

practical applications, but these may be quite general. In America, the Patent Office declared its policies in favour of patenting genes were 'unaffected' by the Blair-Clinton statement. Business as usual.

The Central Banks

The American, European and Japanese patent offices are the 'central banks' of patent property. They sit in the middle of a comprehensive network of researchers, inventors, entrepreneurs and corporations who increasingly believe that they must patent not only what they sell but how they sell it. For them, patents and trademarks are the core of their business: their main product and competitive advantage. For compelling reasons, they are driven to privatize as much as they can. They usually have the support of their shareholders, who want healthy balance sheets, and of their governments, who want healthy industries. The 'central banks' issue the currency.

Their chief purpose is to award as many patents as possible. The first objective of the British Patent Office is to 'stimulate innovation and the international competitiveness of British industry through the promotion and understanding of intellectual property rights'. It has a 'clear focus on customer satisfaction'. To that end, it provides a range of educational and advisory services. It leaves Parliament to settle the social and moral framework within which it operates, although Parliament has shown little interest, discussing patents only twice in twenty years. The mission of the US Patent Office is to 'promote the use of intellectual property rights as a means of achieving economic prosperity'. Its internal noticeboards are more punchy: 'To Help Our Customers Get Patents'.

It is a profitable business, this banking of ideas. The US Patent Office had revenues of about \$830 million in 1999 and profit, depending on how the government allocates the overhead, of \$90-190 million. The British Patent Office recorded revenues in 2000 of £52 million and profits of £13 million. Its accumulated surplus was £113 million.

Meanwhile, the customers are banging on the door. The gold rush has become too general a metaphor to have much meaning, but we are seeing a gold rush in the search for patents, both old and new. It is not the first time. In 1882 the US Supreme Court, faced with a rush of applications, said, 'An indiscriminate creation of exclusive privileges

tends to obstruct rather than stimulate invention. It creates a class of speculative schemers who make it their business to watch the advancing wave of improvement, and gather its foam in the form of patented monopolies, which enable them to lay a heavy tax on the industry of the country, without contributing anything to the real advancement of the arts.' Looking at the advancing waves in Washington, Tokyo and Munich, not much has changed.

There is a boom in specialist advisers who encourage companies to apply for more patents (for instance Aurigin, QED, BTG and other 'patent mining' companies). Aurigin provide 3-D maps of industries showing where patents are crowded close together, which appear as hills, and where they are scarce, which look like valleys. They advise prospectors to head for the valleys and to take out speculative patents. Kevin Rivette of Aurigin is a specialist in maximizing a company's patent assets, including searching for patents the company has forgotten (as described in his enticingly named book, *Rembrandts in the Attic*). Many technology-based companies have a storehouse full of their own patents that are not being fully exploited. Aurigin has developed a technique for a company's patent strategy called 'patent mining' which determines which it should grow, reinforce or sell. Aurigin has many examples of companies that do not know what patents they have, and how they might help their future business. Ben du Pont, one of the heirs to the Du Pont fortune, has started a company called Yet2.com which provides a business-to-business exchange for patents and rights. Launching the company, du Pont was quoted as saying, 'I worked at Du Pont for fourteen years and hadn't the foggiest about what we had for licensing.' For a small fee, Yet2.com will list a patent and seek buyers. IPNetwork.com does the same for copyrights and trademarks, InterDigital for wireless patents.

Usually, their deals are confidential, but occasionally they become public news. BT applied for patents for its hyperlink technology in the 1970s. Most offices awarded a patent which expired over the next 15-20 years. The American patent was appealed and so not effective until 1986. By that time, BT had lost interest. Then in 2000 BT suddenly discovered its patent (no. 4,873,662) rusting somewhere in its Suffolk research centre, and started the difficult process of charging licence fees to companies which had been using the technology in the belief that it

was free. BTG, a company that assists people to find their 'Rembrandts', estimates that companies like BT are losing up to \$100 billion worth of licensing revenues. It describes its own staff as 'merchant scientists'.

The strains are beginning to show. Rivette has criticized the US Patent Office for 'serious deficiencies in staffing, resources and examination procedures'. A hint of the scale of the problem came in 1999 when it appointed an extra 1,000 staff, including 850 examiners, bringing the total to 3,500, an increase of 40 per cent. The British Patent Office's examining staff rose more modestly over the same period by ten; from 205 to 215. According to Greg Aharonian, whose Internet Patent News Service provides an invaluable 'reality check' on patenting policy, the US Patent Office's staff turnover is high at 20 per cent a year, and over 50 per cent of the examiners have been there for less than two years. He gives persuasive evidence that their technical knowledge and legal expertise is not good enough.

These examiners are the heart of the patent process. They are the front-line people, usually working on their own, who decide whether a patent should be awarded. They should justify each decision by reference to citations either from the office's own archives, centred on previous applications, or in relevant science and technical journals. These sources are sufficient if a technology is developing slowly. They are not adequate if the technology is developing very fast; if its inventors operate outside conventional research or academic circles; or if they are spread over many countries speaking many languages. The Internet Patent News Service estimates that over 50 per cent of American software patents do not cite any 'prior art', which patent experts have criticized as being sloppy and probably illegal.

The US Patent Office is the most powerful central bank of all. The American patenting system, comprising Congress, the Patent Office and the courts, has an exceptional influence on global policy on what should and should not be patented. The Patent Office has dealings every day with the world's largest corporations and R & D organizations; it is literally at the defining edge of what is new and innovative. Its decisions affect where the line is drawn between public and private, and thus influence corporate fortunes in America and worldwide. Although an American patent is enforceable only in America, it automatically becomes 'prior art' and the idea cannot be patented elsewhere

except by the holder of the original patent. If one office is quicker and more generous with its patents then it tends to set the pace worldwide. Other countries follow America's policy for reasons of economic self-interest. They admire America's ability to turn ideas into profitable invention. They wish their own national companies were similarly profitable. They know that American corporations will not invest abroad where their rights are not protected.

Creating wealth through patents is as reasonable a business proposition as drilling for oil or making cars (or writing a book). Patent offices and patent holders can reasonably claim the current system fits society's general view about what should be public and what may be private, without too many upsets or changes of direction. But the critics are becoming more vociferous. All patent offices are technology-neutral; in other words they apply the same principles of novelty, inventiveness and technical effect regardless of the technology, whether it be a mechanical device or a business method. This principle, which served well for over a hundred years, is too general when technology's meanings and effects are so wide. In terms of computer programs and business methods, the lines of demarcation are very blurred, and the differences between America and the rest of the world are awkward. In terms of plants and animals, moral questions are unanswered. Industry wants to dismantle the barriers between what Mother Nature is and what companies are free to make. Some countries, unconvinced that they should hand out twenty-year monopolies on such matters, have revived ideas for a 'minor' or 'petty' patent which provides a lower level of protection for a few years and which can be provided more cheaply and quickly.

The patent system is both conceptually troubled and administratively overburdened. The US Patent Office has the most problems; although, to its credit, it is also the most open about them, publishing a White Paper on the patenting of business methods, as we have seen, and setting up quarterly forums in business methods and biotechnology. The system is unlikely to break down. Equally, the decisions taken now in Washington and elsewhere are rewriting the property contract. The deliberate effect is to privatize a wider range of ideas and knowledge in ways that we cannot fully grasp but which, if misguided, will be hard to change.

The public needs to state its claims alongside those of the commercial prospectors, and it needs to do so forcefully. At present, patent offices deal daily with their customers and the courts; seldom with politicians, and hardly ever with the public. They regard themselves as functionaries, deliberately keeping away from the moral, social and political complexities of the creative economy. As a result, the public is not being well served.

The first step is for each country to ensure its national patent office serves not only its customers but the public as well. Second, all offices, not just the trilateral club of Washington, Tokyo and Munich, should work more closely together. In a global economy, the rules of ownership should be democratic and consistent.

COPYRIGHT

Copyright offers a different version of the property contract. It exists only in 'qualifying' works which can be grouped into three categories: literary, dramatic, musical and artistic works, films and TV programmes; performances and broadcasts; and the typographical arrangement of published works. Literary and artistic works are not limited to what the public might regard as such; for example, the law treats a wiring diagram as an artistic work.

The work must fit the category, must be original, and must have involved the author's skill and labour, although the test of originality and skill is lower than the similar tests for a patent. A qualifying work does not need to have any 'novelty or aesthetic value'. However, it does have to be the result of 'independent intellectual effort'. The resolution to this seeming contradiction is that a work has to be original not in the sense of the idea but the expression. The idea can be a copy; but the expression must be original.

In some ways copyright provides a less substantial reward than a patent. Instead of giving monopoly protection to an idea, albeit an idea with a technical application, it gives no protection at all to an idea and protects only a work. But it does have its advantages. All 'works' that qualify are automatically protected and do not have to be registered (uniquely, America does maintain a vestigial registration

system but all qualifying works are still assumed to be copyright). Instead of a patent's twenty-year monopoly, copyright provides longer term protection, usually the author's lifetime plus seventy years. Copyright is not a right to do anything, let alone a monopoly right; rather, it is a right to stop others doing something.

The economic case for patents can be easily stated. I invest my time and money in developing a new scientific process or product which has practicality, usefulness and economic value (so I hope). Society wishes to enjoy the social and economic benefits of my inventiveness and grants me a temporary monopoly so I can make a profit. The case for copyright is less clear-cut and remains unclear to many people.

The problem is twofold. One, societies that are open and democratic assume that individual expressions of a literary and artistic nature should be freely shared as part of ordinary discourse. We do not 'own' our contribution to a conversation. We do not own wit. We do not own insight. So why should people own their literary and artistic expressions merely because they write them down, or perform them? Two, whereas an inventor almost certainly does incur some economic costs, and his invention will have an economic value, an author may incur no cash costs and his product may have no economic value. In turn, the author protests: my works are as valuable as any machine (if not more so, he may think privately); and I have worked hard and long and I must eat (and not only eat, he thinks, but have the chance to be as rich as anyone else).

This uncertainty is evident throughout the history of human expression. Many early societies treated artistic and creative expression, notably writing, painting and music, as belonging to the whole of society rather than to the individual. In Asia, many languages associated with the Islamic and Hindu religions have no word for artist. Concepts of individual authorship and individually-owned expression began to emerge in classical Greece but withered away in the early Christian period and the Middle Ages. Martha Woodmansee of Case Western Reserve University, and author of *The Author, Art and the Market*, says that writers and artists believed themselves to be vehicles for divine inspiration, and thus not entitled to benefit personally from their work. 'Freely have I received,' Martin Luther said of his writing, 'freely given, and want nothing in return.' Authors' rights emerged as

one of the characteristics of secular humanism during the Renaissance, from the fifteenth century onwards. According to the Whitford Committee's Report on Copyright in 1977, English case law recognized an author's rights over his work from the fifteenth century onwards, but only later did Parliament approve a legal code to protect those rights; and only much later did copyright provide a major source of income to authors.

The invention of printing in the mid fifteenth century was a prime stimulus of individual authorship, but for many years the 'stationers', as Britain's printers and publishers were called, benefited more than did the writers, and it was the same in other countries. Under the terms of a royal patent the stationers exercised exclusive guild privileges and operated a register and licensing system for every new book. Throughout the sixteenth and seventeenth centuries many writers were content with these arrangements. They were less concerned with protecting their work than having it published in the first place. Most received the bulk of their income not from sales but from state or private patronage. The commercial rewards for writing were not great; John Milton's publisher paid £10 for *Paradise Lost* in the 1660s, though his wife received a further £8 after his death.

Around the time of the Civil War the political mood changed. The stationers' guild lost its exclusive privileges. Authors began to assert their economic rights. Most of the writers lived in London and knew each other (an early example of an economic cluster becoming a successful pressure group) and when the printers' increasingly interperate demands for new work exceeded the writers' wish or capacity to write, they found themselves in a strong negotiating position. They lobbied for an act of parliament to stop printers and publishers who 'have of late taken the liberty of printing, reprinting and republishing books without the consent of authors'. Writer Daniel Defoe argued splendidly that 'A book is the author's property, tis the child of his inventions, the brat of his brain.' Queen Anne's parliament duly passed the world's first Copyright Act in 1710. The Act laid down the fundamental principle that the author has 'the sole right and liberty of printing books'. Defoe, whose *Robinson Crusoe* was published in 1719, was able to say proudly, 'Writing . . . is become a very considerable branch of the English Commerce.'

In America, the business of printing was also protected by patents before its works were protected by copyright. The General Court of the Massachusetts Bay Colony granted a nearby printer the exclusive patent to print its General Laws and Liberties as early as 1672, but the federated states did not pass laws on author's copyright until the 1780s. Thomas Paine, Noah Webster and other writers based their demands for copyright on the natural law of Hobbes and Locke, given a twist by their own political independence and belief in free speech. As copyright historian Ronald Bettig puts it, the laws assumed 'an inherent connection between creativity, profit and social welfare'. In spite of the states' anti-colonial fervour, most modelled their laws on the English Act. Congress passed the first federal law in 1790.

Following Queen Anne's Act, the English (now British) parliament progressively widened the number of qualifying works and invented new rights, chiefly as the result of new technology. Engravings won protection in 1734, textile designs in 1787, sculpture in 1814, musical performances in 1833 and paintings, drawings and photographs in 1862. It might seem odd that paintings had to wait so long. But copyright is exactly what it says: a right to copy. Paintings have always been protected as private property, and they won protection as intellectual property only when the technology produced copies that were attractive to buyers.

Some of the nineteenth-century reforms of intellectual property caught the public's attention in ways that are difficult to imagine today. The five-year debate in Parliament on extensions to the duration of copyright, which led to the 1842 Copyright Act, attracted 500 petitions with over 30,000 signatures, and many public meetings. The majority attacked copyright as a tax on knowledge. Thomas Babington Macaulay called it a 'tax on readers for the purpose of giving a bounty to authors'.

Today's copyright laws in Britain and elsewhere follow the general principles of Queen Anne's. There is still no copyright in ideas, or in creativity. Creativity is the fuel of the process but it is not itself protected. As I mull over the writing of this next sentence, the various phrases in my head are not copyright works and have no protection. But, once written, the sentence does. When the idea is fixed on to a medium then the law kicks in; lawyers talk of the act of 'fixation'.

The standard term, as we have seen, is the author's lifetime plus seventy years, but there is very little that is standard or clear-cut about copyright terms, coping as they must with a wide variety of works that may have different, multiple or even unknown authorship. Literary works (including plays, musical compositions, artistic works, films and TV programmes) qualify for the author's lifetime plus seventy years. Performances such as sound recordings and broadcasts qualify for fifty years from when they were made. Typographical settings qualify for twenty-five years. The spread of electronic distribution by satellite, cable and the Internet has stimulated a radical reassessment of these rights.

There are five logical stages to the concept of copyright as a force in the creative economy. The *author* comes first, a term which includes not only writers but other creators of a work. Second, the author's *action* on an idea creates a work. This action must involve skill and effort. It cannot be accidental or thoughtless. Third is the *work* – the text, image, performance, publication, broadcast, etc. Fourth, the law specifies the kinds of *rights* that are protected. Each work has a large number of different rights that may be sold or licensed in terms of different media, territories, languages, time periods, etc. Fifth, a *transaction* takes place in which the rights-holder allows, or prevents, others from making copies. A transaction may be an agreement between author and intermediary, intermediary and intermediary, or intermediary and user. Again, the variations are almost infinite.

These five stages have an internal logic in business and legal terms. I create something; and I let you copy it, or not. The logic works in all media. The twin peaks are the author's work (however defined) and copying (however defined). The main forms of work are straightforward, and the idea of copying is familiar from school and everyday life.

The Digital Flip

Digital information ignores this traditional logic. It subverts the familiar principles of creation and copying. A digital binary digit, or 'bit', keeps its unique characteristic for ever. It can be endlessly moved, copied and edited without being at all damaged or degraded. It can be merged and converged without losing its individual meaning. A

bit stream can also be compressed to a fraction of its size without appreciable loss, which increases the speed of transmission.

The traditional five-stage logic of copyright is outmanoeuvred: the essence of computer processing is to reduce words and images to data, manipulate them in whichever way is desired, and then reproduce them as perfectly as the original; the essence of the Internet and other networks is to move these data around the world and reproduce them irrespective of national laws and local business structures. Together, these two processes redefine the nature of media. In its 1994 Green Paper on *The Internet and Copyright*, the US Department of Commerce said, 'The distinctions between authors, producers and performers are becoming irrelevant.' The basic definitions of 'original' and 'copy' imply a hierarchical master/servant relationship between the original and a copy. Digital flips this assumption on its head.

The US National Academies, reporting on *The Digital Dilemma* in 1999, said:

The problem is illustrated simply enough. A printed book can be accessed by one or perhaps two people at once, people who must, of course, be in the same place as the book. But make that same text available in electronic form, and there is almost no technological limit to the number of people who can access it simultaneously, from literally anywhere on the planet where there is a telephone (and hence an Internet connection). At first glance, this is wonderful news for the consumer and for society. The electronic holdings of libraries (and friends) around the world can become available from a home computer, twenty-four hours a day, year-round. They are never 'checked out.' These same advances in technology create new opportunities and markets for publishers. But there is also a more troublesome side. For publishers and authors, the question is, How many copies of the work will be sold (or licensed) if networks make possible planet-wide access? Their nightmare is that the number is *one*.

John Perry Barlow, a former cattle rancher and Grateful Dead lyricist who is a co-founder of the Electronic Frontier Foundation, an Internet body committed to free speech, argues this case vividly, with approving nods to Thomas Jefferson: 'We're going to have to look at information as if we've never seen the stuff before . . . The protections that we will develop will rely far more on ethics and technology than

on law . . . Encryption will be the technical basis of most intellectual property protection . . . The economy of the future will be based more on relationship than possession.' He welcomes this. 'Most of the folks who presently make their living by their wits do so not under the protection of legally instantiated methods of 'owning' their own intelligence or expertise but by defining value on the basis of a continued and deepening interaction with an audience or client base.' In the creative economy, these relationships (personal, original, meaningful) are the main enduring source of value.

Some people say it is not necessary to own creative property in most media outright. Jeremy Rifkin, author of *The End of Work* and *The Age of Access*, says we are turning from a society of sellers and buyers to one of suppliers and users. Ownership is being replaced by access. The critical question is not who owns something but who has access to it, who can use it. Intellectual property law has close similarities with landlord-tenant relationships; for example in the tension between a landlord's absolute rights and a tenant's partial and temporary rights. In terms of intellectual property, we are moving from a society of owner-occupiers to tenants; we are becoming nomads.

Esther Dyson, publisher of an Internet industry newsletter, *Release 1.0*, and author of a book, *Release 2.0*, assumes the collapse of intellectual property is inevitable. She foresees a new business model in which, while the formal kinds of intellectual property lose economic value, the surrounding add-on elements, such as service and support, gain in value. She believes the latter will more than compensate for the loss of the former. She believes that intellectual property is becoming less protectable, and that more money may be made by giving it away for free to entice customers to spend money on contingent goods and services. She writes, 'The likely best defence for content providers is to distribute intellectual property free in order to sell services and relationships.' Her theories echo the traditional marketing principle followed by Gillette, for example, which sells its razors at well below their marginal cost in the certain knowledge it will be able to charge a high price for its blades (in economic theory, to charge an excess rent). She extends the principle into the realm of intangible products and copying. She says, 'In the new world it will be easy to copy information but hard to find it . . . Creativity will proliferate but quality will be

easy and hard to recognize.' Dyson is right that original (copyright) products may become less valuable than the subsequent (trademark) goods and services. But few companies can afford to take this risk, if only because they cannot be certain they will retain control of the features.

The Music Goes Round and Round

The National Academies' nightmare of the single copy seems closest in the case of music. Music takes to digital technologies like a duck to water. Sound is pure physics and occupies no material space. In digital terms, it has little information and requires little bandwidth or storage space. It may be objected that the quality may be patchy, but we accept scratchy sound much more readily than indistinctly printed words or murky pictures, and the quality will improve. Other industries are hovering at the water's edge. Books and magazines need more bandwidth, especially if they incorporate a high level of design, and we have become more aware of their convenience and fond, as ever, of their social status. Books are powerful symbols of learning and knowledge (as Anthony Powell wrote, 'books do furnish a room'). These connotations could fade away, but people have been predicting the end of the book for decades and sales continue to rise. Films and TV programmes require another order of magnitude of bandwidth as well as big, high-quality screens. So music leads the way. Ben Keen, executive editor of *Screen Digest*, said in 1999, 'Within five years the world's top music publishers (Warner, Sony, Bertelsmann, Polygram and EMI) will either have reinvented themselves as Internet companies or they will be in danger of withering away.'

When I asked Rupert Perry, president and chief executive of EMI Europe, in 1999 whether he saw the Internet as 'friend or enemy' he answered 'friend'. One year later the industry answer might not have been so warm or confident. The record companies' attitude to the Internet varies between interest, anger and opportunism. They initially saw it as a marketing medium and encouraged artists to design their own websites, keeping music clips to the industry maximum of thirty seconds. They welcomed the growth of online CD sellers because they made available the backlist of old CDs and LPs that bricks-and-mortar shops cannot afford to keep.

Then a few artists began to break the thirty-second rule. The Beastie Boys, licensed to Capitol, put some of their rare and out-of-print songs on the Internet against Capitol's policy. David Bowie launched an album on the Internet before selling the CD. Elvis Costello started to put all his work on the Internet. The problem escalated when MP3 player-recorders began to be an even smarter urban accessory for the streetwise techie than the most silver-tongued mobile phone. MP3 refers to Motion Picture Experts Group, Layer 3, and is the industry standard for a music file (the MPEG has separate standards for video, etc.). Its first promoters used MP3 to distribute new music that had not been signed to a record company and was not protected by copyright. Like John Perry Barlow, they saw the Internet as a democratic, copyright-free zone.

Jeff Patterson was a computer science student at Santa Cruz, California, in 1993, when he began to post songs by new bands on to a website which, with considerable aplomb, he called the Internet Underground Music Archive. It was a typical Internet start-up. Anyone could contribute ('post') a song. Listeners could listen for free by downloading a file on to a hard disk or MP3 player, or pay to buy a CD or tape. Today IUMA has over 4,000 bands and about two million visits a month, and makes its money by charging a commission on CDs and tapes sold through the site.

As IUMA and other sites flourished, and as the technology became cheaper and easier, the realization that anyone can put music on the Internet began to terrify the major music companies. The Recording Industry Association of America (RIAA) tried to ban the first MP3 player. Then it pushed its own Secure Digital Music Initiative (SDMI), an encryption system, which allows someone to download a CD but prevents them from making further copies. Jay Samit of EMI said, 'Most people are not going to hunt around for poor-quality pirate copies when they can get the real thing.' But several commercial websites, including MP3.com, continued to make music files available without charge. The RIAA started a legal action against MP3.com, who settled out of court with two RIAA members, Warner and BMG, by paying them \$20 million each. Another member, Universal/Polygram, went to court and received damages of \$53.4 billion; they also acknowledged MP3.com's business case by buying shares in the company.

The comparative cost of distributing a CD through a traditional retailer (like Virgin Megastore), an online ordering website (like CDNow) and a web download (like MP3) strongly favours the latter, according to Forrester Research. A sixty-minute piece of music has an average retail price in America of \$15 but the publisher's income ranges from a low of \$6 from the over-the-counter sale to \$9.50 from an online sale and a high of \$11.50 from a download. So MP3 websites, both commercial and non-profit, continue to grow (<http://mp3.lycos.com> lists the sites where you can help yourself, including www.real.com, which has a RealJukebox, and www.winamp.com). By the end of 1999 one in five CDs bought in America were bought online. In the UK the figure was one in ten. The International Federation of the Phonographic Industry (IFPI) reckoned that during the Christmas period in that year 4 million MP3 files were being downloaded every day.

The RIAA was soon back in court, together with AOL Time Warner, against a new competitor. In 1998, eighteen-year-old Shawn Fanning developed a file-sharing program called Napster which allows a user to search for all MP3 files held by all other users with the same software, and transfer selected files to his own hard disk. Its principle is 'share and share alike'; because by searching other people's computers you also allow them to search yours. Other programs called Gnutella and FreeNet did the same. Whereas IUMA offered material deliberately made available, with a 'Look Here' sign attached, the new generation of file-sharing systems allow explorers and trespassers to wander at will into private property. Type in the name of a band or a track and Napster searches not only websites but the hard disks of all connected users for a music file containing that track. If a music executive has put a demo recording of a new unpublished track on to his hard disk, Napster will identify it, copy it, and deliver it home. The use of these search-and-find technologies caused an outcry on a number of fronts: breach of copyright, breach of privacy and breach of confidentiality. In 1999, they became so popular that several American universities' networks were clogged and the authorities banned their students from using them; the students responded with a nationwide campaign for free speech.

It must be acknowledged that these systems do enable people in

their millions to find, identify and copy music. Each does so in a slightly different manner. Some operate a centralized directory (as does Napster, which makes its owners more directly responsible for their traffic and more openly liable in law) while others operate a peer-to-peer system whose owners can genuinely say they have no knowledge and no control over what the system is being used for (as do Gnutella and FreeNet). Some (like Napster) can only handle audio files while others (like Gnutella) can also handle video. But all the systems have a single purpose, which is to enable people to get free access to material, and to copy it. In most cases, this copying is illegal.

Napster's defence was that it merely provides a system for copying files which is no different in essence from the use of an audio cassette to tape music or the use of a video-cassette to tape a TV broadcast. Certainly, the record companies' cries of outrage and fear about Napster and other file-sharing systems echo their earlier protests when faced with audio cassettes and cartridges, and the TV and film industries' outrage when faced with videos and DVDs (not to mention cable retransmission and satellite direct-to-home delivery). Technically, Napster had a point. Copyright law allows exemptions for private copying as 'fair use' or 'fair dealing'. There is nothing intrinsic to these file-sharing systems that favours theft over legitimate usage. They can handle encrypted or copy-protected files just as well as 'open access' ones. On this point, we cannot blame Napster any more than we could blame the manufacturer of a ladder which a burglar uses to gain access to an upstairs window. But in 2000 a US district court decided the sheer scale of Napster file-sharing undercut its defence of 'private copying'. The decision had precedents. US courts have long been active in punishing print shops who carry out large-scale copying, especially for university students. In 1991 a New York district court fined Kinko's copy-shops damages of \$510,000 (for copying twelve books published by Basic Books) and ordered them to pay the plaintiffs' legal fees, which were ultimately set at \$1,365,000. In 2000, when the number of works copied had grown to more like 12 million, the court said Napster was guilty of 'wholesale infringement'.

It is hard to calculate the impact on the industry's revenues. Because some people steal one piece of music does not mean they will not buy another piece. There is evidence in both directions: that people use

Napster instead of buying CDs, and that they use it to discover new music which leads them to buy more CDs. If a person copies a news item to friends, he places a higher value on the publication, not less, and has more incentive to buy it; as well as indirectly promoting it to the recipients. Demographic factors play a part. A young student with little money but lots of free time may enjoy downloading a MP3 file; as he or she gets older and has more money and less free time, and a desire for top-quality sounds, they may prefer to buy a legal CD.

The film industry faced a similar challenge in 2000 when Jon Johansen, a sixteen-year-old Norwegian schoolboy, broke the encryption code at the heart of the Content Scrambler System (CSS) used to protect DVDs. By some circuitous but entirely predictable route, the hacked decryption code, or DeCSS, was placed on the Internet for everyone to download. The film industry cried 'foul', and sought injunctions in the courts, although there was some confusion about the extent to which the industry's CSS actually protected copyrights, and also how far DeCSS undercut it.

It is in the nature of the Internet for codes and systems to be hacked (as we shall see in Chapter 6). The Internet is an organism that avoids obstruction, whether bad code or obstructive censorship, and navigates around it. As networking and file-sharing becomes easier (more transparent; more effective; faster; cheaper) so it changes the economics not only of distribution but also of production. This is because digital copies of a product are intangible and the marginal costs of distribution are so low.

Industries do not collapse because their existing business models are threatened but because they fail to find new ones. This is true of all industries, but it is especially true of industries based on the technologies of copying, like music and film. I expect to see, over the next few decades, a continual outpouring of new and improved devices for exploiting the Internet's instinctive capacities for copying and delivering copyright material. At the end of 2000, the Internet users had the initiative. The question remains whether the conventional music and film industries will reinvent themselves and regain it. Whether they do, and *how* they do, will affect the future of all creative products, and all industries, that depend on digital copying.

THE CREATIVE ECONOMY

Mixed Reforms in Geneva

The principles of copying were addressed at a WIPO diplomatic conference in Geneva in 1996. It approved separate treaties on copyright and performing rights, which Europe implemented by means of a 2000 Directive on Copyright, and discussed but postponed a treaty on the protection of databases. Vigorous arguments took place between the major rights-holders, especially of music and films (led by America, Europe and Japan) and the rest of the world who buy their products and consume their rights. In this debate, countries split along familiar North-South, rich-poor lines. There was a second debate, only slightly less passionate, between the global corporations who invest in rights and therefore want to protect them as much as possible (especially on the Internet) and individuals who want to publish them as widely as possible (especially on the Internet). In this, Americans faced fellow Americans.

The conference did not question the need for a 'property contract', but adopted a new approach. It replaced the old logic, whereby every copy required permission unless it was given a specific exemption, by a differentiation between the unavoidable 'technical' copying that occurs when data is moved around within a closed system, with no obvious economic significance, and the kind of copying that is made with the purpose of, or that enables the action of, adding economic value by making a new transaction. Purely 'technical' copying can be ignored; it has no more significance than a snatch of music heard through an open window. The new rules also continued the rights-owner's control of copying with, as now, exemptions for private copying under the American term of 'fair use' and the British term of 'fair dealing'. These allow the public to copy something for private use (such as education) and public use (such as criticism or review) if it is only a small or 'insubstantial' extract and, if appropriate, proper credit is given. These two principles were redefined for the digital age, although the Europeans disagreed amongst themselves about how much private copying should be allowed, with the British and Dutch being most in favour and the French, Spanish and Belgians being more hostile. Everything else still requires the rights-holder's permission either before or after a copy is made.

Enforcing these rules requires 'rights management' systems, which

enable rights-holders to exercise their rights in electronic form. They include Microsoft's Document Rights Management System, Softlock and Adobe's PDF Merchant, which ensure no file is released until the rights-holder's specified conditions are met, such as payment being made. The development of rights management systems for music and films is highly important, and will shape the industry's future structure and economics.

Other systems put an electronic 'watermark' into every file that contains a piece of copyright work (text, sound, image). When a rights-owner discovers a website is illegally using its material, and provides the evidence, the thief will normally stop whatever he was doing. There is big business in digital detective agencies that surf the Web checking for stolen music, pictures and fashion, such as the IP Warehouse Inc. in Palm Beach, Florida, which operates its (patented) DragNet system, and GrayZone Inc. in New York. But even they are helpless against peer-to-peer file-sharing.

Copyright material is best protected by two factors: a mixture of good law and bad technology. By good law, I mean law that is fair and effective, and whose remedies are proportionate to the mischief. By bad technology, I mean technology's inability to make good copies. The best protection is a legal copy that is cheaper or more easily available than the illegal one. The challenge of digital is that the technology for creating and copying (or recreating) material is now cheaply and widely available and the users and consumers are minded to take what they can. That puts more pressure on the laws, which are not certain of coping. The technology is leading the race, with the users close behind, and the laws a distant third.

It is much easier, and more fun, to make new technology than new law. But the whole point of a property contract is to reconcile these two forces. We need copyright rules that recognize the public's feelings of right and wrong; provide appropriate incentives and rewards; cope with new technologies; and support sustainable industries.

TRADEMARKS

The eighteen-year-old daughter of a friend of mine likes the Nike logo. One evening, she is wearing a Nike T-shirt, sweater, cap, trousers and socks. When I ask why, she responds slowly, believing the question to be dumb, but because she is polite and bright (having that week been offered places at Oxford and five other universities) she does give it a little thought. The answer is obvious. I like it. It's cool. It's there. No more need be said.

The growth of brands and other trademarks is the most noticeable symptom of global consumerism. It is loved by some, disdained by others. Actually, the word 'symptom' is no longer appropriate. Trademarks have become the core factor in most marketplace competition, successfully communicating across diverse languages and cultures. The Nike corporation is not in the business of selling any particular objects like shirts or socks or even shoes (with the partial exception of its special Air system which cushions an athlete's feet). Instead, it sells its brand; it sells itself. The T-shirt is a means of wearing a brand. It is the only sensible strategy. Any large global corporation could compete with Nike in terms of its physical goods; they could design similar shoes, find similar workers to make them at similar prices and create a similar global marketing campaign. Its versions of these products would be commodities, like everyone else's, with no inherent distinguishing feature. But nobody can compete with the Nike trademark. It is registered in every country in the world. Physically, its goods are vulnerable to competitors on design, technology, materials, colours, style, fashion and price. Intangibly, in terms of intellectual property they are almost impregnable. I say 'almost' because another company could build another brand to challenge Nike, just as Nike built its own. The aim of modern branding campaigns is to instil the brand in consumers' minds so that the consumer simply cannot imagine buying anything else.

A trademark does not require any unique inventiveness, as does a patent, or any intellectual or artistic effort, as does a copyright work (which is why the description of 'intellectual' property is grandiose). Any word, name, image, sound or even smell that identifies a good or

service and distinguishes it from others can be a trademark. (In the US services have 'service marks' rather than trademarks.) The mark must not be descriptive. It cannot be a word that other traders might reasonably expect to be able to use, nor must it indicate the product's quality, purpose or value. Anything else is acceptable.

Trademarks are probably the oldest kind of intellectual property, although the last to be fully enshrined in written law. The word 'brand' comes from the Anglo-Saxon verb 'to burn', and the first trademarks were the brands used to mark domestic animals, either by burning the hide or by clipping an ear. Potters, carvers, furniture-makers and stone-masons incised their names, initials or marks into their creations. The growth of industrial manufacturing and trade, especially international trade, gave fresh impetus to corporate branding, as manufacturers wanted to promote their goods worldwide and buyers wanted to know what they were buying.

Today, brand names can be protected in two ways: by trademark registration and by common law actions against 'passing off'. The most common method is registration, although the mere fact of registration may not deter unfair use and the plaintiff may have to apply to the courts. The British Patent Office has had a registration system since 1875, although it was selective in coverage and not much used until the 1994 Trade Mark Act widened the scope and gave more protection. In 1999 the Patent Office received 34,000 applications for trademarks and registered 24,000.

The laws against 'passing off' are an inheritance from common law, and protect property against wrongdoing. They prevent someone from passing off his goods as someone else's. The courts ask a practical question: is the public likely to be confused and to mistake this product for that product? According to copyright expert Michael Flint, there are five tests. The passing off must (1) consist of a misrepresentation that is (2) made by a business in the course of trade (3) to prospective customers (4) which is calculated to injure the business or goodwill of another business and (5) which causes actual damage to the business' trade or goodwill.

A prosecution for 'passing off' is the most common action against trademark infringement, whether or not the mark is registered. It can also be used against any other mischief or unfair dealing. For example,

a book publisher might lose a copyright action against a publisher of another book that had the same or similar title to his own. No copyright would have been infringed. But, if his case met the five tests, he might win a 'passing off' action.

DESIGNS AND SECRETS

The fourth major form is industrial design. Britain's first law protecting industrial design was passed in the 1830s, a few decades before copyright was extended to paintings, indicating design's importance in manufacturing industries then and now. Today, a design can be protected both by registration, rather like a patent, and by a 'design right', which is like copyright.

Registration gives the strongest protection. In order to qualify, a design must be the result of 'skill and effort', which must be evident in its inherent aesthetic independently of its natural shape. Purely functional designs, which involve no skill, are not eligible. This criterion is equivalent to the need for an 'inventive step' in patenting and 'skill and effort' in copyright, and demonstrates the need for a creative product to have 'meaning'. There are four further criteria for registration: shape, configuration, pattern and what is called 'ornament'. Britain's unregistered 'design right' which, like copyright, accrues automatically to every new three-dimensional design, is a relatively new invention and lasts up to fifteen years from when the design was first created. It extends private property rights to functional objects like crafts, toys and furniture, which fall outside copyright law and which might fail to win patent protection.

There are, finally, the general rules of commercial secrecy and confidentiality. Secrecy may seem the antithesis of the creative spirit, whose instinct is to shout from the rooftops in order to reach as many people as possible. But climbing to the rooftop is best done in secret. These laws allow people to own information, and to stop others from using it. America defines a trade secret as a 'formula, pattern, device or compilation of information which is used in a business and which gives the business an opportunity to obtain an advantage over competitors who do not know it or use it'. It is a wide-ranging category.

SHALING BEAUTY

The point of these laws is to prevent theft and misuse. But there is, stuck deep in our psyche, a feeling that the concepts of ownership and possession that we use in terms of physical property are not so compelling when applied to intellectual property, and that stealing intellectual property is not so injurious as stealing the 'real' thing. The intangible nature of intellectual property evades precise definitions of ownership and possession and causes problems when we try to define its theft. Even rights-holders are reluctant to mention 'theft' and prefer to talk about piracy, conjuring up images of likeable rogues in distant lands with parrots on their shoulders.

The evanescent nature of intellectual property, to quote Justice Story, is evident in our different attitudes towards its various states. Buying a fake may result in social obloquy but seldom in legal distress. In some circles, it would be indicative of a breach of social etiquette more than of a legal tort; in others, an indication that one knows what is fashionable (a positive virtue) without being able to afford the 'real thing' (only slightly negative). The possessor of the real thing may feel socially superior to the possessor of a fake, but seldom suffers any direct or indirect economic loss. It is fairly obvious that the cost of a legal bottle of Coca-Cola is not affected by the sale of a fake bottle, unless the fake sold in high volumes and affected Coca-Cola's margins. In fact, it is to many companies' advantage for their products to be known to be worthy of fakery and theft, although naturally they would prefer everyone to buy the real thing.

Patents, by their nature, are seldom stolen or infringed by consumers. They are however regularly infringed by companies, and the penalties can be enormous. Litton Industries won damages of \$1.2 billion in 1993, and damages of \$200 million are not uncommon. Legal damages are only part of the cost, as Kodak discovered in 1990 when the courts ruled it had infringed Polaroid's patents in instant photography. Kodak had to pay \$873 million damages, shut down a \$1.5 billion factory, and spend nearly \$500 million to buy back 'illegal' cameras; as well as lawyers' fees of say \$50 million and uncounted millions on wasted management effort and R & D, and its damaged public image.

Copyright is stolen regularly and substantially. But here again attitudes are ambiguous. If you steal a chair from your neighbour, everyone (State, Church and your neighbour) will agree you have committed an offence and should be punished; make a habit of it, and you will go to prison. Steal a book (or 'forget to return it') and that is still theft but you are unlikely to go to prison. Steal what's in the book and who cares? Copy a video. The neighbour says, 'Can I watch, too?'

The person who steals a book or video will feel more guilty about the physical property than about the words and pictures that make up the intellectual property. People are deeply offended by plagiarism, which they regard as cheating, but less troubled by stealing the final product. People feel more guilty stealing a hardback than a paperback. We have not rid ourselves of the notion that a physical book (the design, the covers, the paper pages; the thickness of it) and the video of a film (again, the heft of it) have more economic value than their contents, and that it is this physical value, not the intellectual value, which determines the offence. It gets worse (or better, according to your view). People who feel guilty about stealing a paperback do not feel so guilty about stealing the same words printed out from a computer hard disc or downloaded from the Internet. It is true that the likelihood of being caught is less, but the feeling of guilt is less, too.

Digital technologies encourage us to treat music and pictures as we have become accustomed to treat words. They reduce all three formats to the same bit data, so that a music file and a text document look alike on a computer's electronic desktop or when attached to an e-mail. As a result, a person accustomed to copying a text file for free sees little reason why he or she could not similarly copy a music file for free. The same confluence of attitudes happened when mobile telephones were enabled to receive music. People who were accustomed to listening to a radio station broadcasting music for free expected an MP3 file delivered to a mobile telephone to be free. The next generation of data compression files squeezes a digital file to about a five-hundredth of its original size, so that a short film can be downloaded in a few minutes. Naturally and inevitably, the file of the film looks like a text file.

People who steal computer software (for instance, by installing office software with a single-user licence in a second computer at home)

perceive little damage is done. Indeed, they know that companies want their software to be as widely networked as possible, and often give it away. The success of many modern brands, from software to shoes, depends upon their rapid dissemination to create a network effect, a buzz of 'street cred'. So, it is said, theft is helping the company, not harming it. There is more than a shred of common sense in all these attitudes.

Nobody knows how many of those who buy stolen copyright material might otherwise have bought legal material. Nobody knows whether the theft of computer software, although against the terms of the licence, actually damages the copyright-holder. Many people who steal material would not have bought their own copy, either because they could not afford it or because it was not available locally. Nobody knows how many times a stolen video or music cassette may be re-copied and reused.

The trade associations do try to quantify the loss, in order to support their lobby for stricter laws. The Global Anti-Counterfeiting Group, which represents major brand owners, estimates theft at about \$250 billion a year, of which copyright theft is about \$20 billion. According to the International Intellectual Property Association (IIPA), which monitors copyright theft, the worst countries are Brazil, where 95 per cent of music recordings are reported to be stolen, followed by Russia (75 per cent) and China (56 per cent). The safest are America (5 per cent) and Britain (1 per cent). Overall, music theft runs at \$4.5 billion a year. The International Federation of the Phonographic Industry (IFPI) estimates that one in three CDs is stolen. The IIPA says \$2.2 billion worth of filmed entertainment is stolen. The worst countries are China, Russia and Turkey, where over 90 per cent of films are stolen. Video copies of major Hollywood films are usually available in Asia one week after their American release, which is why Hollywood tries to open its movies very quickly in those countries. The figure for the theft of books is much lower; say \$1 billion. Theft of computer games runs at \$3.3 billion. Bulgaria and Israel are notorious for the theft and re-export of scientific instruments.

The Business Software Alliance reckons that half the world's software is stolen, costing manufacturers \$7 billion a year, with theft in America running at 25 per cent and in Britain at 29 per cent. The

result is what one Singapore judge has called 'flagrant and massive plunder'.

The level of theft is increasing in almost all categories and in all countries. Of the worst offenders, Russia and China, which do have some laws, seldom bother to enforce them. Worldwide, consumers' leisure spending is increasing faster than the rights-owners' ability to enforce local laws. The growth of the Internet adds massively to the problem. The Internet is intrinsically hostile or evasive to people who want to restrict the passage of material.

The question facing the OECD countries is how to liberalize trade (so they can sell more products overseas) while protecting their property rights.

THE GLOBAL MARKET

America, springboard of globalization, was the first country to realise how greatly its exports, and therefore its entire economy, depend upon its trade in intellectual property. It wanted to liberalize international trade, but it also wanted to protect its exports. As the world was reeling from OPEC's increase in oil prices in 1973-4, the US Senate Committee on Foreign Relations held an emergency session on whether the country could be 'held to ransom' in other areas of the economy. The committee decided that ideas and information might be next. It asked percipitently, 'If information and its communication represent a strategic resource in international affairs, whose value may approach or exceed that of energy, will appropriate US Government policies be formed only after there is an energy-type crisis?' A few years later, President Ford set up a Task Force on National Information Policy which concluded:

Property concepts have been central to legal theory and social and economic activity in our society, but concepts of property were formulated to deal with tangibles, primarily land and chattels. When information, ways of dealing with information, or information products are treated as property, issues arise which differ from those resulting from the application of property theories to tangible matter.

The wording is awkward but the thinking is clear: we need a new foreign policy not only for information but for intellectual property, for the ownership of ideas and information. The subtext was equally clear: we need a policy that suits American interests.

That did not mean a one-sided bargain. All exporters of creative products, whether selling a brand or licensing a copyright, need both a high level of protection everywhere and the *same* level everywhere. America wanted to collaborate with other exporting countries to hike up the global levels of protection so they were the same in Peoria and Penang. It appealed to its fellow members in what is known as the Quad (consisting of America, Europe, Japan and Canada), which forms the main negotiating bloc in international trade. But few paid much attention. Britain continued to give priority to its dwindling manufacturing industry. As late as 1994 the Department of Trade and Industry was stating, against the evidence, that Britain's electronics industry was economically more important than its creative industries. Its view did not change until New Labour won the 1997 election and, amongst other initiatives, set up the Creative Industries Task Force. Germany agreed with Washington about patents, though not about copyrights, and anyway its voice in international affairs was muted. The French have always given a high priority to authors' rights, but they export mostly to a few Francophone countries, and they instinctively disliked America's treatment of 'culture' in purely economic terms. The Japanese, exceptionally gifted at designing TV, video and music equipment, wanted to ensure their patents were protected in all countries, and sided with America. But it was not enough. Washington wondered what to do.

It knew that the global copyright conventions were wrong for its purpose. There was and is a wide gap between its own legal traditions and those of most countries that buy its goods, and it had always been a reluctant member of such conventions. Moreover, WIPO and Unesco, which administered the major conventions, had no brief for trade (and America was at the time extremely hostile to Unesco, as a result of the organization's spirited promotion of Third World interests). Instead, America turned to the international regime for trade, which perfectly suited its interests. In 1986 the General Agreement for Trade and Tariffs (GATT) started its eight-year Uruguay Round for

the overhaul of global trade rules. It had twin aims: primarily, to liberalize trade by the abolition of national restrictions on imports and, secondly, to maintain the value of these imported goods and services in the country of destination. America used the time to lobby intensively for stricter rules on copyright and patent protection. It was supported by the major film, music and pharmaceutical companies. Slowly, other governments came to take its line.

In 1994 over 100 governments met at Marrakesh, Morocco, to replace GATT with the World Trade Organization (WTO), and also sign a Treaty on Trade-Related Intellectual Property Rights (known as TRIPS). The TRIPS agreement covers all creative products: patents; copyrights and related rights; trademarks and service marks; geographical indicators (for products whose value derives from the place of growth or manufacture); industrial designs; the protection of new plants; the layout of integrated circuits; and trade secrets. Unlike its predecessor, the WTO has a right to enforce its rules and apply sanctions.

The TRIPS agreement was not the first global standard for intellectual law and property; the Paris and Berne conventions had that honour, in the 1880s. But it was the first to treat intellectual property primarily as a trade issue. Before TRIPS, disputes on intellectual property were private matters of contract which were resolved, or not, behind closed doors or in the courts. Government trade bodies had no role to play. Afterwards, governments could seek, via the WTO, to enforce the rules, and mischiefs or malfeasance on intellectual property matters could lead to sanctions in other trade categories or, ultimately, to expulsion from the WTO.

The Quad's victory was not welcomed by all members. Some countries resented the Quad's enforcement of Western principles of private property in the rest of the world, whether with regard to plants, medicines or aboriginal art. These complained of TRIPS's adverse effects on a country's ability to protect its own culture and knowledge and therefore to sustain its capacity for creativity and learning. This critical view, hostile to Western privatization, was put by economist Jeffrey Sachs of Harvard University in *The Economist*:

Just as knowledge is becoming the undisputed centrepiece of global prosperity (and the lack of it, the core of human impoverishment) the global regime on

intellectual property requires a new look. The US prevailed upon the world to toughen patent laws and cut down piracy. But now the transnational corporations and rich country institutions are patenting everything from the human genome to rainforest diversity. The poor will be ripped off unless some sense and equity are introduced into this runaway process.

In the 1970s Herb Schiller of San Diego University, who invented the term, and Jeremy Tunstall of City University, talked about America's 'cultural imperialism' in the media. More recently, Peter Drahos of the Queen Mary Intellectual Property Research Institute at London University, talks about 'information feudalism':

There is a structural predicament of global dimensions. The outcome of this predicament is that the scope of patentability is expanding while the role of moral standards in the operation of the patent system is being increasingly limited. Ironically, this is happening at a time when the moral debate over patentability, at least in the field of biotechnology, has never been greater.

There is a delicate balance between the reasonable principle of owning what one creates and protecting those who are too weak, ignorant or poor to protect themselves; between allowing the richest and quickest to claim ownership by means of patents and copyright without allowing the inarticulate to be pushed to the margins. As Mahatma Gandhi said, 'I do not want my house to be walled in or my windows blocked. I want the cultures of all lands to be blown about the house as freely as possible. But also I refuse to be blown off my feet by any.' Standing upright becomes even more difficult if we have to contend with foreign scientific and technical patents on knowledge.

The growing intensity of negotiations over 'wild' plants and their biological derivatives symbolizes this conflict. There are countless examples. My favourite is the gentian. For centuries, Indians have used dogbane, a species of gentian, as a tranquillizer. In the 1950s, a Western company began to import it to the West (without paying for it), where it became so popular that the Indian government had to ban its export, because prices locally were rising beyond what Indians could afford. They also feared the roots would become extinct. Over in Africa, the chemical properties of another gentian, the Madagascan rosy periwinkle, which has pretty pink flowers with a deep red centre, were

becoming highly sought-after. Its genetic properties seemed to limit the growth of cancer cells. From this discovery, according to the United Nations, Eli Lilly earns about \$100 million a year, while the Madagascans earn virtually nothing. To them, Eli Lilly's actions have merely increased the price and restricted the supply to those who assumed either they owned it or that it was in the public domain. According to Dr Pennapa Subcharoen of Thailand's Ministry of Public Health, 'Drug companies come here, collect samples, take them away and say it is for the collective heritage of mankind. Then they study the samples, develop them, claim intellectual property rights and come back and make us buy them.' Subcharoen's point is that drug companies do not invent these plants but exploit local knowledge of their therapeutic qualities. The 1991 Rio Convention on Bio-Diversity puts some constraints on whether such plants may be traded, but it sets few rules on who should pay, or how much. The average royalty is about 1-2 per cent of revenues. The target for many developing countries is 10 per cent. This may seem high, but the US Park Service charges exactly that for bio-prospecting in the Yellowstone National Park.

The range of plant varieties now being studied for genetic value, whether for extracts or for genetically modified seeds, is very large. According to John Vidal, environment editor of the *Guardian*, many of the biological qualities inherent in maize, potato, rice, wheat, sorghum, cassava, millet, soybean and wheat have been or are being privatized. L'Oréal has patented the use of the kava shrub to reduce hair loss. An American company, RiceTec Inc., has obtained a patent for a gene sequence that mimics basmati rice. The patent does not prevent Asian companies from exporting their own basmati rice, but it does restrict the supply in America. Nestlé India has applied to patent a process for parboiling rice. Other companies have applied for patents on tea, coffee, soya, cotton and pepper seeds.

America achieved its aim. The economic value of intellectual property is now better protected than ever before, especially since China has wanted to join the WTO. But the question arises, in both Quad and other countries, whether the politics of trade is a satisfactory forum for moral subtleties.

A NEW CONTRACT?

Is the property contract, which emerged in the 1700s and whose fundamental principles have been unchanged for decades, the best way of regulating the ownership and transaction in ideas in the early 2000s?

There is a sharp debate between the maximalists and minimalists, between optimists and pessimists. The premise of the maximalists' case is the link between strong property protection and the rate of creativity and innovation. A recent WTO study reports that laws on tax and intellectual property top the list of factors affecting a multinational's decision to invest or to trade. Pfizer Inc. says, 'It is a major fallacy to think that the protection of intellectual property is the luxury of already prosperous economies. One of the most efficacious ways of building a strong economy is to insist on protecting intellectual property.' Of the four grounds for intellectual property (incentive, reward, disclosure and natural rights), companies put the strongest emphasis on incentives and rewards. The patent industries talk more about incentives (albeit incentives expressed in reward) while the copyright industries emphasize reward. Many artists create copyright works without calculating the economic return, but once the product is made, they rightly feel strongly about the need for a full and proper reward. The result is a trend towards privatization.

Intellectual property has become a factor in the global battle for competitive advantage. The effect is seen in almost every industry; not merely the traditional copyright and patent industries (which are expanding) but in all industries that depend upon trademarks, brands and designs, from food to sport. Companies want to maximize revenue from each idea and each creative product; and therefore create as many intellectual properties and as many rights as possible. From a company's viewpoint, there are many arguments in favour of privatization and few against. An increasing number of creative products have a property tag attached, and the tag says 'private'.

But the minimalist case, and the case against more privatization, has some powerful arguments, too. Many argue that the expectation of intellectual property rights provides little incentive. Others say that the prospect of an economic reward is not persuasive. Individuals and

(less so) companies innovate for a number of reasons, and many would do so even if their ideas were not protected. As for the historical links between intellectual property and innovation, research by the United Nations and World Bank has shown that many countries flourished in the eighteenth and nineteenth centuries when their own legislation was minimal; the best-documented examples include America, Britain, France, Germany and Switzerland. There is a tradition of science being freely available, which universities and public research companies uphold jealously. Tim O'Reilly, a computer consultant, asks what would have happened if Isaac Newton, instead of publishing his discovery of the laws of motion, had patented their industrial application: 'No, I won't tell you what I know about parabolic trajectories, but I'll calibrate your guns for a fee.' Even rewards are problematic. It is axiomatic that monopoly rights tend to increase costs and are a restraint on competition.

The World Bank has spoken of the dangers of 'excessively strong intellectual property rights'. It cites many public and academic bodies which cannot afford to register their own inventions, nor to license the use of others'. The UN particularly criticizes the process of 'stacking', by which companies register patents for speculative reasons. Many developing countries have a tradition of communal ownership and lack the determination, as well as the legal and financial resources, to deal in the commercial market. Finally, the Internet's use of freeware and open source software gives some proof that the absence of copyright and patents, rather than impeding commercial progress, may hasten it (see Chapter 6).

The property contract is flexible, and continually evolving, which is partly why it is so complex and subtle. But it needs to be reformed. For example, patenting can hardly cope with the rapid moves towards patenting human cells, and copyright is baffled by the Internet's animal-like appetite for free copies. We need to work out a new deal.

There are some specific problems. On the patenting front, we need to review what is patentable and what is excluded. The British 'Statement of Patent Practice' says that its 'exclusions are directed to mental, intellectual, aesthetic or abstract matters'. But such intangible 'matters' make up an increasingly significant amount of Britain's economic output. We need a consensus about whether or not a patent

requires a technological invention (as in Europe and Japan) or whether this is really immaterial (as in America). We also need to review the registration process. The three patent tests of novelty, inventive step and technical effect are being stretched beyond what patent agents and attorneys can agree on, let alone what the public or our elected representatives know about or, if they know, can understand.

In copyright, we need to reform existing copyright law to fit the Internet. The old master/copy relationship no longer holds. We need to redefine what we mean by private copying. In copyright, however, the lawyers can only go so far. The success of any new regime depends greatly on whether the music, film and publishing industries can devise new business models to exploit the digital technologies.

We need to review the nature of monopolies, whether public or private. As we have seen, intellectual property can be owned, possessed, rented and licensed in almost as many ways as can physical property. The salient points are the mechanisms by which the product is exchanged and traded. The most fundamental are whether access is open or closed; if closed, the nature and length of the restrictions; and, if payment is required, its nature (none; by negotiation; or by a non-negotiable, statutory licence).

The basic property contract still stands: a balance between the creator's private reward and society's public access. But each of its specific relationships needs examination: between creator and society; between private and public; and between reward and access. The public's concerns about patenting human genes and using Napster to copy music (or, in some circles, its lack of concern) are part of one single issue.

Above all, who should champion society's cause? The patent offices look after their customers, the patent-holders and rights-holders. Who should look after the patent offices? Who should examine the examiners? *Quis custodiet ipsos custodes?* Justice Story's description of copyright law as transcendently subtle does not encourage outsiders to become involved. But they must, or the contracts will be one-sided and unfair, which is bad for all of us.