Published in Alistair Hudson (ed.) ***New perspectives on property law, obligations and restitution*** **(Cavendish, 2003), pp. 279-303.**

WHOSE MOLECULE IS IT ANYWAY? PRIVATE AND SOCIAL PERSPECTIVES ON INTELLECTUAL PROPERTY

Sol Picciotto, Lancaster University Law School
David Campbell, Cardiff Law School and ESRC Research Centre for Business Relationships, Accountability, Sustainability and Society

Introduction

The contradictions at the heart of the concept of intellectual property (IP) – of property which is intangible, private ownership which requires radical state intervention, and markets which are based on monopolies - never fail to fascinate. In this paper[1] we will argue that their further exploration can still yield interesting insights if it is recognised that the basic contradiction really inheres in the concept of 'private' property generally. This basic contradiction is that between the commonplace, naturalistic understanding of private property as an owner's inherent exclusive rights over a thing, and the justification of property rights as social institutions determining the relative rights of persons towards things. The former does not stand up to close scrutiny; the latter helpfully points to the necessity of publicly designing economic institutions so as to produce welfare optimising outcomes. The *general* idea of an intellectual property right (IPR) is, we will claim, one of the most blatant examples of a property right which, because it is commonly based on the naturalistic understanding, does not produce welfare enhancing outcomes; indeed it constantly needs to be hedged about with limits, exceptions and *sui generis* variants to be workable at all.

IP certainly offers the most bizarre examples of economic actors' alienated perceptions of the nature of their activities. IPRs of course confer exclusive rights protected by the state, subject to certain limits and conditions the scope and function of which are debated and contested. However, since these rights are 'property' rights, economic actors not infrequently consider themselves to be owners not merely of a bundle of rights but of an asset, often conceived of as a functional physical object, subject only to externally-imposed restrictions. In today's 'knowledge economy', debates and decisions about the scope of IP protection seem dominated by a combination of the ideological power of this fetishized conception of property and the direct economic power of corporations seeking to extend their monopolies over cultural and information products. This was starkly brought home to us when, in the course of a recent debate on patents and biotechnology, an IP lawyer who had worked for a corporation engaged in genetic patenting said: 'Pharmaceutical companies do indeed wish to retain patent protection because of the control that it gives them. *It is their molecule* and they have the right to that control' (our emphasis).[2]

Property rights of all sorts are social relationships underwritten by the state rather than 'relationships' between persons and things. Typically, private property rights have their liberal political justification (to the extent they are justified) in their contribution to the creation of 'the system of natural property' in which economic goods, which the limits to the munificence of nature make scarce, are allocated through exchange between private owners; and it is this system that we will describe as 'the market'. IP, however, entails the creation of scarcity artificially by radical state intervention. The fetishization of IP as 'property' means that for public debate over the desirability and scope of state action is substituted a quite unjustified private property claim, albeit subject to some necessary limitations and conditions. Since the law embodies confusion twice confused, it virtually negates rational debate about the welfare outcomes of protecting IPRs. Furthermore, the effect of this fetishism is that normative concerns about what should be produced and how are concealed

by the apparently overriding need to guarantee private ownership rights in order to maintain what is claimed to be the optimal level of innovation. Stripped of its obfuscations, current IP law emerges as a buttress for purportedly 'technical' corporate monopolistic practices, the 'technique' actually representing the privileging and subsidising of certain forms of corporate profit maximization through state regulation.

Rationing: private property as the creation of scarcity

The IP lawyer who argued that biotech firms might 'own' a molecule would also doubtless subscribe to the traditional view that this private right of ownership should be balanced by limitations and exceptions established in the public interest. We will argue that this consequentialist 'balancing' of private rights against public welfare is the wrong starting point for explaining and justifying property rights.

Property should be thought of *in the first instance* as social, as the public regulation of the relations between persons in relation to assets. From this perspective, the granting and protection of exclusive rights of 'private' property to one person is essentially a form of rationing. As long ago as 1933, Sir Arnold Plant considered the implications for IP of Hume's argument that the point of private property is to ensure that goods are put to their best use by providing owners with an incentive to seek the optimal revenue to be derived from them.[3] Hume's justification of private property was based on its general social utility,[4] and he had in mind tangible goods, and in particular natural products, which are scarce in relation to humanity's apparently infinite power and appetite to consume them. In this essentially static view of economic activity, physical goods are rivalrous in consumption, because one person's enjoyment of a scarce good automatically excludes others. For manufactured goods, however, scarcity is a matter of balancing supply and demand, and if one considers economic activity as a dynamic process, the scarcity argument takes the form of the need for an incentive to produce and/or manage assets efficiently. This argument can more easily be used to justify exclusive private property rights in IP 'intangibles', which are generally accepted to be essentially non-rivalrous in consumption: any number of people can enjoy a song or benefit from an innovation. However, it is argued that scarcity must be artificially created in order to provide the necessary incentive for the initial creation of the work or product. Thus, the very fact that IP intangibles do not diminish when consumed is argued to be a disincentive to their initial creation, whereas for tangible goods, consumption, by using up the good, generates demand for further production.

These really quite different arguments are commonly elided in the concept of intellectual property as, precisely, 'property', since it is normally assumed: first, that private property in tangibles is a 'natural' feature, and, secondly, that IP intangibles are unique or exceptional in being nonrival in consumption. Neither of these views can stand up to close scrutiny. We take as an excellent example of the dominant thinking the argument in Torremans' standard work:

> The essential characteristic of property rights is that they are exclusionary rights through which third parties are prohibited from the use and exploitation of the subject produced by these rights … If we take a bicycle as an example of an item of tangible property, it becomes clear that the owner of the bicycle has the exclusive right to use the bicycle and such a monopolistic right in real and personal property is conceded almost naturally. Property rights in items such as our bicycle developed because nobody would be prepared to invest time, material and skills in designing and producing bicycles if he or she would have no right in the result of the process that would enable them to benefit from their work. The most obvious way to do so is to sell the bicycle, but again there would be no interest in the bicycle, this time in acquiring it, should the buyer be unable to get the exclusive right to use the bicycle. The nature of the object gives this right a

> monopolistic character. If someone uses the bicycle, no-one else can use it. The physical nature of the unique embodiment of certain limited resources in the bicycle automatically leads to a particular, competitive, exclusionary effect … In this respect intellectual property rights are fundamentally different. The nature of the property which is the subject of the right and which is protected does not necessarily lead to competitive exclusionary effects. Concurrent use of inventions by a number of manufacturers, including the patentee, or simultaneous performances of a musical, are possible. The invention and the musical will not perish, nor will any use or performance lessen their value. The subject matter of intellectual property rights, eg inventions or creations … is not by its nature individually appropriable. In many cases imitation is even cheaper than invention or creation. The competitive exclusion only arises artificially with the creation of a legally binding intellectual 'property' right. This gives the inventor, owner of the intangible property right, the exclusive use of the invention or the creation.[5]

Torremans' view is a perfectly competent expression of the consequentialist argument for protecting IP.[6] Because IP is intangible, investment in it confronts what is often called a 'free rider' problem, a 'market failure' which handicaps or prevents investment. Though the initial development of an IP good is costly, its reproduction may well be very much cheaper. A market incentive to undertake the investment will be undermined if the good, once put on the market, may be imitated rather than bought from the innovator, for the innovator cannot charge the free-riding imitators; and hence the revenues from the good, and therefore the incentive to develop it, are reduced. Although there is some real substance to the argument, its starting point in a naturalistic view of property results in an unduly abrupt distinction between tangible and intangible property.

Torremans' claim that the desirable exclusionary effect is produced 'automatically' by the 'physical nature' of a tangible good must, with respect, be misleading. It calls to mind Marx's response to Samuel Bailey's belief that commodities have a value as a natural property: '[s]o far no chemist has ever discovered exchange value either in a pearl or a diamond'.[7] The natural qualities of the 'property' in no way determines that it should be dealt with in terms of 'excludability', indeed that it be 'property' at all; this is a matter of the organisation of economic activity though a market based on private property. In the first instance, excludability is a matter of social organisation, not at all a matter of physical nature. Torremans' example of the bicycle is, in fact, a bad one. Throughout the world there are 'red' and 'yellow bicycle' schemes in which bicycles are left for general use, though the difficulties encountered by these schemes make one see why private ownership of bicycles is more common – the 200 yellow bicycles put on the streets of Joensuu, Finland as a means of transport in 1989 all went missing within a few months. Nevertheless, there is no connection traceable to physical nature that makes an object private property. The tangible good is no more naturally private property than the intangible good, or, if we turn this the other way around, on a first analysis the intangible good (an invention, or an artistic creation) is no less private property than the tangible: the question for both is whether and how we wish to treat goods as private property so as to organise economic activity as a market. As Coase has pointed out in relation to all goods, but especially with tangible goods in mind: 'what are traded on the markets are not, as is often supposed by economists, physical entities but the rights to perform certain actions, and the rights which individuals possess are established by the legal system.'[8]

The significance of this for our purposes is that we are now able to place at the centre of our analysis of IP a point which the distinction between tangible and intangible property muddles: economic exchange always involves the creation of an exchangeable good by establishing ownership; what Musgrave has called 'the exclusion principle':

> Exchange in the market depends on the existence of property titles to the things that are to be exchanged. If a consumer wishes to satisfy his desire for any particular commodity, he must meet the terms of exchange set by those who happen to possess this particular commodity, and vice versa. That is to say, he is excluded from the enjoyment of any particular commodity or service unless he is willing to pay the stipulated price to the owner. This may be referred to as the *exclusion principle*. Where it applies, the consumer must bid for the commodities he wants. His offer reveals the value he assigns to them and tells the entrepreneur what to produce under given cost conditions.[9]

Thus, the choice between individual ownership of bicycles or communal bicycle schemes will depend on where, in the circumstances, it is more efficient to place the costs of looking after bicycles and allocating their use. The fate of the Joensuu bicycles shows that private property is very often the most plausible method of economic organisation; but not only does this not mean that private property is always the best method of organisation, it also does not mean that private property is inherent in the physical object.

Though Torremans would hardly deny, were the point pressed, that his bicycle and its alienability requires the social structure of ownership and sale, he nevertheless believes that treating the bicycle as private property may be 'conceded almost naturally'; but surely this is to underestimate what is involved. As a social structure which must be produced to allow economic exchange to work, exclusion involves a social effort which entails, from an economic viewpoint, significant transaction costs.[10] Once looked at in this way, ownership takes on a much more contested form, in regard of both tangible and intangible goods.[11] The excludability of the tangible good is hardly something to be 'conceded almost naturally'; it is an immensely valuable institutional accomplishment, one of the social structures claimed to be the basis of rational capitalism[12] and hence of the superior economic performance of the west. The feature of the bicycle that tends to escape Torremans' analysis is that bicycles are moveable, and ownership is not 'conceded almost naturally' by those who wish to acquire the bicycle without going through the costly business of exchange. We seek to deter those who might steal a bicycle by a system of criminal law, but not only is it impossible that such a deterrent be absolute, we do not try to make it absolute. The police will commit only limited resources to clearing up a bicycle theft, and this is not in general regarded as a dereliction on their part but a necessary accommodation of, first, the finitude of police resources, and second, the fact that a world in which the police had such power that they were able to catch all bicycle thieves would be a worse world than one in which some bicycle theft took place. In recognition of this, a great deal of the work involved in securing the excludability of the bicycle falls on the owner, who must ensure it is securely locked when not in use; and such work *a fortiori* falls on e.g. bicycle retailers, the excludability of whose stock is in large part a cost which they must bear in the forms of the costs of prevention of and insurance against theft.

Though we do not wish to dwell on this, it is clear that there may be a market failure of excludability even in respect of tangible goods such that the good cannot be produced. This very fear now haunts the mobile phone industry, for as these devices are made smaller and more valuable, they create severe excludability problems which the state is seeking to minimise, by e.g. organising the development of co-ordinated anti-theft technology and by giving convicted mobile phone thieves exemplary sentences. Leaving aside the policy issues this woeful example creates, the general theoretical point is that the excludability even of tangible goods is not absolute and it would not necessarily be a good policy to try to make it absolute. It requires a decision whether it is welfare optimising to produce goods in certain ways at all and, if they are to be produced, on the balance to be struck between the roles of the state and the economic actor in guaranteeing excludability.

From an economic viewpoint, then, the question always should be whether it is welfare optimising to create private property and a market in relation to a good, whether it be a bicycle or an industrial process or a song. The point here is that the notion of 'private' property is in a very important sense misleading: 'private' property is a social relationship (which, as we have seen Hume insists, must be justified in terms of its general social value):

> The point is … that the private interest is itself already a socially determined interest, which can be achieved only within the conditions of society and with the means provided by society … It is the interest of private persons; but its content, as well as the form and means of its realisation, is given by social conditions independent of all.[13]

When creating private property of any sort, we have to ask whether the social investment in the costs of excludability is justified. And here a very strong distinction does emerge between IPRs and commercial property of the more ordinary sort. This distinction, to which we now turn, is that between monopoly and competition, which has welfare implications far greater than the distinction between tangible and intangible property.

Regulation: monopoly and competition in the exploitation of innovation

This argument about the need to create excludability even for tangible goods can also be made the other way around, as it recently has been by Boldrin and Levine.[14] If the amount of work involved in creating excludability in tangible goods has been basically ignored in the IP literature, the difficulties of creating excludability in intangible goods have been enormously over-estimated. Considerable refinement of the standard arguments are needed here to get to the requisite level of precision. The problem posed by the intangibility of IP turns on the technological issue of rival and nonrival consumption. It is technologically more difficult to create excludability in a good that does not diminish in supply by virtue of being consumed. Excludability is easier for a tangible good because the good is rival in that consumption diminishes supply. The example usually given is of food because the fit seems so graphic – a specific portion of food is literally consumed. It also applies to a bicycle, since a bicycle being ridden in one direction by one person cannot simultaneously be ridden in another direction by another, though it is clear from the careful precision needed to give this example that the rivalrousness of the bicycle is limited, and a moment's thought will reveal that this is true for the vast majority of tangible goods.[15] The claim is that for the IP good, consumption is not rivalrous. Everyone can use, to give a commonly used example, the fundamental theorem of calculus without it being in any way rendered less available for other users.

But this is still not sufficiently precise. The fact that a good is or is not rival does not itself matter: the real issue is the costs of imitation for the purpose of commercial exploitation. These costs obviously will tend to go up if consumption reduces supply, but the relationship is by no means linear. The calculus theorem is, in an important sense, a misleading example, since the, as it were, purity of its use, which is the point of the example, is not the real issue in discussions of IP, which turn on profane commercial purposes. An inventor of a process for making steel would not care if the idea was copied for the purpose of pure scientific experiment, but would care very much if a rival made steel using the process in such a way as to reduce the inventor's revenues from making steel, which of course entails costs. Thus, the type of use of an idea that IP protection is meant to regulate – rival commercial exploitation - is *never* one of costless imitation. These costs are always positive, though the technology of imitation will influence those costs, and the fact that a good is not consumed by use will tend to lower the costs of imitation. But when the costs of imitation really are zero (or *a fortiori* where the cost of consumption plus imitation is less

than the cost of consumption), all this discussion of IP will be otiose; for this is the state of bliss in which rational economic analysis of any sort is unnecessary.

The technology so far produced which most nearly approaches this limiting case, Napster and similar devices, will be further discussed below. For the present it is enough to note that even Napster requires investment in the relevant copying technology and media and an expenditure of time and effort by end users, and that some of the intermediary costs of making the copying possible (reliably identifying the product, putting it on the web, etc) are sometimes subsidised by parties with an ideological commitment to sharing who make little or no charge for their efforts. Napster is not an ethereal spirit but a corporeal technological innovation and its use has costs. However, let us allow that those costs are relatively small and that, without IP protection, use of Napster means that certain products (e.g. some mass marketed pop songs) would not be produced. But even were this to be the case, it would not be because Napster is costless, it would be because competitive use of Napster reduces the original producer's revenues below the point where he wishes to continue production, and this is an issue susceptible of rational economic analysis in a way that blissful costless imitation is not. The giant entertainment corporations may have their revenues reduced, even drastically reduced, but there is no absolute reason to say this should not happen[16] unless one has decided in advance that the mass marketed pop song or whatever *must* be produced, from which starting point Napster might well appear apocalyptically threatening.

When we focus not on some abstract issue of imitation but on imitation in order to create a rival product which might cut into the inventor's revenues, it is always the case that, absent the IPR monopoly, there would be competition between the inventor and the imitator. In fact, there is no strict distinction between rival and nonrival goods; rather there is a spectrum of rival and nonrival goods.[17] There is no good that is purely rival, and very arguably none that is purely nonrival – the fundamental theorem of calculus is as good a candidate for the latter pole as we can imagine, and it is not really to the point. Once it is recognised that there is indeed such a spectrum, the concept of 'market failure' must also be seen as not an either-or matter: we would suggest thinking of it in terms of a rheostat rather than a switch. As the commercial issue raised by IP is exploitation of an innovation; this is never ethereal (as the pure use of calculus is) but always a costly process which is subject to a degree of competition. As regards, for example, the use of a new process to make steel, the innovator as the first-mover inevitably has advantages which should allow the innovator successfully to compete in the market for steel. The value of these advantages undoubtedly will be less if there is no legally protected IP monopoly, but we normally recognise this as an immensely valuable feature of competition. The idea that the first manufacturer of steel could enter into anti-competitive arrangements (other than IPRs) to secure a monopoly is usually abhorrent. Once the misleading idea that there simply cannot be a market in IP goods is abandoned, the question arises: why is it that in the case of IPRs we seek to allow the innovator to claim a greater proportion of the revenues traceable to the innovation[18] than competition would allow?

This question can best be approached by first answering another. As there is no abrupt cut-off point between goods which naturally can have a market and those which require IP monopoly rights, what determines where a market failure in the sense of there being no market occurs? This is not determined by the fact that excludability is not total, for were this the case, then there would be no markets in any goods because excludability is never total. Market failure is in a sense ubiquitous; the existence of positive transaction costs means that all markets are in some sense imperfect; a point which is well enough recognised in respect of costs of communication and information, and should be recognised in respect of the costs of excludability. Market failure in the sense of there being no market occurs when we do not invest sufficiently to create excludability. *Ceteris paribus*, nonrival goods will require a larger investment to create excludability, but as the existence of IPRs constantly testifies, if we are prepared to incur sufficient transaction costs to create excludability, we can create it.

There is no difference in kind between tangible and intangible goods in this respect. There is a difference of degree between goods in respect of how difficult it is to make them exclusive, and this is in one dimension set by the technological condition of nonrival consumption. But there is another dimension to this. Providing excludability always involves transaction costs. Market failure in the sense of there being no market occurs at the point where the transaction costs of ensuring excludability exceed the benefit obtained thereby. In respect of our concerns here, market failure is determined by the extent to which we are prepared to invest in excludability as well as the technological difficulty of excludability posed by nonrival consumption:

> [M]arket failure is not absolute; it is better to consider a broader category, that of transaction costs, which in general impede and in particular cases completely block the formation of markets ? Market failure is the particular case where transaction costs are so high that the existence of the market *is no longer worthwhile* [our emphasis].[19]

Policy towards IP should be based on awareness of the social basis of all private property, including IP, but the fetishized conception of the IPR as 'private property' leads to two serious mistakes constantly being made. First, this fetishization results in the IPR being conceptualised in terms of the owner's *absolute* right of dominion, although subject to conditions and perhaps limited rights for others imposed in the public interest. Thus, the owner's right appears to be inherent and natural, whereas any limitations and conditions seem to be the result of an 'external' intervention by the state. This makes it hard to get the correct balance between innovator and imitator, for the private property right of the owner is always given special weight when it is, *ex post*, balanced against the right of the user. IP needs to be justified in terms of the balance between the rights of appropriation and the obligations of diffusion, but this *ex post* balancing inevitably prioritises the former. Were the balance struck *ex ante*, as it should be, when the decision is taken to create the private property right, this balance would be more likely to be optimising. The fetishized conception of private property is strongest in those modern systems of IP most firmly rooted in the natural rights perspectives originating in the Enlightenment, especially the authors' rights traditions in the continental European systems of copyright. However, even in the more pragmatic common law systems and in industrial property, the owner's right is that of dominion, and the rights of others are regarded as an intrusion.

The second mistake is that, if the simple assertion that IP is property is deepened into a consequentialist argument, the justification of IP then given borrows from the 'market' justification of private property when, really, it cannot do so at all. We have seen Sir Arnold Plant refer to Hume's justification of private property, and this, of course, is part of the erection of the system of natural liberty that is the best justification of the market economy. We have also seen that for Hume private property is justified as the best way to encourage the optimal utilisation of goods. However, nature is not frugal in this way with ideas, and IP is, in fact, one of the clearest examples of the artificial creation of a scarcity (monopoly) by the state. As Plant has brilliantly pointed out:

> It is a peculiarity of property rights in patents (and copyrights) that they do not arise out of the scarcity of the objects which become appropriated. They are not a *consequence* of scarcity. They are the deliberate creation of statute law; and whereas in general the institution of private property makes for the preservation of scarce goods, tending (as we might loosely say) to lead us 'to make the most of them', property rights in patents and copyright make possible the *creation* of scarcity of the products appropriated which could not otherwise be maintained. Whereas we might expect that public action concerning private property would normally be directed at the prevention of the raising of prices, in these cases the object of the legislation is to confer the power of raising prices by enabling the

> creation of scarcity. The beneficiary is made the owner of the entire supply of a product for which there may be no easily obtainable substitute. It is the intention of the legislators that he shall be placed in a position to secure an income from the monopoly conferred upon him by restricting the supply in order to raise the price.[20]

The IPR cannot be justified by reference to the market, for it is a monopolistic intervention which seeks to oust the market, often being justified in terms of the need to give a greater stimulus to production than that which the market would provide. We by no means wish to argue that IP monopolies (or other monopolies) may never be justified; even Adam Smith occasionally allowed this.[21] We want rather to insist that the justification of IPRs be considered against a far more sophisticated notion of market failure, one which does not simply believe markets are impossible in certain goods but which recognises that the question is whether the social expenditure on the transaction costs of creating (excludability and therefore) a market is worthwhile. The issue is one of comparison of alternative governance structures and, as has so often been the case with regard to public goods,[22] state intervention in the form of IP monopolies has been based on the belief that markets are impossible when the case for this simply has not been properly made out. Each case must be considered on its merits and not subsumed under a general notion of IP. Once this is done, we strongly suspect that a sensible business model incorporating markets and competition may be devised for almost all IP goods.

Such a model may very well not yield the revenues to the IPR holder that an absolute IPR monopoly would; but since such a monopoly would inevitably alter the rate at which certain innovations are developed, *prima facie* it is right that this should be the case. Rational pricing of the exploitation of the innovation is determined by market competition even when (as always) the market is imperfect; and it should take a very strong argument indeed to show that the distortion of pricing through the granting of monopoly rights will produce a superior outcome. Even if exploitation is slowed or prevented by competition, that is by no means itself sufficient to demonstrate the need for monopoly rights. As Plant has pointed out, the substitution of a rate of innovation determined by monopolistic intervention for the rate determined by competition is, in general terms, impossible to justify.[23]

There may, of course, as we have acknowledged, be specific cases when the argument for monopoly as opposed to a competitive market may be sustainable. Each case should, we repeat, be considered on its merits. Three points of general application should be considered whenever weighing up whether the (imperfect) market or the grant of a monopoly will produce a superior outcome:

1. by granting the monopoly, one is forfeiting the power of competition to determine the rate of investment in innovation and substituting for it a planned determination (by the monopolist and the state). As we believe there is no sensible way to determine an optimal rate of investment in innovation, for the problem is simply too difficult, we conclude that the overwhelming majority of claims to do so are typical examples of welfare economics' absurd scientistic confidence in quite arbitrary numbers. Plant's observation, made as long ago as 1933, remains true, that 'the science of economics as it stands today furnishes no basis of justification for this enormous experiment in the encouragement of a particular activity by enabling monopolistic price control'.[24] But if this is so, then recognising IPRs can represent a serious mistake. By giving some corporations extreme encouragement for investment in some types of innovation, IPRs would mean that the rate of such investment is too high. The exploitation is subsidised by the state underwriting extreme excludability, providing revenues to corporations far greater than they could obtain by competitive pursuit of excludability (by developing a good reputation, or highly valued products), while saving them most of the costs of establishing the necessary excludability. Current concerns over the rate of development in gene technology are a

perfect example of the sort of issue raised by this interference in competition.[25] (On the other hand, IPRs do create a more limited possibility of slowing down or closing off some innovation, and this raises the obverse of this argument, though we will not discuss this here).

2. in order to enforce the monopoly, the state grants potentially draconian remedies to private corporations. These remedies are not curtailed by being framed in terms of expectation as are normal commercial remedies, but, precisely because IPRs are not market based, expectation remedies are considered to be inadequate and the use of criminal sanctions, private injunctions, and swingeing damages 'calculated' on complete disgorgement or outright punitive bases are required. These enormous concessions of power (and indeed public subsidy as parties bear so little of the court costs) to private corporations are reminiscent of mercantilism rather than modern commercial life and represent a major cost in themselves, the cost of the undermining of legitimacy in the operation of the legal system as IPRs effectively grant a terror weapon to corporations prepared to wield it.
3. the availability of the monopoly rights will, of course, alter the behaviour of those who might take advantage of them. That a (potential) monopoly has no welfare enhancing basis can hardly be expected to prevent rent-seeking behaviour, and the extraordinary post-war growth of IP law in general and copyright in particular is a product of the revenues to be obtained from legal exploitation of the willingness to grant such monopolies.[26] There is, we submit, no sensible way in which to assess whether this sort of behaviour is of value on a cost-benefit basis; the only way to do this is to normally replace the monopoly with competition, and it should be recognised that whenever we create the monopoly, we are incurring the cost of (potential) regulatory capture and the diversion of corporate effort into rent seeking behaviour.

It is clear that much investment that now takes place under IP protection would not take place under competition, but unless one is fixated with the growth of output as a good in itself, as the governments of the advanced capitalist societies manifestly are, one might prefer less investment of this kind. For example, the level of investment in the mass marketing of pop groups is a phenomenon incomprehensible without IP for, especially as the music is so formulaic or even simply manufactured by the corporation, competition would certainly curtail this investment. In our opinion, which we believe is widely shared, much of this music has little value and the overwhelming part of the mass marketing of it is pernicious. Of course, one should not prevent this music being made or (perhaps with reservations) sold in this way; but, equally, on what possible ground are we extending extraordinary monopoly protection to allow such banal cultural products to establish an appalling hegemony, which rightly would be deprecated were a similar propaganda effort made by an authoritarian regime? Public regulation of this sort simply has lost any grasp of its public function, and is being hijacked for the purposes of private accumulation without any public justification. It is most eloquent testimony to the private property fetish at the heart of our understanding of IP that a truly enormous investment of public resources takes place without question in order to allow the most banal pop performer (and his backing corporation) to exact monopoly revenues. That the performer might be restricted by competition to reduced revenues or even that the world might be spared the Spice Girls or the like not by censorship but by removal of enormous public subsidy is not even raised as an issue.

Our argument so far has been that both tangible and intangible goods raise the problem of the transaction costs of creating excludability, but that the general conception of IP as property makes proper apprehension of this problem very difficult indeed. Creation of excludability in IP requires the special step of creating a monopoly, but whether this very costly step is worthwhile typically is not asked. The naturalistic view simply closes off all argument as a consequence of regarding IP as property. A somewhat stronger consequentialist argument may be made that the monopoly is necessary to allow IP goods to

be produced, but the typical way this argument is constructed is itself quite wrong. An idea of clear-cut market failure leads to the claim that the monopoly is needed to allow IP goods to be produced at all. However, the abrupt distinction between tangible and intangible goods on which this claimed market failure rests is never appropriate to the analysis of competitive commercial exploitation. We can see no general reason why a workable competitive model for innovation in most goods could not be produced. We entirely allow that a convincing welfare argument for monopoly might be made in the case of certain specific goods for which a competitive model cannot be produced. On the other hand, there are many goods (e.g. mass marketed pop) in respect of which we see no reason to dispute the verdict of the market that, as these are goods the value of which cannot offset the costs of their competitive production, they should not be produced. As a convincing welfare argument for intervention in respect of these goods cannot be made, no monopolistic encouragement should be given to their production.

Unlimited IPRs would be so draconian that the consequentialist argument recognises that there are no grounds on which their grant can be unlimited, and there are very many derogations from the various monopolies.[27] However, this way of tailoring the IPR, as a public interest derogation from what in its basic concept is regarded as an absolute private property right, makes it difficult to establish a workable rule for the welfare optimising use of the IPR.

Revenues: elastic property rights or reasonable remuneration?

In this section we will analyze the difficulties caused by the private property paradigm of IP, especially in managing the increasingly complex processes of innovation and creation inherent in the 'knowledge economy'.[28] We do not argue that the general concept of IPRs is unsuited to new technologies, far from it. The elasticity of the private property concept allows it only too easily to expand to provide protection for anything from computer software to DNA fragments. There is generally sufficient flexibility in the concepts defining the existing categories of IPRs to allow one or other, or even more than one, to cover any new technology: hence, computer programs have been protected both by copyright and patents, even though neither form is truly appropriate.[29] In other cases, legislatures have been lobbied to create *sui generis* private property rights, as with plant varieties, computer chip designs, and databases. In either case, it is normally assumed that some form of exclusive private property right is essential to stimulate and protect the investment needed to generate innovation.

To be sure, it is usually recognised that the extension of such rights can seriously restrict the diffusion of innovation. Hence, a consequentialist balancing of private rights of appropriation against the public interest in diffusion which is supposed to be safeguarded by limits and exceptions to those rights is central to modern IP. The fantastic irony is that it is the *restrictions* that are deemed to be impediments to the market, whereas of course it is the initial *creation* by the state of monopoly rights that distorts competition. In many ways, the balance of initial private rights and subsequent public interest exceptions makes it hard to design an effective property regime, which should be based on the appropriate specification of the initial rights. Such is the power of the private property paradigm that there has been only some hesitant discussion of a possible alternative approach towards what may be termed a competition-oriented system for remunerating innovation.[30]

The expansion of private rights and restriction of exceptions

The frequent response to arguments that IPRs are inappropriate for today's knowledge economy is that the problems posed are not new. Certainly, the contemporary debates in

many ways reflect those that accompanied the birth of IPRs in their modern form, notably the argument that private property in intellectual products is incompatible with the necessarily interdependent and interactive nature of creative and intellectual work.[31] However, the earlier debates took place in a context where technological and social change had broken apart the pre-existing forms of property. The patent originated as a means of circumventing guild control of innovation; while copyright was a form of state control of printing by licensing publishers, until reborn as an automatic right for authors to the fruits of their labour.[32] At the time of the birth of the modern system of IPRs, as part of the transition to industrial capitalism in the late 18th and first part of the 19th century, the new private property paradigm was a struggling infant.[33] Now it is a lusty giant, blocking the pathways of development of today's technologies.

Historical and contemporary evidence confirms that IPRs are important not to stimulate invention and creativity, as often claimed, but to mediate their social diffusion through commercialization. Even Britain, the cradle of the industrial revolution, had no effective modern patent system until the mid-19th century, after the main phase of scientific advance.[34] Contemporaneously, the enormous strides made in biotechnology, including the international effort to decode the human genome, have been to a great extent publicly funded - only subsequently have patent claims been made for commercial applications.[35] The economic justification for patent protection, on careful analysis, is limited at most to the need to reinforce the normal lead-time gained by an inventor, by obviating the need for secrecy, to enable optimal pricing for the commercial prospect offered by the invention.[36] Empirical evaluation of the effects of the complex processes of protection is even more damning:

> `Nonsensical as it may sound, the patent system is essentially anti-innovative. This is not just because it assists a very specialised sort of innovation and discourages other sorts. Much more important is that the patent system satisfies the requirements of those who need to feel that innovation is controlled and contained, that innovation is in its place, part of process. Most innovation is not like this at all.'[37]

Nor has the creation of literary and musical works ever required the protection of copyright, although the heroic figure of the author has been enlisted (not least by 19th century authors such as Charles Dickens and Victor Hugo) to press for steadily more extensive protection, essentially to ensure their very large remuneration through the sale of products resulting from that creativity. Thus, the key question is whether, and to what extent, an *exclusive* private property right is necessary to secure adequate remuneration.

Exclusivity has come to be defined differently in the two main pillars of IP which emerged historically.[38] For industrially useful technologies, patents (and related rights) provide a relatively short period of protection[39] under conditions which can be stringent (the product or process must entail a significant technological advance as well as industrial utility); but the protection against imitation, for example by reverse engineering, is absolute. A later-in-time independent inventor obtains no rights, unless the invention is clearly a distinct one. For creative works, copyright has given increasingly extensive terms of protection,[40] and the requirement of originality which establishes the threshhold of protection is generally set very low, but protection is only against copying, so emulation by independent means is permitted in principle. In practice, however, the presumption is against it, and infringement may also extend to non-literal copying, which makes reverse engineering hazardous, requiring specific provisions if decompilation is to be permitted.[41]

Copyright has also been greatly widened by its extension during the 20th century, firstly to so-called derivative works, which gave its protection to such essentially industrial products as sound recordings, cine films, sound and television broadcasts, and then to computer programs, which are essentially functional products rather than creative works. On the other hand, performers, to whom it may seem hard to deny the status of creative artist, have experienced greater difficulty in obtaining a property right.[42] Finally, when reproductive technologies (audio and video recorders and photocopiers) became widely available,

copyright was extended to give an owner the exclusive right to control reproduction 'in any manner or form'.[43] Thus, there has been a steady expansion of the scope of rights protected, and of what is meant by 'copying', to include the control of all kinds of ancillary acts, including adaptation, public performance, broadcasting, and most recently distribution and rental.

Despite the fiction that copyright is necessary to reward and encourage creativity, the truth is that an enormous number of creative works are disseminated free by their authors, while the remainder are mostly owned contractually by firms. Thus, the commercial exploitation of IPRs in practice is done not by the inventor or creator, but by a commercial developer or intermediary such as a publisher. Far from copyright facilitating the growth of the information economy, one leading copyright specialist and judge has gone so far as to say that:

> the fact that our system of communication, teaching and entertainment does not grind to a standstill is in large part due to the fact that in most cases infringement of copyright has, historically, been ignored'.[44]

Determining remuneration

From the economic perspective, a key question for IPRs is whether they should take the form of exclusive private property rights, or non-exclusive rights to appropriate remuneration. In practice, the commercialization of IPRs takes place through various forms of licensing, while their ultimate valorization comes from the sales of products usually embodying multiple IPRs. The development of commercial cultural or information products increasingly requires a combination of inputs often involving a large number of IPRs with many different owners. Thus, a multi-media product such as a DVD will involve many providers of content, both creative (music, lyrics, visuals) and technical (software). Similarly, bio-engineering products often depend on a variety of 'building blocks' or research tools, which their 'owners' may only be willing to licence on condition of an ownership share of the final product.[45] If the owner of each input has an exclusive private property right, the transaction costs of bargaining to obtain the bundle of rights at an optimal price may pose an insuperable obstacle.

An alternative approach to the private property paradigm is suggested by recent scholarship on the economics of IP which points out that a right to remuneration, based on a liability rule, can be in many ways superior to a private property right in creating the best conditions for bargaining to determine commercial value. This line of analysis originated with Calabresi and Melamed, whose famous rationalisation of the protection of some kinds of proprietary interests, most importantly against a pollution nuisance, by means of damages rather than injunction turned on the claim that denying the owner a 'blocking' right against the industrial development causing the pollution was welfare enhancing.[46] More recently, Kaplow and Shavell's comprehensive review[47] suggested that the preference for a property remedy to protect an individual's ownership of things is most appropriate for personal possessions, since they are likely to have a unique value to an owner, which would not be adequately reflected in a damages award. This would suggest that for nonrival goods such as IPRs, a liability rule would be adequate. However, these authors suggest that there may be an economic justification for property protection of IP, since if owners consider that the compensation they might receive would be too low, they would have too little incentive to develop and commercialize the asset.

Others have suggested that in some circumstances exclusive property rights can block effective economic use of assets. Thus, Michael Heller has pointed to the 'tragedy of the anticommons', in situations where multiple overlapping private property rights prevent the efficient combination of assets.[48] Countering this, Robert Merges suggests that court-

determined compensation is not the only means of obtaining collective valuation of assets, and he provides examples of how owners of property rights 'contract in' to collective valuation arrangements, such as patent pools and collective copyright licensing organisations.[49] Merges argues for 'voluntary' collective compensation processes, largely because IPRs are difficult to value, which is rather a circular argument. Indeed, the emergence of private organizations to manage licensing seems to indicate the failure of the private property paradigm rather than its success. In fact, this entire line of analysis strongly emphasises the importance of the initial definition of the entitlement, or the 'boundary' of the right, in establishing the basis for the pricing negotiations.[50]

This can be clearly seen in the history of the various forms of collective licensing which have been the main means for securing remuneration from the commercialization of cultural products via 'secondary' rights in the audio-visual industries which dominated the 20th century. The creation of a collective rights organization (CRO) has generally accompanied the legal recognition or protection of such a right, ever since the origins of CROs in France.[51] The legal framework for CROs has varied both between and within different jurisdictions, often depending on the relative economic, political, and cultural pressures generated by the creators and users of the works in question. Thus in the US the power of the recording industry ensured that music 'mechanical' (recording) rights were subject to a statutory licence, under which the royalty remained legislatively fixed at 2 cents from 1909 to 1978.[52] In contrast, music performances have been licensed by privately-formed organizations, beginning with the establishment of ASCAP in 1914. However, it is seriously misleading to characterise these as 'voluntary' bodies, and even Merges concedes that acceptance by users entirely depended on their coercion by litigation, and hence on the willingness of the courts to support property rights.[53] In fact, decades of legal battles entailed payment of enormous lawyers' fees which have rivalled the income generated for composers.[54] Resort by users to the antitrust laws resulted in consent decrees, which made the performing rights organizations in effect regulated bodies.[55]

From the private property perspective, licensing schemes merely offer a solution to the collective-action and transaction-costs problems for individual owners to control the use made of their property. From this angle, any element of compulsion to licence is considered an intrusion on the private property right, since it means that 'the exclusive right to authorise has been degraded to a mere right to remuneration'.[56] However, this assumes that the specification of the property right adequately and clearly reflects the incentives/access balance. Typically, however, new technologies create new forms of diffusion which require that balance to be reformulated:[57] A composer could hardly have expected to obtain the same royalty for airplays on the new-fangled wireless as might have been appropriate from music-hall performances. In practice, the levels of remuneration have been set by licensing schemes, which experience shows entail some compulsion on both sides, if only to set the parameters for negotiation. Thus, with the advent of photocopying in the 1970s, publishers revived the familiar refrain of 'piracy', although the real issue was the appropriate return (if any) that print publishers should obtain from the secondary market created by this new technology, and the legal battles focused on the extent of the 'fair dealing' exception.[58]

Hence, the regimes of collective administration of rights are increasingly a focus of conflict. On the one hand, private property idealists see them as at best a necessary evil, and deplore the notion that licensing should be compulsory, ignoring the reality that compulsion results from the definition of the property right. Others see them as powerful yet increasingly fragile, precisely due to the vain attempts to force them into a private property paradigm, and argue for their reconceptualization as forms of regulation.[59] In fact, despite the wide variety of types of organization for collective administration of rights, all involve regulation through collective contracts, generally overlaid to varying extents by competition or antitrust laws and/or specific statutory schemes.[60]

Regrettably, however, the extension of private rights over 'secondary' uses balanced only by limited exceptions in the public interest has now been established as an international requirement, in the Berne and TRIPS agreements, as a result of intense lobbying (amounting to 'regulatory capture') of international organizations by sectional corporate interests.[61] These agreements now require states to grant complete rights to control reproduction in all forms, subject only to 'limited exceptions in the public interest' and provided that such reproduction does not 'conflict with a normal exploitation of the work and does not unreasonably prejudice the legitimate interests' of the author or rights-holder: now described as the three-step test.[62] In practice, the test entails an evaluation of the availability of licensing and of the remuneration it produces. Thus, in the first complaint under these provisions, a WTO Panel decided that whether there is a conflict with 'normal exploitation' depends on whether licensing is available or could be introduced, and for the 'legitimate interests' requirement whether the exception might 'cause an unreasonable loss of income to the copyright owner'.[63]

Digital diffusion

These tensions are becoming even more acute with the advent of the new communications technologies. As the conflict over Napster starkly dramatized, literary or musical works can now be made available for download over the internet, dramatically reducing the marginal cost of access to information or cultural products (and shifting much of it to the consumer). From a business or economic viewpoint, this is a form of 'disintermediation', since the traditional role of the publisher is radically challenged if an author can now very easily offer direct access to a new work to anyone in the world with access to a networked computer. However, organizations which set themselves up as 'content providers' may succeed in establishing toll-booths on the information superhighway, either by providing value-added (e.g. convenience, or certification of reliability or quality), or by acquiring property rights from the authors and establishing monopolies. Furthermore, they may claim their own right to this assembly, either by analogy with encyclopaedias and compilations which have separate copyright protection,[64] or as a database.[65]

However, the shift to digital 'virtual' diffusion necessarily brings into question the very nature of the author's right to control reproduction. Simply accessing a work over the internet entails making a copy of it, and such copies can of course be freely replicated for other consumers. Equally, a product purchased in print, vinyl or disc format can readily be digitised, and hence shared by any number of consumers. This potentially creates vast new audiences for cultural and informational products, although these potential markets pose major challenges for valorization of the initial investments, given the extremely low marginal costs of access. Perhaps unsurprisingly, therefore, the new communications technologies are perceived mainly as threats by the vested interests which have come to dominate the diffusion of commodified knowledge and culture. Hence the campaigns against 'piracy' waged by organizations such as the International Federation of the Phonographic Industry (IFPI), which blames the Internet for the threat to its hitherto secure, monopoly-protected markets.[66]

At the same time, however, digital technologies and the Internet potentially offer a new solution: the power to control (and therefore charge) for access, or pay-per-view. Whether this can become established and accepted will depend on a wide variety of interrelated factors, involving social and cultural practices as well as political and economic decisions, embodied in legal regulation. Most importantly, it requires the creation of excludability, which entails strong state measures of intervention and investment of legitimacy. The new measures to ensure excludability are necessary because in the knowledge economy it is increasingly difficult to maintain a strict line between consumption and (re)production, on which commodification based on private property rights depends.[67]

Unsurprisingly, the large media conglomerates have made substantial investments in systems such as digital watermarks, encryption and content-management. These are euphemistically described as 'self-help systems' by enthusiasts such as Kenneth Dam, who inevitably analogises technological protection with the locking up of private property.[68] However, since any such technological fix can also be counteracted technologically, the self-help enthusiasts are ultimately very desirous of state protection. This entails a very significant state investment to attempt to reinforce excludability, by criminalizing anti-circumvention technology. A requirement to do so has now been internationally agreed,[69] and is being vigorously implemented in Europe and the USA.[70] Even more important than the potential resources involved in attempting to enforce these prohibitions, however, is the investment of legitimacy. There is undoubtedly a very powerful popular ideology which considers the Internet as a realm of freedom which should facilitate global human interaction, as far as possible without state or corporate control. This is accompanied by a great reluctance to pay toll-charges. Although decried as unrealistic by corporate interests, it can be seen as rooted in an instinctual understanding of the basic economics of digital communication: the virtually zero marginal costs of access (most of which are borne by the consumer).

The strong state backing to reinforce excludability of digital products via technical protection systems has given rise to concern from commentators about the reduction of public interest exceptions and limitations on copyright,[71] and even the intrusion on the privacy of consumers.[72] Indeed, one critic has gone so far as to say that 'The ultimate outcome of technological control and other attempts to reprivatize copyright … is a dramatic reduction in the utility of communication networks like the Internet. This privatization trend is transforming the Internet from a two-way medium of active cultural participation among citizens into a one-way medium for content distribution to passive consumers.'[73]

However, the viability of exclusive private rights is not simply a matter either of technology or of state sanctions. In effect, rights-management is becoming a specialised function, drawing to itself potentially enormous revenues, while also consuming very significant social resources. Far from being simple items of private property, the multi-media products the commercialization of which is being so heavily protected are themselves complex bundles of rights. These include not only rights in the 'creative' works involved (lyrics, music, text, graphics, performances) but also in the technological processes (software) involved, including the technical protection systems themselves.[74] Software providers do not sell a physical product but grant a licence to use their technology, which may assert rights over derivative works resulting from its use, creating complex problems of joint ownership.[75] In these circumstances, to treat copyright as an exclusive right rather than a right to reasonable remuneration is clearly inappropriate and unworkable.

The extension of patentability

For a variety of reasons the extent of private property rights has been far less in the case of industrial property, especially patents, and their limitation in the public interest greater, than in the case of copyright; although we suspect that this is due far more to the stronger commercial counter-pressures from users of technological innovations than to a rational consequentialist 'balancing'. Even here, however, the private property perspective has produced significant distortions. The contemporary debate about patenting of biotechnology is an example of this. Although it is widely considered that the patenting of the products of gene technology has gone too far, there seems to be no easy way to redress the balance within the current patent principles and practices.

Considerable public concern and debate has been aroused by reports that extensive claims have been made for the patenting of gene sequences.[76] Yet, the patenting of genetic engineering products has been presented as a natural and logical application of the basic

principles of patentability, simply extended to this new technology.[77] Certainly, patents have long been granted in the field of biotechnology, including living organisms. The fact that Louis Pasteur had been granted patents in 1873 for yeast used in fermenting beer helped the US Supreme Court accept that there could be no particular impediment to the patenting of living matter isolated by the new techniques of bioengineering, in its famous decision in *Diamond v Chakrabarty* (1980). However, Pasteur's patents were for a production process,[78] not for the micro-organism itself. In fact, for much of the 20th century patents were not generally available for chemical compounds, and were not usually claimed even for pharmaceutical drugs until the 1950s.[79] With the development of the new 'wonder drugs' (antibiotics, steroids, birth-control pills), patent offices began to accept the patentability of substances that occurred in nature but had been purified or isolated, and shown to have useful properties, by an 'inventor'. Thus, as Drahos and Braithwaite have convincingly argued:

> The patenting of genes, which through the 1990s increasingly drew more public attention, was the culmination of a business approach that had been evolving in the chemical, agricultural, seed and pharmaceutical sectors for all of the 20th century.'[80]

Lobbying by these industrial sectors (allied to that by media industries for copyright) resulted in the embodiment in the TRIPS agreement's article 27 of the sweeping requirement that:

> patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step, and are capable of industrial application.

However, the Agreement provides no definition of these basic patentability criteria of novelty, inventive step (non-obviousness), and industrial applicability (utility), although their application to bio-engineering products is far from easy. Thus, the position exemplified by the statement 'It is their molecule' tends to be substituted for adequate policy discussion.

In fact, the evidence has grown that that patentability criteria have been relaxed to allow the protection of routine (computer-generated) discoveries/inventions.[81] In this context, again, it has been suggested (notably by Jerome Reichman) that the appropriate alternative would be a compensatory liability regime.[82] In Reichman's version, this would be limited to low-level or routine inventions, although this raises the question of where the line should be drawn between innovations that have full property protection and the lesser 'incremental' ones.

If one can cast off the mystique of the private property ideology, the simple solution would be to recast IPRs as rights to compensation rather than rights to exclude. This would mean essentially that users would have an automatic licence, although the innovator would be entitled to appropriate compensation, rather than a right to exclude backed by the potential of injunctions and swingeing damages. Automatic licensing would certainly alter the balance of power between users and originators, but as experience with copyright licensing shows, it would result in licensing schemes of various kinds, and hence produce reliable revenues and greater stability and certainty for all. It would also make it easier to define with much greater subtlety the relative rights of different kinds of user, as well as calibrating rewards according to the importance of the innovation, as Reichman suggests. Originators will always have the option of keeping their innovations or works private, unless users are willing to offer reasonable levels of reward via licensing.

Although this solution is conceptually simple, and practically would be easier to implement than the increasing variety and complexity of IPRs, it faces the daunting obstacle of the treaties, culminating in TRIPS, which have erected international IP rules which in many ways embody the private property paradigm. At the same time, this process has now focused unprecedented public attention on the suitability of existing IP regimes for economic

development, especially of poorer countries. Combined with the growing concerns in the advanced countries as to the effects of strong IP rights in restricting the diffusion of innovation and distorting culture, there may be a basis for a radical rethinking.

Conclusion

As we hope this brief account has shown, the elasticity of the private property concept has greatly facilitated the continual extension of IPRs to the products of new technologies during the 20th century. This process is not new,[83] but it has culminated in the establishment of unprecedently high levels of protection as an international obligation under TRIPS. At every step of this process, when the extent of desirable IPRs has been debated, economic analysis has shown that the justification for such protection is at best limited. That they have nevertheless been continuously further extended is a tribute not only to the lobbying power of certain firms and industries but more, we suggest, to the ideological power of the private property paradigm.

The ideological argument for IP has two stages: tangible goods are considered to be natural property (due to scarcity) so are given (as close as possible to) absolute excludability; intangible goods, which also argued to require an incentive to be produced, are also treated as 'property' which should be given sufficient legal protection to give them similar excludability. Both stages of this argument contain numerous fallacies which conceal the necessity of social investment in excludability for all goods, and thus make very difficult the proper evaluation of whether such an investment is worthwhile. This question is particularly acute in relation to IP goods, not only because excludability is more difficult, but above all because it involves the creation and protection of monopolies. Even asking this question is anathema. Once IP is considered to be property, it is able to borrow the legitimacy of the market in tangible goods, even though IP rests on the ousting of that market by state intervention to create monopoly. Marx often used the metaphor of inversion to describe ideological perceptions of the world,[84] and surely this is what has happened in IP. In the world of corporate capitalism, state intervention to create monopolies (often for reasons for which there can be no publicly convincing welfare justification) can be perceived to be the extension of the market and the protection of purely private interests. The formulation of policy towards the creation of IP on the basis of this bewildered perception is bound to be extremely poor, and indeed it is.

Our analysis has also suggested what we believe is a significant way in which IPRs can be reconceptualised to begin to reduce the power of the private property paradigm. This reconceptualisation turns on the reintroduction of competition into the determination of the optimal level of investment in IP goods. This is possible in a far wider range of cases than is now admitted, and that it may mean some IP goods currently no longer produced will cease to be produced (e.g. mass marketing of pop songs) is not an argument against but an argument for the reintroduction of competition.

However, all this is *not* an argument for deregulation. As we have previously argued elsewhere,[85] no welfare enhancing market can be created without extensive state involvement. But that involvement does not have to take the form of monopolistic intervention, and though we acknowledge that there may be instances where the case for this can be made out, it has not been made out in the case of a great many existing IP rights. The main point we hope we have made is that the monopoly entailed in exclusive private property rights is not the appropriate starting point for determining the appropriate remuneration for either technological innovations or cultural products.

Notes

[1] Earlier versions have been presented at the joint annual meetings of the Law and Society Association and the Canadian Law and Society Association, Vancouver, May 2002 and at the WG Hart Workshop, Institute of Advanced Legal Studies, London, July 2002.
[2] Private e-mail to Sol Picciotto by a participant in a discussion list organised by the Commission on Intellectual Property Rights set up by the UK's Department for International Development, in response to an email making the point that IPRs confer control over access to and the dissemination of knowledge-based products.
[3] A. Plant, 'The Economic Theory Concerning Patents for Inventions', in A Plant, *Selected Economic Essays and Addresses* (London, Routledge and Kegan Paul, 1974) 35, p. 35. See further D Hume, *Enquiries* (3rd edn, Oxford, Oxford University Press, 1975) sec. 156: 'Who sees not … that whatever is produced by a man's art or industry ought, for ever, to be secured to him, in order to give encouragement to such *useful* habits and accomplishments? … What other reason, indeed, could writers give why this must be *mine* and that *yours*, since uninstructed nature surely never made any such distinction? The objects which receive those appellations are, of themselves, foreign to us; they are totally disjointed and separated from us; and nothing but the general interests of society can form the connection.'
[4] Ibid: 'in order to establish laws for the regulation of property, we must be acquainted with the nature and situation of man … and must search for those rules, which are, on the whole, most *useful* and *beneficial*'.
[5] P. Torremans, *Holyoak and Torremans Intellectual Property Law* (3rd edn, Sevenoaks, Butterworths, 2001) pp. 13-14.
[6] The *locii classicus* of Torremans' argument in the economic literature is K. Shell, 'A Model of Inventive Activity and Capital Accumulation', in K. Shell, ed, *Essays on the Theory of Optimal Economic Growth*, (Cambridge, USA, MIT Press,1967) 67.
[7] K. Marx, *Capital*, vol. 1, in K. Marx and F. Engels, *Collected Works*, vol. 35 (London: Lawrence and Wishart, 1996) p. 94. Hume, above n. 3, sec. 159 makes the same point, though, of course, he puts forward an immeasurably inferior dialectic (in Kant's sense) of the naturalistic error: 'if a man expose … what we call property to the … scrutiny of sense or science he will not, by the most acute enquiry, find any foundation for the difference made by moral sentiment. I may lawfully nourish myself from this tree; but the fruit of another, ten paces off, it is criminal for me to touch … nor is it possible, in the one case more than in the other, to point out, in the object, that precise quality or circumstance which is the foundation of the sentiment'.
[8] R.H. Coase, 'The Institutional Structure of Production', in R.H. Coase, *Essays on Economics and Economists* (Chicago, USA, University of Chicago Press, 1994) 3, p. 11.
[9] R.A. Musgrave, *The Theory of Public Finance* (Princeton, USA, Princeton University Press, 1959) p. 9.
[10] K.J. Arrow, 'The Organisation of Economic Activity', in K.J. Arrow, *Collected Papers*, vol. 2 (Cambridge (USA): Belknap Press, 1983) 133, p. 149: 'two sources of transaction costs [are]: (1) exclusion costs and (2) costs of communication and information, including both the supplying and the learning of the terms on which transactions can be carried out'.
[11] Torremans is hardly alone in downplaying the absolutely crucial importance of what Ian Macneil, the contract scholar who has paid the most fruitful attention to this, calls the '[s]overeign imposition of norms' by the 'external god' Leviathan (I.R. Macneil, 'Values in Contract: Internal and External' (1983) 78 *Northwestern University Law Review* 340, 370); that is to say, it is the vital matter of confining utility-maximisation within a normative framework which channels it into the form of rational economic action:[C]ontract between totally isolated, utility-maximising individuals is not contract, but war … contractual solidarity - the social solidarity making exchange work … at a minimum holds the parties together so that

they will not kill and steal in preference to exchanging [This is a matter of the] external god providing social stability, enforcement of promises, and other basic requirements. Within these rigid confines, the parties are free to maximise their individual utilities to their hearts' content' (I.R. Macneil, *The New Social Contract* (New Haven, USA, Yale University Press, 1980) pp. 1, 14). The law of contract obviously exists within such externally imposed confines, residing within a space provided by the criminal law's prohibition of, say, robbery.
[12] C.B. Macpherson, 'A Political Theory of Property', in C.B. Macpherson, *Democratic Theory* (Oxford, Oxford University Press, 1973) 120, pp. 123-131.
[13] K. Marx, *Grundrisse*, in K. Marx and F. Engels, *Collected Works*, vol. 28 (London, Lawrence and Wishart, 1986), p. 156.
[14] M. Boldrin and D.K. Levine, 'The Case Against Intellectual Property' (2002) 92 *American Economic Review (Papers and Proceedings)* 209. This paper rather too briefly states an argument set out at greater length in earlier working papers: M. Boldrin and D.K. Levine, 'Growth Under Perfect Competititon' (UCLA and Universidad Carlos III de Mardid, 1997) and M. Boldrin and D.K. Levine, 'Perfectly Competitive Innovation' (Federal Reserve Bank of Minnesota Research Department Staff Report 303, 2002).
[15] Though we do not wish to dwell on the matter, for a full discussion involves very complex issues about the specification of a 'good' for the purposes of general equilibrium theory, even the food example is more complex than it appears. A bag of chips can be shared if there are enough chips in relation to the number of eaters, although no doubt chip shop owners would prefer to be able to sell the chips in lots which prevent sharing; indeed, only relatively recently have bags of chips come to be sold in different sizes, something unheard of previously when sharing was an accepted part of the seller's and buyer's specification of the good. Can it be doubted that, again were it possible, fish and chip shop owners would sell chips to buyers under terms which compelled them to throw away any they did not eat rather than share them?
[16] P. Romer, 'When Should We Use Intellectual Property Rights?' (2002) 92 *American Economic Review (Papers and Proceedings)* 213, 214: 'Even if file-sharing will reduce revenue for the music industry and thereby reduce the variety of musical recordings, this need not cause a net reduction in consumer welfare'.
[17] Cf. the treatment of degrees of 'interdependence' in A.A. Schmid, *Property. Power and Public Choice* (2nd edn, New York, USA, Praeger, 1987) ch. 3.
[18] We are, of course, being too generous to the innovator in the way we put this question. If the innovator is able to claim an IPR, independent innovation and therefore exploitation not traceable to the innovation protected by the IPR, is also prevented.
[19] Arrow, 'The Organisation of Economic Activity', above n. 10, pp. 134, 139.
[20] Plant, above n. 3, p. 36.
[21] A. Smith, *The Wealth of Nations* (Oxford: Oxford University Press, 1976) 754. See further n. 69 to this passage supplied by the editors of the Glasgow Edition.
[22] R.H. Coase, 'The Lighthouse in Economics', in R.H. Coase, *The Firm, the Market and the Law* (Chicago, USA, University of Chicago Press, 1986) 187.
[23] Plant, above n. 3, p. 47.
[24] Ibid, p. 55.
[25] The state, of course, subsidises the development of gene technology in many ways in addition to granting IP monopolies, but this is generally very poorly understood. When this paper was presented to the WG Hart Workshop, a distinguished participant registered concern that our suggestions would interfere with the market in gene technology represented by the success of Wellcome! This is to say, 'represented' by a charity working intimately with a huge state subsidised research and development apparatus, including more or less completely nationalised health care and teaching and research hospital systems. Support of

gene research by Wellcome may be a good policy, but to believe that such a policy would be support of a market is hopelessly confused.
[26] Mr Justice Laddie, 'Copyright: Over-strength, Over-regulated, Over-rated' (1996) 5 *European Intellectual Property Review* 253.
[27] W. Nordhaus, *Invention, Growth and Welfare*, Cambridge, USA, MIT Press, 1969).
[28] D. Quah, 'Matching Demand and Supply in a Weightless Economy: Market-driven Creativity with and without IPRs' (LSE Economics Department, 2002).
[29] P. Samuelson et al., 'A Manifesto Concerning the Legal Protection of Computer Programs' (1994) 94 *Columbia Law Review* 2308.
[30] The term market-friendly is also appropriate although, unfortunately, it is likely to stimulate opposition from those on the political left who do not understand that markets are merely social institutions of distribution, and from those on the right who assume that a market necessarily requires strong private property rights.
[31] Pointed out most cogently in B. Sherman and L. Bently, *The Making of Modern Intellectual Property Law: The British Experience, 1760-1911* (Cambridge, Cambridge University Press, 1999) e.g. p. 38. While Sherman and Bently are undoubtedly correct to point out that the contemporary confrontations of IP law with cyberspace and biotechnology do not necessarily herald its death-throes, but can be seen as a continuation of a long history (ibid, pp. 1-2), this is not in itself an adequate justification for the solutions offered by IP law, either now or in the past.
[32] F.D. Prager, 'A History of Intellectual Property from 1545 to 1787' (1944) 26 *Journal of the Patent Office Society* 711.
[33] Thus, the House of Lords in *Donaldson v. Becket* ((1774) 1 ER 837) rejected perpetual common law copyright, confining the booksellers to their more limited protection of 14 years (renewable once for a living author) under the Statute of Anne; whereas now the internationally-fixed minimum is the life of the author plus 50 years (TRIPS agreement article 12), extended to 70 in major jurisdictions such as the EU and the US.
[34] H.I. Dutton, *The Patent System and Inventive Activity During the Industrial Revolution 1750-1852* (Manchester: Manchester University Press, 1984).
[35] G.A. Evans, 'The Human Genome Project and Public Policy' (1999) 8 *Public Understanding of Science* 161.
[36] E.W. Kitch, 'The Nature and Function of the Patent System' (1977) 20 *Journal of Law and Economics* 265. Applied research has focused on the role of patents in managing commercial interactions between innovators, starting from a neo-Schumpeterian view of the dynamics of competition based on innovation, and exploring the difficulty of exploiting scientific innovation if the only alternatives are secrecy or openness: M.D. McKelvey, *Evolutionary Innovation. The Business of Biotechnology* (Oxford, Oxford University Press, 1996).
[37] S. McDonald, 'Exploring the Hidden Costs of Patents', in P. Drahos and R. Mayne (eds.), *Global Intellectual Property Rights. Knowledge, Access and Development* (New York, USA, Palgrave Macmillan-Oxfam, 2002) 13, p. 34.
[38] J.H. Reichman, 'Legal Hybrids Between the Patent and Copyright Paradigms', in W.F. Korthals et al. (eds.), *Information Law Towards the 21st Century* (Deventer, Netherlands, Kluwer, 1992) 325, 329.
[39] Now extended to 20 years from date of filing by art. 33 of the TRIPS agreement.
[40] The internationally agreed standard is now generally the life of the author plus 50 years, although for collective works such as cine films it is normally 50 years from publication (Berne Convention, art.7; TRIPS, art. 12). However, it was extended to life of the author plus 70 years in the EU from 1995, and in the US by the Sonny Bono Copyright Term Extension Act 1998. For details of the progressive extensions of the copyright term in the US see Briefs

for the Petitioners in *Eldred v. Ashcroft* (currently pending a decision by the Supreme Court) and other material available from www.eldred.com.

[41] Art. 6 of the Council Directive on Legal Protection of Computer Programs, 91/250/EEC, enacted in the UK by a Regulation introducing a new s.50(B) into the Copyright Designs and Patents Act 1988.

[42] Thus, while authors have long been granted the exclusive right to authorise public performances of literary, dramatic and musical works, the extension of the Berne Convention to performers was resisted on the grounds that their less creative role should not be allowed to reduce the remuneration for authors (S. Ricketson, *The Berne Convention for the Protection of Literary and Artistic Works* (Deventer, Notherlands, Kluwer and Centre for Commercial Law Studies, Queen Mary College, 1987) ch. 15). Only under the Rome Convention of 1961 were performers given the more limited right to control fixation of their performances, although this has now been extended to a property right to control dissemination of those fixations as part of a general extension of rights over recordings (WIPO Performances and Phonograms Treaty 1996; Council Directive 2001/29/EEC, art. 3).

[43] Art. 9 of the Berne Convention, introduced in the 1967 revision, though this still leaves open the question of what constitutes reproduction (and Berne does not explicitly require it to be in a 'material' form, as does e.g. the UK legislation, Copyright Designs and Patents Act 1988, s.17(2)); however, the examples in the article made it clear that the right to authorise reproduction includes recording but not performance (Ricketson, above n. 42, sec. 8.6). Also, Berne applies only to literary and artistic works (but including cinematographic works, and adaptations or translations).

[44] Laddie, above n. 26, 257.

[45] R.S. Eisenberg, 'Bargaining over the Transfer of Proprietary Research Tools: Is this Market Failing or Emerging?', in R.C. Dreyfuss et al. (eds.), *Expanding the Boundaries of Intellectual Property. Innovation Policy for the Information Society* (Oxford, OUP, 2001) 223.

[46] G. Calabresi and A.D. Melamed, 'Property Rules, Liability Rules and Inalienability: One View of the Cathedral' (1972) 85 *Harvard Law Review* 1089

[47] L. Kaplow and S. Shavell, 'Property Rules versus Liability Rules: an Economic Analysis' (1996) 109 *Harvard Law Review* 713.

[48] M.A. Heller, 'The Tragedy of the Anticommons: Property in the Transition from Marx to Markets' (1998) 111 *Harvard Law Review* 621 and M.A. Heller and R.S. Eisenberg, 'Can Patents Deter Innovation? The Anticommons in Biomedical Research' (1998) 280 *Science* 698. See also I. Ayres and E. Talley, 'Solomonic Bargaining: Dividing a Legal Entitlement to Facilitate Coasean Trade' (1995) 104 *Yale Law Journal* 1027.

[49] R.P. Merges, 'Contracting into Liability Rules: Intellectual Property Rights and Collective Rights Organizations' (1996) 84 *California Law Review* 1293 and R.P. Merges, 'Institutions for Intellectual Property Transactions: the Case of Patent Pools', in Dreyfuss et al. (eds.), above n. 45, 123.

[50] For an economic analysis which demonstrates the superiority of a reward system over a private property right of innovation see S. Shavell and T. van Ypersele, 'Rewards Versus Intellectual Property Rights' (2001) 44 *Journal of Law and Economics* 525, who argue that the appropriate level of reward could be based on sales data, and if done continuously would be based on superior information than that available to an innovator who typically has to estimate *ex ante*.

[51] The creation of a right for authors over dramatic performances in France in 1791 resulted from pressures by an informal association instigated by Beaumarchais, which was formalised in 1829 as the SACD (*Société des auteurs et compositeurs dramatiques*); and the legal support for a right of composers over performances of their music in the famous legal action

in 1847 against the café-concert Les Ambassadeurs resulted in the creation in 1851 of SACEM (*Société des auteurs, compositeurs et éditeurs de musique*): see A. Schmidt, *Les Sociétés d'Auteurs SACEM-SACD: Contrats de Représentation* (Paris, France, Pichon and Durand-Audias, 1971).

[52] Although this has been criticized as rigid by Merges, 'Contracting into Liability Rules: Intellectual Property Rights and Collective Rights Organizations', above n. 49, 1313-4, it certainly succeeded in stimulating the massive growth of a recorded music industry, without noticeably diminishing the enthusiasm of composers to write songs. Under the 1976 Copyright Act, this became assimilated to a compulsory licensing regime, supervised by a Copyright Royalty Tribunal, established for cable, jukebox and public broadcasting performances.

[53] ASCAP was effectively empowered by the Supreme Court decision in *Herbert v. Shanley* (242 US 591 (1917)) which narrowly defined the 'for profit' limitation of the music performance right, to cover music played to entertain diners in a restaurant.

[54] J.M. Kernochan, 'Music Performance Rights Organizations in the United States of America: Special Characteristics, Restraints, and Public Attitudes' (1985) 21 *Copyright* 389, 398.

[55] The broadcasters also formed their own rival body to compete with ASCAP, the BMI, which accepted a consent decree shortly before ASCAP did: Kernochan, ibid, 395-9.

[56] H.C. Jehoram, 'The Future of Copyright Collecting Societies', (2001) 23 *European Intellectual Property Review* 134, 136.

[57] T. Gallagher, 'Copyright Compulsory Licensing and Incentives' (Oxford Intellectual Property Research Centre Working Paper Series No. 2, 2001).

[58] S. Picciotto, 'Copyright Licensing: The Case of Higher Education Photocopying in the UK' (2002) 9 *European Intellectual Property Review* 438.

[59] For the former view, see Jehoram, above n. 56; for the latter, M Kretschmer, 'The Failure of Property Rules in Collective Administration: Rethinking Copyright Societies as Regulatory Instruments' (2002) 24 *European Intellectual Property Review* 126.

[60] A relatively comprehensive survey is provided by D. Sinacore-Guinn, *Collective Administration of Copyrights and Neighbouring Rights: International Practices, Procedures and Organizations* (Boston, USA, Little Brown, 1993), who nevertheless tries to maintain that the 'golden rule' is that 'Collective administration must be designed and operated in a manner supportive of the private rights nature of creative rights' (ibid, 815). For a detailed analysis of the important role of regulatory contracts in France see Schmidt, above n. 51.

[61] M.P. Ryan, *Knowledge Diplomacy: Global Competition and the Politics of Intellectual Property*, (Washington DC, USA, Brookings Institution Press, 1998) and P. Drahos and J. Braithwaite, *Information Feudalism: Who Owns the Knowledge Economy?* (London, Earthscan, 2002) chs. 4-9.

[62] This wording from art. 9 of the 1967 Stockholm revision of the Berne Convention has been transposed into article 13 of TRIPS, but with the significant replacement of 'author' by 'rights holder'. For a more general critique of the way in which the TRIPS agreement prioritises private rights over public interests, see S. Picciotto, 'Defending the Public Interest in TRIPS and the WTO', in Drahos and Mayne, (eds.), above n. 37, 224.

[63] Report of the Panel, World Trade Organisation, 'United States – Section 110(5) of the US Copyright Act' (document WT/DS/160/R, 15 June 2000) para. 6.229.

[64] 'Collections of literary and artistic works such as encyclopaedias and anthologies which, by reason of the selection and arrangement of their contents, constitute intellectual creations shall be protected as such, without prejudice to the copyright in each of the works forming part of such collections': Berne Convention, art. 9(5).

[65] The European Council Database Directive (96/9/EEC of 11 March 1996, implemented from 1998) requires full copyright protection for 'databases which, by reason of the selection or arrangement of their contents, constitute the author's own intellectual creation' (art. 3); but also creates a new right for the maker of a database 'which shows that there has been qualitatively and/or quantitatively a substantial investment in either the obtaining, verification or presentation of their contents to prevent extraction and/or utilization of the whole or of a substantial part…' (art. 7). The term of protection is 15 years from the 'date of completion', but since of course most such databases are continually extended, the term may also extend indefinitely. The owner is protected (against both lawful and unlawful users) from 'The repeated and systematic extraction and/or re-utilization of insubstantial [sic] parts of the contents of the database implying acts which conflict with a normal exploitation of that database or which unreasonably prejudice the legitimate interests of the maker' (art. 7.5); although 'extraction' and 're-utilization' are defined more restrictively, applying only to all or a substantial part of the database, and requiring transfer to another medium (extraction) or making available to the public (re-utilization). Exceptions may allow lawful users rights of extraction for the purposes of illustration for teaching or scientific research (art. 9.b).
[66] S. Sanghera, 'Executives Worry About Piracy, but Their Preoccupation with Marketing and Inability to Develop Enduringly Successful Bands May Pose a Bigger Threat' 15 November 2002) *Financial Times*.
[67] C. May, *A Global Political Economy of Intellectual Property Rights: The New Enclosures?* (London, Routledge, 2000).
[68] K.W. Dam, 'Self-Help in the Digital Jungle', in Dreyfuss et al (eds.), above n. 45, 103. Dam also freely accepts that although the contents that may be protected in such ways do not necessarily 'belong' to the protector, and the Digital Millenium Copyright Act is aimed at circumvention only of copyright-protected works, the prohibition of anti-circumvention technology would also create excludability for any works.
[69] WIPO Copyright Treaty of 1966, art 12.
[70] The US Digital Millenium Copyright Act of 1998 (now US Code annotated Title 17, ch. 12 on Copyright Protection and Management Systems) and Council Directive 2001/29/EEC, arts 6 and 7.
[71] J.R. Therien, 'Exorcising the Specter of a "Pay-Per-Use" Society: Toward Preserving Fair Use and the Public Domain in the Digital Age' (2001) 16 *Berkeley Technology Law Journal* 979; D. Nimmer, 'A Riff on Fair Use in the Digital Millennium Copyright Act' (2000) 148 *University of Pennsylvania Law Review* 673; J. Sheets, 'Copyright Misused: The Impact of the DMCA Anti-Circumvention Measures on Fair and Innovative Markets' (2000) 22 *Hastings Communications and Entertainment Law Journal* 1.
[72] L.A. Bygrave, 'The Technologization of Copyright: Implications for Privacy and Related Interests' (2002) 24 *European Intellectual Property Review* 51.
[73] M. Jackson, 'Using Technology to Circumvent the Law: The DMCA's Push to Privatize Copyright' (2001) 23 *Hastings Communications and Entertainment Law Journal* 607, 608.
[74] P. Brown, 'Digital Rights Management Technologies [2002] *Practising Law Institute (Patents)* 691.
[75] C. Field, 'Copyright Co-Ownership in Cyberspace: The Digital Merger of Content and Technology in Digital Rights Management and E-Commerce' (2001) 19 *Entertainment and Sports Lawyer* 3.
[76] A US Patent Office official has been cited as stating that by September 1998 as many as 500,000 claims had been filed for patents on gene sequences: Crucible Group, *Seeding Solutions* (Ottawa, Canada, International Development Research Centre, 2000) n. 120.
[77] Thus Philip Grubb states 'there is no reason why the basic requirements for patentability should not apply in the field of biotechnology as in any other', although he concedes that 'the

inherent complexity of living systems is such that it becomes more difficult to ensure that these requirements are met where living organisms are involved': P.W. Grubb, *Patents for Chemicals, Pharmaceuticals and Biotechnology: Fundamentals of Global Law, Practice and Strategy* (Oxford, Oxford University Press, 1999) p. 226.

[78] The Letters Patent granted in the UK on 24th August 1871 (No. 2225) were for 'improvements in brewing'; those in France (Brevet no. 98476 dated 13 March 1873) for procedures of manufacturing and conserving beer, and the US patents 135,245 (28 January 1873) and 141,072 (22 July 1873) were for Brewing Beer and Ale and Manufacture of Beer and Yeast. I am grateful to Louise Davies for unearthing these patents.

[79] Grubb, above n. 77, p. 66; Drahos and Braithwaite, above n. 61, pp. 152-3; and P. Temin, 'Technology, Regulation and Market Structure in the Modern Pharmaceutical Industry', (1979) 10 *Bell Journal of Economics* 429.

[80] Drahos and Braithwaite, above n. 61, p. 158.

[81] Nuffield Council on Bioethics, *The Ethics of Patenting DNA* (London, Nuffield Council on Bioethics, 2002).

[82] J.H. Reichman, 'Of Green Tulips and Legal Kudzu: Repackaging Rights in Subpatentable Innovation', in Dreyfuss et al. (eds.), above n. 45, 23. Reichman also argues for a compensation regime for 'hybrids': J.H. Reichman, 'Legal Hybrids between the Patent and Copyright Paradigms', (1994) 94 *Columbia Law Review* 2432 (part of a Symposium: Towards a Third Intellectual Property Right Paradigm).

[83] See D.F. Noble, *America by Design* (New York, USA, Knopf, 1977) and Drahos and Braithwaite, above n. 61, ch. 3.

[84] Marx, above n. 7, p. 19.

[85] D Campbell and S Picciotto, 'Exploring the Interaction Between Law and Economics: The Limits of Formalism' (1998) 18 *Legal Studies* 249.