The Heavenly Jukebox

Rampant music piracy may hurt musicians less than they fear. The real threat -- to listeners and, conceivably, democracy itself -- is the music industry's reaction to it

by **Charles C. Mann**

A LITTLE while ago I heard that the future of music was being decided in a nondescript office suite above a bank in San Mateo, California. I couldn't get there in time, so I asked a friend to check it out. A crowd was milling in front of the entrance when he arrived. My friend parked illegally and called me on his cell phone. There are twenty or thirty television cameras, he said, and a lectern with a dozen microphones. Also lots of police officers. I asked about the loud noise in the background. "That," he explained, "is people smashing compact discs with sledgehammers."

The compact discs contained music by the rock band Metallica. Three weeks earlier Metallica had sued a now-notorious Internet start-up called Napster, which is based on the fourth floor of the bank building. (The name comes from the founder's moniker in adolescence.) Far from being the colossus that its media prominence might lead one to expect, Napster is a surprisingly small outfit: it consists mainly of a Web site, about thirty-five hip, slightly disheveled employees, and a hundred or so of the powerful computers known as servers. By connecting to these computers with special software, Napster members can search one another's hard drives for music files, downloading gratis any songs they discover.

As the furor over Napster suggests, the opportunity to share music quickly and without charge has been greeted with more enthusiasm by listeners than by the music industry. Although the company's music-swapping software has only just been officially released, the service already has about 20 million regular users, and the tally is rising every day. Countless other people use Napster's brethren; the company is but the most prominent of many free-music services on the Internet. The result, in Metallica's opinion, is an outrageous pirate's bacchanalia -- millions of pieces of music shuttling around the Net uncontrolled. The group filed suit, according to its drummer, Lars Ulrich, "to put Napster out of business."

I asked my friend to visit Napster's headquarters that day because I knew that Ulrich, Metallica's lawyer, and several burly guys in T-shirts were driving to San Mateo in a black sport-utility vehicle. In the SUV were thirteen boxes full of printouts listing the user names of 335,435 Napsterites who, the band said, had traded Metallica songs during the previous weekend. Ulrich and his entourage planned to dump the boxes in the company's tiny, cluttered foyer. The people with the sledgehammers planned to shout unflattering remarks while this was taking place. Suddenly a compact man with high-tide hair and shades came to the podium: Lars Ulrich. My friend held up his phone a few feet from the drummer's face, but I could barely hear Ulrich. The catcalls were too loud.

"You suck, Lars! You sellout!"

"This is not about pounding the fans, this is about Napster ..."

"Then why are you busting them? Have you ever even *used* Napster, Lars?"

Hooting laughter almost drowned out Ulrich's response. In an online chat with fans the previous day, Ulrich had admitted that he had never actually tried Napster. Indeed, he said later, his experience with the Internet was limited to using America Online "a couple of times to check some hockey scores." Nonetheless, his suspicions, however unfounded on experience, were entirely warranted as a matter of fact.

Within the music industry it is widely believed that much of the physical infrastructure of music -- compact discs, automobile cassette-tape players, shopping-mall megastores -- is rapidly being replaced by the Internet and a new generation of devices with no moving parts. By 2003, according to the Sanford C. Bernstein & Co. Investment Research Group, listeners will rarely if ever drive to Tower Records for their music. Instead they will tap into a vast cloud of music on the Net. This heavenly jukebox, as it is sometimes called, will hold the contents of every record store in the world, all of it instantly accessible from any desktop. And that will be just the beginning. [Edgar Bronfman Jr., the head of Universal], the world's biggest music company, predicted in a speech in May that soon "a few clicks of your mouse will make it possible for you to summon every book ever written in any language, every movie ever made, every television show ever produced, and every piece of music ever recorded." In this vast intellectual commons nothing will ever again be out of print or impossible to find; every

scrap of human culture transcribed, no matter how obscure or commercially unsuccessful, will be available to all.

Bronfman detests Napster. His speech likened the company to both slavery and Soviet communism. But its servers constitute the nearest extant approximation of his vision of a boundless sea of digital culture. While Ulrich spoke, I logged on to Napster. More than 100,000 people were on the company's machines, frolicking about in terabytes of music. "True fans of the talent are the ones who respect our rights," the drummer was saying. I typed in search terms: Mahler, Mingus, Method Man, Metallica ... all were free for the taking. And all were freely being taken -- users couldn't put a nickel in the machine even if they wanted to. Little wonder that the thought of such systems spreading to films, videos, books, and magazines has riveted the attention of artists, writers, and producers.

"Down in front! Down in front! ... Metallica sucks!"

"Hey, Lars!" -- a reporter. "Are you able to quantify the revenue lost?"

"It's not about revenue."

"Yeah? What's it about, then?"

In the short run the struggle is for control of the heavenly jukebox. Technophiles claim that the major labels, profitable concerns today, will rapidly cease to exist, because the Internet makes copying and distributing recorded music so fast, cheap, and easy that charging for it will effectively become impossible. Adding to the labels' fears, a horde of dot-coms, rising from the bogs of San Francisco like so many stinging insects, is trying to hasten their demise. Through their trade association, the Recording Industry Association of America, the labels are fighting back with every available weapon: litigation, lobbying, public relations, and, behind the trenches, jiggery-pokery with technical standards. Caught in the middle are musicians, Metallica among them, who believe that their livelihoods will soon be menaced by their own audiences.

At stake in the long run is the global agora: the universal library-movie theater-television-concert hall-museum on the Internet. The legal and social precedents set by *Metallica* v. *Napster* -- and half a dozen other e-music lawsuits -- are likely to ramify into film and video as these, too, move online. When true electronic books, e-magazines, and e-newspapers become readily available, their rules of operation may well be shaped by the creation of the heavenly jukebox. Music, according to a National Research Council report released last November, is the "canary in the digital coal mine."

This is unfortunate. Silicon Valley denizens often refer generically to writers, painters, filmmakers, journalists, actors, photographers, designers, and musicians as "content providers," as if there were no important differences among them. Yet the music industry -- tangled in packages of rights that exist nowhere else, burdened by the peculiar legacies of earlier conflicts -- is not like other culture industries, and digital technology is

exerting different forces on it. Compared with writers and filmmakers, musicians are both more imperiled by the Internet and better able to slip past the threat. The music industry seems to have less room to maneuver. In consequence, it has been pushing for decisive judicial and legislative action. The Internet will become a principal arena for the clash of ideas that the Founders believed necessary for democracy. Allowing the travails of a single industry -- no matter how legitimate its concerns -- to decide the architecture of that arena would be a folly that could take a long time to undo.

"It's not about our bank accounts, it's about the thousands and thousands of artists out there who aren't fortunate enough to have the --"

"Radio is free! What about radio?"

"We have the right to control our music!"

"Fuck you, Lars. It's our music too!"

Legislation, Litigation, Leg-Breaking

ULRICH, it seemed clear, regarded the widespread dissemination of contraband music as a dangerous new thing, another anxiety-provoking novelty from the electronic age. In fact unauthorized music has been around as long as the music industry itself. Ulrich was not even the first musician to sue a business that he regarded as a cover for intellectual piracy. That honor may belong to Sir Arthur Sullivan, of Gilbert and Sullivan. Indeed, Sullivan's problems were, if anything, worse than Metallica's.

Like the members of Metallica, who are unusually independent of their record label, Sullivan was a careful businessman who forced the music industry to accede to his demands. In the last quarter of the nineteenth century, when Sullivan composed his operas, the phonograph was in its infancy and radio broadcasts did not exist; the chief sources of music were churches, theaters, music halls, and the pianos that were prominently featured in most middle-class parlors. All these had to be fed large quantities of sheet music. In consequence the music industry was dominated by a group of big sheet-music companies. Sheet music was immensely popular -- hit pieces sold hundreds of thousands of copies. And the industry would have been even more profitable, its leaders believed, if it had not faced rampant international piracy. Bootleg Brahms and Beethoven were openly hawked on the streets of every city in Europe and the Americas. As one of Britain's most popular composers, Sullivan was a favorite target for bootleggers; he and his manager spent years fighting copyright infringement in court.

Technology, law, and culture seemed to conspire against British composers and music publishers. Improvements in printing and shipping methods had made it cheaper and easier for outlaw printers to manufacture and distribute sheet music. Worse, from the publishers' point of view, courts in many countries ruled that piano rolls (the player piano

was another new invention) did not infringe composers' copyrights, because the perforations in the rolls did not look like the notes in the original printed music, and hence could not be copies of them. Building on this precedent, phonograph recordings, too, were deemed not to require licenses or payments to composers. When publishers complained, they encountered a distinct lack of popular sympathy for their plight.

One of the biggest sources of illicit sheet music in London was a limited partnership led by James Frederick Willetts, a.k.a. "the London Pirate King." The partnership was known as James Fisher & Co., although there was no James Fisher; the real principals hesitated to do business in their own names. Fisher & Co. had a simple business plan: it sold the scores for musical compositions without paying copyright holders for the right to do so. If customers ordered 500 or more copies, the partners would prepare them to specification. "Piracy while you wait," one publisher's lawyer growled.

Is history repeating itself? At first glance the answer seems to be yes. Once again new technology has encouraged the proliferation of unauthorized music for next to nothing. Once again consumers have eagerly embraced this material. Once again complexities in copyright law seem to provide legal havens for practices detested by publishers -- havens used by new businesses to give the public access to contraband music. And once again some voices are arguing that music copyright has done little but create an exploitative oligopoly that feeds on musicians and listeners alike. The way events play out today, however, may well be different from the outcome a century ago.

Sullivan fought British bootleggers but was especially outraged by their American counterparts: legitimate publishers who took advantage of a quirk in U.S. law that denied the protections of copyright to foreign authors. The irate Sullivan filed lawsuit after lawsuit in U.S. courts, but only dented the trade. To prevent the pirating of *The Pirates of Penzance,* he long refused to publish the score; bouncers prowled every show to stop music thieves from writing down the melodies. Tired of what he regarded as "guerrilla warfare," Sullivan paid American musicians to put their names on the scores of several operas, including *The Mikado,* and then to hand the rights back to him, thus satisfying the requirements of U.S. copyright law. He sued American theatrical companies when the scores were pirated anyway -- and lost. "No Englishman possesses any rights which a true-born American is bound to respect," one judge supposedly said. In 1900, when Sullivan died, his funeral cortege passed through London streets that were still full of scofflaw music-hawkers.

British publishers were fighting back too. "They were losing a lot of money," says James Coover, a music professor at the State University of New York at Buffalo. "What else would you expect them to do?" As he documents in *Music Publishing, Copyright and Piracy in Victorian England* (1985), the efforts of Britain's Music Publishers' Association were at first scattershot and ineffective. The publishers tried to restrict the length of time during which people could perform sheet music before they were required to buy another copy. They asked the postmaster general to block all music shipments from the United States. They threatened to prosecute musicians who transposed songs

into other keys. But eventually the publishers hit on a winning strategy: they persuaded Parliament to pass strong new anti-piracy legislation and then sought to enforce it.

The Musical Copyright Act came into effect on October 1, 1902. That day more than a thousand anti-pirate vigilantes, paid by the Music Publishers' Association, swaggered onto the streets of London, searching for and destroying illegitimate editions of "Stars and Stripes Forever," "Brooklyn Cake Walk," and "Pliny, Come Kiss Yo' Baby!" The goons became violent. Skulls were cracked, doors broken, sheet-music bonfires set. Millions of songs were seized. In addition to vigilantes, the publishers hired lawyers, who sued Fisher & Co. in 1905. Testimony was lopsided. The publishers called more than fifty witnesses, Fisher & Co. zero. Willetts was sentenced to nine months in the clink. The light sentence annoyed the publishers, who had gone to considerable expense to prosecute him. Nonetheless, the trial was successful, Coover told me recently: by showing the teeth in the new copyright law, the publishers "scared off" the great majority of music black-marketeers. The pirate trade quickly collapsed, done in by a determined blend of legislation, litigation, and leg-breaking.

Today's music industry, like yesterday's, initially faced unfavorable laws; like yesterday's industry, it induced the legislature to revamp them and then went after infringers with a legal club. The first attempt to prosecute someone who released copyrighted material on the Internet, in 1994, collapsed embarrassingly when the judge threw out the charges -- existing case law said that infringement had to be associated with financial gain, and the material had been given away. The No Electronic Theft Act, passed in 1997, closed this loophole. The Digital Millennium Copyright Act, passed in 1998, further strengthened the industry's hand -- it banned attempts to circumvent copy protection. With the help of what Edgar Bronfman, of Universal, recently described as a "Roman legion or two of Wall Street lawyers," the Recording Industry Association of America has for the past two years sued or threatened to sue Web sites that contain copyrighted songs, universities that allow students to trade tunes on their computer networks, consumer-electronics companies that produce digital music players, online-music services that lack proper licenses, and, of course, Napster. *A&M Records, et al.* v. *Napster,* an RIAA-backed suit by seventeen record companies, was filed in December, ninety-four years after charges were brought against Fisher & Co.

Some of the lawsuits have been successful, most notably a proceeding against MP3.com, a site that, among other things, lets people listen through the Internet to music they own on compact discs. (The company did not obtain the requisite licenses to provide this service.) Napster has suffered serious legal setbacks, even though a trial remains at least a month away. Nonetheless, it is widely believed that this time around, laws and lawsuits will not be enough. Although the British were able to preserve their traditional way of selling music at the beginning of the twentieth century, nothing comparable will be possible at the beginning of the twenty-first -- the Internet, as the new-economy magazines like to say, has Changed Everything. Hillary Rosen, the president of the RIAA, conceded to me that "there are not enough lawyers in the world to sue all the people we'd have to sue." (As it is, the association sends as many as thirty threatening letters every day.) Stop fighting to preserve the past, Rosen counsels record labels. It can't

be done. The costs of manufacturing and distributing online music are so low that record companies will be forced to offer their wares on the Net. Instead of fighting the trend, she says, the industry should "embrace the opportunities" provided by the Internet. Don't try to stop the flow of zeros and ones -- rechannel it!

Rosen's advice is predicated on the belief that the labels can find a way to make music files effectively uncopyable -- a belief that many Internet-security experts regard as an illusion. "If people think that building higher walls and nastier barbed wire around desirable product [on the Net] is going to prevent people from getting it, they're only fooling themselves," contends Dan Farmer, a computer-security researcher for EarthLink, a big Internet service provider. Farmer strongly believes in protecting artists' copyrights; indeed, he consulted for the plaintiffs in *A&M Records, et al.* v. *Napster.* But in a time when a single click can spread a work around the world, he and others ask, how can anyone imagine that it is possible to control distribution?

In an e-mail exchange I asked Farmer what would happen if all content migrated to the Net, as many publishers promise, but none of it could be paid for, as many technophiles promise. Would this mean the collapse of the music labels, the movie studios, and book publishers? (I barely avoided adding *The Atlantic Monthly* and myself to the list.) Given publishers' past successes, such an apocalyptic resolution seemed unlikely. But watching the lists of song titles on Napster drop down my screen like the slats of a venetian blind made it easy to imagine. Farmer quite properly replied that economics wasn't his field. He restated his belief that there was really not much to be done about it. Then he added, in what I imagined were the apologetic tones of someone forced to give bad news, "I can see why people get worried about this stuff, though."

Joe Average Becomes Jane Hacker

ARGUABLY, the person most responsible for the present turmoil in the recording industry is an Italian engineer named Leonardo Chiariglione, and he is responsible only by accident. The director of the television research division at Telecom Italia's Centro Studi e Laboratori Telecomunicazioni, the Italian equivalent of the old Bell Labs, Chiariglione led the development of a standard means for converting recorded sound into digital form, which is now called MP3. The tale of the development of MP3 explains both how the music industry stumbled into its current predicament and why technophiles believe that the industry's attempts to control online copying are doomed to failure.

The International Organization for Standardization, based in Switzerland, is the world's premier standards body, establishing conventions for everything from the dimensions of letter paper to the size of screw threads. Chiariglione approached the organization -- and a sister agency, the International Electrotechnical Commission, also based in Switzerland -- about putting together a working group to arrive at standards for digital video and audio, both of which

were on the horizon. The [Moving Picture Experts Group](#) (MPEG) met for the first time in May of 1988. Twenty-five people attended. Not one of them was from a record company. "Some of them came later, when the group became larger," Chiariglione says. "But at the time -- well, nobody *knew,* you see. Nobody, I promise you, had any idea of what this would mean to music."

Converting pictures and sounds into zeros and ones creates files that are too large for most computers and networks to work with easily: a single second of music from a compact disc takes up 175,000 bytes. Researchers have invented methods of shrinking this information without losing its identifying qualities, much as shorthand shrinks written language while leaving its sense intact. Codecs, as these methods are called, take advantage of quirks in human perception. (*Codec* stands for "coder-decoder.") Because the ear can discern certain frequencies more clearly than others in particular situations, codecs can slice away the tones people don't perceive, decreasing the size of music files without greatly affecting the sound. "You'd think that people would notice if you pulled out half the sounds in their favorite music, but they don't," says David Weekly, an independent programmer who is writing an online book about digital audio.

Chiariglione's group asked for candidate audio and visual codecs. One response came from the [Institute for Integrated Circuits](#) of the Fraunhofer Gesellschaft, a group of forty-seven laboratories in Germany that helps companies develop marketable products from university research. In the 1980s a research team from the institute and the University of Erlangen developed a codec that let high-quality music be transmitted over ordinary telephone lines, fine-tuning it by encoding music, including a Suzanne Vega song, hundreds of times and listening to the results. The codec could shrink music files by a factor of twelve or more with little loss of quality. With the Fraunhofer-Erlangen team's help, Chiariglione's group laboriously incorporated the codec into its first audiovisual standard, MPEG-1. Completed in 1992, MPEG-1 described three separate but related schemes -- "layers," in the jargon -- for converting sound into a pattern of ones and zeros. Layer 1 and Layer 2 were intended for high-performance applications; Layer 3, a buffed-up version of the Germans' ideas, was intended for devices that handle data relatively slowly, such as today's personal computers. MPEG-1, Layer 3 is what is now called MP3.

To show industries how to use the codec, MPEG cobbled together a free sample program that converted music into MP3 files. The demonstration software created poor-quality sound, and Fraunhofer did not intend that it be used. The software's "source code" -- its underlying instructions -- was stored on an easily accessible computer at the University of Erlangen, from which it was downloaded by one SoloH, a hacker in the Netherlands (and, one assumes, a *Star Wars* fan). SoloH revamped the source code to produce software that converted compact-disc tracks into music files of acceptable quality. (The conversion is known as "ripping" a CD.)

This single unexpected act undid the music industry. Other hackers joined in, and the work passed from hand to hand in an ad hoc electronic swap meet, each coder tinkering with the software and passing on the resulting improvements to the rest. Within

two years an active digital-music subculture was shoehorning MP3 sites into obscure corners of the Net, all chockablock with songs -- copyrighted songs -- that had previously been imprisoned on compact discs.

No one was more surprised than Chiariglione. The main application the experts group had foreseen for MPEG-1, of which MP3 is a part, was CD-i, a now-uncommon form of interactive compact disc developed by Philips and Sony to put games and educational programs on television sets. But on the Net little is predictable. The development of MP3 software happened with the burbling, self-organizing spontaneity that is one of the global network's most salient characteristics -- and the ultimate source of the music industry's digital dilemma.

Napster was incorporated in May of last year, and released its software in preliminary form three months later. It quickly caught on, spawning imitations and variants, commercial and nose-thumbingly uncommercial: Wrapster, Napigator, Gnutella, Scour Exchange, CuteMX, iMesh, eCircles, FileSwap, Gnarly!, MP123, NetBrilliant, OnShare, Angry Coffee -- even, mockingly, Metallicster. Much of the software is hard to find, slow, buggy, and unfinished, requiring so much perseverance that one might expect only adolescents to use it. Adolescents, as it happens, are the labels' biggest market, and indeed, the infelicities of the user experience have not deterred them from ripping and trading CDs on these services. Estimates of the number of MP3 files on the Net range from just under 100 million to more than a billion. Some students, blessed with the fast Internet links common at universities, have thousands of songs on their computers. In April the Bernstein Investment Research Group warned that within three years the industry could lose as many as one out of six CD sales to Internet piracy.

"The sharing may be technically illegal, but there's no way to stop it," says Whitney Broussard, a lawyer at the music-law firm of Selverne, Mandelbaum & Mintz. "Already the entire body of important musical works is in compact-disc format -- unencrypted digital copies" that are freely convertible into MP3 files. MP3 itself can't be retrofitted to enforce copyrights, because today's ripping and playing software wouldn't be able to comprehend the add-ons. Similarly, CD players can't readily be changed to make copying impossible; indeed, a trial release in Germany of copy-protected CDs foundered early this year, because some consumers couldn't get them to play. As for halting the spread of MP3s ripped from CDs, Broussard says, "it's too late."

Furthermore, the industry is not simply fighting an unorganized group of college kids. In an illustration of Lenin's remark about capitalists' selling the rope with which to hang themselves, businesspeople are lining up to profit from activities they officially decry.

The trade association for record stores, the National Association of Recording Merchandisers, trumpets on its Web site its support of "aggressive efforts to fight piracy." And yet the National Record Mart, an association member that owns more than 180 record stores, announced last March -- in an if-you-can't-beat-'em-join-'em move -- that it would buy MP3Board.com, a company that runs a Web site that searches for and posts

links to illicit music files. When the RIAA tried to shut down MP3Board.com, in May, the company sued, demanding that the court pre-emptively rule that its service is legal. (The labels countersued in June.) Perhaps more startling, Scour.com, a rapidly growing start-up with a Napsterlike service called Scour Exchange, is bankrolled in part by Michael Ovitz, agent and manager to the stars. A search on Scour for Robin Williams, a client of Ovitz's management company, turned up more than fifty copies, all available for downloading, of comedy routines from Williams's recordings.

Beset by a growing mass of enemies, the labels and dozens of other companies -- retailers, consumer-electronics firms, information-technology companies, trade associations, dot-coms of various persuasions -- have been meeting to create what is uneuphoniously known as the Secure Digital Music Initiative. The goal is to create security measures that will permit the industry to release music on the Internet without fear of its spreading uncontrollably. Unlike the bulk of today's online music, SDMI music will be playable only on software and hardware that follows SDMI rules about copying. It will be as if CDs could be played only on special stereo systems that cannot be hooked up to tape recorders. Most important, customers won't be able to trade downloaded SDMI music on Napster and its ilk. More accurately, customers will be able to shuttle files around Napster freely, but the SDMI protection will control the circumstances under which the files can actually be played. In theory, SDMI will return control of the music to the industry -- a necessary precondition, in Bronfman's view, for the "huge creative and industrial efforts" required to build the heavenly jukebox and the planetary sea of content that will follow it.

The head of SDMI is an engineer with considerable experience with large, fractious groups: Leonardo Chiariglione. Despite his efforts, the initiative has been plagued by feuding and foot-dragging. SDMI members include both record stores and e-commerce sites that hope to drive them out of existence, record labels that want to shut off free music and hardware manufacturers that are rushing scores of Walkman-like MP3 players to the market, and such active legal antagonists as Napster and the RIAA. The multiple conflicts have helped to ensure that the first fully functional SDMI music files will not be available until Christmas at the earliest, more than a year after the target date.

But even when SDMI music finally becomes available, it "just won't work," according to Gene Hoffman, an SDMI participant who is the president of the online music store EMusic.com. "There's no way it will do the things they want it to do, which is to lock up this kind of content."

Encoding computer files in a way that prevents unauthorized copying is a form of cryptography. No matter how SDMI encodes a song, explains Martin Eberhard, the CEO of Nuvomedia, which manufactures electronic books, it must be listened to in unscrambled form, which means that somewhere on the computer the song exists in "plaintext," as cryptographers call it. The decrypted stream of data can be captured, in the digital equivalent of putting a tape recorder in front of stereo speakers. "It doesn't matter how good the cryptography is," Eberhard says. "Once [the music] is decrypted, you just bypass the cryptography and re-rip the music into an MP3."

SDMI employs the further protection of embedding digital watermarks in the music. SDMI software looks for the watermarks; if they have been altered, which happens if the music is illicitly decrypted, the software refuses to play the music. But watermarking, too, is vulnerable to attack, according to Bruce Schneier, an Internet-security consultant who is the author of *Secrets and Lies,* a disquisition on the pitfalls of computer networks which is being published this month. "At the moment, the techniques are hard to do," he says. But the Net is very good at bringing down the bar. "You always have two kinds of attackers, Joe Average and Jane Hacker. Many systems in the real world only have to be secure against Joe Average." Door locks are an example: they're vulnerable to expert thieves, but the chance that any one door will encounter an expert thief is small. "But if I am Jane Hacker, the best online," Schneier says, "I can write a program that does what I do and put it up on the Web -- click here to defeat the system. Suddenly Joe Average is just as good as Jane Hacker."

Last year Microsoft released a new version of Windows Media Audio, an equivalent to MP3 that the company touted as secure: songs in the format could be restricted to a single personal computer. Within hours of its release somebody with nothing else to do slammed together a program, archly called "unfuck," that intercepted the decrypted data and stripped away the restrictions. Hours after that the program was available on Web sites around the world, from one of which I recently downloaded it. "If your stuff is on everybody's desktop, people will try to tinker with it," Gene Hoffman says. "You're giving the whole world a chance to crack your cryptography on machines that inherently make that easy to do."

These difficulties are not restricted to music. Contemplating the apparently ineluctable growth of the global network, book publishers and film studios see themselves rushing toward a digital dilemma of their own. Like the record labels, they recognize the overwhelming speed, ease, and cheapness of online distribution. At the same time, they fear -- with good reason -- that what has happened to the music industry will happen to them. On March 14 Stephen King electronically released a novella, *Riding the Bullet,* in a format that was readable only by using designated electronic books or special software. Just three days later a plaintext version appeared on a Web site in Switzerland. Remarkably, the crackers troubled themselves to break the code even though Amazon and Barnes & Noble were offering the authorized version at no charge.

Film studios use what is called the Content Scrambling System to encrypt digital video discs. Last year at least two groups of European hackers raced to break the CSS encryption; the better software, DeCSS, was released on the Web in October. It was used by yet another band of hackers to create a new compression scheme, called DivX, that can shrink feature films to 600 megabytes -- small enough to be traded, Napster-style, by people with ultra-fast connections. The software, which is distributed from a Web site ostensibly based on a group of islands in the Indian Ocean, is hard to use, unreliable, and popular; a week after the release of *Mission: Impossible 2,* I found DivX copies on the Net. Meanwhile, the movie industry has been trying to suppress not only the hundreds of Web sites around the world that host unauthorized software but also the much larger group of sites that link to them. Because new DeCSS and DivX sites pop up as rapidly as

the old ones are taken down, the studios are facing a grim, unwinnable contest of legal Whack-a-Mole.

Given the huge number of MP3 files already in existence, the explosion of file-sharing software, the willingness of companies to try to profit from illicit copies, and the likelihood that SDMI will be circumvented, it seems reasonable to suppose that the music industry will never be able to restrict copyrighted material on personal computers connected to the Internet. Nor will print publishers or video or film producers. The content industry therefore has two possible courses of action. One is to prepare for a world in which copyright plays a much smaller role. The other is to change the Internet. The first alternative is problematic, to say the least. The second could be much worse.

They're Paying Our Song

EVERY year Austin, Texas, hosts [South by Southwest](#), the nation's biggest showcase for independent rock-and-roll. Hundreds of bands play in the city's scores of enjoyably scruffy bars, which are thronged by young people with the slightly dazed expression that is a side effect of shouting over noisy amplifiers. When I attended the festival this spring, I was overwhelmed by the list of bands -- almost a thousand in all, most of them little-known hopefuls. I had no idea how to sort through the list for what I would like. Luckily for me, I ran into some professional music critics who allowed me to accompany them, which is how I ended up listening to the [Ass Ponys](#) late one night.

Led by a husky singer and guitarist named Chuck Cleaver, the Ponys crunched through a set of songs with whimsical lyrics about robots, astronauts, and rural suicide. At the back of the room, beneath an atmospheric shroud of cigarette smoke, was a card table stacked with copies of their most recent CD, *Some Stupid With a Flare Gun.* By the bar stood a tight clump of people in sleek black clothing with cell phones the size of credit cards. With their Palm hand-helds they were attempting to beam contact information at one another through the occluded air. They didn't look like local students, so I asked the bartender if he knew who they were. "Dot-commers," he said, setting down my beer with unnecessary force.

Silicon Valley had overwhelmed South by Southwest. In a festival usually devoted to small, colorfully named record labels with two-digit bank balances and crudely printed brochures, the slick ranks of the venture-capitalized were a distinct oddity. It was like a visitation from a distant, richer planet.

Music, especially popular music, has been a cultural bellwether since the end of World War II. Swing, bebop, blues, rock, minimalism, funk, rap: each in its own way has shaped cinema, literature, fashion, television, advertising, and, it sometimes seems, everything else one encounters. But the cultural predominance of the music trade is not matched by its financial import. Last year the worldwide sales of all 600 or so members

of the Recording Industry Association of America totaled $14.5 billion -- a bit less than, say, the annual revenues of Northwestern Mutual Life Insurance. As for the tiny labels at South by Southwest, many of the dot-coms in attendance could have bought them outright for petty cash.

After the show I asked Cleaver if he was concerned about the fate of the music industry in the Internet age. "You must be kidding," he said. With some resignation he recounted the sneaky methods by which three record labels had ripped off the band or consigned its music to oblivion, a subject to which he has devoted several chapters of an unpublished autobiography he offered to send me. (He had nicer things to say about his current label, Checkered Past.) Later I asked one of the music critics if Cleaver's tales of corporate malfeasance were true. More than true, I was told -- they were typical. Not only is the total income from music copyright small, but individual musicians receive even less of the total than one would imagine. "It's relatively mild," Cleaver said later, "the screwing by Napster compared with the regular screwing."

Although many musicians resent it when people download their music free, most of them don't lose much money from the practice, because they earn so little from copyright. "Clearly, copyright can generate a huge amount of money for those people who write songs that become mass sellers," says Simon Frith, a rock scholar in the film-and-media department at the University of Stirling, in Scotland, and the editor of *Music and Copyright* (1993). But most musicians don't write multimillion-sellers. Last year, according to the survey firm Soundscan, just eighty-eight recordings -- only .03 percent of the compact discs on the market-accounted for a quarter of all record sales. For the remaining 99.97 percent, Frith says, "copyright is really just a way of earning less than they would if they received a fee from the record company." Losing copyright would thus have surprisingly little direct financial impact on musicians. Instead, Frith says, the big loser would be the music industry, because today it "is entirely structured around contracts that control intellectual-property rights -- control them rather ruthlessly, in fact."

Like book publishers, record labels give artists advances on their sales. And like book publishers, record labels officially lose money on their releases; they make up for the failures with the occasional huge hit and the steady stream of income from back-catalogue recordings. But there the similarity ends. The music industry is strikingly unlike book publishing or, for that matter, any other culture industry. *Some Stupid With a Flare Gun,* for example, contains twelve songs, all written and performed by the Ass Ponys. From this compact disc the band receives, in theory, royalties from three different sources: sales of the disc as a whole, "performance rights" for performances of each of the twelve songs (on radio or MTV, for instance), and "mechanical rights" for copies of each song made on CD, sheet music, and the like. No real equivalent of this system exists in the print world, but it's almost as if the author of a book of short stories received royalties from sales in bookstores, from reading the stories to audiences, and from printing each story in the book itself. The triple-royalty scheme is "extraordinarily, ridiculously complex," says David Nimmer, the author of the standard textbook *Nimmer*

on Copyright. Attempts to apply the scheme to the digital realm have only further complicated matters.

As a rule, the royalty on the CD itself -- typically about $1.30 per disc before various deductions -- goes to performers rather than composers. After paying performers an advance against royalties, as book publishers pay writers, record labels, unlike publishers, routinely deduct the costs of production, marketing, and promotion from the performers' royalties. For important releases these costs may amount to a million dollars or more. Performers rarely see a penny of CD royalties. Unheralded session musicians and orchestra members, who are paid flat fees, often do better in the end.

Paying back the record label is even more difficult than it sounds, because contracts are rife with idiosyncratic legal details that effectively reduce royalty rates. As a result, many, perhaps most, musicians on big record labels accumulate a debt that the labels -- unlike book publishers -- routinely charge against their next projects, should they prove to be successful. According to Whitney Broussard, the music lawyer, musicians who make a major-label pop-music compact disc typically must sell a million copies to receive a royalty check. "A million units is a platinum record," he says. "A platinum record means you've broken even -- maybe." Meanwhile, he adds, "the label would have grossed almost eleven million dollars at this point, netting perhaps four million."

As a standard practice labels demand that musicians surrender the copyright on the compact disc itself. "When you look at the legal line on a CD, it says 'Copyright 1976 Atlantic Records' or 'Copyright 1996 RCA Records,'" the singer Courtney Love explained in a speech to a music convention in May. "When you look at a book, though, it'll say something like 'Copyright 1999 Susan Faludi' or 'David Foster Wallace.' Authors own their books and license them to publishers. When the contract runs out, writers get their books back. But record companies own our copyrights forever."

Strikingly, the companies own the recordings even if the artists have fully compensated the label for production and sales costs. "It's like you pay off the mortgage and the bank still owns the house," says Timothy White, the editor-in-chief of *Billboard.* "Everything is charged against the musician -- recording expenses, marketing and promotional costs -- and then when it's all paid off, they still own the record." Until last November artists could take back their recordings after thirty-five years. But then, without any hearings, Congress passed a bill with an industry-backed amendment that apparently strips away this right. "It's unconscionable," White says. "It's big companies making a naked grab of intellectual property from small companies and individuals."

The other two kinds of royalties -- performance and mechanical rights -- go to songwriters and composers. (The Ass Ponys receive these because they write their own songs; Frank Sinatra did not, because he sang mostly jazz standards.) Songwriters receive performance-rights payments when their compositions are played in public -- executed in concert, beamed over the radio, sprayed over supermarket shoppers from speakers in the ceiling. Individual payments are calculated through a complex formula that weighs audience size, time of day, and length of the composition. In the United States the money

is collected primarily by Broadcast Music Incorporated and the American Society for Composers, Authors, and Publishers, known respectively as BMI and ASCAP. Mechanical rights derive in this country from the Copyright Act of 1909, which reversed earlier court rulings that piano rolls and phonograph recordings were not copies of music. Today the recording industry pays composers 7.55 cents for every track on every copy of every CD, pre-recorded cassette, and vinyl record stamped out by the manufacturing plants. The fee is collected by the Harry Fox Agency, a division of the National Music Publishers' Association, which represents about 23,000 music publishers. In 1998 performance and mechanical rights totaled about $2.5 billion.

Because U.S. labels, publishers, and collecting societies do not break down their cash flow, it is difficult to establish how much of the $2.5 billion American songwriters actually receive. But in an impressively thorough study Ruth Towse, an economist at Erasmus University, in Rotterdam, ascertained that in Britain from 1989 to 1995 the average annual payment to musicians was $112.50. Musicians in Sweden and Denmark made even less. Although the system in the United States is different, the figures, as Towse drily observed, "do not suggest that performers' right considerably improves performers' earnings."

A few composers -- the members of Metallica, for instance, who perform their own songs -- do extremely well by copyright. But even some of the country's most noted performers and composers are not in this elect group. Among them was Charles Mingus, who wrote and played such now-classic jazz pieces as "Goodbye Pork Pie Hat" and "Better Git It in Your Soul." According to Sue Mingus, his widow and legatee, "Charles used to joke that he wouldn't have recognized a royalty check if it walked in the door." She meant royalties on record sales; Mingus did receive checks for performance and mechanical rights. But when I asked what Mingus's life would have been like without copyright, she said, "It would have been harder. He took copyright very seriously. But what kept him going financially was that he toured constantly." Few rock performers have this alternative: their equipment is so bulky and expensive that their shows can lose money even if every seat is sold.

Musicians, who are owed many small checks from diverse sources, cannot readily collect their royalty payments themselves. Similarly, it would be difficult for radio stations to seek out and pay every label and publisher whose music they broadcast. In
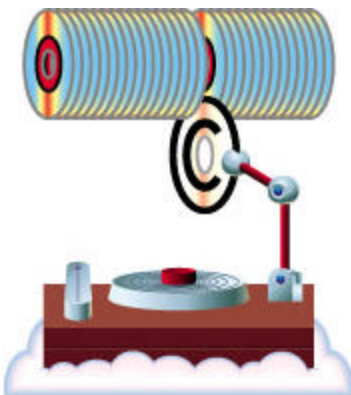
consequence, there are powerful incentives to concentrate the task into a small number of hands. Further driving consolidation is the cost of marketing and advertising. Promotion is expensive for book publishers and movie studios, too, but they aren't trying to place their wares on the shrinking playlists of radio-station chains and MTV. Because singles effectively no longer exist, playlists are not based on their sales; songs on the radio function chiefly as promotional samples for CDs. Instead playlists are based on criteria that people in the trade find difficult to explain to outsiders, but that include the expenditure of large sums for

what is carefully called "independent promotion" -- a system, as Courtney Love explained, "where the record companies use middlemen so they can pretend not to know that radio stations ... are getting paid to play their records." Although Love didn't use the word, the technical term for paying people to play music is *payola.*

Payola wasn't always illegal, and similar schemes still aren't in many industries: consumer-products firms, for example, pay supermarkets "slotting allowances" to stock their wares. According to the author and historian Kerry Segrave, one early payola enthusiast was Sir Arthur Sullivan, who in 1875 paid a prominent singer to perform one of his compositions before music-hall audiences. Until his death Sullivan sent a share of his sheet-music royalties to the singer.

Although the payola market thrived in the vaudeville era, it did not become truly rapacious until the birth of rock-and-roll. Chuck Berry divided the royalties from his hit "Maybelline" with two DJs. Dick Clark, the host of *American Bandstand,* had links to a record company and several music publishers. After a chest-thumping congressional investigation, highlighted by appalled evocations of the evils of rock-and-roll, anti-payola legislation was passed in 1960. The labels outsourced the practice to "independent promoters," a loose network of volatile individuals with big bodyguards and special relationships with radio stations. Millions of dollars went for payola -- much of it recouped from artists' royalties. A second wave of investigations, in the 1980s, did not end the practice.

At present the music industry is dominated by what are called the five majors: Warner, Sony, EMI, BMG, and Universal. (Warner and EMI have announced plans to combine; the joint label will become part of the merged America Online and Time Warner.) The majors control about 85 percent of the market for recorded music in this country. They do this by routinely performing the paradoxical task of discovering and marketing musicians with whom a worldwide body of consumers can form relationships that feel individual and genuine. "You want to fill up stadiums with people who think that Bruce Springsteen, the voice of working-class America, is speaking only to them," says David Sanjek, the archives director at BMI and a co-author, with his late father, of *American Popular Music Business in the 20th Century* (1991). "The labels are often incredibly good at doing this."

Music critics frequently sneer at the practice of manufacturing pop concoctions like Britney Spears and the Backstreet Boys. But in this way the labels helped to create Elvis, the Beatles, and the Supremes -- musicians who embodied entire eras in three-minute tunes. As Moshe Adler, an economist at Columbia University, has argued, even listeners who grumble about the major-label music forced on them are probably better off than if they had to sort through the world's thousands of aspiring musicians on their own. But this benefit to consumers comes at a cost to musicians. Records that are hits around the world inevitably draw listeners' attention from music by local artists that might be equally pleasing. "The money is made by reducing diversity," Adler says.

For better or worse, the star-maker machinery behind the popular song, as Joni Mitchell called it, is the aspect of the music industry that would be most imperiled by the effective loss of copyright to the Net. If the majors can't reap the benefits of their marketing muscle, says Hal Varian, an economist and the dean of the School of Information Management and Systems, at Berkeley, "their current business model won't survive." The impact on their profits could be devastating. Musicians have much less to lose, and much less to fear.

Elton John Gets Mad

TO many musicians, the threat to the majors posed by the Net is more than counterbalanced by the promise of the heavenly jukebox. Ultimately, many music pundits say, listeners will simply pay a monthly fee and download whatever music they want. Music will no longer be a product, acquired in a shrink-wrapped package, in the vision of Jim Griffin, the co-chairman of Evolab, a start-up that is attempting to create a wireless version of the jukebox. Instead it will become a service, almost a utility. Consumers will have ready access to more artists than they do now, but will pay less for music; musicians will no longer be forced to cover exorbitant production costs, and will be able to reach audiences more easily than ever before. "Musicians will get paid," Griffin promises. "But to the consumer, music will feel free -- just the way cable TV feels free once you've paid the fee."

Huge obstacles stand in the way of this attractive vision. Legally, downloading a song can be construed as being simultaneously a sale (someone is buying the song), a broadcast (the song is being transmitted over the Internet), and a mechanical copy (the buyer is making a copy on a hard drive). Pooling the world's music would require negotiating copyright licenses with dozens of collecting societies (ASCAP, BMI, Harry Fox, and the like) here and abroad, hundreds of record companies big and small, and thousands of independent music publishers. One would also have to obtain licenses from the patent-holders on the codec and the developers of the copy-protection software, if any is used. The entire musical output of the world may well end up on Napster or its equivalent before the lawyers finish.

This possibility may not prove completely disastrous. In the past, creators who have lost revenue they should have received from intellectual property have been able to find other ways to support themselves, even if under reduced circumstances. Musicians will still be able to charge for performances, sell T-shirts, and make personal appearances at the launch parties of new dot-coms. Some may follow the singer-songwriter Todd Rundgren's lead and send subscribers regular shipments of music for a fee. Others will use the Net to introduce listeners to their music with the hope of then charging for more. More than a million people downloaded music by the band Fisher from MP3.com, and as a result the band was signed by a major early this year.

Such plans are not limited to pop groups. Symphony orchestras have been losing record contracts as labels cut back on releases whose sales potential is small. In June sixty-six symphony orchestras and opera and ballet companies, among them some of the nation's most prominent, announced that they were joining together to build audiences by distributing their music over the Net. Musicians will explore services like MP3.com's DAM, which charges fans a fee to burn songs from unsigned bands onto custom-made CDs; the musicians and the Web site split the proceeds. The company also pays bands to let their work be syndicated to restaurants and other establishments as hip background music. David Bowie, ever inventive, has sold bonds based on his future earnings. The singer-songwriter Aimee Mann, regarded by her label as uncommercial, successfully released a CD over the Internet. Limp Bizkit announced plans for a national tour of free concerts, with the band's fee picked up by a corporate sponsor -- Napster.

In addition, businesses will probably still have to pay: they can be sued more readily than individuals for playing illicit music. And advertisers, broadcasters, film companies, Web sites, and other companies will always be interested in music. "Music draws a crowd," Griffin says. "And there are a lot of reasons that companies are interested in crowds. Look at the JVC Jazz Festival in New York, or Budweiser sponsoring the Rolling Stones." These firms sponsor music not to sell compact discs but because music provides an environment in which to put across a message. "Maybe Coke will find a way to integrate itself directly into the shows," says Hal Varian, the Berkeley economist. "Or they'll release the music free on the Internet, except that it will be wrapped in a commercial."

Varian is untroubled by the thought of corporate-sponsored music. What difference does it make if the Spice Girls are marketed by Coca-Cola or by Virgin Records, soon to be a subdivision of AOL Time Warner? The difference is that Virgin must recoup its costs from the sale of CDs and cassettes, whereas Coca-Cola can write off the whole undertaking as an advertising expense. If it hired experienced marketers, Coca-Cola, which has annual revenues much higher than those of the entire music industry, would be far better able to promote music than any individual label. If Virgin cannot make money from the sale of music, it will either be hired by Coca-Cola -- or Nike, or Ford, or Frito-Lay -- or be replaced by it.

Even if they lost their supremacy, the labels would still have ways to make money. Their expertise in production and marketing would still be valuable. And their

control over the copyrights on music of the past would still generate licensing revenues from advertisers, broadcasters, and other businesses. Indeed, the proliferation of Internet radio and music-subscription services may create a windfall for the labels' music-publishing arms. But there is little doubt that in a world where individual listeners can ignore copyright rules, the labels will lose their dominant position.

Surprisingly few performers and composers would mourn the fall of the majors. The hostility musicians routinely express toward their industry is unlike anything in book publishing or even in Hollywood. Elton John, who has sold more than 60 million records and won four Grammies, is like a Stephen King or a John Grisham of music. It seems fair to say that neither writer would, as John did in March, on the *Today* show, vehemently denounce publishers as "thieves" and "blatant, out-and-out crooks." The major labels were now "just laughing all the way to the bank," he said. "But they won't be laughing very soon, because when the music on the Internet comes in, the record companies will all be crying."

When I tried to describe this rosy picture of artistic self-sufficiency on the Net to the science-fiction writer Bruce Sterling, he was able to contain his enthusiasm. In 1993 Sterling became one of the first writers to post a book in its entirety on the Internet. The effort was part of a time "when writers really had the idea that with all this great technology they could bypass the Man and go directly to the public," he told me. "Hell, *I* believed it -- sort of, I guess. And you know what we all found out? It never works. Either you spend all your time marketing yourself, in which case you don't actually write, or you hand over the marketing to your Web-site guy or the new Internet entrepreneur who's going to take care of it all for you, and they then become your new boss."

Some artists may do well under the new system, Sterling said. Some won't. But, as he points out, the current attempt to weigh the results of the loss of effective copyright assumes that the majors will sit by passively as their role is usurped. They won't, of course. As they did in the past, they'll fight with every available weapon. And sooner rather than later they'll go after the Internet itself.

Fear and Greed

WHEN I was younger, I was briefly in a rock band. Some of its members were not completely devoid of musical talent; alas, I was not one of them. As often occurs in such situations, I was assigned to the drums. Eventually the other members decided that having no ability to keep a beat was even more of a handicap on the drums than on other instruments, and I was replaced by someone who also couldn't play drums but at least had the potential to learn.

I recently obtained a tape we made in performance. Because I wanted to learn more about digital music, I decided to make a project of converting the songs on the tape into MP3 files. After considerable fussing I was able to listen to my younger self on the tinny little speakers that flank my monitor. The experience failed to provoke regret about

the road not taken. In fact, it provoked little thought of any kind until a few days later, when I loaded up Gnutella.

Gnutella is software that (again!) is being developed by a loose band of young people with a lot of spare time. (The name Gnutella comes from a combination of "Nutella," a thick chocolate-hazelnut spread presumably favored by the program's developers, and the GNU Project, a free-software group.) Like Napster, Gnutella allows people to search one another's hard drives for pieces of music; unlike Napster, Gnutella lets its users swap pictures, movies, and texts.

After the Gnutella window came up on my screen, I saw that its users were sharing about a million megabytes' worth of pictures, sounds, programs, and texts. And then, to my shock, I saw that somebody was trying to copy my band's music.

Because the last thing I wanted was to reveal this stuff to the world, I quickly slammed the program shut. After double-checking to ensure that Gnutella wasn't running, I sat in my chair, somewhat unnerved. I was safe -- should I run for public office, my opponent would not be able to use the music to ridicule me in attack ads. But who had tried to copy it, and how had they found it? A few minutes later I figured it out. I had stuck the MP3s in a directory with other MP3s. Because I couldn't remember the names of the songs we played, I had awarded whimsical names to the computer files of those songs. Some of the names were variants on the names of famous rock tunes. A Gnutella user searching for the originals had come across mine and tried to download one of them.

In this small way I walked in Lars Ulrich's shoes. The impetus for Metallica's legal attack on Napster was the circulation on the service of rough drafts of "I Disappear," a single from the soundtrack of *Mission: Impossible 2*. With the volatile promiscuity of the Internet, unfinished versions had been copied hundreds of times, depriving the group of control over its own work and, possibly, of some sales. When the musicians complained, they were astounded by the angry reaction. Trying to stop what they viewed as the forced publication of private material, Metallica -- rebellious rock-and-rollers for twenty years -- suddenly found themselves accused of censorship and toadying to corporate America.

Did the band in fact lose money, in addition to control? Ascertaining the financial impact of file-swapping is difficult -- indeed, the discussion quickly verges on the theological. Because not everyone who downloads a song would otherwise have paid for the compact disc, one can't simply multiply the number of illicitly traded CDs by the average price of a CD to estimate the economic impact of unauthorized copying. So pro- and anti-sharing advocates rely on indirect data. In May, Reciprocal, a start-up in New York that hopes to make money from secure downloads, released a study showing that CD sales at stores near colleges -- thought to be hotbeds of Napster users -- had slipped slightly, whereas overall CD sales had risen. Scoffing, pro-Napster forces pointed out that this year, when MP3 is supposedly destroying the music business, the industry is selling more compact discs than ever before. Such sales increases, in the view of John Perry Barlow, an advocate of sharing and a former lyricist for the Grateful Dead, are the logical

outcome of music-swapping, which exposes audiences to new music. Counterargument: it is simply the demographic boom in the number of teenagers that is propelling the rise in music sales. Counter-counterargument: this spring new records by Eminem, Britney Spears, and 'N Sync were easily available on the Internet, yet buyers mobbed stores for all three; *No Strings Attached,* by 'N Sync, sold 2.4 million copies in its first week -- more than any other album in history.

To Ulrich, such claims have merit but fail to address a central question. "Why would people pay for music if they get it for free?" he asked outside Napster. "We're very lucky -- we have all the money we need. But what about the musicians who are just getting started? How are they going to survive?"

The back and forth exemplifies the "fear and greed" that drive the struggle over online music, according to P. Bernt Hugenholtz, of the Institute for Information Law, at the University of Amsterdam. Publishers of all kinds of material fear the unpredictability of the Internet, he argued at a conference in London last year. Their apprehension leads to campaigns of "aggressive, almost paranoid lobbying for increased copyright protection in the digital environment." In turn, the lobbying scares the digital elite, who fear that "the Internet, once hailed as the ultimate vehicle of democracy and empowerment, will succumb to the evil forces of monopoly and capitalism."

For "content industries," fear turns directly to greed with the realization that digital technology provides opportunities to extract money from consumers in ways never before attempted. Consider Stephen King's electronic novella, *Riding the Bullet.* Not only was it "printed" and distributed for next to nothing, but in theory the book could not be copied from one computer to another -- owners of *Riding the Bullet* could not lend it to their friends. Editors often guess that four or five people read every "hard" copy of most popular books and magazines; digital technology offers the captivating possibility of forcing the freeloaders to pay up.

Users feel greed too. Every person to whom I introduced Napster, Gnutella, Scour, and the other services was tempted to use them. (Because I make my living from copyright, I tried to restrict my downloading to music I already own or that is out of print. Although that is probably illegal, I figured the artists wouldn't mind.) At first I thought that most adults would never put up with the uncertainties of illicit downloads -- the bad rips, the cut-off transmissions, and the defects of the MP3 codec itself, which are distinctly audible in sustained pure notes. But according to a survey funded by the Pew Charitable Trusts, more than 40 percent of all music-grabbers are thirty or older. Indeed, it is hard to imagine asking people to forgo the twin pleasures of downloading anything they want without paying and coming up with intellectual justifications for doing it. "Information wants to be free." "The labels are thieves." "Everything's going to the Net anyway."

Seeing itself as under threat, each side lashes out at the other. Record labels, invoking the image of the suffering genius in the garret, speak of the need to protect artists. But the copyrights involved are all too often owned by enormous companies.

Users, too, see themselves as powerless victims of corporate over-reaching. But one of the features of the Internet, as the development of MP3 shows, is that small groups of people can greatly disturb large organizations.

Gnutella is an example. The initial version of the software was written by programmers at a subsidiary of America Online called Nullsoft. On March 14 of this year Nullsoft put a preliminary version of the software on the Web. America Online, one recalls, is merging with Time Warner, the owners of Warner Music, one of the five majors. The appearance of Gnutella apparently displeased AOL, and the program vanished within hours. But during that time thousands of people downloaded the program, and thousands more tried but were blocked by traffic. Eight days later someone I don't know e-mailed me and several hundred other people a copy of Gnutella's source code, which could be used to re-create the program. Because the code was copyrighted by America Online, actually using it would have been legally fraught. I didn't have to worry, because in another e-mail I was told the address of a Web site where volunteer coders had posted a version of the software they had created without using the original source code. This new version was the one I was using when someone tried to download my music.

In part, Gnutella was a response to the legal threats against Napster. In Napster every user's searches are shuttled through a central hub -- the company's server room. The service can be shut down by unplugging the hub. Similarly, because all the searches are directed to Napster's Internet address, college computer administrators can reject all requests to send and receive data to and from that site, thus blocking it completely. With Gnutella, the users' computers are all connected directly to one another. Gnutella is therefore much less vulnerable to legal action -- there's no central entity to sue. The reason the software was written is evident from the anonymous tutorial that accompanied the first version. The decentralized nature of the software, it explained, "makes it pretty damned tough for college administrators to block access to the gnutella service ... [and] almost fucking impossible for college [administrators] to block the free uninhibited transfer of information.... Am I making myself painfully clear? I thought so."

Gnutella has many potential uses, but today it is primarily a vehicle for sharing illicit music, pirated software, and pornography. The last is especially prominent. Although Gnutella is usually discussed in connection with music, the most common search term users type in must surely be "Pamela Anderson video." Without much trouble I was able to find pirated versions of most of the software on my computer, complete with identifying codes necessary for installation; many versions of a take from the French television show *Dimanche* in which the camera operator cruelly zooms in as Britney Spears falls out of her dress; a complete set of Yo-Yo Ma's latest version of the Bach solo-cello suites; cheat files for a computer game named Obsidian that my son and I never finished playing because it was too long; a plaintext copy of *Riding the Bullet*; twelve of Shostakovich's fifteen string quartets, most of them performed by the Borodin; and a preliminary version of a DivX software kit for ripping and playing DVDs.

It defies belief to expect that publishers will passively let this continue. As Lawrence Lessig, of Harvard Law School, points out, the structure of the Internet is set by software and federal law, both of which can always be rewritten. Applying this insight straightforwardly to Gnutella leads to the suggestion that the music industry ask Congress to ban music-swapping or even add stringent legal controls on decentralized file-sharing applications.

Could the government really clamp down? According to Dan Farmer, the computer-security researcher, it will always be possible to disguise the use of such services by encryption. Such arguments have repeatedly proved true in the past, but they do not take into account the possibility that law enforcement, spurred by industry, might go after infringers much harder than it has before. "Silicon Valley is constantly saying that the government is irrelevant and powerless," Lessig says. "But that's because most people there have never seen it get serious."

Today Internet service providers are shielded from responsibility for the traffic they bear. Just as my telephone company is not legally liable if I make criminal plans on the phone, my Internet service provider is not implicated if I trade unauthorized music on the Net. But if providers were required by law to monitor actively for the use of Gnutella, people would be less likely to use it. "If the police started arresting people and seizing their computers," says Robert Kohn, a co-founder of EMusic.com, "music on the Internet would not seem quite so free." Worried about the future of free speech, a computer activist in London named Ian Clarke is leading an effort to create a network called FreeNet that would guarantee anonymity, no matter what. But it, too, could conceivably be prohibited, and if it comes to anything, surely we will see attempts to do so. The Net, Bronfman promised in July, "will not be able to survive if it becomes a haven for illegal activity. Copyrights must be protected online."

THE trouble is that the legal charge is being led by the recording industry, which -- in addition to having the most to lose -- has a tradition of tight copyright control and rough dealings that is not shared by other media. Given the special circumstances of the industry, this tradition is comprehensible. But it doesn't qualify the labels to set the rules for the global forum. To music companies, prohibiting online anonymity, something Bronfman has suggested, may make sense. But print publishers should feel differently about letting people read and write without revealing their identities. Too many editors know how important anonymity was to Soviet protest literature, and how profitable some of that writing was in the West. Similarly, the movie industry should be careful of the legal precedents set in music. If Napster wins its lawsuits, DivX movies may slip into legality.

Equally important, other culture industries potentially have less to fear from unbridled distribution than the music industry. The Secure Digital Music Initiative will be broken, argues Martin Eberhard, the e-book manufacturer, not so much because of the Internet but because of the combination of the Internet and personal computers.

Computers can simultaneously play and re-record music for future distribution, whether or not the music was initially encrypted. Single-purpose machines like CD players and electronic-book readers cannot do this without retrofitting that is beyond the capability of the vast majority of computer users -- it involves tinkering with hardware components. If electronic books, magazines, and newspapers are distributed through the Internet not to computers but only to specialized reading devices, they will be much less vulnerable to copying. If Hollywood stops licensing DVD technology to computer manufacturers, the studios will gain some of the same protections; and they will also continue to be able to count on money from ticket sales. For the record labels it's too late. They can't take back compact discs and the millions of CD machines that can play them.

Musicians, who share so little of the wealth from music copyright, might even do better in a world of unrestricted copying, by performing, selling merchandise, offering subscriptions, and the like. Writers, filmmakers, and other content providers who have fewer ways to recoup may well be more vulnerable to the Net. These losses, though, lie only in the future.

The potential lack of economic harm is especially significant in light of the importance of copyright to democracy. According to most legal scholars, the writers of the Constitution viewed copyright in utilitarian terms. By granting a temporary monopoly on distribution to creators, the Founders hoped to stimulate the creation of new ideas. "The creator was rewarded for a little while, but then the idea passed into the commons, where people could do what they liked with it," Lessig says. Now, he says, the campaign against piracy is pushing toward "a massive increase in regulation over the distribution of culture, which is inconsistent with the conception of the commons that lies at the root of democracy." In the American tradition artists, writers, musicians, and audiences work together, creating the intellectual ferment that has helped this country adapt to change for more than two centuries. "People hear the cries of the industry about piracy, which are real and justifiable," Lessig says. "But they don't realize that simply giving the industry what it wants will have an impact on the entire public sphere."

Except for the music industry, the campaigners against Internet piracy are working well in advance of the problem. Many of the music-industry lawsuits have been decided rapidly, without extensive fact-finding; many did not even require the companies to show that they had been harmed. The Digital Millennium Copyright Act, which is being used to sue Napster, contains elaborate provisions governing the Secure Digital Music Initiative, even though music files that are fully SDMI-compliant don't yet exist. "People are always scoffing that the technology moves so much faster than the law," P. Bernt Hugenholtz, of the University of Amsterdam, told me, "but that's ridiculous. In fact the law is moving faster than the technology, which is both ironic and a very bad sign. I'll tell you one thing. All academics I've ever met -- no matter what their political stance -- agree on one thing: all this Internet-related legislation is very, very premature."

He sighed. "You'd think they'd at least see what the car looked like before trying to drive it."