This most recent opinion is particularly interesting, because instead of giving a test for novelty, the judge finishes the process (begun in the 1980s) of splitting the concept into two others—disclosure and enablement—by explicitly stating that they are separate and by going on to give separate tests for each. This case is explored in detail in Chapter 6, and the move between these tests over time is explored in Chapter 7.

The tests resulting from judges' opinions, together with other snippets of legal cases deemed useful by the IPO, are collected together and provided to examiners in the IPO's Manual of Patent Practice (Intellectual Property Office, 2010*a*). This manual, an electronic document due to the frequency with which it is updated, follows the structure of The Patents Act 1977, with guidance notes and relevant case law added to relevant sections of the Act. The section for novelty, for example, refers to the *Synthon* case I will be examining closely in Chapter 6, because it specifies that novelty is to be understood in terms of disclosure and enablement, before going on to provide guidance for putting those requirements into practice, examples of common missteps, and so on. The issue of the splitting of novelty into disclosure and enablement is sufficiently complex, and its history sufficiently convoluted and controversial, that it deserves separate, thorough examination; I therefore defer my analysis of it to Chapters 6 and 7. For the purposes of this chapter, it is sufficient to note that the Manual of Patent Practice is deemed to capture all that is practically important about the legal determinations, and seen as rendering it in a form that is beneficial to the work of the examiners who are tasked with effecting many of those determinations.

Of course, approved methods of comparison are only useful alongside some way of gathering things to compare: as well as the invention being assessed, the examiner must have access to a 'state of the art' from which to find potential anticipating matter. For this purpose, examiners cultivate a set of shared and individual archival technologies. The principal such technology is the collection of interlinked databases of worldwide patent applications. In the past, this patent application archive was a physical library of paper documents, categorized by and located at the IPO itself. This was coupled with a sophisticated indexing system of columns of drawers of varyingly coloured index cards with positions on the top for varyingly coloured clips, allowing the examiner to find the right patent application for the search he was doing by looking, for example, for a card with a pink clip at position sixteen and a black clip at position seventeen. We have already heard from one examiner about the changes to work practices resulting from the switch from this practically finite, exhaustively-searchable system to the practically infinite computerized system currently in use. What remains the case, though, is that the database system is often the primary resource for examiners in constructing a usable version of the state of the art. Generally an examiner will begin a search by querying the database for keywords relating to the patent application at hand, and the results are narrowed down using a classification system imposed on the database. The IPO has recently switched from using and maintaining its own classification system to using the one provided by the European Patent Office (EPO).[12] In addition, the IPO

[12]Maintenance of the classification system involves adding incoming applications to the relevant category of the database, so that it might be found later, and also the definition of new subcategories when necessary. Moving the IPO to the EPO's classification scheme required the reclassification of their entire database of documents: a labour-intensive process

has gained access to a wider set of patent application databases from other countries, which has resulted in examiners' belief that the 'state of the art' they can produce is now larger, and even in some way total:

> "[P]rior to the online stuff we have available, we only searched [British] documents, American, European [Office] ones and Japanese ones. So all the rest of the world we didn't really get to see, we didn't see what the Germans did, we didn't see what the French did because we had no access to them. With the online [system] we can have access to everything ever back to the early 1800s for inventing stuff… There's an English language abstract for pretty much everything as well. So we're searching abstracts and we can also search full text for English language documents. So it's big. If it's out there we can probably access it."
>
> - Bert (examiner)

This extensive, managed and shared resource for all examiners is coupled with the personal cultivation of resources useful only to individual examiners or technology areas. The internet is used frequently, with examiners keeping lists of websites where they find success in 'finding prior art'. Certain websites are more useful than others, because to be a valid document the material must be dated; forums are therefore frequently used, as posts are dated, as are customer reviews on product pages for online stores. As well as the internet, some examiners keep a personal library of useful material such as specialist encyclopedias.

Having detailed the legal background and material context of the assessment work, it is now possible to describe the business of performing searches and substantive examinations. A patent examiner performs a search by making use of the databases to which his or her computer is connected. The first task, however, is to decide what to search for based on the text of the patent

the IPO paid the EPO to perform.

application. This is done through a reading of the application's claims and descriptions, although there is some disagreement among examiners over the right way to achieve this. Some examiners say one must read the claims first, since they are the legal definition of the invention and will be what the patent ends up covering, and to read the description first would be to allow oneself to be influenced by what the applicant intends by the claims, instead of what the claims actually say. Other examiners insist that the descriptions must be read first, so that it is possible to understand what it is the claims are even talking about. In either case, what examiners do through this reading is attempt to determine what the invention is, so they can do a search for it. This is a task which differs from case to case:

> "Sometimes you can say, well, the claim says that, that's the invention, fine and dandy, off I go, I'll search that. Other times you'll say, well, that claim doesn't make a whole deal of sense, so I have to take my lead from the broader statements in the description and say on balance I think the invention is this."
>
> - Oliver (examiner)

When the examiner is satisfied that he understands what the invention is—although given the patent attorney strategies discussed in Chapter 4, this is not at all straightforwardly related to what one might wish to say the invention 'actually is'—he will produce a list of keywords to search for in order to uncover related material.

> *Observing an examiner at his computer. The examiner walks me through a search he has been working on today. As a part of this, he has queried some section of the database for the term 'substitution'. Over 6,000 documents are returned. He then uses what he calls a 'clustering' tool to gather documents that do not use exactly the queried-for term, but are related to the documents already found. Around 19,000 documents are now returned. The examiner instructs the system to narrow down*

to only those documents that are filed under one of six or so technology categories that are deemed relevant to the invention at hand. This brings the results count down to around 500. He narrows down by the keyword 'video'. There are now 123 documents. This is apparently a sufficiently small number that the examiner can load them up in a viewer and browse through them one by one.

- Observation with Bert (examiner)

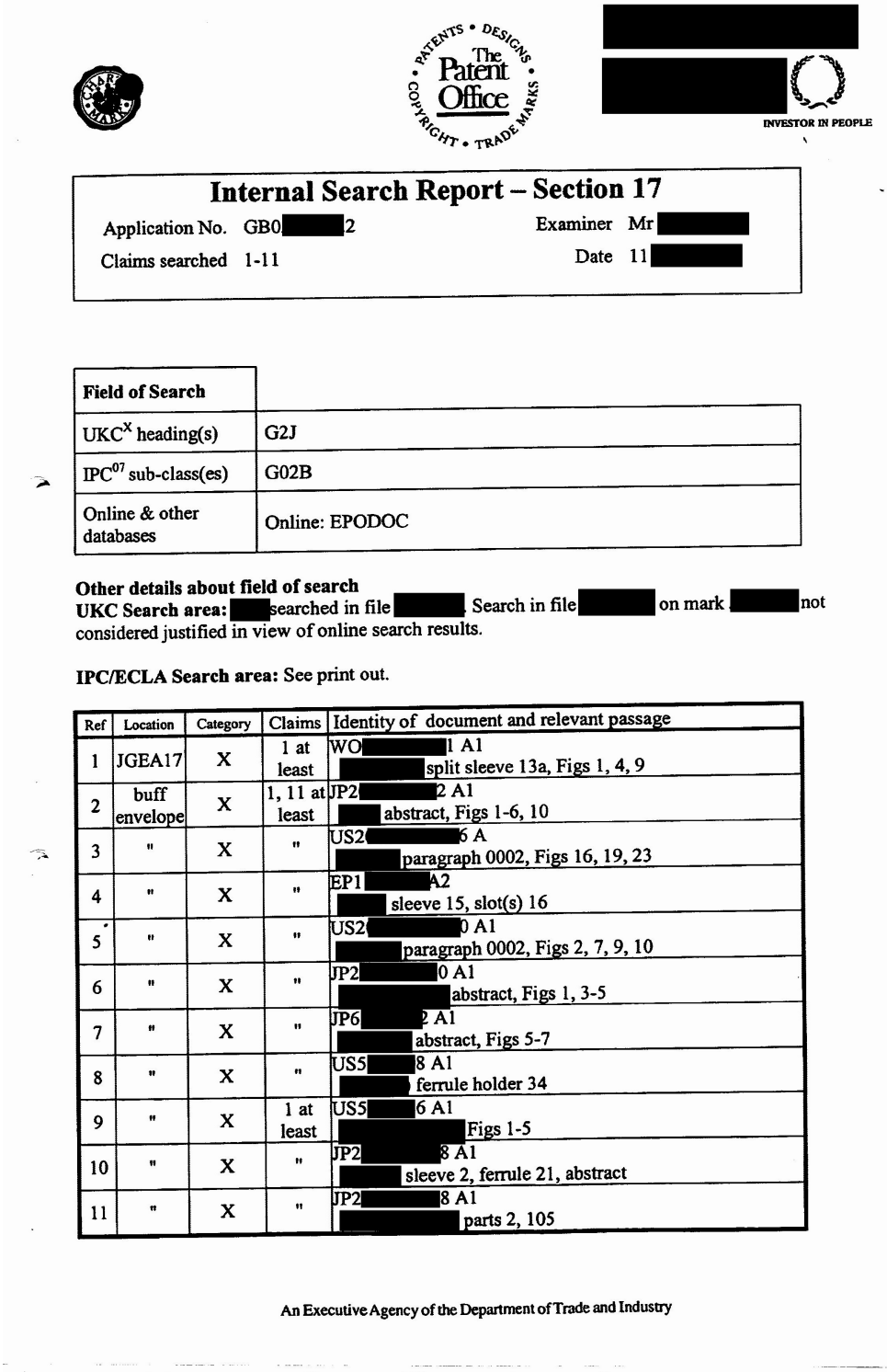
The search consists of a number of such sets of queries and document browsings. Examiners in different technology areas will end up looking through different numbers of documents for each search, but generally each will look through between several hundred and several thousand over the course of between one and four days. The examiner will gather together those documents which are most relevant to the patent application at hand, and from them will produce a search report to send to the applicant. An anonymised search report can be seen in Figure 5.1. The main part of the search report is a table of documents relevant to the application under consideration. In this context of providing references to these documents for the applicant, the examiners frequently refer to them as 'citations', which are categorised as 'X', 'Y', or 'A'. An 'X' citation is one where the document is, by itself, potentially enough to stop the patent application being granted. In the simplest case, this would be a document which describes precisely the invention being applied for in the patent application, using precisely the same words, depriving the application of novelty. An 'X' citation is not synonymous with a novelty objection, however, since it is deemed possible to find a single document to cite which shows that the application is not inventive, by virtue of its being only trivially different from the found document. 'Y' citations are documents which, in combination with others, are poten-

tially enough to stop the application being granted. A simple (if somewhat implausible) example I was given was an application claiming as an invention a chair with rounded feet, and the patent examiner cannot find any single document close enough for an 'X' citation but can find one document describing a chair and another describing a table with rounded feet; these documents in combination could constitute a 'Y' citation, by virtue of the fact that they could in combination be said to show that the idea of a chair with rounded feet is not inventive given what already exists. Finally, 'A' citations are documents which would not prevent the granting of the patent but which the examiner feels are relevant and the applicant may want to know about. One example given to me was where a patent application uses a different material to many similar inventions; the similar inventions are not enough to stop the patent being granted, but it may be that there is a very good reason why the alternative material is not used, and the applicant may want to see the other patents to see why this is. The 'X' citation is held by examiners to be the strongest objection, which is presumably why in the search report in Figure 5.1 there are no other citations in addition to the 'X' citations.

The idea that some citations are better or stronger than others stems from the objectives of the examiners during the assessment. Because inventions may only be patented if they are new and inventive, the examiner seeks to find material that would show that the invention fails to be one or both. As discussed in Chapter 4, patent applications are frequently written as attempts to overreach, to claim too much in the knowledge that the patent examiner will 'push back' the application to what is grantable, which may

well be a 'larger' invention (to return to the spatial metaphor) than would have been claimed for were the applicant to attempt not to overreach. The patent examiners are, of course, very aware of this strategy, and even if they were not they would be aware of the fact that it is very rare for a patent application to be granted without requiring any modification at all. What this means is that a patent examiner, in assessing an application, must assume that it probably will be unpatentable in some way, and that the patent examiner must discover exactly in what ways it is unpatentable, so that it may be prevented from being patented as-is. This leads to the sort of language that is common among patent examiners, which speaks of attempts to 'stop' a patent application, by which they mean not that the patent will never be granted, but just that it is their job to force the applicant to alter it until it is acceptable. In this logic of preventing unworthy patents, there emerges a terminology surrounding the suitability of the matter examiners are able to uncover and recruit to this cause (Callon, 1986). 'X' citations, therefore, are 'better' or 'stronger' than 'Y' citations, and examiners speak of 'knocking out' an application's claims or features when identifying satisfactory citations. Some examiners referred to particularly strong citations as 'knockout' citations and, in certain cases, and without being able to explain to me the origins of the phrase, 'stone bonkers' citations. These were the citations in which, as the examiner Gareth put it to me, "there's nothing left between what we've found and what's been applied for."

The substantive examination of the patent application takes place some time later, often after approximately three years. Examiners explained to me that while part of the reason for this delay is simply a lack of resources,



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[redacted]
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Internal Search Report – Section 17

Application No. GB0[redacted]2 Examiner Mr [redacted]

Claims searched 1-11 Date 11[redacted]

Field of Search	
UKC[X] heading(s)	G2J
IPC[07] sub-class(es)	G02B
Online & other databases	Online: EPODOC

Other details about field of search
UKC Search area: [redacted]searched in file [redacted] Search in file [redacted] on mark [redacted] not considered justified in view of online search results.

IPC/ECLA Search area: See print out.

Ref	Location	Category	Claims	Identity of document and relevant passage
1	JGEA17	X	1 at least	WO[redacted]1 A1 [redacted] split sleeve 13a, Figs 1, 4, 9
2	buff envelope	X	1, 11 at least	JP2[redacted]2 A1 [redacted] abstract, Figs 1-6, 10
3	"	X	"	US2[redacted]6 A [redacted] paragraph 0002, Figs 16, 19, 23
4	"	X	"	EP1[redacted]A2 [redacted] sleeve 15, slot(s) 16
5	"	X	"	US2[redacted]0 A1 [redacted] paragraph 0002, Figs 2, 7, 9, 10
6	"	X	"	JP2[redacted]0 A1 [redacted] abstract, Figs 1, 3-5
7	"	X	"	JP6[redacted]2 A1 [redacted] abstract, Figs 5-7
8	"	X	"	US5[redacted]8 A1 [redacted] ferrule holder 34
9	"	X	1 at least	US5[redacted]6 A1 [redacted] Figs 1-5
10	"	X	"	JP2[redacted]8 A1 [redacted] sleeve 2, ferrule 21, abstract
11	"	X	"	JP2[redacted]8 A1 [redacted] parts 2, 105

An Executive Agency of the Department of Trade and Industry

Figure 5.1: A search report

there is also a very good reason why examinations must come at least several years later, this reason being to do with the timings of the patent asessment process. When patent applications are submitted to the patent office, they are not immediately published. They do, count as having 'priority' from that date, which is to say that an identical application with a later priority date would lose out in a novelty contest. Because applications are not made public for a number of months into the process, the original search for an application cannot include documents which have an earlier priority than the application but which have not yet been published, for to do so would be to reveal to the applicant a document which is at that point secret. An example would be if person A makes an application on one day and person B makes an identical application the following day. When the search for B's application takes place, A's document is not public, so B cannot be informed of its content. A's document is, however, highly relevant to the examination of B's application—it ensures that it will not succeed—so the results of the original search for B's application are not sufficient for the purposes of the examination; instead, a 'top-up' search must be done on B's application at this point, which will reveal A's application, which has been published in the interim. This 'top-up' search is the first stage of the substantive examination.

With the material found in the original and top-up searches, the examiner will perform a more detailed assessment of whether and precisely how these documents preclude the granting of the patent. The examiner will also study the content of the application carefully to ensure that there are no other problems, such as the application being for two inventions rather than the allowable one, whether the language is entirely clear, and so on. Having

done this, the examiner produces an examination report and sends this to the applicant. An anonymised examination report can be seen in Figure 5.2. In this case, the examiner has found numerous documents which deprive the application of novelty, as well as a problem to do with the language used in the application to describe the various parts of the invention.

Frequently, as in the examination report in Figure 5.2, the decision of the examination will be not to grant. This is not necessarily a surprise to the applicant, who may not have altered their application in response to the citations in the search report, wishing instead to wait until after the examination to respond; as discussed in Chapter 4, the applicant has no reason to make alterations early, since any eventual resulting patent will be granted retrospectively from the date of the original application, and there are a variety of reasons for the applicant to delay making alterations, including gathering more information about their own research and/or the market. After receiving the examination report, the applicant is given an opportunity to dispute the examiner's citations and/or reasoning, and also to submit alterations to the application that will ensure the objections no longer apply. The examiner will then re-examine the case. Figure 5.3 shows the examination report resulting from the re-examination of the case in Figure 5.2, between which the applicant replied with a mixture of alterations to the application and rejections of the applicability of certain citations in the first examination report. It can be seen that the examiner is still unhappy with the application as it stands, and that while the alterations have meant that many of the previous novelty citations no longer apply, there is one remaining. Since only one citation is needed for an application to be 'not new' and therefore

UK Intellectual Property Office

For Creativity and Innovation

Your ref : [redacted]
Application No: GB[redacted]2
Applicant : [redacted]
Latest date for reply: 1[redacted]

Examiner : [redacted]
Tel : [redacted]
Date of report : 1[redacted]

Page 1/1

Patents Act 1977
Examination Report under Section 18(3)

Novelty

1. The invention as defined in claims 1 and 11 at least is not new because it has already been disclosed in the following documents:

WO1[redacted]1	[redacted]	split sleeve 13a, Figs 1, 4, 9
JP2[redacted]1		abstract, Figs 1-6, 10
US2[redacted]A		paragraph 0002, Figs 16, 19, 23
EP1[redacted]2		sleeve 15, slot(s) 16
US2[redacted]1		paragraph 0002, Figs 2, 7, 9, 10
JP2[redacted]1		abstract, Figs 1, 3-5
JP6[redacted]1		abstract, Figs 5-7
US5[redacted]1		ferrule holder 34
US5[redacted]1		Figs 1-5
JP2[redacted]1		sleeve 2, ferrule 21, abstract
JP2[redacted]1		parts 2, 105

2. These documents show various sleeve connectors for ferrules in which one end has a greater resistance to transverse movement than the other.

3. Due to the number of documents already cited, I have deferred the completion of the search until after amendment.

Scope of the Invention

4. Throughout the application, the two ends are referred to as 'open' and 'closed', but in none of the embodiments is there an end that is actually closed. This makes the scope of the invention a little unclear.

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Figure 5.2: An examination report

unpatentable, and since in addition the examiner finds certain parts of the application text to be unclear, the examiner has again refused to grant the patent. These periods of correspondence can be quite prolonged, and as will be seen later this can be a source of some frustration for the examiners, who are rewarded in a way that does not take account of these rounds of amendment and re-examination.

It is clear that the examiner is not alone when making determinations of novelty. Rather than grappling, in the abstract, with the problem of whether or not an invention is new, an examiner is provided with numerous resources for this task: first, a vocabulary—'state of the art', 'prior art', 'anticipation', 'enablement', 'disclosure'—which allow discussion of what have been declared to be different constituent aspects of novelty; second, legal tests for determining where a given case stands in relation to those aspects; third, a curated manual providing a digest of the most important such tests and how to implement them; and fourthly, a set of archival technologies for gathering together material to constitute for an examiner and for a particular application the 'state of the art' in relation to which the application's novelty is to be determined. Rather than the lone operation of an individual judgment, therefore, the examiner's assessment is produced in the context of a community of resources and techniques for producing accounts about novelty.

INTELLECTUAL PROPERTY OFFICE

Your ref :	[redacted]	**Examiner :**	[redacted]
Application No:	GB[redacted]2	**Tel :**	[redacted]
Applicant :	[redacted]	**Date of report :**	9[redacted]
Latest date for reply:	11[redacted]	Page 1/1	

Patents Act 1977
Examination Report under Section 18(3)

Basis of the examination

1. My examination has taken account of the amendments filed with your agent's letter of 28[redacted]

Novelty

2. The invention as defined in claims 1,5 and 6 is not new because it has already been disclosed in the following document:

EP1[redacted]2 [redacted] sleeve 15, slot(s) 16

3. EP 1[redacted] - In your letter you claim that part 15, which has the slots, is merely a sleeve holder and that part 19 is actually the sleeve. In the description, however, it clearly says that part 15 is a 'sleeve member' and part 19 is a 'ferrule'.

Scope of the invention

4. Claim 1 defines a connector 'comprising a first ferrule'. However, the connector is for connecting ferrules, so the ferrule itself is not part of the connector.

5. The terminology 'open end' and 'closed end' remains a problem. The connector has two open ends, which are closed once a ferrule is inserted. May I suggest that you change the terminology to the simpler and clearer 'first end' and 'second end'.

6. Claim 1 says that the connector is for 'transmitting and/or receiving and optical signal. The connector itself neither transmits nor receives, but connects apparatus that does.

Figure 5.3: An examination report for a modified application

5.3 The efficiency of examiners

While the amount of time that elapses between a patent application arriving at the IPO and a final decision being made is regularly several years, the amount of time it spends actually being assessed is just a few days. From the point of view of examiners, applications arrive in their purview, are assessed, and then are despatched, as an unending stream of 'work units' through which they must proceed in what appears at least to some of them as a somewhat Sisyphean manner of repetition. This metaphor is slightly misleading, however: while several examiners did highlight the unending nature of their remit, and the astonishing (to them and me both) regularity of their work patterns, no one claimed the work was futile. Indeed, many had a strong sense of the importance of their work and even that they were providing a public good. Their grievances, which I will be exploring shortly, were with just one side of—and indeed were part of the enactment of—their dichotomy of 'the work' and 'the job'. In other words, while the examiners were most forthcoming in their complaints, these were almost universally regarding the manner in which they were expected to go about performing their role, rather than their role itself or the wider system of patenting. It must be said, however, that one of my greatest surprises during my visit to the IPO was the curious contrast between the highly educated workforce and what appeared to me to be a Taylorist or neo-Fordist fascination with regularity and speed, with patent applications being passed along to examiners who then operated on them in some way before sending them back into the system, with this work pattern being performed by examiners with-

out much deviation for the entirety of their careers. It was not simply a case of encountering a kind of 'knowledge work' that was somewhat repetitious; rather, it was the sense that this was a form of assembly line, with highly skilled work being packaged into processual atoms—'work units', being either searches or substantive examinations—which are located along the duration of a patent application's career through the organisation. The work of the patent examiners is highly regularised and routinised, with a regime of efficiency concerns in which these highly skilled workers were reduced to a single number, contentiously representing the amount of work they have done during a period of assessment (the length of which varies according to seniority, with more senior examiners assessed less frequently). Examiners referred to the number, the method of calculating the number, and the system of assessment itself using the same term: "W over A", the vocalization of the mathematical expression W/A. No one I spoke to was able to explain to me the exact meanings of the letters W and A, although it was commonly known that the former related to (but was not identical to) the number of work units completed, and the latter was a measurement of time, but in unknown units.

A common complaint about the system was that it did not take into account necessary work which did not fall precisely into either type of work unit, such as time spent corresponding with an applicant over 'amendments', or changes to an application necessary for awarding a patent. This examiner provides a typical expression of this complaint:

> "The point is we also have things you don't get any points for, like amendments, and that can take a couple of days straight off the bat in a month if you're doing exams regularly. There's a

> lot of other things that, you know, if you get interrupted—phone calls, this, that and the other—time slips massively. And if you've got to do a case a day, day-in and day-out, and you lose two or three days almost inevitably to something like amendments or whatever, it's very difficult to do two cases in a day, three cases in a day just to make that up." - John (examiner)

The W/A was used not only as a way of measuring the amount of work completed the examiners, but also as a way to formulate a target for that amount. Examiners knew that 'their' W/A (use of the possessive was commonplace) had to be above a certain figure (occasionally also referred to as 'their' W/A) in order for them to be deemed to be performing adequately in their role. Many examiners were aggrieved about the targets they were given:

> "The targets that we are set as a B2[13] I think are ridiculous. I have to do a set number of cases every month to reach my W/A. I think it's crazy. In a 22-day month I have to do 14 to 16 cases, which to me is a hell of a lot. You know, you pick one case up and you start another, and that to me detracts from the quality of the work that I can put out." - Fiona (examiner)

Examiners knew that the personalized nature of the targets resulted not from each examiner being given an individually adjusted target, but rather the way the W/A was calculated, specifically that the number of work units was multiplied by another figure apparently designed to correspond to the difficulty of the work that examiner is doing. This figure, referred to as a

[13]Examiners are given such labels to denote their seniority. A 'B2' is a trainee examiner, the more senior labels being 'C1' and 'C2'. The absence of any 'A' level or even a 'B1' is, I was told, to be explained in terms of the general hierarchy of the civil service: as patent examiners are specialized workers, they start at a higher grade. There are no other examiner grades, but there are numerous Deputy Directors, senior examiners in charge of an 'area' (a technological theme, and the cohort of examiners specializing in that theme). The three examiner grades—'B2', 'C1' and 'C2'—encompass all possible variations in experience: outside of applying for a Deputy Directorship, an examiner is, as one examiner expressed it to me, "C2 until you die".

'taff', was itself calculated not for individual examiners but for the technology areas in which they worked. No one I asked was able to explain the derivation of the term 'taff', or even of any of the words of which it is presumably an acronym (it was universally spoken as the word 'taff' rather than the initialism 'T-A-F-F'). The language used by patent examiners was, in any case, thoroughly laden with acronyms and other shorthand. The examiners were also very aware of how unusual this made their dialogues:

> "You can get to the point where you can talk in complete abstraction because you could say things like "That case is three not five", and that means the case is not ready for publication because it's the status that you mark on one of the systems. So no one would say "Oh yes, it's not ready for publication", they'd say "Oh no, it's three not five" ... When I started a guy did a fifteen minute talk just using the acronyms and abbreviations – brilliant. He could have gone on the stage with it. He was all "Because we're in PD and we have B2s and we do section seventeens and section eighteens", and it was all this sort of stuff. And he referred to the MOP. We have PDNs, we have PDIs, we've got the PMB, we've got IPOB, and it just goes on." - Bert (examiner)

In my conversations with examiners I was presented with several partly contradictory accounts of the rationale behind taff calculation, joined around the common theme that the figure was in some way intended to be representative of the difficulty of the given technology area. Because W/As included the multiplication of work units by taffs, examiners working in technology areas with high taffs were required to complete fewer work units to reach an acceptable W/A than were examiners with low taffs. Perhaps predictably, the examiners with the higher taffs were more likely to view the calculation of taffs as reasonable:

> "I've got 1.5. So [my cases] are deemed to be very complex because of ... the technology involved because it is cutting edge ...

> People like LG and big TV companies, so they really are at the cutting edge. So the cases are often very sophisticated and they can also be very thick; there's a lot of material in there, in the technical specifications. Whereas some cases can be just two or three pages, I often see ones over a hundred plus. In some cases instead of three or four claims, I can get fifty, sixty, seventy claims to deal with."[14] - Bert (examiner)

In this account, the taff is a straightforward reflection of the amount of work required to assess applications in a particular technology area. The examiner clearly views his high taff as deserved, given the amount of time he must spend on each case. By contrast, some examiners questioned the relationship between the difficulty of working in a given technology area and the taff awarded for doing so. The following examiner does just this, while also providing an alternative explanation for the calculation of taffs, based on 'hearings', arbitrations provided by the patent office:

> "What I found out is they base it on the number of hearings. So things like computer programmes and business methods, because they have a lot of hearings, they've got a high weighting ... A friend of mine, he does business models and methods and his casing has got a rating of 1.47. And I'm like, hang on a moment. I sit here, I've got a very complex chemical apparatus [to assess] ... which is a bitch to search because the best keyword I've got is 'permeable'. And this, I'm going to have to look at a thousand documents to find what I'm looking for. You on the other hand just write up an objection saying 'Sorry, you can't have this, and if you do then here's a novelty document.' And that's it, end of story[15]. It would take him a day, it'll take me two days and I don't think that's really fair." - Fiona (examiner)

[14]Claims are fundamental components of patents and of patent applications, essentially being the precise, legal account of the invention. See Myers (1995) for an account of their production and rhetorical features.

[15]In the UK, computer programmes and business methods are among the various things the legislation specifically states are not patentable. The examiner's point is that it is straightforward to inform an applicant that their application is not patentable if it is attempting to patent something defined as not being patentable. The incomplete phrase "and if you do then here's a novelty document" refers to her belief that, even if the applicant continued with their attempt to patent a business method, it would be straightforward to find material showing that the claimed business method was not new. Exactly why she believes

It is interesting to note that this examiner's account is presented in terms of something she "found out"; that is, the information was not readily apparent or forthcoming. While not all examiners shared this particular origin story for the taffs, it was a common view amongst many that the calculation of taffs was something from which they were quite removed: it was a process that happened elsewhere, in an unclear manner, by persons unknown. Most examiners had only knowledge of their own taff and those of various other colleagues. No one, including examiners who were more sympathetic of the system, was able to explain to me exactly how these numbers were calculated, or indeed who was responsible for calculating them, beyond the suggestion that there was a group of examiners somewhere who maintained the system.

For one examiner, the failure of taffs adequately to reflect the difficulty of working in each technology area is to be explained in terms of its origins at a time when the work of assessment was, because of the different archival technologies used, quite different:

> "I think the taff system originated and the original taffs were set back in the mists of time when there were some headings [technology areas] where to do a complete search involved looking through five box files and then that was it, job done. They were searches you could do in half an hour. And it was probably reasonable to give them a very low taff. Now that we do everything electronically, even in the time I've been here the job has changed almost beyond recognition in how you go around doing a search. And given the number of patents on the databases, there's very few searches where you'd ever start it, search, run out of documents to look at... It doesn't matter if there's ten thousand or a hundred thousand documents, you're not going to look through all of them. I think the lower taff headings are pretty hard on

this would be straightforward is unclear, but given her other remarks it could be due to her beliefs about the relative difficulty of the language used in such applications.

> anyone working on them now. But because they haven't overhauled the taff system entirely, it's just been what was set in the dawn of time and then tweaks and adjustments and things that were merged and unmerged and it doesn't really reflect the way the job has changed overall." - John (examiner)

These "tweaks and adjustments" have resulted in taffs calculated to two decimal places; when I remarked on the apparent precision of the figure I was informed that it was "inaccurate information recorded very accurately".[16] In any case, it appears that the taff system is not due to be altered to the examiners' satisfaction any time soon. As mentioned earlier, from the point of view of a patent application, travel through the patent office is a process that takes years. The IPO imposes targets on itself for satisfactory completion speeds of various tasks, and at this point in time the examiners were all aware that the most important target was for searches: all applications were to be searched within four months of arrival. This was a target that was nearly, but not quite being met. As one examiner pointed out, this is a possible explanation for why the taff system could not be reformed: such a process of reform would require person-hours that the organization was not willing to divert from the primary business of assessment. In an irony of such attempts to ensure organizational efficiency, the flaws of the worker measurement system are apparently destined to remain in place because of the very resource pressures for which the system is an attempted solution.

[16] See Funtowicz and Ravetz' 'NUSAP' system (Funtowicz and Ravetz, 1989) for an attempt to provide a rigorous terminology with which to disambiguate and describe such ambiguities of accuracies in statistical data

5.4 Ensuring quality and visible visibility

It was not only by having their efficiency quantified that examiners were held to account by the IPO. There was also a strong focus on the 'quality' of their work, understood in terms of the degree to which an examiner performed all actions deemed necessary in a particular assessment. As for who it is that decides what is necessary, this was a point of ambiguity within the process, in that examiners could never be sure exactly who would be reviewing their work, nor which work would be reviewed, nor at what time, nor precisely for what purpose.

Examiners' work was visible to two distinct audiences: other examiners who were to continue with a case,[17] and a quality review board. In both cases this was possible because of the monitoring techniques under which examiners performed their work. For searches, the computer programme used to perform the search also produced a report at the conclusion of the search, summarizing exactly what the examiner had done: what keywords were searched, for example, and with what wildcards,[18] and in which categories of the database. This report was 'attached' to the application in the paper-dossier-metaphorical system the computerized system used, meaning that anyone assessing that same application would be able to read the search report and see exactly what steps had been followed by the first examiner. One senior examiner explained why this was useful:

[17]Given the length of time between searches and examinations, and given the frequent movement of examiners between technological areas, it was a relatively common occurrence for an application to be searched by one examiner and examined by another.

[18]Wildcards are textual modifiers which widen the requested search in some specific manner. For example, appending an asterisk symbol to a word would return matches not only of that exact word, but of any word that began with it.

> "It's a vast improvement over where we were back in the 80s, where for example on a search report you [the later examiner] got three words: document reference, this is a good citation. Nowadays it's much more complete as to what you've done and why you've done it. And if you have to pick up somebody else's case to finish it off because they've gone off somewhere else, you are in a better position to trust that the guy's done the proper job and that you know that you don't have to go back over that old ground again." - Oliver (examiner)

So the monitoring system provided a standardization of work practices that enabled examiners more easily to continue cases begun by other examiners, and to see what might have been overlooked that they would have to complete themselves. By providing a textual record of the work completed by an examiner, the monitoring system makes that work transferable to other settings. In particular, it makes that work visible to different audiences, for different purposes, without the examiner having to (or, indeed, being able to) produce a different account of their work for those audiences.

For the quality review board, the search reports are a way to assess whether the work of an examiner has been completed satisfactorily. The board periodically samples and assesses the work of an examiner, coming to a judgment that, alongside their W/A, forms part of the examiner's overall assessment. It is, however, not entirely straightforward to say that the objective of this quality assessment was to ensure quality; as this senior examiner explained, the IPO itself was in a position of accountability:

> "The job has become more bureaucratic in that now it's all computer-based there are steps that you have to go through and you have to be recorded as going through to get the job done. In the pure paper-based early days, it's just open the case file, dah-dah-dah-dah, address it to the new person and it's gone. Now there's a lot more of, 'process' would be a good word for it. There's an

> emphasis on completing the process now that there wasn't back then. Basically that's come about through this need to get the ISO certification of all our processes[19] ... Every process has to have a set of documentation to go with it, a set procedure that you follow with all the ins and outs of it documented, so that if you do something, it's in line with procedure and best practice ... It is the source of disquiet, disgruntlement, because a lot of us old guys came from an era where you just got on with the job effectively. As long as the case went out the door, nobody cared how you got there. Now you have to follow the ISO process. I can see why: it's a good thing. But sometimes you do get the feeling that process is driving common sense at times ... It's the question of having to record everything you do and having to record that you're thinking about the things that you don't do that you could do. So there's a kind of overemphasis on meeting the process—sorry, being seen to meet the process, I guess—rather than trusting people to have followed the process." - Oliver (examiner)

Since the examiner monitoring techniques are part of the IPO's attempts to regularize and document its processes in order to gain ISO certification, it is difficult to say that the techniques are straightforwardly intended to ensure quality in assessment. Indeed, the senior examiner describes the tension between these two aims, noting how "you do get the feeling that process is driving common sense at times". In particular, his words highlight alternative organizational ambitions—ensuring that examiners are "meeting the process" and ensuring that they are "being seen to meet the process"—with the former being related to examiners' obligations to the organization, and the latter being related to the organization's obligations to the ISO. Who or what exactly is being monitored by this technology is therefore a matter of some ambiguity: it is not simply a matter of making the work of the examiners visible, but rather of making it visibly visible, of making it possible for the ISO to witness the visibility to the IPO of examiners' working practices.

[19] ISO 9000 is a family of quality management standards certifications for organizations.

I have shown in these last two sections a variety of the ways in which accountability relations can be traced in the IPO. Examiners are situated in a complex web of technologies of accountability, with their working practices observed in great detail by various different audiences. They are measured, quantified, and given a score (their W/A) reflecting in a somewhat problematic manner the amount of work they have done. They have the smallest details of their work recorded and archived for potential use and analysis by numerous actors at some point in the future. These details are used to assess their performance, but the very implementation and usage of the technologies and processes permitting this is itself used to assess the organization in which they work, which problematize attempts to provide a straightforward account of what all these technologies of accountability are actually for.

5.5 Conclusions

While detailing the working practices of patent examiners and aspects of their organization, I have provided three stories about the work of the UK patent office: firstly, the materials, techniques and technologies involved in the production of accounts about novelty and the novelty of individual patent applications; secondly, the calculations of efficiency of examiners and the attendant disciplinary regime; and thirdly, the system of monitoring examiners' working practices, related somewhat problematically to the notion of quality. In this section I explore the extent to which the varieties of understandings of accountability identified earlier—normative alignment, representation and control, reflexive accountability, and accountability as practi-

cal availability—illuminate these stories.

Beginning with the idea of normative alignment, this aspect of accountability is clearly evident in the tying of norms of 'efficiency' and 'quality' to the organization's assessment of the performance of workers. The organization has a view on what counts as an acceptable W/A for an examiner of a given seniority and of what a 'good' search report looks like; this is the prescribed reality which it is the examiner's duty to ensure becomes the case. To return to Munro's formulation, the examiner is accountable to the IPO for the efficiency and quality of his/her work. Furthermore, the IPO is itself accountable to the ISO, an external certification agency, for ensuring that its systems, including those to do with the monitoring of examination quality, are adequate.

Similarly, it is possible to see those same stories as instances of representation and control. Examiners are reduced to (or 'summed up' as, depending on one's choice of metaphor) objects that can be inspected, measured and judged. The W/A measure in particular, representing aspects of the worker's work as a number, is a stark example of this kind of representation, and the application of individual targets for this measure a straightforward form of control. 'Search reports', similarly, reduce many hours of work to a manageable 'immutable mobile' (Latour, 1990). And Power's observation about audit that "what is being assured is the quality of the control systems rather than the quality of first order operations" (Power, 1997, p. 73) appears strikingly accurate in the case of this monitoring system, in the light of doubts about the efficacy of that system for its ostensible purpose of ensur-

ing quality, and concerns that its implementation is at least partly the result of an organizational ambition to retain ISO certification.

Applying the ethnomethodological idea of reflexive accountability is somewhat more difficult. 'Novelty' in the legislation is through various means made to meet certain of Garfinkel's understandings of accountability—it is, for example, made "detectable, countable, recordable, reportable, tell-a-story-aboutable, analyzeable" (Garfinkel, 1967, p. 33) and so on—but this account-ability of novelty does not appear to be of the reflexive, 'interesting' (Peyrot, 1982, p. 13) kind. Furthermore, the suggestion that the accountability of activities stems from their situatedness in an already-meaningful, organized state of affairs (Peyrot, 1982) is problematized when activities become accounts the meanings of which are determined only much later and in various different ways, as in the case of the monitoring system, which produces accounts of work whose meanings are only later represented as being to do with 'records of past activity to guide future activity', 'representative samples of work to guide assessment', and 'instances of a system of regularization to guide good organizational practice'.

The simplification of stories around such technologies also presents problems for the notion of accountability as control, as it results in the overlooking of ways in which such control can be understood other than as the restriction of freedoms. As with the subjects in Winthereik et al.'s (2007) study of doctors' use of electronic patient records, patent examiners are generally positive about the monitoring technology, as it allows them greater knowledge of their past actions when it is time to continue with a case after a long

period of time.

What is noticeably absent from these analyses is any commonality between the three stories. In particular, there is no discussion of the common theme of transformation: workers become numbers;[20] work becomes text; conceptual notions become practicable words, tests and database query results. Moreover, these transformations all result in the production for certain practices of suitable objects, from original material the practices have more trouble grasping: the 'amount of work' an examiner does is a complex matter, but a number such as W/A is straightforward to produce and compare; the details of the work of an examiner and of the processes of an organization are complex beyond description, but a routinization and monitoring system produces immutably mobile documents and renders the work visibly visible; and while the question of whether something is new is a somewhat philosophical problem, the vocabulary of novelty, the defined tests and the archive technologies are clear and practicable objects with which assessment can take place in a consistent way.

These observations lead us to consider the possibility of a useful rehabilitation of Garfinkel's more general, less widely-used understanding of accountability that I described as practical availability. Garfinkel's insight—that accountability is a condition, the *possibility* (in a given field) of counting, reporting, calculating, categorizing, evaluating, etc.—has, I argue, been overshadowed by the focus on the reflexivity of activities, i.e. the produc-

[20] 'Summing up' is of course a kind of transformation, but its specificity means that its usefulness is limited to cases such as this. Moreover, the phrase doesn't do justice to the messiness of transformations, which do not always result in a simple number, but often—as with 'novelty' made assessable—result in a complex amalgam of technologies and practices

tion by some phenomena of their own accountability. While this is indeed an interesting and worthwhile project into investigating certain aspects of sociality, I argue that there is also something to be gained by exploring *unreflexive* accountability, or external methods by which phenomena come to be accountable. In each of our three accounts the practice or practices in question, be they assessment of patent applications, of patent examiners, or of a patent office, are furnished with objects suiting their purposes through the production and maintenance of a technological and organizational apparatus. Explicitly defined and textually gathered legal tests and examples, a minutely-specified technical vocabulary and a flexible database system provide for the practices of patent assessment a suitably operable, stable and consistent object, 'novelty'. Techniques of quantification, calculation and arithmetical comparison, together with the processes of taff-production, provide for the practices of patent assessor assessment a suitably transportable, summational and commensurable object, the 'W/A' figure. Technologies of monitoring provide for the practices of patent assessor assessment and for the practices of patent assessor assessment assessment (an aspect of the assessment of an organizations 'processes') a suitably immutable and standardized object, the 'search report'. In understanding accountability, then, it might be useful to shift more of our focus from accounting practices to the generation of suitable, stable objects for those practices; from the production of accounts, in other words, to the production of *accountabilia*.

As regards novelty, I have shown how the term takes practical form in the IPO through and in the context of a variety of technologies, organizational processes, political negotiations and the varying and often conflicting

accounts of the rationales for these. In particular, one of the fundamental tasks of the IPO—the assessment and certification of novelty—is thoroughly entangled in relations of accountability. Moreover, these relations are not a 'muddying' of otherwise straightforward practices; rather, the practices of novelty-assessment gain a usable object only through the building of such relations. Accountability practices are, it seems, an important aspect of the accomplishment of novelty in the UK patent system. Furthermore, the events and routines represented in this chapter add to the demonstration that novelty does not simply persist in the patent system as some neutral, inert concept, an unproblematic standard against which applications can be judged. It is, rather, actively maintained through the provision of physical and electronic materials and complex organizational processes that provide for the various actors concerned with novelty a set of suitable, stable objects, to enable them to achieve their various, potentially conflicting, goals.

CHAPTER 6

The scale of the problem and the problem of scale

In the previous two chapters, I have described some of the features of practices surrounding novelty among patent attorneys and the patent examiners of the Intellectual Property Office. I also introduced the Manual of Patent Practice, a document prepared by the Intellectual Property Office for the use of its examiners, containing the legislation concerning patent rights and up-to-date legal opinion on the correct way to interpret the legislation in various situations. The Manual, I argued, was a key part of how novelty is made operable for practitioners in the Intellectual Property Office, by reducing an abstract notion to a document of instructions for how to proceed. As well as this, however, the Manual can be seen to be a link of sorts between the Intellectual Property Office and the courts, or between patent examiners and judges. While litigation in the courts over contested patent rights is often seen to be an undesirable outcome by many in the process, it does occur and in the rulings on those cases judges make pronouncements which occasionally, depending on the court and the seniority of the judge, are incorporated

into the Manual of Patent Practice so that patent assessment will reflect what has been decided. Novelty, clearly, appears in a number of different parts of the UK patent system. It is in the legislation, in the courts, in the patent office, and in the offices of lawyers preparing applications, not to mention the universities and companies preparing to transform their research into intellectual property. It appears differently in these different places also: in the patent office as a justification for a course of action by an examiner on a particular case; in the legislation as a part of the articulation of what counts as patentable; and in the courts both as something through which to adjudicate cases and as something which must itself be analysed and, for the particular purposes of the courts, made clearer or improved. Novelty is also, ostensibly at least, linked together between these settings through technologies such as the Manual of Patent Practice.

Novelty, it would appear, is found in numerous locations and domains of practice. It appears as a feature of local, individual interactions, but also the routines of an entire organisation, not to mention the universalising proclamations of the law. As I argued in Chapter 2, this embroils novelty quite clearly in that enduring problem of social science, the problem of scale. This problem has been the source of a great deal of debate, and in recent years this debate has intensified, with proposals such as the total abandonment of scale as an analytic resource (Marston et al., 2005) and the transformation of scale from resource into topic (Woolgar et al., 2009) in the Garfinkelian (1967) mode. In this chapter I offer a structure in the debate as it now stands, which concerns not so much the familiar dichotomy of 'micro' and 'macro' but rather the alternative ways of dealing with that received dichotomy. As

will become apparent, to analyze the problem of scale from a purely theoretical point of view is somewhat to beg the question. The empirical component of the chapter, therefore, concerns a series of events within the courts that demonstrate that the problem of scale affects practitioners other than social scientists.

In this chapter I provide a detailed exploration of a single, recent legal case concerning the novelty of patents: *Synthon v SmithKline Beecham*,[1] a conflict concerning the ownership of the invention of a particular form of a particular compound useful in the production of antidepressants, a particularly valuable kind of pharmaceutical. This case, eventually reaching the House of Lords—at the time, the highest legal authority in the United Kingdom—led to judgments effectively splitting the concept of novelty into two separate ideas. In following this case, and the attempts to effect its judgments in the assessment practices of the Intellectual Property Office, I will address the following questions: what does the story of this recent legal change tell us about how such attempted amendments of novelty are made to travel through the patent system? What part in this is played by scale? And to what extent are our own and our subjects' scalar practices similar and mutually illuminating?

The structure of the chapter is as follows. Firstly, I explore and critically assess the literature surrounding the analytic problem of scale in the social sciences and propose a distinction between approaches seeking to fix the problem and those seeking to move beyond it: these are what I term 'resolutionist' and 'dissolutionist' approaches to scale. Secondly, I explore the

[1] [2002] EWHC 2573 (Pat); [2003] EWCA Civ 861; [2005] UKHL 59

events of *Synthon* and the judgments concerning novelty that emerged from it. Thirdly, I look at how these judgments are transported to the Intellectual Property Office, and examine how successfully assessment practice there has been altered in line with the judgments. Fourthly, I make use of some of the analytical approaches and tools discussed in the first section to explore the 'scaling-up' of the senior judge in *Synthon* and his judgments. Fifthly, I provide a re-reading of the story of this case to demonstrate the dilemma at the heart of it, which concerns a conflict over scales of analysis. The chapter concludes with a comparison of the scalar dilemmas of these jurists and social scientists, and suggests the implications of this for social scientific practice and the practical accomplishment of novelty.

6.1 The resolution and dissolution of scale

Existing analytical approaches to scale are distinguishable according to which of two broad emphases they display. While both emphases share the idea that scale is a problem, they differ with respect to the manner in which they formulate that problem and in which they propose a solution. Specifically, one emphasis argues that scale is a problem in need of resolution—that is, fixing—while the other argues that it is a problem in need of dissolution—that is, of abandonment and replacement. In this section I will present these 'resolutionist' and 'dissolutionist' emphases in turn, focusing in particular on the latter of these, as it is the more recent trend and does not already have the sort of expositions enjoyed by the former (see e.g. Alexander et al., 1987).

The resolutionist emphasis is concerned with scale as an analytical problem to be overcome; specifically, a problem concerning a gap or gaps between levels of analysis, with the objective being the understanding of the nature of these levels and their essential differences, and also the proper overcoming of the gap(s) between them. Quite frequently the levels are termed 'micro' and 'macro'; as Jensen (2007) notes, the apparent importance of these categories is shown in titles such as *The Micro-Macro Link* (Alexander et al., 1987) and *Advances in Social Theory and Methodology: Toward an Integration of Micro and Macro Sociologies* (Knorr-Cetina and Cicourel, 1981). The orientation by researchers to a common dichotomy—micro/macro—does not, however, ensure a common set of concerns. For Alexander and Giesen (1987), the terms 'micro' and 'macro' are synonymous with, respectively, agency and structure, or what they term 'action' and 'order'. In their historical account of the micro-macro problem, they focus on five possible solutions, which are represented to varying degrees by different sociological schools:

> "Sociological theory has maintained that (1) rational, purposeful individuals create society through contingent acts of freedom; (2) interpretive individuals create society through contingent acts of freedom; (3) socialized individuals re-create society as a collective force through contingent acts of freedom; (4) socialized individuals reproduce society by translating existing social environment into the microrealm; and (5) rational, purposeful individuals acquiesce to society because they are forced to by external, social control." (Alexander and Giesen, 1987, p. 14)

For Hilbert (1990), by contrast, the micro-macro dichotomy is to be understood not as the opposition of agency and structure but as the separation of two different levels of structure: micro-structure and macro-structure

(both of which he rejects on behalf of ethnomethodology). And for Callon and Latour (1981) the problem of micro and macro concerns neither agency nor structure (a dichotomy they wish to overcome) but the relative power of what they term micro- and macro-actors. However understood, the micro and macro are in the resolutionist emphasis seen as stable and (individually) unproblematic domains. As Hilbert (1990) notes,

> "it is safe to say that [such] theorists ... assume the structural integrity of the domains they seek to link, whether conceived as independent, causally related, mutually interdependent, or merging into each other through interpenetrating, intervening levels."
> (Hilbert, 1990, p. 795)

In this emphasis, the terms "with all their implications are basic to the debate and therefore to be retained" (Jensen, 2007, p. 835).

This retention of terminology is one of the reasons why, according to research in what I call the dissolutionist emphasis in scale-oriented research, the resolutionist emphasis dooms researchers to 'family quarrels' (Woolgar et al., 2009) with no possibility of an end. By contrast, research in the dissolutionist emphasis proceeds with reference to the explicit or implicit goal of overcoming, dismissing, closing down, circumventing, evading—in short, dissolving—the received categories of scalar analysis, in order to revive debate about scale.

There is a certain artificiality to this grouping, in that different modes of and individual works of research displaying this emphasis proceed toward this goal (or even from it, taking it to be a *fait accompli*) for different purposes and in different, sometimes conflicting ways. Despite this, however, I believe the grouping is useful, as instances of research presenting this em-

phasis do exhibit certain commonalities that might be overlooked outside of their being gathered together in opposition to resolutionist research. Most interesting among these commonalities are the strategies employed both in the justification of the project and in its execution. It is worthwhile to attempt to gather together these strategies and assess the degree to which they succeed.

While by no means an exhaustive catalogue of dissolutionist techniques, two strategies are particularly apparent and widespread. The first is the notion that what have been described as different scales are better treated as equivalent due to structural similarities, particularly their essentially relational nature and their endless complexity. This is the strategy of methodological symmetry. The second is the proposal that scale ought to be explored according to an ethnographically actor-centric sensibility in order to understand the ways in which it is practised outside of the debates of professional sociologists. This is what I follow Woolgar et al. (2009) in calling 'scalography'.

6.1.1 Methodological symmetry

A common strategy among research orienting itself against received categories of scalar analysis is the notion of methodological symmetry; that is, the heuristic of approaching identically one's objects of analysis, disregarding differences that appear to be (or are presented in the literature as being) essential properties of those objects. The technique of symmetry has been deployed against a number of essentialised binarisms: the strong pro-

gramme in the sociology of knowledge (Bloor, 1976) for truth and falsity; actor-network theory (Callon and Latour, 1981; Callon, 1986; Law, 1987; Latour, 2005) for humans and non-humans (or 'social' and 'technical'); and reflexivist analysis (Woolgar, 1988*a*; Ashmore, 1989) for analyst and subject. Symmetry even has its own histories (Woolgar, 2004) and critiques (Pels, 1996). In this case, however, it is used to treat identically phenomena of different scales. It is sensible to begin with that research programme which is well-known for its 'generalized symmetry', and which is explicit about proceeding with symmetry towards scale: actor-network theory.

Actor-network theory makes use of the argument that symmetry towards scale is necessary to avoid obscuring scalar dynamics, specifically those concerning power. Rather than power being a property of an actor, in actor-network theory it is an effect of the size and strength of the network an actor draws around itself. According to this view, analytic failure to approach symmetrically actors of different apparent size "has the effect of reifying those who are successful while obscuring the methods by which such large-scale social control is achieved and precariously maintained" (Law, 1986, p. 5). This is not to claim that all actors are identical, but rather to shift the terms of discussion of differences in size to properties of relations rather than actors themselves:

> "*There are* of course macro-actors and micro-actors, but the difference between them is brought about by power relations and the constructions of networks that will *elude analysis* if we presume *a priori* that macro-actors are bigger than or superior to micro-actors."
>
> (Callon and Latour, 1981, p. 280, emphasis in original)

The consideration of networks—indeed, the consideration of actors as net-

works, or as the two as equivalent—is in this view an essential enabler of the analysis of power relations.

It is important to note that actors and networks are not opposed in actor-network theory, but rather seen as representing two sides of the same phenomenon, "like waves and particles" (Latour, 1999, p. 19). The process by which networks come to be seen as a single unit—an actor—is called 'punctualization'. Law (1992) describes the process in this way:

> "All phenomena are the effect or the product of heterogeneous networks. But in practice we do not cope with endless network ramification. Indeed, much of the time we are not even in a position to detect network complexities. So what is happening? The answer is that if a network acts as a single block, then it disappears, to be replaced by the action itself and the seemingly simple author of that action. At the same time, the way in which the effect is generated is also effaced: for the time being it is neither visible, nor relevant. So it is that something much simpler—a working television, a well-managed bank or a healthy body—comes, for a time, to mask the networks that produce it."
>
> (Law, 1992, p. 385)

At first blush, this is an appealing explanation. However, it also raises a number of questions. Firstly, where in this account are we to find audiences and their differing perspectives? For whom is the network in question summarised away or exposed through incident? Naturally, disasters and failures expose the network to all audiences, since they cannot help but be confronted by it. A rider of a bicycle, for example, is during a failure of that machine confronted with the network constituting it; rather than a single unit, a component in the mechanics of daily life, the bicycle is exposed as a collection of parts, one or more of which are failing to function either individually or in concert. These parts, however, or these functional aspects, are

to certain audiences *always* present, not only during periods of failure. To a mechanic or enthusiast, a bicycle is rarely just a unit, but is rather a configuration of components and functions: tyres, tyre pressure, chain slack, gear ratio, pedalling cadence, rider drag and so on. So while it is clear that it is possible to attend to the networks constituting units, it does not seem to be done uniformly by all audiences. Nor, however, do we want to suggest that this is a matter of undirected interpretation. Computer cases, for example, can be seen as an attempt by manufacturers to present a 'preferred reading' (Woolgar, 1991) of the computer as a unit rather than a network of components. To at least some degree the presentation of the computer in this form does succeed in influencing its perception: instead of a tangle of wires and components, the computer becomes, in all senses, a black box. So clearly we ought to ask what is the relationship between audiences and the visibility of underlying networks.

The second question concerning the notion of punctualization relates to the focus on failure. As mentioned above, it is not only during periods of failure that networks become visible; failure is instead, perhaps, simply the time during which the switch from unit to network is made by the most observers, as failure affects all users, not only those who are particularly knowledgeable about the topic at hand. In addition, using terms such as 'failure' as explanatory categories is problematic insofar as those categories are themselves often a contingent achievement: whether something is working is a matter about which there can be a great deal of local and intercontextual disagreement (Mackenzie, 1990). It is therefore necessary to ask in what circumstances punctualization takes place.

Thirdly, punctualization appears to suggest an overly positivistic notion of the network, in contrast with known historical and cultural variations among analytic practices. For example, unhealthy bodies are exposed by medical practitioners today as networks comprising, among other things, organs and genes, but at other times what was found within were humours in need of balancing. Similarly, the heads of persons suffering from what we call mental illness have been in different analytic cultures exposed as comprising the psyche, neurones and demons. It is therefore worthwhile to ask how helpful it is to discuss units as being composed of networks which are occasionally unmasked; instead, we might ask about the practices of dividing up units into explanatory or functional components without ourselves relying on or reifying the components those practices identify. To what extent, in other words, can we analyze analysis without relying on a fixed taxonomy?

The notion of actor-networks in general, and punctualization in particular, provide a useful vocabulary for approaching without bias phenomena of different scales: everything is simply a network, regardless of the scale we are considering, be it organic, institutional or geopolitical. Moreover, while the notion of punctualization is arguably reliant on a restrictive realism, it does provide the suggestive insight that within any unit is a collective that may be analysed in an identical fashion to the collective within which that unit may be found.

This repetition of form and complexity is a common observation. Jensen's (2007) 'fractal sociology', for example, "proposes that all social events are on

the same level, in the sense that each set of events can be described as equally complex regardless of their putative fit into a micropicture or macropicture." (Jensen, 2007, p. 838). For Jensen the fractal metaphor is suggestive of an endless and equivalent complexity at any possible 'level' of analysis. In this regard, and as he notes, he follows Strathern (1991) in her observations about the unchanging "quantity of information" (Strathern, 1991, p. xix) to be found across different possible scales. In fact, far more than Jensen, Strathern ties together the ontological and epistemological aspects of this insight:

> "To suggest that the 'quantity of information' ... remains constant is to suggest that the intensity of perception is a constant. The single person is as complex to analyze as a corporation composed of many." (Strathern, 1991, p. xix)

What is interesting about this is the recognition of the role of an audience or perceiver which was, as we saw, noticeably absent from punctualization.

The introduction of the active perceiver permits discussion of their involvement with the phenomena in question. Rather than say a network is or is not visible without reference to those for whom it would be visible (a curious deletion, to be sure), we can more solidly ground such discussions in terms of the analytical practices of the perceiver. Kwa (2002) provides a useful distinction of such analytical styles, into what he terms the 'romantic' and the 'baroque':

> "The romantics look up ... and recognize collections of individuals as higher-order individuals. This is a process of abstraction, a search for higher-order laws and principles... By contrast, the baroque looks down and, like Leibniz, observes the mundane crawling and swarming of matter: 'Every bit of matter can be

> conceived as a garden full of plants or a pond full of fish. But each branch of the plant, each drop of its bodily fluids, is also such a garden or such a pond'... So it is the direction of looking that matters. Only then does the fundamental difference between the romantic conception of a society as an organism and the baroque conception of an organism as a society appear."
>
> (Kwa, 2002, p. 26)

In Kwa's baroque mode as in the actor-network theory exposure of punctualized networks, units are broken apart to find communities within. By contrast with actor-network theory, however, this process is an analytical one, rather than something happening to the entities themselves. It is, to use Kwa's terms, a "looking"; specifically, a looking downward into the complexities within objects, as opposed to a looking upwards into a system of which the present object forms a part.

We must ask, however, whether it is necessary to treat these analytic modes as being mutually exclusive alternatives to which analysis must ally itself fully. Certainly, Kwa is right to note that some authors are to be understood as being exemplars of one mode or the other, because of the consistency of their entire oeuvre. Yet is analysis not also a practice of our subjects? What might we discover if we allowed ourselves to witness 'looking up' and 'looking down' as analytic strategies and repertoires deployed locally, temporarily, and for particular purposes?

6.1.2 Scalography

It is this sort of question that is at the heart of the second dissolutionist strategy: that of recognizing scale to be a feature of actors' practices and studying

it as such. It is tempting to label the approach ethnographic, although that would be too strongly suggestive of a methodology, rather than a strategy. Instead, I adopt the term 'scalography' (Woolgar et al., 2009), itself an example of the recent trend[2] to decouple the ethnographic sensibility from its method and principal object.

Woolgar et al. (2009) explicitly call for the examination of scale as a phenomenon actively produced in the course of certain activities:

> "how are different scales of analysis and thought achieved? How is the 'macro-scale' produced and sustained? What processes of miniaturization enable the creation of micro-entities? How important are instruments, devices and other technologies in generating and sustaining scalar effects?"
>
> (Woolgar et al., 2009, p. 3)

Specifically, they argue, the ethnographic focus on empirical detail ought to provide a useful corrective to abstract philosophical meditations; what they propose is required of researchers interested in reviving debates about scale is to

> "address the conceptual issues associated with scale in relation to specific empirical cases, deflating the pretensions to grandiose theoretical treatments by instead emphasising the local, specific and contingent." (Woolgar et al., 2009, p. 4)

Devices have long been recognized as being relevant to scale. Actor-network theory famously (or infamously, depending on one's humanist leanings) rejected the asymmetric analysis of humans and non-humans, instead proposing a relational science unconcerned with whether the relations under investigation were between humans (sometimes called 'social') or be-

[2]See for example Mol's (2002) 'praxiography', Dear's (2001) 'epistemography' and Lynch's (2001) 'ethigraphy' and (2008) 'ontography'.

tween devices (sometimes called 'technical').[3] What matters about devices, in actor-network theory, is not that they are non-human but that they are particularly durable: actors' size derives from the strength of their network, and the strength of the network derives from the durability of its associations:

> "what makes the sovereign formidable and the contract solemn are the palace from which he speaks, the well-equipped armies that surround him, the scribes and the recording equipment that serve him" (Callon and Latour, 1981, p. 284)

Durable associations are also, in this account, key to scalar phenomena of a different sort: long-distance control (or, in other words, the 'global'). Durability can derive not only from devices, but the 'immutability' of documents (Latour, 1990) and the effective training of people (Law, 1986), with the mobility of all three allowing control across vast distances.

Devices also, however, play a role in practices that are scalar for the participants themselves (as opposed to for analysts of powerful actors and long-distance control). Yaneva's (2005; 2009) accounts of her ethnographic studies of architecture practices reveal just how crucial devices such as models can be for actors concerned with producing scale for themselves. Scale, unsurprisingly, is something of a central concern of architects. What Yaneva shows, however, is that their approach to scale is not entirely based on attempting to reach precision and verisimilitude. Rather, the architects she studied made use of a set of two models between which they move back and forth as they progress through the project:

> "In a small model "everything should be suggestive rather than resolved", argue architects. If the small model is undefined and

[3] Law's term "heterogeneous engineering" (Law, 1987) is more suggestive of this aspect of the approach.

> abstract, deploying rough figures and approximate relationships, the large-scale model is meticulous and enriched with more data and concrete details... the large scale model is more powerful, not because of an inherent superiority of size, but because it has the ability to capture more parameters and concerns, to sum up more requirements and limitations, to reflect more details, corners and finishing, to enroll more viewers, to enable more bodies to gather around it, to provoke more violent disputes or to trigger more unpredictable actions." (Yaneva, 2009, p. 3)

These two models, each deemed necessary to the task, are updated individually and with reference to each other in a repeated movement back and forth that Yaneva describes as 'scaling up' and 'scaling down':

> "Scaling up scatters the original unity of the small-scale model, while scaling down incorporates a patchwork of the complex scattered details back into that unity" (Yaneva, 2009, p. 4)

The similarities with punctualization and Kwa's baroque and romantic modes are clear. Unlike punctualization, however, the unit and collective are produced alongside one another; it is not the revelation of one as having been hiding within another. And unlike the baroque and romantic modes, these practitioners appear to move back and forth with speed and regularity; neither mode is by itself sufficient for their purposes.

The production of different scales of analysis by practitioners is not something that only emerges in architecture, however. Jurists and patent examiners experience similar scalar troubles as they go about their work. In the next sections I present the story of a recent legal case and its relationship to assessment practices in the patent office. The case in question centres on a legal dispute that opens up a problem for those concerned, which in turn becomes a dispute of a much more fundamental and wide-reaching sort.

6.2 Novelty and enablement in *Synthon v SmithKline Beecham*

The *Synthon* case is analysed in this chapter for two principal reasons. First, it allows the detailed exploration of reasoning in the courts, another site in which novelty is practiced in the patent system. Second, the particularities of the case, and its effect on the patent office, are interested from the point of view of the analytical problem of scale. There is, however, another reason, concerning the next chapter of this thesis. In Chapter 7 I provide a history of changes in legal tests surrounding the novelty criterion over the past 150 years. The *Synthon* case is at the end of this history, as it is the most recent major alteration in UK patent law to the novelty criterion.

As will be seen in Chapter 7, the novelty criterion in UK patent law has, in the past few decades, been elaborated in terms of what has been called the principle of enablement. In order for a patent to be granted, the invention must be deemed new. Any earlier document which leads to the judgment that the invention is *not* new is said to 'anticipate' the invention. Until the late 1980s, what was deemed necessary for a document to anticipate a patent was that it constituted a 'disclosure': essentially, that it described precisely the same invention. Through a number of cases,[4] however, it came to be that what was required was, specifically, an *enabling* disclosure; that is, a disclosure that not only describes the features of the invention but instructs the reader in how to create it or put it into practice. However, it was never

[4]Primarily, *Genentech [Human Growth Hormone] Patent* [1989] RPC 613 and *Asahi Kasei Kogyo KK's Application* [1991] RPC 485

precisely specified exactly what would constitute enablement. This was the context in which the *Synthon* case took place.

In June 1997 Synthon BV, a Dutch pharmaceutical company, applied for a patent for a particular group of chemicals, sulfonic acid salts of paroxetine, which included paroxetine methane sulfonate (also known as paroxetine mesylate and PMS). Such chemicals are valuable for their use in antidepressants. In October 1998 SmithKline Beecham plc, a British pharmaceutical company, made an application for a particular crystal form of paroxetine mesylate that it believed differed from the forms described in Synthon's application. In 2001 Synthon began legal proceedings to have SmithKline Beecham's patent revoked on the grounds that it was not, in the light of its own patent, new. This legal process would last four years and incorporate disputes in and decisions by three courts, eventually leading to a new ruling by the House of Lords about what is meant by 'new'.

The first case was seen by Justice Jacob in the Patent Court.[5] It transpired in the course of the case that in Synthon's application there were mistakes in the instructions for how to go about creating the compounds of which they claimed ownership. Jacob decided, however, that these mistakes were not so critical as to preclude a 'skilled man'[6] from proceeding using necessary alterations. In other words, it was decided that, even though there were mistakes, Synthon's text did provide 'enablement'. As Justice Jacob put it:

> 'Synthon got there first. All that can be said for SB [SmithKline Beecham] is that their disclosure is to a readier way of making

[5] *Synthon BV v SmithKline Beecham plc* [2002] EWHC 2573 (Pat)

[6] A term of art in patent law, a legal construct used to aid discussions of what might be considered reasonable in certain circumstances such as this.

the crystals, but Synthon's is clear enough."[7] '

Justice Jacob ruled (in December 2002), therefore, that Synthon's patent did indeed anticipate SmithKline Beecham's, denying the latter of the novelty required to be a valid patent. SmithKline Beecham's patent would, on Jacob's orders, be revoked.

SmithKline Beecham then took the case to the Court of Appeal,[8] which, in a judgment given by Lord Justice Aldous, reversed Jacob's decision. The reasoning was that, since there were mistakes in Synthon's application about how to derive the compound, it could not be seen to be anticipating SmithKline Beecham's application. In Aldous' words:

> 'There are no clear and unmistakeable directions to make PMS as claimed in claim 1 of the patent ... The general teaching of the application does not mention PMS. It is one of a number of compounds described by reference to formulae. The only specific reference is in example 1. That describes a different form. It follows that the skilled person would not expect to produce the PMS claimed in claim 1 by carrying out the general teaching of the application... Further the teaching is not such that skilled persons would at once perceive, understand and be able practically to apply the invention claimed in claim 1 of the patent without the necessity of doing further experiments... The general statements in the application relied on did not disclose any particular method of production of any particular product. To suggest that they did when the specific method did not work is, I believe, fanciful."[9] '

For Aldous, therefore, Synthon's application simply did not provide the information required for a reader to understand how to manufacture the compound. In response to the argument (of Synthon and of Justice Jacob) that the skilled person would be able to correct such mistakes, Aldous wrote:

[7] *Synthon BV v SmithKline Beecham plc* [2002] EWHC 2573 (Pat) [96]
[8] *Synthon BV v SmithKline Beecham plc* [2003] EWCA Civ 861
[9] *Synthon BV v SmithKline Beecham plc* [2003] EWCA Civ 861 [50]-[51]

> 'Once it had been established that example 1 did not disclose a successful route to PMS as claimed in the patent, the skilled addressee might have adopted obvious modifications. But such an approach is not permissible when considering novelty."[10] '

The word 'obvious' requires an explanation. According to the legislation, for a patent to be granted it must be (among other things) new and inventive. That it must be new is the novelty criterion we are discussing; that it must be inventive is a separate criterion, effectively demanding that the invention not be 'obvious' in the light of other known inventions (inventiveness is, for this reason, also referred to as 'non-obviousness'). This obviousness is judged in terms of what the 'skilled person'—conceived of in the context of the given invention—would, given his knowledge of the subject, find obvious. The reason Aldous mentions it is that, while it is possible to revoke patents on the grounds that they are obvious in the light of others, this is not what Synthon was attempting to do. Because of a technicality to do with the dates of application (SmithKline Beecham's application was made before Synthon's was published), only novelty was available to Synthon as an avenue for having SmithKline Beecham's patent revoked. Given that the case in question is about novelty, and not about obviousness, Aldous is arguing, it is inappropriate to consider 'obvious modifications'. Justice Jacob was therefore, Aldous argues, in error when he used such considerations to decide that Synthon's patent anticipated SmithKline Beecham's. And given this judicial error, as well as its material counterpart that Synthon's patent did not anticipate SmithKline Beecham's, the Court of Appeal ruled (in June 2003) that Jacob's decision to revoke SmithKline Beecham's patent should be

[10] *Synthon BV v SmithKline Beecham plc* [2003] EWCA Civ 861 [56]

overturned.

Synthon did not accept this decision, and in January 2004 the House of Lords Appeals Committee gave permission to Synthon to appeal this decision to the House of Lords. In July 2005 the case was heard, and in October 2005 the House of Lords presented its decision,[11] contained predominantly in the Opinion of Lord Hoffman. Lord Hoffman argued that Aldous had been wrong to overturn Jacob's decision, and that the decision to do so was based on faulty reasoning by Aldous about the twin criteria of novelty (disclosure and enablement):

> '[W]ith great respect to Aldous LJ, who is an acknowledged master of patent law, the questions of disclosure and enablement are so intermingled [in his judgment] that it is often difficult to say which of them he is talking about."[12] '

The most egregious error, in Lord Hoffman's view, concerned paragraph 56, which I quoted above. That paragraph contains Aldous' claim that talk of obvious modifications is not permissible, because the dispute is about novelty. Lord Hoffman writes,

> 'This passage again suggests to me a serious confusion between disclosure and enablement. The evidence [about the possibility of the skilled person being able to derive the compound from the flawed instructions] was relied upon solely for the purpose of proving enablement. But the reference at the end to 'obvious modifications' being impermissible is a reference to the requirement that the prior art must have planted the flag[13] on the patented invention, which is a principle of disclosure. On that question [this] evidence ... could have nothing to contribute."[14] '

[11] *Synthon BV v SmithKline Beecham plc* [2005] UKHL 59

[12] *Synthon BV v SmithKline Beecham plc* [2005] UKHL 59 [39]

[13] "Planting the flag" is a reference to a frequently-cited test for disclosure, originating in *The General Tire & Rubber Company v The Firestone Tyre and Rubber Company Limited and Others* [1972] RPC 457

[14] *Synthon BV v SmithKline Beecham plc* [2005] UKHL 59 [54]

In other words, Lord Hoffman argues that Aldous has confused disclosure and enablement, to the effect of ruling incorrectly. He takes the opportunity of this apparent confusion to specify precise, separate meanings of disclosure and enablement, and to insist that the concepts must be kept distinct.

Firstly, Lord Hoffman outlined various historical judgments concerning disclosure[15] before providing his own test: for disclosure to occur, "the matter relied upon as prior art must disclose subject matter which, if performed, would necessarily result in an infringement of the patent."[16]. Secondly, he writes that enablement "means that the ordinary skilled person would have been able to perform the invention which satisfies the requirement of disclosure."[17]. He notes that in *Asahi* (where the necessity of enablement was effectively decided in the first place), the "degree of knowledge, skill and perseverance the skilled man was assumed to have"[18] were not determined. Instead, Lord Hoffman draws on another case, concerned with a different aspect of patent law, for a description of the skilled person (or 'hypothetical addressee', as it is called here):

> 'The hypothetical addressee is not a person of exceptional skill and knowledge, that he is not to be expected to exercise any invention nor any prolonged research, inquiry or experiment. He must, however, be prepared to display a reasonable degree of skill and common knowledge of the art in making trials and to correct obvious errors in the specification if a means of correcting them can readily be found."[19] '

[15] See Chapter 7 for an account of the gradual shift of these tests over time.
[16] *Synthon BV v SmithKline Beecham plc* [2005] UKHL 59 [22]
[17] *Synthon BV v SmithKline Beecham plc* [2005] UKHL 59 [26]
[18] *Synthon BV v SmithKline Beecham plc* [2005] UKHL 59 [27]
[19] *Valensi v British Radio Corp* [1973] RPC 337 CA [33]

Finally, Lord Hoffmann wrote some guidelines for avoiding confusion when discussing disclosure and enablement (terms he described variously as 'concepts' and 'requirements'). It is worthwhile to quote his reasoning at length:

> '[I]n deciding whether there has been anticipation, there is a serious risk of confusion if the two requirements are not kept distinct. For example, I have explained that for the purpose of disclosure, the prior art must disclose an invention which, if performed, would necessarily infringe the patent. It is not enough to say that, given the prior art, the person skilled in the art would without undue burden be able to come up with an invention which infringed the patent. But once the very subject matter of the invention has been disclosed by the prior art and the question is whether it was enabled, the person skilled in the art is assumed to be willing to make trial and error experiments to get it to work. If, therefore, one asks whether some degree of experimentation is to be assumed, it is very important to know whether one is talking about disclosure or about enablement."[20] '

This reasoning is at the heart of Lord Hoffman's criticism of Aldous. Aldous considered 'obvious modifications' to be impermissible when discussing novelty, but he was unclear as to whether he was discussing disclosure or enablement. Lord Hoffman concludes[21] that Aldous' reasoning does not succeed: if it was disclosure he was discussing, then he was simply wrong (the compound was disclosed), and if it was enablement, then he did not offer sufficient evidence to overturn Jacob's decision that the skilled man would be able to manufacture this compound even with the flawed instructions. Specifically, Lord Hoffman notes that Jacob,

> 'found that the skilled man would have tried some other solvent from the range mentioned in the application or forming part of

[20] *Synthon BV v SmithKline Beecham plc* [2005] UKHL 59 [30]
[21] *Synthon BV v SmithKline Beecham plc* [2005] UKHL 59 [55]

> his common general knowledge and would have been able to make PMS crystals within a reasonable time", and warns that "[t]his is a finding of fact by a very experienced judge with which an appellate court should be reluctant to interfere"[22] '

In either case, Lord Hoffman argues, Aldous was incorrect to reverse Jacob's decision, and so the House of Lords ruled to overturn Aldous' decision, thereby reinstating Jacob's. On 20 October 2005, seven years after their application was made, SmithKline Beecham's patent was revoked.

6.3 Enablement from courtroom to patent office

It has been suggested by legal commentators that Lord Hoffman's articulation of a test for enablement, distinct from that for disclosure, is an important event in patent law (Freeland, 2006). Yet it must not be taken for granted that this change in how novelty is to be understood is effected uniformly throughout the patent system. In this section I discuss the effect of this judgment on the practices of patent assessment in the patent office. During my time at the IPO, I was frequently told by examiners that the best way for me to understand what they did would be by reading the manual; while it certainly was instructive to read this document, it was particularly interesting to discover the aspects of work described differently by examiners and their manual. 'Novelty' was just such a point of disagreement.

As described in Chapter 5, patent examiners are provided with—and frequently defer explanations of their work to—the Manual of Patent Practice (Intellectual Property Office, 2010*a*). The Manual is a compilation of leg-

[22] *Synthon BV v SmithKline Beecham plc* [2005] UKHL 59 [38]

islation, rulings, guidelines and tests that an examiner may refer to as an authoritative resource on how to go about doing the work of assessment. As one might expect in a formal document such as this, the notion of novelty it presents is very similar to the one found in the legal judgments; indeed, it is by design a summary of the accounts of novelty presented there. A brief extract will illustrate this similarity, particularly as regards the *Synthon* case:

> **Section 2: Novelty**
>
> *An invention shall be taken to be new if it does not form part of the state of the art*.[23]
>
> **2.02** An invention defined in a claim lacks novelty if the specified combination of features has already been anticipated in a previous disclosure. In *SmithKline Beecham Plc's (Paroxetine Methanesulfonate) Patent* [2006] RPC 10,[24] the House of Lords held there were two requirements for anticipation: prior disclosure (see 2.03 to 2.09) and enablement (see 2.10). These are distinct concepts, each of which has to be satisfied and each of which has its own rules.
>
> **Prior Disclosure**
>
> **2.03** Prior disclosure is the first requirement to be satisfied for matter to anticipate an invention. To constitute a prior disclosure of a patent, the matter relied upon as prior art must disclose subject matter which, if performed, would necessarily result in infringement of the patent...
>
> **Enablement**
>
> **2.10** Enablement is the second requirement for anticipation as held by *SmithKline Beecham Plc's (Paroxetine Methanesulfonate) Patent* [2006] RPC 10. The ordinary skilled person must be able to perform the invention which satisfies the requirement of disclosure...
>
> (Intellectual Property Office, 2010*a*)

Clearly, the description of novelty in this document is very similar to that found in the law. In certain places it is more than similar: it uses the precise wording found in the House of Lords' judgment. It also explicitly references

[23] As mentioned in Chapter 5, this is the definition of 'new' that is found in the legislation.

[24] This refers to the case we have been following. The citation is different because it refers to a different publication, but the publication is of the same case.

the case itself, although only as a warrant for the inclusion of the enablement requirement, and not as a source of the disclosure and enablement tests which are direct quotes of the words of Lord Hoffman.

Taking the manual as an accurate account of the work of the examiners—as it was suggested by examiners that I do—would lead to a very positive impression of the faithfulness of assessment practices to the latest legal decisions. My interviews with examiners, however, suggest that the manual may not be as accurate an account of their work as the examiners themselves suggest.

I asked all of the examiners I spoke to to explain to me in detail the intricacies of their assessment work, and particularly the assessment of novelty. One examiner, when explaining how one goes about assessing novelty, did mention the enablement criterion. He described it to me this way:

> "In order to make a citation [of a document that anticipates the patent application at hand] there's got to be an enabler. It's got to be a disclosure that would enable someone to go off and do it basically. You can't just cite Star Trek if someone invents a teleporter. If however you had an invention in a comic book where the skilled addressee could look at it and actually go away and make it from what was shown in the comic, then you could cite that comic. Just showing a flying car wouldn't be enough to knock out the patent for a fully functional flying car."
>
> - John (examiner)

I was encouraged to be given this account of enablement. I had gone to the patent office partly to explore the relationship between novelty there and in the law, and since I already knew about the disclosure and enablement requirements from my reading of the law, I expected to have these terms explained to me in detail by the examiners who had to make use of them daily.

The clear relationship I expected, however, was not what I found. Jacob was the only examiner who, in discussing novelty, mentioned the concept of enablement. Far more common was the response that novelty was a trivial matter:

> "Obviously to decide if something is new is a lot easier than to decide if something is inventive... So whatever is defined in that claim, for example a plectrum with three sides and made out of this material, if you can't find any documents which disclose all of those features, then it's new... [I]t's straightforward. It's either new or it's not." - Lisa (examiner)

> Carl: "The first thing you do is, when you do the search you'll see if you can find it."
> Interviewer: "That's for novelty?"
> Carl: "Yes."
> Interviewer: "So how do you know when you've found it? How close does it have to be?"
> Carl: "For a novelty it has to read on."
> Interviewer: "Read on? What does that mean?"
> Carl: "That the claim describes the other article. So if someone had invented this and I found that, does the claim that describes this describe that? If it does, then this reads on to the claim and the claim isn't new."
> Interviewer: "Is it usually straightforward"
> Carl: "Yes. If they're not straightforward it's not a novelty."
> - Carl (examiner)

A number of things are interesting about these responses. Firstly, enablement is not mentioned at all; novelty is taken to be about disclosure only. Secondly, the matter of assessing for novelty is described as straightforward. Thirdly, and perhaps most interestingly, the phrase "if they're not straightforward it's not a novelty" suggests that, rather than it just happening to be the case that assessing novelty is straightforward, it is in fact a necessary condition of a novelty citation that it be straightforward. Potential objections that an examiner might make to a patent application, if they are

not straightforward, cannot concern novelty. This is in contrast with other criteria examiners must assess, such as inventive step:

> "Whereas novelty, it's clear cut—you know, the thing has these features or it doesn't—with inventive step, it's sort of a codified way of allowing you to say it's obvious. Because at some point [inventive step] comes down to a judgment call, but there is a sort of formalized process that guides the examiner through it."
>
> - Carl (examiner)

The formalized process to which Carl refers guides the examiner through the mental construction of the 'skilled person' for the technical area of the invention in question, so that the examiner might determine whether for that skilled person the invention in question is just an obvious modification of inventions that are already known, rendering it unpatentable. What is particularly striking about this account is that this process—of conceptualizing the skilled person—is used not just to describe the assessment of inventive step but to contrast the assessment of that criteria and the assessment of novelty. Novelty in this account simply does not concern what the skilled person is capable of doing. This is interesting not only because of how clearly it conflicts with the instructions of the Manual of Patent Practice, which is itself largely a reproduction of legal opinion on the matter, but also because of how closely it follows the reasoning of Lord Justice Aldous, for whom (as we saw earlier), consideration of the skilled addressee and their potential obvious modifications "is not permissible when considering novelty" (Synthon 2003, para. 56). These examiners and Aldous share their style of reasoning about novelty: that it is to be clearly demarcated from obviousness and that this demarcation is done using the notion of the skilled person.

It should be noted that not all examiners found novelty a trivial matter,

but the difficulties mentioned with assessing it were, with the exception of the one examiner we already discussed, of other kinds than those concerning enablement or the skilled person. These difficulties concerned matters such as ambiguity or the inability to find evidence one knows exists:

> Interviewer: "Is novelty fairly obvious?"
> Bert: "It can be. It depends on how technical your heading is. You can get into minutia just arguing what the definition of a slot is. You know, a slot could be rectangular or is it a V-shape, and one [patent attorney] might say no, that's a groove and that's a slot."
>
> - Bert (examiner)

> Carl: "Where it can get difficult is where you have to interpret the scope of a word. Let's say you had a beach bag with a removable mat to lie on. So you take it to a beach and it's stored in a compartment inside the beach bag. You then get to the beach and you then remove it from the compartment. Does that mean removable or does that mean detachable?"
> Interviewer: "Is that an important difference?"
> Carl: "It can be. Because if you find something that has a beach bag that has a mat that folds out and stays attached to it, the mat is removed from the inside of the bag, but it isn't detached. And the applicant and the agent may have meant detached, but they haven't actually specifically said detached. And then when you get to the exam stage, that's when you start arguing."
>
> - Carl (examiner)

> Lisa: "Obviously you need to find the evidence [for a novelty citation]. Which sometimes is tricky because you feel like you've seen something before."
> Interviewer: "Right, somewhere in your database of millions of documents."
> Lisa: "That's right, yes. Or sometimes the really frustrating thing is, sometimes I work on display technologies, and somebody [applied for] one and I was sure I'd seen it in a film somewhere. It was something to do with the way the screen moved and it disappeared behind something else, and I'm thinking gosh, but I couldn't for the life of me think where I'd seen it.

> That was very frustrating because obviously you need to find the evidence, you can't say I'm sure I've seen it before."
>
> - Lisa (examiner)

What is to be made of the differences between novelty in the courts and in the patent office? And how are we to make sense of the dispute in the courts? The following two sections address these questions. I explore firstly the influence of Lord Hoffman and his words, and secondly the different strategies employed by actors in the dispute.

6.4 The scaling-up of Leonard Hoffman

If we follow Callon and Latour (1981) in referring to the 'sizes' of actors as a description of their power, influence or reach, it is straightforward to view Lord Hoffman—whose judgment in *Synthon* articulated the separation of the disclosure and enablement subcriteria of novelty—as a relatively large actor. His words not only decide the fate of that particular legal case, but put in place tests for disclosure and enablement—as well as the exhortation that they be considered separately—that become legal entities in their own right, to be drawn on and referred to by later legal actors as authoritative judgments on what counts as satisfying those particular conditions. Freeland, for example, predicts that the test Lord Hoffman provides for disclosure, in particular, is one "to which the courts may well refer for decades to come" (Freeland, 2006, p. 165).

As we saw, however, there are limits to his influence. In the patent office, enablement does not appear to feature as prominently as it does in the

courts. Rather, novelty is for the most part treated as a trivial matter, and opposed to inventiveness, which is presented as requiring more subtlety in assessment. So Lord Hoffman is not quite as influential an actor as we might suppose were we simply to presume that the patent office straightforwardly alters its practices with respect to the decisions of the courts. And yet, as we saw, there is a sense in which the office does this quite diligently, by frequently updating with the latest legal decisions the Manual of Practice it publishes for its examiners.

We can, as actor-network theory proposes, make sense of Lord Hoffman's moderate influence in terms of the durability of his associations. As the mapping of networks of associations is in principle endless (a frequent criticism of actor-network theory), I will discuss just three aspects of these associations: legal hierarchy, documents and the adequacy of the patent assessment practices.

Firstly, as a Law Lord—the most senior level of judge in the UK at the time—Lord Hoffman has the authority to overrule the judgments made in lower courts. It is, in other words, the institutional convention of this legal system that the judgments of judges in higher courts are taken to matter more than, and where contradictory to overrule, those in lower courts. This strict ordering of importance, weightiness or validity of judgments is a convention Lord Hoffman's association with which renders his own words particularly important.

There is, however, something not quite correct about saying that Lord Hoffman is so associated. Were he to retire, were he to give judgments on

matters unrelated to points of law, or were he even merely to opine on a case over which he was not presiding, his words would not function in the same way, nor would they have the same authority. It is not Lord Hoffman *qua* Leonard Hoffman who gains influence from the legal hierarchy; rather, it is the position of Law Lord which only at certain times, in certain settings and for certain matters he embodies. This is, of course, the rational-legal type of authority discussed by Weber (1964). The point is worth making, however, since it is possible when using actor-network imagery to overlook those relations of authority that transcend the actors temporarily occupying them. Specifically, it would not provide the full picture to say that Lord Hoffman is influential because of his associations; in addition the point must be made that it is the position of Law Lord that is influential, and that it is from his temporary and context-relative occupation of that office that Lord Hoffman derives what influence he has. It is not enough, in other words, to say that influence is associational, as Callon and Latour suggest; rather it is also at least to some degree positional.

Secondly, documents are central to the propagation of this decision by the House of Lords. It has been suggested (Latour, 1990; Law, 1986) that documents are particularly interesting technologies insofar as their portability and durability make possible the transference of knowledge and instructions across vast distances and long periods of time without succumbing as memories do to the frailties of the human mind and body. Today, of course, our documentary culture is as much rooted in electrons as it is in paper; with this change the portability and durability of documents increases, and reproduction is a great deal easier. Regardless of the physical manifesta-

tion of the documents, however, the procedures of regularized propagation, collation and re-presentation of documents and their information are part of the environment of associations within which the judges in the House of Lords and the examiners in the Intellectual Property Office operate. To begin with, judgments are put in document form rather than merely spoken to a courtroom and lost beyond that moment. Moreover, the document produced is not a summary of what was said but the full text, so that interested parties may inspect it for whatever purposes. Such purposes within the courts include, as we saw, later judges citing certain passages to add weight to their own arguments; outside the courts it enables, for example, officers at the patent office to gather together decisions and expositions into documents structured around topics conceivably of interest to examiners. In this way examiners wanting to know more about a particular topic—perhaps because their current case presents a certain complexity—can find in their manual a section for that topic containing the latest legal judgments on the matter, transported from the courtroom to the examiner's office, and preserved across years, through the use of documents and institutional documentary routines. In this way Lord Hoffman is durably associated with a great number of other actors.

Finally, as mentioned earlier, Lord Hoffman's influence beyond this point begins to fade. His words are diligently gathered into the correct parts of the Manual of Patent Practice, and the manual is available to every examiner in the patent office (in electronic form, apparently due to the frequency of revisions). As we saw, however, examiners' presentations of novelty differ a great deal from Lord Hoffman's. In particular, only one examiner mentioned

the concepts of enablement and the skilled person; the others presented novelty as a trivial matter. Is this lack of consistency between the courts and the patent office a failure of examiner training, a failure adequately to 'drill' the persons to follow prescribed routines, as in the durable-associational practices of the military (Law, 1986)? To answer this, it is necessary first to return to the story of *Synthon v SmithKline Beecham*, to explore in more depth one particular aspect of the disagreement between the judges.

6.5 Looking up and looking down from novelty

There are, I argue, two opposing ways to make sense of the events of the *Synthon* case. The first way to understand these events is as a conflict between Synthon and SmithKline Beecham, arbitrated by judges of increasing seniority and expertise, concerning a point of law over which confusion was possible (and, with Aldous, actually taking place). Novelty was understood in terms of anticipation, which was understood in terms of enabling disclosures. The terms 'enablement' and 'disclosure', however, were not adequately separated, resulting in confusion by various parties, until Lord Hoffman provided explicit instructions on how to keep them separate, including precise and separate tests for each. The story, then, is of a concept made more precise and more practicable. In the same House of Lords judgment, Lord Walker writes:

> 'In the interpretation and application of patent statutes judge-made doctrine has over the years done much to clarify the abstract generalities of the statutes and to secure uniformity in their

application."[25]

The events of the case, in this interpretation, were "a useful clarification of the law" (Freeland, 2006, p. 165). The problem with this account is that it takes rather a lot on faith. It assumes that, because a senior judge said a more junior judge was confused in his interpretation of the law, then it is the senior judge who was correct. It also does not treat critically the senior judge's claim that the resulting terminology is an improvement on what came before.

The second way to read these events addresses these concerns. In this reading, the events of *Synthon* are to be understood as a conflict between different styles of reasoning adopted by the various parties and judges. In this reading, Aldous is not so much mistaken in his remarks as he is orienting to a different way of going about assuring the consistency of patent law. Aldous' concern is not with the precise specification of disclosure and enablement; it is with the overlap between the separate statutory criteria of novelty and inventiveness that occurs when one introduces to the assessment of the former a conceptual tool (the skilled man capable of using his own knowledge to make simple modifications) properly belonging to the latter. Novelty and inventiveness must remain separate, Aldous argues, and the development of the concept of enablement within novelty leads not to a more precise conceptualisation of novelty but to a blurring of its separation from inventiveness. In this reading of the story, then, the conflict is between different approaches to ensuring the consistency of the law. For Lord Hoffman, this is to be done by progressing ever deeper into subcategorisations, by being ever more pre-

[25] *Synthon BV v SmithKline Beecham plc* [2005] UKHL 59 [57]

cise about concepts that have been introduced to make sense of novelty. For Aldous, this is to be done by considering other matters—specifically, the matter of inventiveness—and by guarding the boundary between these notions. The conclusion of this reading of the story is more ambiguous than was that of the first reading. It is unclear whether novelty has been made more precise or less, whether it has been replaced with clearer subcriteria or with a tangle of words that collide terribly with other criteria. In any case, the final act in this story is not the heroic arrival at truth and the overcoming of error, but the practical resolution of what is the case by legal-hierarchical fiat.

We can add to this second reading the accounts of the examiners, who for the most part agree with Aldous in their view that novelty is something simpler than inventiveness and that the skilled person is a concept concerning inventiveness only.

What we have, then, is a fundamental disagreement about what novelty is (and is not) among actors for whom the notion is one of their central concerns. This disagreement is over the correct direction to look: does one look 'down', within novelty, to more fundamental, constituent concepts and to their soundness and consistency, or does one look 'up', above or outside of novelty, to its conceptual neighbours and to the preservation of their boundaries? In fact, both may be seen as boundary work (Gieryn, 1983)—for Lord Hoffman and Jacob, between disclosure and enablement, and for Aldous and the examiners, between novelty and inventiveness—but at different levels, one above the other. Moreover, it is not merely a choice of which bound-

ary is at stake, but rather which is the more important to preserve: for Lord Hoffman, the precise specification of disclosure and enablement is necessary to ensure a consistent adjudication of novelty; for Aldous, the statutory separation of novelty and inventiveness outweighs obeisance to the existing legal delimitations of disclosure and enablement. The disagreement, therefore, is to do with which scale of analysis is to be prioritised.

6.6 Conclusions

These two analyses—of the size of the actor Lord Hoffman, and of the alternative directions of 'looking' at the heart of the disagreements—are instances of some of the different approaches to scale discussed earlier: the concern with actors' sizes being rooted in our analytic preoccupation with power and influence, and the actors' prioritizing of different scales of analysis being more of a scalographic—or actor-centric—approach. Both appear to be important in creating a full picture of the events: denying the actor-centric approach might have led us to conclude that the examiners were simply poorly-trained, when by exploring the actors' conceptions of the scales at work we can see that there is an entrenched alternative—of novelty and inventiveness being the important separation—that resists simple erasure by legal decree. Rather than say that either is the better or more important way of approaching scale, therefore, I suggest that they each have a useful role, and that the combination can be illuminating.

That we might produce better analyses is one outcome from the juxta-

position of analytic and scalographic approaches; another is that our own analytic practices can be compared with those of the actors we study. We can, in particular, ask to what extent our own problems with scale are different from those encountered by our subjects. Our problem, as framed earlier, concerned the disjuncture between different scales or levels of analysis (often just the two levels, 'micro' and 'macro'); their problem concerns an incompatibility between different levels. Our problem has been approached by various solutions that I termed resolutions and dissolutions, the former being attempts to bridge, link or synthesize the disconnected levels and the latter being attempts to shed or replace those levels or otherwise disturb the stability and independence we grant them; whatever success these solutions have had has been quite local, such is the diversity of work adopting these different approaches. Their problem has been provided two solutions that appear to work well in their respective arenas: in the courts the 'lower' level is prioritized, with this solution being ensured by fiat; in the patent office the 'higher' level is prioritized, with this solution being largely unmolested by the legal solution. For both us and them the problems settle into local solutions.

How similar is our scalar reasoning to that of our subjects? The preliminary dichotomy in our approaches to scale presented earlier—resolution and dissolution—does not appear entirely suitable for describing the alternatives the patent system presents. Specifically, while actors there disagree over the correct level at which to protect the coherence of novelty as a practicable category, neither side can be said to be proposing the unraveling or dissolution of any of the concepts—novelty, inventiveness, disclosure or enablement—

that are in tension. No-one is, like the methodological symmetrists, proposing an alternative vocabulary to enable a flattening redescription, nor is there the proposal for an actor-centric analysis (presumably, this would be anathema to members of a system concerning itself with the objective adjudication of competing property rights). So the dissolutionist emphasis appears unrepresented in this debate; the disagreement is not between resolution and dissolution, but between varieties of resolution, over the right level at which to ensure the resolution of competing concepts.

Kwa's phrases—'looking up' and 'looking down'—appear more likely to succeed at this task. We have already seen how the disagreement in the patent system can be seen to be based on whether actors aim to protect novelty in an upward-looking (i.e. relative to its boundary with inventiveness) or a downward-looking (i.e. concerning its constituent concepts, disclosure and enablement) direction. Our modes of analysis, too, can be seen in these terms. The desire for the resolution of the problem of scale could be 'looking up' in the sense of systematizing and regularizing, while dissolutionist approaches could be 'looking down' in the sense of seeking to destabilize the received categories and find complexities within. It is, of course, in the 'looking up' mode that this comparison is made: the mode of generalising and abstracting and finding 'the bigger picture'. This mode has behind it something of an imperative in academia, an 'ethics of scale' (Woolgar, forthcoming), that to a degree ensures its appearance in conclusions.

Perhaps one way to move forward with our scalar problem, then, is to treat it like just another practical one: what else is theory, after all, other than

another form of practice? If there is anything to be learned from the patent system, in that case, it is that a universally practised solution to the problem of scale might be too much to hope for, even with the use of fiat which, mercifully, is not available to academics. Perhaps all that is to be done is to adopt local solutions according to the needs of our particular local purposes, and not spend too much time on such old quarrels; not, in any case, when there are plenty of new quarrels to be had.

As regards novelty, I have argued that it is implicated in scalar dilemmas: the practical accomplishment of novelty, therefore, is in part the product of a contest over different scales of analysis. Given the strictly hierarchical nature of this legal system, the contest is resolved through fiat. Valuations were made about which scale to prioritise, however, and as the next chapter will show, disagreements about what is important when doing legal articulations are not easily put to rest.

CHAPTER 7

Deferral, Inconcludability and the Jurist's Regress: the novelty controversy in UK patent law

In the previous chapter I showed how a legal attempt to pin down precisely what is meant by 'novelty', and its related or subsidiary terms, led to analytical conflicts that could have become a protracted dilemma or controversy were it not for the apparent finality of legal-hierarchical fiat. The *Synthon* case of that chapter, however, concluded less than a decade ago: a short time in legal history, and certainly not enough time to declare anything settled. In Chapter 2 a question arose as to whether the legal project of attempting to express what is meant by 'novelty' in relation to patents could ever hope to be complete. If the legal articulation of novelty continues to change, what are the occurrences that give rise to such changes, and what are the features of the situation that preclude a stable articulation? In this final empirical chapter I address these questions by exploring the changes in the legal articulation of novelty that have featured in a controversy, almost 150 years in

length, over the correct way of understanding, and testing for, novelty. As well as providing context to the *Synthon* dispute in the last chapter and the state of affairs of the present, this chapter provides an account of the contingency of the historical development of legal theorizing about novelty and of the practical difficulties experienced by legal actors in their attempts to define novelty, distinct from the difficulties of any particular case.

The chapter is structured as follows. The first section explores research that has engaged with similar questions of potentially unresolvable analytical situations, to see whether they can usefully be brought to bear on the history of the legal articulation of novelty. Three related theoretical notions are identified: first, the 'Experimenter's Regress', as set out by Harry Collins (1985; 1994; 2002); second, the ethnomethodological problem of inconcludability as identified by Garfinkel (1967) and Woolgar (1988*c*); third, the strategic use of ambiguity and deferral as explored by Rappert (2001) and Lee (1999). The second section sets out the history of a 150-year-old controversy over the test for novelty in the United Kingdom patent system, detailing the opposing 'right to work' and 'enablement' principles for articulating novelty that competed for dominance until the recent triumph of 'enablement'. In the third section, I return to the notions of regress, inconcludability and deferral to determine the extent to which they can aid our understanding of this longstanding legal controversy, at the very heart of what, for the purposes of actors in the patent system, constitutes novelty. I conclude with the argument that the task of devising a legal articulation for novelty can be seen to be an instance of the analytical problems of regress and inconcludability, and that recent changes in that legal articulation suc-

ceed in reducing the effect of these problems by making use of strategic ambiguity and deferral.

7.1 Regress, inconcludability and deferral

The 'Experimenter's Regress' is a notion introduced by Harry Collins (1985) to describe a certain kind of problem experienced by scientists in certain scientific scenarios. The scientists in question were physicists attempting to detect a postulated scientific entity, the gravitational wave. According to the theory that postulated these entities, the gravitational waves would not be detectable without the use of scientific instruments. In other words—and critically, for Collins' theory—the existence of gravitational waves could never be determined through the witnessing of any unimpeachable, unmediated occurrence, but rather would always depend on the suitability and accuracy of the detecting instruments.[1] Moreover, such was the hypothesized elusiveness of these postulated entities that the required detecting instruments would themselves be of such sophistication as to be without obvious means of certifiable calibration; that is to say, it could never be known whether the detectors were working properly. This is the heart of the experimenter's regress: that in such a situation one could prove neither the existence of the entity nor the reliability of the detectors, without relying on

[1]Obviously, the degree to which *any* occurrence is held to be unimpeachable and unmediated depends on one's philosophical position, but for the purpose of Collins' argument the contrast can be made with any phenomena—the falling of objects towards the ground, for example—which does not require the use of equipment to be witnessed, or any phenomena—the splitting of cells, for example—whose witnessing requires the use only of equipment—such as basic microscopes—whose reliability is by the relevant parties agreed to be beyond reproach.

the other already being proven. As Collins puts it:

> "What the correct outcome [of a test] is depends upon whether there are gravity waves hitting the Earth in detectable fluxes. To find this out we must build a good gravity wave detector and have a look. But we won't know if we have built a good detector until we have tried it and obtained the correct outcome! But we don't know what the correct outcome is until . . . and so on *ad infinitum*." (Collins, 1985, p. 84)

Collins observed that the regress does not paralyse the scientists in their attempt to reach an answer regarding the existence of gravitational waves. Rather, other methods of reasoning are used to break the circle. Indeed, such are the prevalence and mundaneity of these methods that it is not clear that the experimenters experience their regress as a problem:

> "Experimenters [in these situations] can never be sure that their results, or others' results, are correct; therefore they need something in addition to experiments to settle scientific controversies . . . The something *can* include a range of things from high theoretical argument to low dirty tricks; this is a similar range of things to those involves in settling controversies in fields other than science. Not every controversy will involve recourse to all of these things." (Collins, 1994, p. 502)

This ability among scientists to circumvent the regress has led some commentators to argue that it is not, in fact, a real problem. For example, Franklin (1994) argues that Collins' account of the gravitational radiation experiments is flawed, and that a correct account removes all evidence of an experimenter's regress. Specifically, he argues that the scientific community proceeded 'reasonably':

> "Contrary to Collins, I believe that the scientific community made a reasoned judgment and rejected [the results of the experimenter in question] and accepted those of his critics. Although no formal rules were applied, i.e. if you make four errors, rather than

> three, your results lack credibility; or if there are five, but not six, conflicting results, your work is still credible; the procedure was reasonable." (Franklin, 1994, p. 484)

The problem with this line of critique is that Collins' original argument says nothing about scientists not acting 'reasonably'; it says, rather, that the outcome of the gravitational wave controversy could have been different as the experiments themselves could not determine their own correctness. Collins' reply to Franklin makes clear the logical gap between reasonableness and inevitability:

> "It is quite reasonable that [the sets of experiments, mistakes, and other technical elements which contributed to the demise of belief in high fluxes of gravity waves] were made to add up the way they did, and it would have been quite reasonable had they been made to add up another way. Franklin seems to think that reasonableness can only lead to a single conclusion. This view is staggeringly at variance with the most casual observation of the way human life works. Reasonable people are always disagreeing; the most highly trained, highly intelligent experts, of the highest integrity, are always disagreeing with one another." (Collins, 1994, p. 502)

Culp (1994; 1995), on the other hand, argues that the experimenter's regress is not a real problem because scientists have standards of 'robustness'—where a robust body of data is "a body of data produced by a number of different techniques" (Culp, 1995, p. 441)—which allow the breaking of the regress. The problem with this proposal is that it also relies upon judgments as to the degree to which a given property—such as 'robustness'—can be said to be held by a given body of data; if we are trying to escape a circle to do with judgments, this begs the question. It simply transforms the regress about the accuracy or reliability of tests into one about robustness of data,

and it is not clear that this property is any less socially negotiated than reliability or accuracy:

> "general principles like robustness are too vague to warrant anything whatsoever, because when described in sufficient detail it emerges that the way such principles are instantiated is in flux—and the devil is in the details." (Rasmussen, 2001, p. 643)

Certainly, robustness could be invoked in reasonable closures to controversies, but this becomes an example of the way the experimenter's regress is avoided through alternative methods of reasoning, rather than a breakage of the experimenter's regress itself. Robustness, in this case, becomes the "something in addition to experiments" (Collins, 1994, p. 502), serving as a proxy for the accuracy of the tests. Indeed, one finds in Collins' account that another such proxy is already in use: namely, the credibility of scientists. Scientists are able to break the regress by beginning with prior judgments about experimenters' abilities and processes:

> "I am not really impressed with [X's] experimental capabilities so I would question anything he has done more than I would question other people's."
>
> "I think the group at . . . W . . . are just out of their minds."
>
> "If you do as Y has done and you just give your figures to some . . . girls and ask them to work that out, well, you don't know anything. You don't know whether those girls were talking to their boyfriends at the time." (Collins, 1985)

Yet credibility, like robustness, suffers from the general problem with proxies: that of their being no less negotiated than what they represent, always subject to debate about their own accuracy and reliability. Moreover, their negotiated character allows us to see that these two lines of criticism of the experimenter's regress are more related than they seemed at first, since

the reasonableness of scientists' activities is negotiated together with the indicators and character of such reasonableness, as Rasmussen argues:

> "Arguments, such as that offered by Allan Franklin, to the effect that science cannot be socially constructed because there are "no episodes in the history of science in which scientific decisions have gone against the weight of evidence", lack force when it is realized that the standards by which evidence is weighed are open to negotiation and dispute. Scientific decisions are by definition always in agreement with the scientific evidence, since decisions are reached when scientists agree on what evidence counts and how it should be weighed."
>
> (Rasmussen, 1993, p. 264)

Both the reasonableness of scientists and the suitability of scientific standards are left intact by the experimenter's regress, yet since both reasonable scientists and suitable standards nevertheless can conflict, neither can determine a way out of a controversy; rather, the end of the controversy determines, post hoc, which was the correct form of reasonableness, and which the correct standard. This having been done, the controversy appears to have been ended by their correctness, the decision is scientific, and the regress appears never to have existed.

Since Collins first presented the experimenter's regress, there have been a number of attempts to find the phenomenon in other scientific areas: Collins and Pinch (2005) find the regress occurring in tests in the 1970s over whether vitamin C cures cancer; and in the work of biologists attempting to determine whether or not there is such a thing as the postulated 'mesomeme', Rasmussen finds a "logical circularity entailed in the evaluation of experiments according to their results" (Rasmussen, 1993, p. 256). There have also been attempts to show that the regress is not limited to the experimen-

tal sciences. Kennefick argues that the same phenomenon can be seen in the work of theoretical physicists: when the mathematics is sufficiently complex, the problem appears again, since the proposed proof of an unknown result (analogous to the test for an unverified entity in experimental science) cannot be verified without reference to whether it produces the correct answer. Kennefick terms this the 'theoretician's regress': "the dilemma theorists face when the best or only check of a calculation is its own disputed result" (Kennefick, 2000, p. 25).

Here we begin to see that the interesting features of Collins' regress are not features of experimentation at all, but are somewhat more general. Indeed, the pattern can be found in areas outside the areas of theoretical and experimental progress, if one looks to instances of scientific expertise. Collins and Evans (2002) argue for an 'expert's regress' on the basis of the difficulty of knowing in advance who is truly an expert on events. Similarly, Brewer (1998) identifies a clear regress in the problem of choosing experts for scientific legal testimony:

> "The basic problem of competition is how a nonexpert can rationally decide which of the competing experts (whose competition is intra-disciplinary or extra-disciplinary, actual or implied) to believe when the nonexpert is not competent to assess the substantive merits of the experts' competing arguments. When experts testify to contrary or contradictory propositions, the nonexpert must decide whom to believe on the scientific issue. But, ex hypothesi, the nonexpert does not have sufficient competence in the expert discipline to be able to make the choice on substantive grounds, so on what basis can the nonexpert make that choice?"
>
> (Brewer, 1998, p. 1625)

As Brewer notes, one can make use of credentials as proxies for expertise: the expert's qualifications, the standing of their institution, and so on. How-

ever, this merely shifts the problem to one of how one identifies the right credentials; presumably, Brewer argues, one would look to a 'meta-expert', an expert on expertise, but then the problem again becomes one of how one chooses between competing (meta-)experts. As before, the proxy only helps if one ignores the problems with the proxy.

While the apparent extensibility of the regress appears to suggest that it is a useful idea, it can also be seen as resulting from the power of its intellectual forebears. Godin and Gingras (2002), for example, argue that the experimenter's regress is merely one consequence of well-known arguments from philosophical skepticism. As they note, an extremely clear parallel with Collins' arguments can be found in the works of the sixteenth century skeptic Montaigne:

> "To judge the appearances that we receive from objects, we would need a judicatory instrument; to verify this instrument, we need a demonstration; to verify this demonstration, an instrument: there we are in a circle." (Montaigne, 1938, Vol. II, p. 322)

However, the idea of such a circle is older still, and can be traced back at least as far as the third century Greek philosopher Sextus Empiricus:

> "In order for the dispute that has arisen about standards to be decided, one must possess an agreed standard through which we can judge it; and in order to possess an agreed standard, the dispute about standards must already have been decided."
> (Sextus Empiricus, 1933, Vol. II, p. 20)

Godin and Gingras use this parallel to argue that the way to 'solve' the experimenter's regress is to adopt the solutions proposed to the problem of philosophical skepticism by the 'mitigated skeptics' such as Mersenne and Gassendi. Their solution was to abandon the notion that knowledge claims

must have absolute foundations.[2] This, indeed, is not radically different from Collins' own descriptions of how experimental regresses are avoided: that scientists do without the requirement of deductive proof either of the correctness of their equipment or the existence of their objects, and instead proceed using other methods of reasoning. Going further, Collins argues that while the experimenter's regress and philosophical skepticism are structurally similar, the former is not so much an example of the latter as a demonstration of the latter's appearance in a form of reasoning—Baconian induction, or scientific method—thought to be outside its reach:

> "[E]xperimental replication is the experimental equivalent of inductive inference; we can see, then, that [the experimenter's regress] is not [Sextus Empiricus' skepticism], but a way of showing how to apply [this skepticism] to science in the face of the widespread belief that science has resolved it." (Collins, 2002, p. 155)

It is in one of Woolgar's 'methodological horrors' (Woolgar, 1988*c*) that we find an even more alarming generalisation of Collins' regress: namely, the 'horror' of inconcludability. Inconcludability, it is argued, is a feature of all attempts to pin down or determine conclusively the objects of representations, since any such attempt will inevitably require the use of other representations, and so the problem is not escaped:

> "The task of exhaustively and precisely defining the underlying pattern (meaning) of any one representation is in principle endless. In other words, it is always possible to ask for further clarification, elaboration, elucidation and the like. Attempts to meet

[2]This solution is similar to those relied upon by other authors who have encountered such a skeptical circle. Sugden (2005), in attempting to assess the existence of 'abstract objects', found that the endeavour relied upon an answer to the question of what was to count as such a thing, which in turn relied upon exemplars, thus begging the question. The solution adopted in that case was the pragmatic 'reflective equilibrium' of John Rawls (Rawls, 1971). In the case of Pirsig's (1974) fictionalized analysis of 'Quality', a similar skeptical circle was escaped from through the rejection of what he presented as constraining analytical processes.

> this request are ultimately doomed to failure in the sense that they inevitably involve the use of other representations (in the form of words, signs, gestures, graphs, and so on) as part of the clarification process and these documents can themselves be subject to the same kinds of request for yet further elucidation. It is impossible to provide an exhaustive account of (say) the meaning of a representation since all accounts comprise meanings which remain unexplicated; the very nature of the task of exhaustive explication thus multiplies the features of the task."
>
> (Woolgar, 1988*c*, p. 32)

It is important to note that the representation–object relationship is not limited to words and meanings, terms and referents, signifiers and signifieds; rather, the very same process of relational doubt can be applied to any document–entity relationship, where the document is anything that is used to stand in for, pin down or reveal the object: test apparatus, for example. It is not hard to see, therefore, that the experimenter's regress is a special case of inconcludability. With inconcludability, the problem is that anything used to pin down an indeterminate entity or meaning is itself potentially subject to demands for further elucidation; that is, the relationship between the two is subject to doubt. With the experimenter's regress, the first question concerns the existence of the entity or phenomenon—gravity waves, for instance—and the document used to answer that question—the detector, in this case—is itself subject to doubt concerning its accuracy. And all possible attempts to establish the accuracy of the detector through other documents such as robustness and the credibility of the experimenter's team—the 'proxies' I referred to earlier—are themselves subject to further demands for elucidation, subject to further doubt. The experimenter's regress is, in this sense, another example of inconcludability. The difference, however, concerns one particular such document of the detector's accuracy: the gravity

waves themselves. To rely on this document is, however, to beg the question, since it was their existence we were questioning in the first place. So the situation which Collins suggests can be understood in terms of the experimenter's regress is not really any different from any other inconcludability problem, except insofar as it has been framed in terms of the observation that the original object could act as a document for a document of the original object. What Collins highlights is that, given the inconcludability of the situation, the only way conclusively to overcome doubt concerning the object is by establishing that the accuracy of the detector is already beyond doubt, and vice versa; and, moreover, that the impossibility of this task ensures the practical necessity of invoking other methods of reasoning to end the controversy. In other words, an experimenter's regress is a documentary chain that, due to its clear circularity, is particularly unsuitable for establishing certainty in a context of particularly noticeable uncertainty and general inconcludability.

The 'horror' of inconcludability that Woolgar raises can be traced back to the ethnomethodological studies of Garfinkel. In one exercise, Garfinkel asked students to transcribe a conversation, and alongside each spoken line to write what the speaking parties understood they were talking about. So, for example, this utterance was accompanied by the attempted eludication following:

> "Dana succeeded in putting a penny in a parking meter today without being picked up."
>
> "This afternoon as I was bringing Dana, our four-year-old son, home from the nursery school, he succeeded in reaching high enough to put a penny in a parking meter when we parked in

> a meter zone, whereas before he had always had to be picked up to reach that high." (Garfinkel, 1967, p. 25)

The difficulty for the students came as Garfinkel, highlighting possible ambiguities or uncertainties, demanded of the students progressively more accuracy and clarity in their accompanying accounts, since this reduced the degree to which they could rely on certain matters not to be in need of explanation, thereby increasing the work of the exercise. As Garfinkel observed, this was not simply a case of a large workload which students did not have sufficient time or motivation to complete; rather, the work of completing the task simply increased the amount of work to be done:

> "*[I]f*, for whatever a student wrote, I was able to persuade him that it was not yet accurate, distinct, or clear enough, and *if* he remained willing to repair the ambiguity, then he returned to the task with the complaint that the writing itself developed the conversation as a branching texture of relevant matters. The very *way* of accomplishing the task multiplied its features."
> (Garfinkel, 1967, p. 26)

The task, of course, was an artificial one, since in general people are not required to explain all aspects of their language, and can rely on shared understandings or at least a willingness by others to give the benefit of the doubt so as to keep the peace (we saw in the discussion of other Garfinkelian experiments in Chapter 5 just what strength of feeling one can expect to occur when one refuses simply to go along with a conversation as one generally does). Yet the artificial task exposes as a latent feature of social life the impossibility *in principle* of providing self-contained, unquestionable accounts, since a sufficiently capable and motivated interlocutor will always be able to find a point of ambiguity. The students' task could never be completed

because Garfinkel "had required them to take on the impossible task of "repairing" the essential incompleteness of *any* set of instructions [for how to understand something] no matter how carefully or elaborately written they might be." (Garfinkel, 1967, p. 29-30).

I described inconcludability as a latent feature of social life. This raises a question: exactly for whom is all this a horror? If in most situations the potential problem of inconcludability does not appear, then presumably it is not a horror for the practitioners themselves. For Lynch, "[Woolgar's] policy of unrestricted skepticism licenses the sociological "observer" to impute methodological horrors to practices that would otherwise appear unperturbed" (Lynch, 1993, p. 194). And yet it must also be noted that in certain situations, such as with Garfinkel's demands for further elaboration by his students, it can be a problem for practitioners themselves. For Woolgar, inconcludability is the problem that exhaustive accounts are, *in principle*, endless. In practice, exhaustiveness may not be required, and there may not be an actor arguing that it has not been provided.

There is a similar analyst-practitioner awkwardness in the experimenter's regress. The regress is, arguably, something of a horror in the sense that for those seeking to provide solid logical foundations to the reasoning of a group acting within certain kinds of situations, it appears that the task is impossible. Yet if it is such a horror then it is a modest one, because, firstly, it claims only that the scientist's task cannot be solved through logical deduction alone, not that it cannot be solved reasonably, and secondly, the problem it identifies is not necessarily experienced as a problem, due to

the various methods practitioners use to sidestep it. And yet these sidestepping methods—these proxies—are no safer from the skeptical circle than are the primary phenomena; this property of the regress is what is most troubling to the analyst, if not to the practitioner, since it is not the case that one finds "scientists endlessly laboring to evade or circumvent the problems that a skeptical philosopher could raise" (Lynch, 1993, p. 194).

There is a debate to be had over whether it is accurate—or, since that is a problematic term, acceptable—to describe a state of affairs as a problem or horror if it is not viewed or experienced as such by participants. Clearly the answer to that question will depend on one's analytical sensibilities. I believe it is not unreasonable to claim that it is acceptable for analysts to describe aspects of practice that practitioners do not recognise. Yet, it also appears to be the case that using terms such as 'problem' or 'horror' to furnish our analytical vocabulary is rendered problematic by the ambiguity over for whom matters are problematic or horrifying. With that in mind, I argue that it is useful to keep the notions of regress and inconcludability in hand to describe situations or states of affairs—without in addition subscribing to the view that they are problems or horrors—simply because they succinctly describe features of situations in which, for whatever reason, conclusion—or conclusion that meets some chosen standards of reasoning—cannot occur.

Yet this way of approaching the phenomena is perhaps rather unbalanced. I have asked what are the features of situations in which regress or inconcludability occur, yet I have not asked what features prevent or end them, or indeed prevent them from being seen to be problems by the prac-

titioners themselves. As already discussed, one reason for this is the willingness of actors generally not to continue with their demands for clarity and precision. As Chia writes, in general "what we experience is a continuing process of referral which ends when we collectively agree not to ask for more clarification and to stabilize and establish a mean for the meaning of a term" (Chia, 1996, p, 73). Blum, similarly, argues that what prevents understanding between theorists with different sensibilities is that "they differentially decide where to stop doubting" (Blum, 1974, p. 301), suggesting, as Chia does, that concludable situations will feature collective agreement not to continue doubting.

Simply ending processes of doubt is not the only way in which situations are interpretatively concludable. The second way is for the doubt to continue, but for it to take place outside of the situation; that is, for it to be deferred. The wrangling over the meanings of terms is simply made to happen somewhere else at some other time. Lee (1999), for example, argues that the ambiguity over the meaning of childhood that arises in policymaking is dealt with through the deferral of the resolution of ambiguity to the local enforcement of the policy:

> "Article 12 [of the United Nations Convention on the Rights of the Child] manages to appear clear and legitimate because it shifts the burden of the ambiguity that it produces onto future instances of decision-making. Rather than resolving debate about and abolishing the ambiguity of childhood, then, Article 12 'manages' ambiguity by deferral and by distribution." (Lee, 1999, p. 458)

Deferral can be seen here to be strategy for managing the inconcludability of policy negotiation. Similarly, Rappert (2001) observes, in conflicts over the meaning of 'non-lethal' weapons, "[w]hat force is acceptable, what jus-

tifications are made for it, and by whom, depends on the distribution of ambiguities." (Rappert, 2001, p. 582).

If general agreement to discontinue processes of doubt is what ensures situations of inconcludability do not generally occur, then strategies of deferral and distribution are a way in which local concludability can occur when there is no such general agreement. We might expect, therefore, to observe deferral and distribution in those situations where actors have a greater motivation to continue doubting than to reach agreement or, as is the case in everyday sociality, simply to get along.

In the following sections, I turn to the legal history of patentability in the United Kingdom, and set out the features of a controversy, 150 years in the making, over the test for novelty of inventions, and the two opposing principles of a fair patent law. Firstly, I set out the so-called 'right to work' principle, according to which no patent must be awarded which prevents people from doing what they were doing already. Secondly, I discuss the emergence and eventual triumph of the 'enablement' principle which, as noted briefly in Chapter 6, requires that novelty can only be deprived of an invention by earlier material which actually instructs the reader in how to put it into practice. Thirdly, I assess the degree to which the conflict between these principles can be understood as deriving from the ambiguity of the idea of what is 'available to the public'. Finally, I return to the themes developed in this discussion to determine the extent to which this controversy, and the many changes to the legal articulation of novelty, can be illuminated by the themes of regress, inconcludability and deferral.

7.2 The right to work principle

In the 1930s, some cigarette-making machines began to experience a quality problem. The way these machines worked was this: tobacco was dropped onto a moving band to produce a continuous rod of tobacco; also travelling on the band was a continuous strip of paper which would become the outer covering of the cigarette; the continuous flow of tobacco and paper was severed and closed periodically, producing cigarettes of uniform length. This "continuous rod" technique enabled machines to produce cigarettes at great speeds. At a certain speed (over 1000 per minute), however, the operators of the machines noticed a deterioration in the quality of the cigarettes being produced, due to a lack of uniformity in the way tobacco was ending up inside them. This was believed to be happening because the tobacco being dropped onto the band was bouncing or slipping, due to it falling onto something moving horizontally.

The Molins Machine Company developed a solution to this problem, which was to cause the tobacco to be moving in the same direction as the band when it was dropped onto it. This invention was duly patented (Molins, 1928), and a diagram of the device from the patent can be seen in Figure 7.1. The mechanism worked by having tobacco fall through a sequence of rollers (items 1-7 in the diagram), before falling down diagonal vanes (item 11 in the diagram), which give the tobacco a lateral movement in the same direction as the travel of the web of paper onto which the tobacco falls (item 12).

In 1936, the Molins Machine Company began litigating the Industrial Machine Company over what they argued was the infringement of this patent.

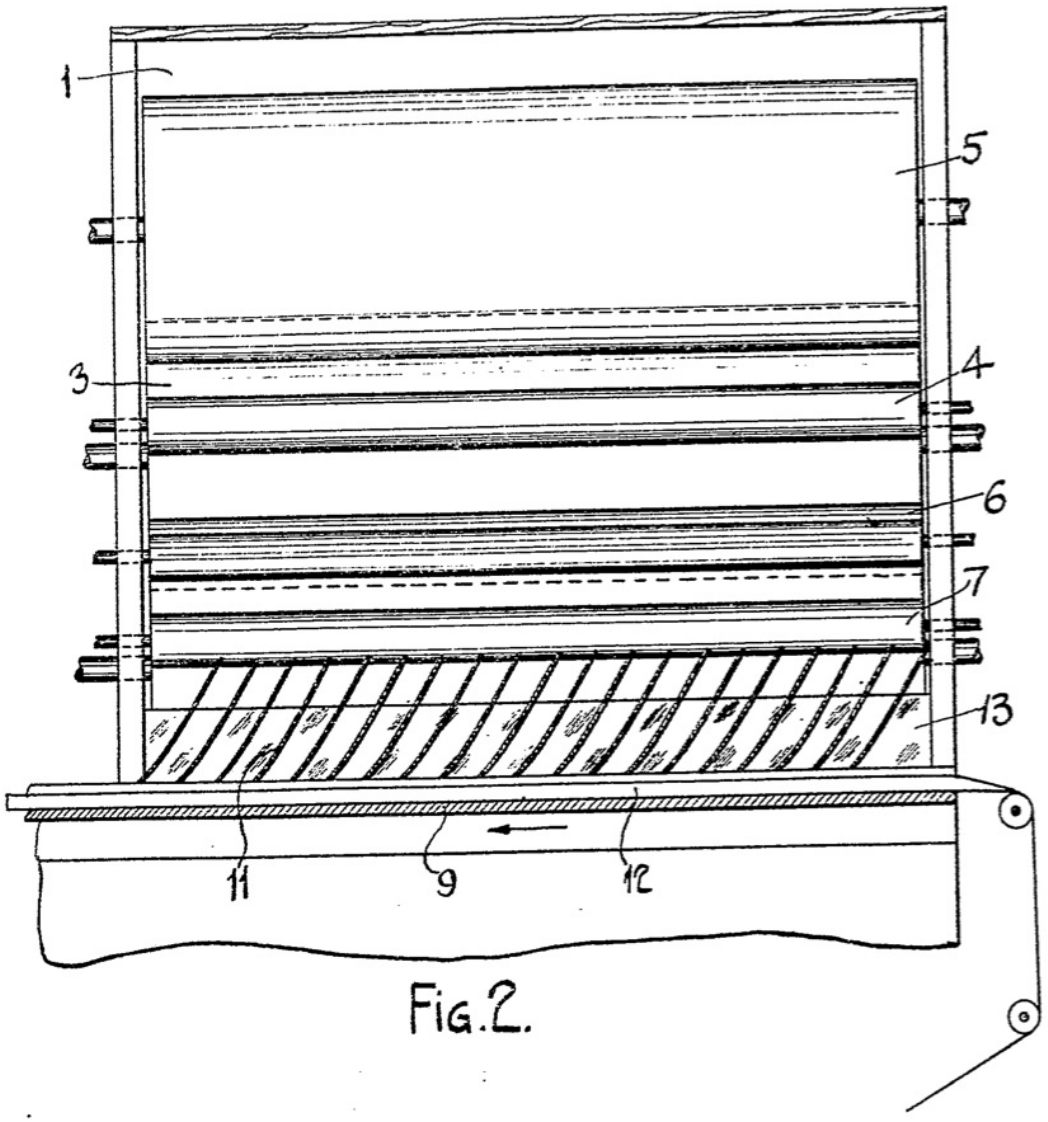


Figure 7.1: The Molins cigarette-making machine

During the course of this litigation, however, it was discovered that a German patent (Bonsack, 1880) contained in its specification a drawing of a mechanism which would have exactly the same effect as the Molins invention (the judgment does not make clear which of the diagrams in Bonsack's patent is the relevant one, but the diagram of the entire machine is presented in Figure 7.2). If the Molins patent was found to be invalid in the light of this earlier patent, it would be revoked and the issue of infringement by the In-

dustrial Machine Company would disappear. The infringement case, therefore, turned on just this question of validity; namely, whether Molins' patent could be said still to be have been 'new' in the light of Bonsack's patent, or whether the latter anticipated the former. The point of difficulty for the legal professionals involved was that the Bonsack patent did not explain the purpose of the mechanism, and that even though it would have the effect of ensuring the quality of the cigarettes at greater speeds of production, the Bonsack machine itself could only function at approximately one sixth of the speed of the Molins machine. In *Molins and Molins Machine Co Ltd v Industrial Machine Co Ltd*[3] it was ruled that this did not matter. Farwell J determined that the only reason to have such a device would be to ensure quality, and so Bonsack must have faced the same problem as Molins. This, according to Farwell J, meant that the Bonsack patent anticipated Molins':

> "I come to the conclusion that it is not correct to say that the problem of Bonsack and the problem of the patentee [Molins] were so different that there can be no anticipation. In my judgment the problem is the same, although in a different degree, and the solution of that problem, or one method of removing the difficulty, is shown in the Bonsack specification."[4]

Molins' patent was held to be anticipated, which is to say not new, and so it was therefore invalid. The appeal court came to the same conclusion[5], although for different reasons. For Lord Greene MR, the purpose of the Bonsack device was immaterial; what mattered was simply that it was there, and that it had the same effect as Molins' invention:

> "Bonsack's instruction is to make a machine of a particular kind ... The inclination which he gives to his trough is a physical fact

[3] [1936] 3 All ER 709
[4] *Molins and Molins Machine Co Ltd v Industrial Machinery Co Ltd* [1936] 3 All ER 709 [716]
[5] *Molins v Industrial Machinery Co Ltd* [1937] 4 All ER 295

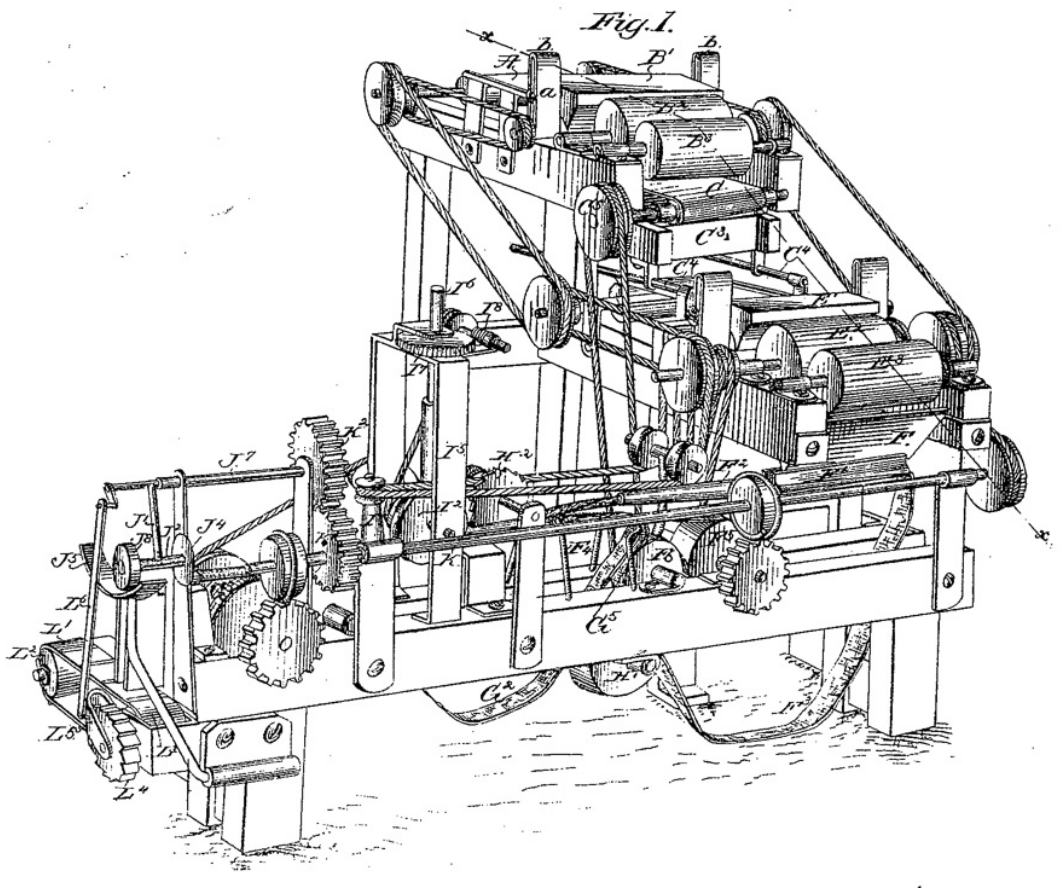


Figure 7.2: The Bonsack cigarette-making machine

> necessarily present in each machine made in accordance with his specification and is as much a part of the true nature of that machine as any other element in it."[6]

As Colston notes (Colston, 1999, p. 90), the *Molins* case came at a period in UK patent history when the overriding principle was the so-called "right to work". This was the idea that the state should never grant a monopoly—a patent—that would prevent someone from doing something they were already doing. In other words, if someone invents a cigarette-making machine that contains a device for moving tobacco horizontally as it drops onto the paper, and you were already using such a device, it does not matter

[6] *Molins v Industrial Machinery Co Ltd* [1937] 4 All ER 295 [300]

why you were doing it: no-one else should be able to patent it, because that would prevent you from doing something you were already doing. This is in keeping with what is often referred to as the 'patent bargain': the notion that a temporary monopoly should be granted as a reward for contributing something new to society. A well-known statement of this "right to work" principle comes from the US patents judge, Judge Giles Rich:

> "[W]e see that the good monopoly or patent is one which serves to give the public, through its incentive, something which it has not had before and would not be likely to get without the incentive-at least not so soon as with it. The bad monopoly is one which takes from the public that which it already has or could readily have without the added incentive of the patent right."
>
> (Rich, 1978, p. 288)

He was by no means the first to elaborate this principle, however, as can be seen from the writings of the legal historian George Ticknor Curtis, who argued that when an invention is already in the prior art,

> "the public have acquired nothing from the specification of the patentee which they did not possess before, and…the patentee has invented nothing, which he, as one of the public, could not have derived from the means of knowledge which the public before possessed. Hence it is, that the production of a prior description, which was in the possession of the public, negatives the title of the patentee as the first inventor." (Curtis, 1873)

The observation is no less ancient in the UK patent system, and the principle can be found articulated by judges at least as far back as 1843: "We think the public cannot be precluded from the right of using such information as they were already possessed of at the time the patent was granted."[7]. The *Molins* case demonstrates the strength of this principle at this period in history, since

[7] *Stead v Williams* [1843] 2 WPC 126 [142]

it leads to the judgment that it is immaterial even for what purpose a certain device is being used. In other words, the courts ruled that even if Bonsack's earlier machines suffered no quality problems, and Bonsack's device was not intended as a remedy to quality problems, it simply did not matter; all that mattered was that such a device already existed, and Molins therefore ought never to have been granted a monopoly for it.

7.3 The enablement requirement

In the final few decades of the twentieth century, patent law in the United Kingdom began to be pervaded by a new understanding of what should be required for something to anticipate a later invention, and thereby to deprive it of the novelty it requires to be patented. This change was to come about largely as a result of the judgments of Judge Falconer who, in a number of Patent Court cases, argued for the necessity of the principle of 'enabling disclosure', the most recent major legal dispute over which was the *Synthon v SmithKline BV* case we explored in Chapter 6. While today the principle of enabling disclosure is a fixture of UK patent law, it was by no means an inevitable outcome, particularly given the alternative principles it displaced. In this section we will explore the origins of this principle, the controversy surroundings its contradiction of the longstanding principle of the right to work, and the resulting change in what it means for an invention to be new.

In the early 1980s, the American biotechnology corporation Genentech was awarded a patent for an invention relating to the genetic engineering of

human protein from bacteria (Goeddel and Heyneker, 1983). The American pharmaceutical corporation Eli Lilly sought to have this patent revoked, and the case went before the UK Patents Court in 1988-9.[8] Eli Lilly's lawyers argued that Genentech should not have received the patent, since it was anticipated by various earlier documents, including an earlier Genentech patent application (Itakura and Riggs, 1979) and a European patent awarded to Stanford University (Nunber et al., 1980). What emerged in the case was a disagreement between the parties over what was to count as anticipating material; specifically, was it enough that the invention in Genentech's patent was also described in the earlier documents, or was it also necessary that the earlier documents provide sufficient information so as to allow the reader to actually recreate the described invention? In other words, as Falconer J put it, was it a necessary part of a document disclosing a later invention that it be an *enabling* disclosure? In the end, Falconer J ruled that the earlier documents did indeed anticipate Genentech's patent. In so doing, he also made the more general ruling that enablement was a necessary part of disclosure.

This was the first time that the requirement of enabling disclosure had been made explicitly in the UK. Whether it had been expressed before, implicitly, is up for debate. Falconer J himself, in his judgment, argued that the principle has a very long history in UK patent law, and can be found in the case of *Hill v Evans*[9] in the judgment of Lord Westbury LC:

> "... the antecedent statement must be such that a person of ordinary knowledge of the subject would at once perceive and understand *and be able practically to apply* the discovery without the necessity of making further experiments ... the information ... given

[8] *Genentech [Human Growth Hormone] Patent* [1989] RPC 613
[9] [1862] 31 LJCh 457

> by the prior publication must, *for the purposes of practical utility*, be equal to that given by the subsequent patent."[10] (emphases added)

By contrast, some contemporary commentators argued that this was a misreading of Westbury's reasoning, which was intended only to apply to patents concerning industrial processes (Hill's patent concerned the purification of coal gas) rather than inventions in general (White, 1990). Falconer J once again argued that his enablement requirement was based on historical judgments, however, when in his judgment in *Quantel v Spaceward*[11] he found authorization in the widely-used test for novelty expressed in the judgment of *General Tire*[12]. In that case, Lord Justice Sachs had written the following about what would count as anticipation:

> "...To anticipate the patentee's claim the prior publication must contain clear and unmistakeable directions to do what the patentee claims to have invented ...A signpost, however clear, upon the road to the patentee's invention will not suffice. The prior inventor must be clearly shown to have planted his flag at the precise destination before the patentee." [13]

Falconer used the authority of this language in his judgment in *Quantel v Spaceward*, arguing that the "clear and unmistakeable directions" demanded by Lord Justice Sachs "must amount to an enabling disclosure".[14] Again, however, White argued that such an interpretation was extremely problematic, noting that Lord Justice Sachs' language in *General Tire* was only part of an elaboration of anticipation in which the requirement of clear instructions

[10] *Hill v Evans* [1862] 31 LJCh 457 [463]
[11] [1990] RPC 83
[12] *The General Tire & Rubber Company v The Firestone Tyre and Rubber Company Limited and Others* [1972] RPC 457
[13] *The General Tire & Rubber Company v The Firestone Tyre and Rubber Company Limited and Others* [1972] RPC 457 [485]
[14] *Quantel v Spaceward* [1990] RPC 83 [112]

(enablement, as Falconer would have it) was only an alternative to the requirement of a clear description (disclosure), with the alternative wordings being readable as allowing for both product or device inventions, which one would describe in form, and process inventions, for which one would provide instructions:

> "If the prior inventor's publication contains a clear description of, or clear instructions to do or make, something that would infringe the patentee's claim if carried out after the grant of the patentee's patent, the patentee's claim will have been shown to lack the necessary novelty, that is to say, it will have been anticipated."[15]

The question whether Falconer's principle of enabling disclosure was rooted in past judgments is clearly an issue that is up for debate. For Falconer, the principle was not a new demand but rather an old one that had simply been lost, and had not been expressed explicitly enough. For White, the principle was based on misreadings of past texts, and was moreover a 'distinctly worrying' development that would introduce the ambiguities of the 'man skilled in the art'—the hypothetical person who is or is not enabled by a particular disclosure—to the judgment of novelty (White, 1990, p. 6). In this at least, White was correct: as we saw in Chapter 7, the 'man skilled in the art' was indeed introduced as a means of articulating what was meant by 'enablement', and there was disagreement over the wisdom of this. But long before this, the principle of enabling disclosure—still capable of being overturned by judges more senior than Falconer—was to experience its first test in the UK's most senior lawmaking body, the House of Lords.

[15] *The General Tire & Rubber Company v The Firestone Tyre and Rubber Company Limited and Others* [1972] RPC 457 at 484

7.4 The ambiguity of availability

In 1985, the Japanese firm Asahi Kasei Kogyo (AKK) applied for a UK patent for a genetically engineered polypeptide that could be used to treat tumours in humans (Bruce and Hirataka, 1985). The examiner refused to grant the patent on the grounds that it was not new in the light of an existing pending European application for the Dainippon Pharmaceutical Company (Masaaki et al., 1985). AKK argued, adopting the increasingly prevalent language of the period, that enablement was a requirement for an anticipating disclosure, and that while Dainippon's application did disclose the information in AKK's application, the disclosure was not an enabling one. The examiner disagreed on both counts, and the case went to the patent court. The court agreed with the examiner that enablement was not a requirement, and the appeals court agreed also. By the time AKK's case was heard by the House of Lords,[16] however, Falconer's pro-enablement judgments had been made in the lower courts, to the effect of influencing the House of Lords to rule in favour of AKK. Lord Oliver, following Falconer's reasoning in *Genentech Inc's (Human Growth Hormone) Patent*[17] and *Quantel (Bedford) Ltd v Spaceward Microsystems Ltd*[18], agreed that enablement must be required of an earlier document in order to deprive a later invention of novelty:

> "I do not see how an invention can be said to have been made available to the public merely by a published statement of its existence, unless the method of working is so self-evident as to require no explanation."[19]

[16] *Asahi Kasei Kogyo KK's Application* [1991] RPC 485
[17] [1989] RPC 613
[18] [1990] RPC 83
[19] *Asahi Kasei Kogyo KK's Application* [1991] RPC 485 [539]

This case is interesting for two reasons. First, as a House of Lords ruling it strengthened the principle of enabling disclosure in UK patent law. Secondly, as can be seen in the quote from Lord Oliver's judgment, it explicitly tied together that principle with the demand, written in the legislation, that for something to be new it must not previously have been "made available to the public" (Intellectual Property Office, 2010*b*, Part I, Section 2(2)). The disagreement over enablement exposes an ambiguity in this requirement: namely, is something available to the public if they are aware of it, or must they understand how to put it into practice?

This and other dilemmas of the enablement requirement were tackled in the House of Lords a few years later. In 1972 Merrell Dow had been granted a patent for a non-drowsy anti-histamine drug called terfenadine. In 1992, the patent expired, allowing other companies to make the drug. Merrell Dow, however, had since patenting terfenadine learned more about how it worked. Terfenadine, when ingested, is metabolised in the liver, producing what is referred to in the case as the acid metabolite.[20] Merrell Dow patented the acid metabolite in 1980 (Carr et al., 1980). What they had discovered was that production of the acid metabolite is an inevitable consequence of swallowing terfenadine. Anyone taking terfenadine after the 1992 expiry of the terfenadine patent, but before the eventual expiry of the acid metabolite patent, was therefore creating a patented substance in their own body. Thankfully, the legislation ensures that acts "done privately and for purposes which are not commercial" are exempt from infringement. However,

[20] And what is referred to technically as 4-[4-(4-hydroxydiphenylmethyl-l-piperidinyl)-l-hydroxybutyl]-a.

Merrell Dow argued that the supply of terfenadine by another pharmaceutical company would not be exempt, and would inevitably be the infringing provision of a patented invention, since one could not give someone terfenadine without effectively also supplying them with the acid metabolite.

The case *Merrell Dow Pharmaceuticals v HN Norton* (1996) concerned just such an alleged infringement of the acid metabolite patent. By the time the case reached the House of Lords, the issue had become not whether this would be infringement—it was accepted that it would be—but rather whether the acid metabolite patent was valid. Specifically, given that terfenadine had already been patented and put into working, thereby producing acid metabolite countless times, could the acid metabolite really be a new invention? In his judgment, Lord Hoffman discussed what he called the "intuitive response" to this question; that is, the idea that Merrell Dow should never have been allowed to patent the acid metabolite, as it violates the principle that patents should not prevent people from doing what they had done before:

> "Ever since the power of the Crown to grant monopolies was curbed by parliament and the courts at the beginning of the seventeenth century, it has been a fundamental principle of United Kingdom patent law that the Crown could not grant a patent which would enable the patentee to stop another trader from doing what he had done before."[21]

This principle is, of course, the 'right to work' principle discussed earlier. In the end, Lord Hoffman rejected this argument, by beginning with the question of whether or not the invention was available to the public:

[21] *Merrell Dow Pharmaceuticals v HN Norton* [1996] RPC 76 [83]

> "Making matter available to the public . . . requires the communication of information. The use of a product makes the invention part of the state of the art only so far as that use makes available the necessary information."[22]

Clearly, this way of understanding what is entailed by "available to the public" is stricter than the 'right to work' principle. It is not enough for the public merely to be working the invention: they must have made the information available, however that is to be understood. To that extent, Lord Hoffman ruled, the 'intuitive response' is wrong. There was, in other words, no 'right to work' when it came to the novelty of inventions.

These rulings of the 1990s established the priority of the requirement of enabling disclosures over the requirement of respecting the 'right to work' principle. With the requirement that a novelty-destroying disclosure be enabling, however, there arose the question of what is to count as enabling. This was a matter of some dispute until the recent elaboration of a test for enablement, separate from the test for disclosure, during *Synthon v SmithKline Beecham* (see Chapter 6). In this case, enablement was elucidated in terms of the 'man skilled in the art', a term of art previously restricted to the inventiveness criterion for patentability. This is, at the time of writing, the articulation of novelty in UK patent law.

7.5 Conclusions

We have seen how, over the hundreds of years in which there has been a modern patent system in the United Kingdom, the legal articulation of nov-

[22] *Merrell Dow Pharmaceuticals v HN Norton* [1996] RPC 76 [86]

elty has changed considerably. The opposing principles—of the 'right to work' and the 'enabling disclosure—have resulted in dramatic shifts in the tests for whether an invention is new, and this is in addition to more general disagreement over the meaning of tests, such as those in *General Tire* and *Hill v Evans*. It seems that the task of providing a stable articulation of novelty is a difficult one: over the years there have been numerous changes to the definition of novelty and numerous attempts to specify it, to describe it in useful terms, to pin it down precisely, and to provide tests that allow it to be manifested accurately in individual instances. How are we to understand the constant change, and the apparent difficulty had by jurists attempting to provide a final specification, of what one might expect—particularly given the accounts to that effect by other patent practitioners—to be a simple, uncontroversial notion? What is to be said about the state of novelty today: a notion one might reasonably expect to be, for all practical purposes of the relevant participants, metaphysically atomic, now split into disclosure and enablement.[23]

At the outset of this chapter, I asked the extent to which the practical accomplishment of novelty can be understood in terms of regress, inconcludability and deferral. While none of these can be said to explain these events, I would argue that each of these three provides some insight into the shape of the historical controversy and its current, perhaps temporary, conclusion.

How helpful is the notion of analytical regress in understanding these

[23]The metaphor—and etymology—of the atom are useful here. The 'a-tom', or 'indivisible thing', was eventually broken apart in the first half of the 20th Century, even though it had been given that name in view of such an event being impossible. Novelty, similarly, lasted only a number of decades as a foundational notion of patentability, before being broken apart. In both these cases, it turns out, all that was needed was sufficient energy.

shifts in the legal articulation of novelty? It is certainly possible to argue that these events follow the pattern of a Collins-style regress. The question whether a given invention is new appears to be rather similar to the question whether, for example, gravity waves exist, since in both cases there is no straightforward, demonstrable answer outside of the use of an experiment (or, in the case of the law, a test). Indeed, a slight modification of Collins' formulation show how similar the cases are:

> "What the correct outcome is depends upon whether *the invention is new*. To find this out we must *write a good test for novelty* and have a look. But we won't know if we have *written a good test* until we have tried it and obtained the correct outcome. But we don't know what the correct outcome is until . . . and so on *ad infinitum*."
> (Collins, 1985, p. 84, amended)

Following Collins' 'experimenter's regress', Collins and Evans' (2002) 'expert's regress', and Kennefick's (2000) 'theoretician's regress', we might call this the 'jurist's regress'. As with these other regresses, however, it does not appear to be much of a problem for the participants involved. As we saw earlier, rather than be paralysed by the lack of a deductively sound way to proceed, practitioners in regress situations call upon proxies that allow them to reach conclusions. For the experimenters, it was predominantly assessements of the credibility of other experimenters that allowed judgments to be made of the experiments themselves. For the jurists, the analogous proxy appears to be the opposing principles of 'right to work' and 'enabling disclosure': since each principle is an expression of a fundamental belief in something that must be the case in patent law, individual articulations of novelty and tests for it can be assessed according to how well they defend one of the principles. The regress does not feature as a problem for practi-

tioners because their proxies for what counts as a good test for novelty are sufficient for their purposes.

Perhaps the more general issue of inconcludability can offer more insight. I argued earlier that the experimenter's regress can be seen to be a particular example of ethnomethodological inconcludability; specifically, it is the case where the only deductively sound way to reach a conclusion regarding an object (gravity waves, for example, or the novelty of an invention) is to make use of something—an elaboration, for example, or a legal test or scientific experiment—whose reliability can only be known once the conclusion regarding the object is already known. I also suggested that it is worthwhile to understand the difference between situations where inconcludability features as a problem and situations where it does not. Two important differences, I argued, were the lack of situational norms regarding shared degrees of acceptable doubt and the lack of deferral or distribution strategies. I now turn to the question of the extent to which the legal events at hand can be understood in terms of inconcludability and these related notions.

The ethnomethodological 'horror' of inconcludability is the suggestion that any enterprise which has as its goal the precise articulation of a thing or a meaning will suffer from demands for elaboration of such articulations, elaboration of these elaborations, and so on in a pattern that is in principle endless and in practice ended only by the exhaustion of motivation or resources by relevant actors. In the case of the novelty criterion for patentability, the task demanded of jurists at various points in time is the precise, final articulation of 'novelty' in order to end conflicts between various inventing

parties. As we have seen, novelty has for the purposes of practical use been elaborated in terms of anticipation; that is, the question of whether an invention is new is respecified as the question of whether there is any matter which anticipates it. This respecification brings with it the new question: what is to count as anticipation? The answer to this question was provided in terms of disclosure: that is to say, there must be an earlier, public document providing the details of the invention, disclosing it and in so doing providing the public with an increased level of knowledge. Over time, sufficient specificatory demands were made of the criterion of disclosure that it was deemed necessary to respecify the criterion as an 'enabling disclosure', which is to say that a non-enabling disclosure is not sufficient to anticipate an invention. In *Synthon v SmithKline Beecham*, the jurist in the position to do so took the decision to end what he saw as the ambiguity of the enabling disclosure requirement, and what he saw as its mistaken invocations by other jurists, by specifying an additional enablement criterion, distinct from disclosure. It was, of course, not enough simply to declare that enablement would be its own requirement; rather, this requirement too required an elaboration. As we saw in Chapter 6, this elaboration made use of the term of art 'the man skilled in the art' that had previously been used only in attempts to pin down the precise meaning of the requirement that patents be inventive (as opposed to 'merely' new).

This latest elaboration—the drawing in of the man skilled in the art—is a particularly interesting event, but before discussing it it is worthwhile to note that this pattern of elaborations—novelty to anticipation to disclosure to enablement to the skilled man—can be seen as the product of the

inconcludability of the situation presented by the task of seeking a final articulation of novelty. At each stage, participants find cause to doubt the correctness of the representation of the desired notion, and to remedy this doubt or repair the weaknesses it highlights, the jurists' response is to draw in another representation—another document or proxy—to bolster the first representation, to strengthen the claim that it can be said accurately to capture novelty. The sequence of elaborations just outlined, the spinning of ever-more-complex specifications of previous specifications, can be seen to be a chain of documentary-damage-and-repair that is allowed to continue because of the particularly high levels of motivation and resources possessed in legal contexts by certain actors in certain cases. In other words, we ought not to be surprised that the legal system produces sequences of inconcludability that are closer to the ethnomethodological proposal than one would find in other contexts: the system is, by design, the place where one finds actors motivated to challenge the validity of representations, and, by historical circumstance, the place where one finds actors with sufficient resources to challenge those representations with such relentlessness as to ensure their eventual breakage and resulting, elucidatory, repair.

This being said, not all representations are the same. Some are vague, in the sense that they can only be made precise in particular contexts. As we saw, Lee (1999) and Rappert (2001) give examples of policy language that is vague in this sense, leading to the deferral (or distribution) of determinations as to the precise meaning of the language. In such cases, the resolution of the matter is made in the particular situation governed by the generalities of the policy. Lee noted that this may even be a requirement of successful

policy language. By considering inconcludability, we can add another benefit to the deferral of ambiguity: that since the practical resolution of the policy language takes place elsewhere, the representation itself is a less attractive (and worthwhile) target. Since the policy language does not attempt to provide a final specification of the matter, but rather defers that task elsewhere, there is less to be gained by attacking the language itself.

This benefit to deferring the resolution of representations is also enjoyed by the jurists in the case of the legal specification of novelty. The phrase 'man skilled in the art' is another elucidation that continues the chain of such elucidations, as we have seen, but it is different from its predecessors in that it is already known by all relevant practitioners to be a term of art that is given final meaning only with reference to the particularities of cases, and only in the local contexts that deal with those particularities. In other words, the man skilled in the art is already known not to be precise, not to be finally specified for all cases. The demands for clarification and justification that fuel inconcludability chains are weakened by the knowledge, shared by all participants in this system, that the very point of the phrase 'man skilled in the art' is to allow for local differences that cannot be gathered under a universal legal declaration. Deferral is, in this case, a partial remedy for inconcludability; or, if not a remedy, then a strategy for shifting the problem elsewhere.

The practical business of providing a legal articulation of novelty is, I have argued, not at all as straightforward as other interested practitioners have suggested. The analytical patterns of regress and, even more so, of

inconcludability and deferral, feature as significant aspects of this ongoing activity. What we might have hoped to be the solid foundation to a variety of different practices involving patent novelty turns out to be ever-shifting, with a new fundamental term—the man skilled in the art—being a controversial addition that might, as a deferral device, provide a newfound stability to the articulation of novelty.

CHAPTER 8

Conclusion

In the last four chapters I have explored a variety of different aspects of the patent system: applicant strategy, patent application drafting and submission, patent assessment and litigation, and the long-term movements in judicial reasoning. In so doing I have uncovered numerous features of the manner in which novelty is practically accomplished: the routines, the vocabularies, the strategies, the materials, the resources and resource pressures, and the ambiguities and their deferrals. I will draw a number of conclusions regarding these findings. First, however, it is worthwhile briefly to revisit the individual chapters so as to gather them together more easily.

8.1 Recapitulation

The first key research question that arose from my investigation of the literature surrounding novelty and patent systems concerned the practices regarding the objects of which novelty is demanded, assessed and certified. In

the case of the patent system, these are the inventions. How is it determined just what the invention is? And how does this relate to the question whether it is new? Turning to the literature, I found various theories of objects and boundaries: the demarcation problem of the philosophy of science; the sociological relativisation of this problem as boundary-work; and the proposals of boundary objects, fluid objects and multiple objects. While these ideas are certainly useful, I argued that they lacked attention to the role of the analyst or audience in determining objects and their stability, particularly when there are multiple analysts or audiences. In light of this, I asked a further question: in determining just what the invention is, what is the relationship between alternative actors' views or dynamics of stabilisation? The questions were explored with reference to the processes of patent drafting and patent assessment, particularly focusing on the working practices and strategies of patent attorneys and their interaction with patent examiners.

I began with a model of the patent process in which: (i) an inventor, through research, invents an invention; (ii) a patent attorney renders this invention as a patent application and submits it to the patent office; and (iii) the patent office either grants or refuses to grant a patent for this invention. The work of the patent attorneys makes it clear, however, that they have a much greater role to play in shaping the invention than this model suggests. Inventors have something, but they do not by themselves know exactly what 'their invention' is. The patent attorneys, in discussion with the inventors and making use of their unique technical-linguistic skills, help the inventors to uncover the extent of their invention. Even more than this, however, the assessment processes of the patent office are deliberately employed by the

patent attorneys as part of their strategy for determining the extent of the invention, by claiming for an invention that is likely to be too broad so as to be 'pushed back' to something narrower but still broader than they might have originally claimed were they to have attempted to have a patent granted with no alterations necessary. The lengthy duration of the patent process, in addition, is employed strategically by attorneys so as to allow their clients the opportunity to alter their application in response to additional research and changes in the marketplace after the application is submitted.

What this updated model of the patent process allowed us to see is that inventions are in part determined by the very processes designed to assess them. In other words, the patent certification process does not neutrally assess inventions but alters them, or constitutes a context within and against which they are altered. Moreover, this fact is well-known by certain actors seeking to gain from the system, and is employed to their advantage. The instability of 'the invention' throughout the patent process is something of which patent attorneys are well aware. Novelty, therefore, while in one sense straightfowardly a requirement of inventions, is in another sense a vital contribution to the determining of the inventions of which it is a requirement. The practices surrounding the enforcement of the novelty requirement are used to discover the invention itself. In the practices of patent assessment, in other words, novelty is part of both the certification and the constituting of inventions, which are neither stable in the first instance nor linearly stabilised throughout the process, but rather at the centre of opposing practices of purposive stabilisation and destabilisation, resulting only after the grant in a defeasibly shared understanding of what, from that point, was, from the

first instance, a new invention.

The second key research question that emerged from the literature concerned the extent to which practices of quantification and accountability were involved in the practical accomplishment of novelty in the patent system. In order to continue providing a thorough account of novelty practices in their various locations, and to determine the extent to which the optimization concerns of patent economists were reflected in and could be implemented in the bureaucratic reality omitted from their models, this question was answered with particular reference to the work of the patent examiners in the UK Intellectual Property Office. Various emphases in research concerned with accountability were identified in order to engage with the empirical material more fully: first, 'representation and control', which explores the interwovenness of those practices; second, 'normative alignment', which relates to the lay sense of people being accountable to others for gaps between their actions and others' expectations; third, 'reflexive accountability', the ethnomethodological notion that all social interaction is rooted in techniques ensuring mutual intelligibility of actions. In addition it was suggested that one could identify a fourth emphasis in Garfinkel's writings: what was called the 'practical availability of phenomena', in which things are transformed into things of which accounts can be made.

I explored the details of the processes of patent assessment: first, the search, with its past and present archive technologies and its technical vocabulary for 'citations'; and second, the substantive examination, with the resulting rounds of correspondence with patent attorneys. I also explored

the relationship between these assessment practices concerning the certification of novelty and the legislative demand that patented inventions be new. This is a relationship held together by various materials and techniques: the legislation's own cascading definitions of its own terms, legal judgments surrounding the proper way to test whether those terms have been satisfied in any particular case, and the Intellectual Property Office's own efforts to gather and consolidate those judgments into a convenient form for patent examiners, in order that their assessments enforce, as closely as possible, the word of the law. I also showed how the patent examiners are reduced to a single efficiency score, their *W/A*, through an opaque and rather unloved calculatory system, based on a controversial measure of the difficulty of each examiner's particular technology area and a relentless measure of the amount of work done. Finally, I showed how the patent examiners operate under the gaze of a monitoring system operating in the name of ensuring the quality of patent examiners' work, but also somewhat related to the Intellectual Property Office's own objective of obtaining certification for its processes. Through this it could be seen that the monitoring system cannot be said to be acting solely in order to ensure the quality of the patent assessment work, but also in order to be a demonstration of the work's visibility to the organization; that is, to provide the visible visibility required for organizational certification. As one senior practitioner observed, there is something of a conflict between the goals of ensuring quality and of assuring others that quality is being ensured.

In analysing these goings-on, I found that while each of the first three emphases of accountability research was useful in some way, the final em-

phasis of accountability as practical availability was particularly useful. Through the technical vocabulary, databases, and legal tests and manuals, the legal notion of novelty was made available to the assessment practices of the patent examiners; through the calculation of technology area weightings and resulting individual *W/A* efficiency scores, the patent examiners were made available to the appraisal practices of the organization; and through the monitoring system, the work of the patent examiners and the routines of the organization were made available to the practices of actors concerned with quality. A variety of accountability practices—particularly as regards the availability to certain practices of a wide variety of actors, entities and other practices—are clearly involved in the practical accomplishment of novelty in the patent system.

The third key research question that emerged from our investigation of the literature concerned the analytic problem of scale. This is a problem that potentially must be confronted when considering any phenomenon but certainly when considering something, such as novelty, that appears to be distributed across organizations and from the minutiae of individual working practices to the force of legal proclamations. It is necessary, when considering such a phenomenon, to engage with the various positions that have been put forward in the debate over scale. In doing so, I identified the opposed 'resolutionist' and 'dissolutionist' approaches to the problem of scale: respectively, the proposal that the problem can be resolved or fixed in some way, and the proposal that scale must simply be abandoned as an analytical category and replaced with other notions or tropes. In order to approach this issue, and to continue developing a thorough account of the practices

surrounding the accomplishment of novelty in the patent system, this chapter took as its empirical material the recent and rather influential legal battle *Synthon v SmithKline Beecham*. This case is one of the most recent major legal events as concerns novelty, and also highlights the fact that the analytic problem of scale is not solely experienced by academic analysts, but legal ones also.

The legal case began as a conflict between pharmaceutical companies Synthon and SmithKline Beecham over a group of chemicals including paroxetine mesylate. As the case progressed, however, it became an opportunity for judges to engage with and attempt to clarify the relatively new legal articulation of novelty-destroying anticipation as requiring an *enabling disclosure*. As it turned out, the various judges came to entirely opposing approaches of how to understand this new term. According to the senior judge, Lord Hoffman, the appeals court judge Aldous LJ had reasoned in a way which did not adequately distinguish between enablement and disclosure, and his reasoning was as a result somewhat confused. In order to prevent this occurring again, Lord Hoffman provided separate tests for enablement and disclosure, effectively splitting anticipation—the counterpart to novelty—into two constituent requirements. I noted, however, that Aldous LJ was concerned with a different problem that enablement presented; namely, the potential lack of clarity it introduced into the difference between the novelty and inventiveness requirements. Rather than read the case in the law's own terms, as a progressive clarification by a more senior judge about a matter a lower judge confused, we can identify in the judgments of Aldous LJ and Lord Hoffman two opposed forms of reasoning about novelty and how it

must be articulated as a legal notion. For Lord Hoffman, it is necessary to progress deeper into subcategorizations, to be ever more precise about the existing concepts of enablement and disclosure. For Aldous LJ, it is necessary to guard the wider boundaries between novelty and inventiveness. In the attempt to arrive at a legal determination of novelty, we find conflicting modes of reasoning that reflect rather well the 'looking up' and 'looking down' styles identified by Kwa.

The fourth key research question that emerged from our examination of the literature concerned the issue of how novelty, an apparently fundamental notion, could ever be defined, pinned down and specified with sufficient precision and finality to render it practicable. In order to address this question, I explored various literatures concerning such analytic problems. I began with the problem of the experimenter's regress, identified by Collins as a feature of scientific experimentation concerning the logical impossibility of ending disputes over disputed objects with the use of disputed test apparatus, and the practical necessity of employing other modes of reasoning—particularly, the rational but non-deductive reliance on proxies such as credibility and robustness—to overcome this impossibility. I explored the relationship between the experimenter's regress and similar problems from philosophical skepticism. I also noted that the regress could be seen to be a particular instance of inconcludability, in which doubts over objects can never be defeated by documentary elaborations, since the documents themselves are also susceptible to doubt, multiplying the problem. Finally, I explored the strategy of deferral, particularly as regards policy language, noting that the combination of artful ambiguity and deferred resolution can be

seen to be a solution to problems relating to opposing requirements of generality and particularity.

I then turned to the problem faced by patent jurists in the several hundred years of modern patent law and its novelty requirement. I noted not only that the legal articulation of novelty has changed considerably over the years, but also that the task of articulating it has produced an increasing number of related terms to elaborate existing terms. In addition, I showed that at the heart of the legislative definition of novelty lies an ambiguity regarding what is 'available to the public', and that fundamentally opposing ways of interpreting this have coexisted in legal judgments as the principle of the right to work and what has come to be known as the principle of enabling disclosure. Only in the last few decades has this opposition been made explicit and, through the declarative fiat of senior legal judgments, resolved. Yet this resolution was done with the further deployment of elaborating concepts which introduced other ambiguities. Most recently, the notion of the 'person skilled in the art', previously employed only to make sense of the inventiveness criterion for patentability, has been introduced as a way of articulating the enablement subcriterion of the novelty criterion.

In analysing these events, I argued that the changing articulations of novelty over the decades do resemble the events of the controversy Collins analysed as an experimenter's regress. By having no universally demonstrable form, novelty is something which, when attempts are made to pin it down precisely using legal articulations or 'tests', is arguably at the centre of just such a regress. More generally, the multiplication of elaborating concepts

is precisely in keeping with the features of a situation in which the inconcludability of a matter is not simply ignored, or bracketed with reference to agreed-upon understandings of the world, as is frequently the case. Rather, the legal arena constitutes a setting where actors have the motivation, the resources and the opportunity to keep challenging attempts to make final articulations regarding novelty and its array of elaborating concepts. The inconcludability of the problem of determining novelty once and for all, therefore, is maintained, and this latent feature of the meaningfulness of social life becomes a very real feature of the practical business of rendering, for practical purposes, what it means for something to be new. Finally, I suggested that the recent introduction of the 'person skilled in the art' into the legal articulation of novelty is an instance of the strategy of deferral, with the term managing the problem of the inconcludability of novelty through the universal proclamation of its local resolution.

8.2 Conclusions

What these different theoretical approaches have allowed me to show, through these chapters, is that, contra research that explicitly or implicitly takes novelty to be an unproblematic, even inert, background phenomenon or property, it is an accomplishment of complex heterogeneous practices. It cannot simply be taken for granted, whether as justification for research (the 'implicationist' rationale I identified earlier), or as a policy lever (the instrumentalist approach of patent economists). Rather, it comes about through an ongoing accomplishment of material, legal, rational, scalar, spatial, lexical

and organizational practices. As well as the individual features of these that I have illustrated, a number of recurring themes can be seen in these practices. These themes are: inversion, stability and instability, and distribution and deferral.

To begin with inversion. Novelty is not straightforwardly a matter of whether or not something is new, I have argued. Rather, in this set of contexts at least, novelty is partly performative of *what the thing is*. The thing does not precede its own certification of novelty. A deliberately unfinished form of the object is put to assessment, novelty is certified (or the object is 'pushed back' to something of which novelty can be certified), and with that certification it is worked out what the object is. This inversion is perhaps a peculiarity of the patent system. I would argue, however, that it is likely to occur as a feature of any domain in which novelty is valued and assessed. 'The contribution' of a piece of research can be thought of in a similar way: it is not a fixed aspect of the document, but a negotiated entity worked out through an assessment of the research in relation to what already exists. The theme of inversion in novelty, in short, suggests that seeking to understand whether or not something is new is somewhat to preclude analysis of the ways in which novelty is performative of the thing itself.

The second theme that emerges from this investigation into the practices surrounding the accomplishment of novelty is that of *stability and instability*. For the patent attorneys, the instability of the inventions through the application and assessment process was a strategic advantage. For the patent examiners, a primary task of assessment was to stabilise the invention, to

force the attorney to be more precise in their language. We saw how the legal articulation of novelty, while apparently quite unstable if one considers the changes it has gone through, is stabilised for the purposes of patent assessment in curated manuals of practice. And the ambiguity of the language surrounding novelty, deferred to contexts where it is desirable from those legal contexts where it is not, is similarly a matter of the stability or instability of the meanings of certain terms.

It is tempting to say that novelty is an unstable thing, a peculiar kind of entity requiring a metaphor connoting such instability. But the truth is rather more complex than this simplified complexity. Doing novelty involves patterns of stabilisation and destabilisation, as demanded by the purposes of particular actors in particular contexts. Clarity and stability are not universally advantageous, and neither are ambiguity and instability. They are deemed useful for particular purposes at particular times. Variable stability and opportunistic ambiguity are a part of what, in the UK patent system, is involved in the practical accomplishment of novelty.

The third theme that emerged through the chapters was that of distribution and deferral. The resolution of whether a given thing is new, what the thing even is, and what is even meant by 'new', is distributed across various domains of practice. This is also, I suggest, done rather unevenly, since the recent 'enablement' foundation of novelty does not even appear in some areas of patent practice. We also saw how these matters are deferred at various points: attorneys defer the precise specification of 'the invention' to allow for flexibility later; examiners defer explanations to the Manual of

Patent Practice; and jurists enrol strategically ambiguous terms to defer the problem of inconcludability.

What is the effect of this? I identified in the review of the literature what I called an instrumentalist approach to novelty in the patent system. While I was critical towards this approach as regards its usefulness in leading to an explication of novelty, this is not to say that it is not, in its own way, of value. It is worthwhile briefly to discuss what instrumental recommendations might result from what I have argued in this thesis. I discussed in the review of the literature that there have been numerous attempts by economists to use mathematical calculations to discover the optimal properties of a patent system. One particular lever of interest was the breadth of patents, and the various models of the consequences of altering this. I noted that such analyses did not attempt to engage with the question of how an economically-optimal patent breadth—even if it could be agreed upon—could be implemented in the bureaucratic reality of the patent system. After exploring the details of the working practices of the patent system, particularly of patent examiners, this concern appears to have been quite justified. It is not at all clear how a chosen patent breadth could even be specified in terms that could be translated into the routines of patent examination, let alone actually made to be adopted by the large number of examiners. We saw that changes in the judgments of examiners are attempted by providing detailed examples of cases involving the preferred outcomes, but it is not clear how this could be achieved with an 'optimal' patent breadth. This is not to say, however, that it is not worthwhile to attempt to make changes to the patent process that might result in economic benefit. Altering

patent length—the number of years a patent lasts—is a far simpler matter, since patent length is, unlike patent breadth, straightforwardly numerical and, also unlike patent breadth, a relatively straightfoward administrative matter, rather than an exercise of judgment. The costs associated with the process could similarly be altered, if that were thought to be likely to have a positive effect on some desired outcome. It is only the idea of implementing an optimal patent breadth, with its uncertain quantification of what is in practice a highly qualitative matter, that is questioned by this thesis.

There is, however, an additional difficulty raised by this thesis regarding attempts to alter the patent system to produce economic benefits. This difficulty concerns the strategic use of the system by actors in it. Patent attorneys, specifically, are highly skilled at using the processes of the system to the advantage of their clients. Furthermore, clients do not simply use the patent system to protect their inventions; rather, they use the system as a part of their corporate strategy, seeking inventions based on the patent landscape in addition to the other way around, and often seeking patents merely to block their competitors' research trajectories rather than to protect their own inventions. Attempts to improve the economic output of the patent system which make use of naïve modeling which fails to take account of this reflexive property of the system could very likely experience counterintuitive results, as the actors simply alter their strategies to take advantage of the new landscape. Similarly, the use of patents as a metric for innovation is cast seriously into doubt when one considers just how much patent-related activity is not to do with what we would want to call beneficial innovation, but is the result of a strategy that is, by virtue of creating monopolies which

prevent rather than enable industrial activity, the corporate equivalent of scorched earth. These attempts to stimulate and measure innovative activity are seriously called into question by the complexities of the actors' strategies.

I have argued throughout this thesis for the value of exploring the extent to which novelty can be understood as a practical accomplishment. These instrumental recommendations are useful in a straightforward sense, but I believe that the other themes that have emerged are also of value. One of the most basic orderings made use of by humans—the distinction between what is new and what is old—conceals a world of complexity, and an institution with a foundational interest in novelty allows us to see the extraordinary range of practices, negotiations, valuations and strategies that provide for the possibility of routinely deciding whether or not a given thing is new.

8.3 Openings

That settles that, then. Novelty is worked out through negotiated (in)stability in the determination of objects, inversion of the simple view that objects precede their novelty, establishment of suitably available objects for practice, disputes over which scales of analysis to prioritise, and deferral of ambiguity in the face of inconcludability. Rather than a straightforward, transcendental ordering or property of entities, novelty is a complex practical accomplishment that must be explicated rather than simply relied upon.

This raises something of a difficulty, however, since I am claiming to have provided a new way of thinking about novelty, with that new way being to

approach novelty as a local, contingent, messy, negotiated, defeasible, deferred, distributed, sometimes contradictory accomplishment. In the light of what I have claimed, what is the force of the claim? Can I coherently claim to have provided something new, or is this self-defeating?

Perhaps this difficulty can be sidestepped. After all, this thesis is not a patent application. What I have argued about novelty has been based on patent practice, so perhaps I can argue that it simply does not apply here. This is unconvincing, however, since that would rely on a claim that *some* novelty practices (in patent systems, for example) are local and contingent and so on, whereas others (in academic theses, for example) are exempt from such contingencies and can make unfettered, universal claims to novelty. This seems like wishful thinking, and more than a little arbitrary. In fact, patent applications and theses are similar in a number of ways. They both contain claims (otherwise known as arguments or conclusions). They both are written and rewritten in relation not only to the substantive matter at hand but in relation to what has gone before. And while the institutional surroundings are very different, they both are subjected to close assessment by examiners.

Perhaps the better approach is not to claim that this kind of work is transcendentally, unproblematically new in a way that I have argued patents are not, but to learn from the actors whose navigations of the complexities of novelty practice I have explored in this thesis. A clear starting point is the strategic instability of the object employed by patent attorneys. I argued that the invention does not precede its novelty; rather, attorneys overreach

in what they claim, knowing that they will be 'pushed back' by examiners to whatever it is that is new, and through that they will discover what it is the invention always was. Could a similar back-and-forth occur with this thesis? Ought I to overreach, in the knowledge that I will be forced to retreat until, together, we discover not my invention but my contribution? This seems highly problematic. In patent practice, there are no great costs associated with overreaching (other than the time it takes to redraft the application), but with a thesis such a move would likely be factored (negatively) into the overall assessment.

The mechanics of determining overreach are, in any case, different in these different practices. With patents, if an application claims something of which a part is already known, then the examiner will rule that the entire claim is not new. With theses, it is not quite so straightforward. If a small part of one of my arguments is already known from elsewhere, it might not lead to the rejection of the entire thesis, since there are the other arguments and the relationships between them that might still be taken to be new.

Perhaps I can make some use of deferral, since that featured so prominently in a variety of places in patent practice. Attorneys deferred the determination of their inventions for strategic reasons; examiners deferred the explanations of their work to the Manual for reasons of expressibility; jurists deferred the resolution of novelty to local instances.

It is the last of these instances of deferral that is the most useful here. The ambiguity of the 'skilled man' was brought into the legal articulation of novelty, providing the jurists with a universal declaration that novelty is a lo-

cally particular matter, with the precise meaning of novelty to be worked out case by case, in some other context. This is rather similar to my claim as to how novelty is accomplished. Both approaches to novelty attempt to make a general claim about something that, through familiarity with its details and complexities, is taken to be not adequately generalisable, or generalisable only by drawing in a strategically ambiguous notion that captures the need for the matter to be worked out in other, local, particular settings.

Perhaps this is a way to make the claim I have sought to make: by deferring a final statement about what novelty is. Certainly, more research is needed in this area. I have described what I have argued are the features of how novelty is accomplished in practice in one particular set of related contexts, yet I do not claim to have provided a final articulation of novelty. Given what I have shown, it is not clear there ever could be such a thing. And this lack of finality, moreover, allows me to make a more modest, more defensible, claim: that this is what novelty is like, in this place, at this time, for these people and their various, conflicting purposes; that certain patterns are noticeable in their doing of novelty; that these patterns need not be shared by other such doings, since what novelty is is bound up with the reasons for which it is done, the resources available, and a good deal besides; and that whether or not any of this is taken to be new is bound up with similarly local purposes, norms, patterns, negotiations and contingencies.

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