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CHAPTER TEN

Conclusion

Toward a New Model of Musical Production and Consumption

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It is . . . so easy to write songs now, you know, with sequencers and various programs—any idiot can put together an acceptable set of chords and a decent drum beat, 'cause you can buy them off the shelf.
(Brian Eno, *Musician* 204, November 1995: 34)

A new kind of consumer practice now lies at the very heart of music production in the digital studio. This practice changes, in a fundamental way, the very nature of contemporary music-making. Such a development is certainly not without its positive effects, for it potentially opens the doors of creative activity in music to a wider range of individuals: "What has become interesting is the idea that artists are people who specialize in judgement rather than skill. And this of course, reopens the question of who can use that job description" (Brian Eno, *Mix* 16 [6], 1992: 30). Indeed, it could be argued that with the introduction of digital technologies and their attendant uses, the distinction between production and consumption has become increasingly blurred and, to a certain degree, meaningless.

As I have attempted to demonstrate throughout this book, however, this development has taken place within a cultural formation that is complex—composed of a diverse set of institutions, pressures, mediations, and individual interests. The imbrication of production and consumption, at every level of the cultural formation, has resulted in a curious mixture of creative energy, economic opportunity, and associational complexity, on the one hand, and an assortment of musical, technical, and economic dependencies, on the other.

The interweaving of production and consumption within the synthesizer industry is a result, in part, of the shift to microprocessor-based technology during the 1970s and '80s. These forces exerted themselves in a variety of ways. In the design of the instruments themselves, many manufacturers have adopted a product development strategy that uses a combination of custom chip design and standard microprocessor components. In itself, this choice hardly seems unique; all industries consume (raw materials, parts, and components from outside suppliers, labor power, etc.) as much as they produce, and by the turn of the century, an entire sector of the piano trade had been built around the ready availability of prefabricated parts from a growing piano supply industry. What is different about the digital musical instrument industry is the degree to which technical innovation within the field has become dependent upon the general level of sophistication and the market success of technologies originating within the computer industry. Developments in the industrial sector are, furthermore, strongly dependent upon the particular characteristics of the musicians' market. The strategy of continuous innovation has created the need for continuous consumption. This strategy, in turn, has placed considerable pressure on the manufacturers to emphasize market criteria even at the initial stages of instrument design; the limitations of MIDI as a technical specification are the outcome of such pressures and criteria.

As a result of the increased complexity of the new instruments and because of their reproductive capabilities, a small cottage industry dedicated to supplying new sounds for digital instruments has evolved. This industry has created the basis for an entire set of dependencies: On the one hand, musicians have come to rely on manufacturers and third-party suppliers for new and interesting sounds; and, on the other, the cottage industry has become dependent on decisions made by the larger manufacturers, on the general success of their instruments in the marketplace, and on their promotional and distributional resources.

The musicians' magazine industry is an equally complex cultural formation. Magazines have played a key role in the division of musicians into discrete market segments. Specialization allows them to act as a more efficient promotional vehicle for advertisers and, increasingly, as a source of marketing information as well; furthermore, they have begun to act as a surrogate "community" for some musicians, adopting the conventional rituals of musicians' interaction and offering a dubious form of career exposure.

Musicians' magazines have played an important role not only in promoting the new technologies but in creating a climate wherein the values of consumption could flourish. Linked to the creation of this general climate is the simultaneous valorization of "progress" in musical instrument design. Finally, the mobilization of the home as a site of production was

encouraged by the magazines; the specific contours of this phenomenon, in terms of gender and family interaction, stand in marked contrast to earlier constructions of home music-making in the music press.

User groups and computer networks have also been an important factor in the growth and dissemination of technical knowledge among some musicians. Groups of synthesizer enthusiasts display a certain continuity with the (largely male) radio hobbyists of the early twentieth century and with the more recent forms of association that have become characteristic of computer culture. In particular, they demonstrate an intense interest in technology for its own sake and, above all, a democratic idealism expressed as self-realization through technology. In the early days of the International MIDI Association, this combination of characteristics proved to be disastrous in the face of pressure from the musical instrument industry. Equally important, these groups have fostered an even more highly intensified form of identification between individuals and the objects of consumption—and the manufacturers that produce them—than has the musicians' press.

With the introduction of electronic and digital technologies, musicians have had to rethink their musical practices. In the recording studio they have adopted a somewhat distanced and objectified view of sound-making (the view of the producer), and with MIDI, an even more rationalized and calculated form of control over sound production has developed. These shifts in musical practice have been marked by an expanding set of sophisticated techniques and an emerging vocabulary (albeit vague and metaphoric in nature) that directs the attention of the musician and the listener to selected aspects of the music-making process. In this context, the redefinition of familiar terms such as "sound" and "live" mark a significant change in the conceptualization of musical practice in relation to sound recording as the dominant mode of production in contemporary musical culture.

At the same time, musicians have found themselves increasingly drawn toward a particular mode of consumption in order to supply themselves with not only instruments and recording devices but with the very sounds they need to produce music. This consumer behavior has manifested itself along several different dimensions. First, there has been an expansion in the range of technology deemed necessary for contemporary amateur and semi-professional practice. Many musicians no longer find it adequate to simply own a guitar or a keyboard and an amplifier. The average home studio is filled with musical gear, often including multiple synthesizers, samplers, and/or drum machines; microphones, mixing console, and monitoring equipment; racks of signal processors and tape decks; and

a computer and peripheral hardware and software. Even a modest studio can cost thousands of dollars.

Second, a new temporal dimension has been added to the musicians' purchasing patterns. Whereas a musical instrument was once understood to last for years, the increasing pace of technical innovations within the microprocessor-based musical instrument industry since the 1980s suggests that an investment in high technology will likely become obsolete within one or two brief product cycles. Despite the "vintage" status conferred upon a small number of electronic instruments, the increased frequency of instrument purchases is attested to by the large used instrument market for keyboards, signal processors, and the like.

Third, there now exists what might be understood as an increase in the depth of the music market. The buying and selling of prefabricated sounds, preset rhythm patterns, and even entire popular songs in the form of MIDI sequences for digital instruments has become a new area of the market that exists somewhere below the level of the instrument itself, in essence forming a new sublevel of cultural commodification. These three dimensions—the increased number and diversity of products, the frequency of purchase, and the increasing depth of commodity relations—characterize the pattern of consumption among many musicians since the early 1980s. As I have argued throughout this book, however, the significance of this pattern does not lie simply in the fact that musicians appear to consume more now than in the past, but rather in that a pattern of consumption has become an integral aspect of their musical production practices. A more fundamental shift in the conceptualization of music-making overall has thus occurred.

Within the musical instrument industry during the early 1990s, attention shifted, to some degree, away from sampling and synthesis toward the new possibilities offered by digital audio recording. There are at least two reasons for this redirection: First, the pace of both the introduction and the acceptance of innovations within the synthesizer market slowed. Even the latest synthesis techniques, such as physical modeling, failed to capture the imagination of consumers in the way that both FM synthesis and sampling did in the 1980s. Second, the introduction of inexpensive digital audio recorders in the form of both modular multitrack tape systems and computer-based, hard disk recording systems expanded the market for these devices beyond the realm of the high-end professional studios. Because recording devices can attract a much broader spectrum of potential consumers within the musicians' market than can keyboard instruments, investment in this area of technology has intensified.

Certainly, there can be no clear division between these technologies and those described throughout this book. Modular multitracks are, in many

ways, simply an extension of the home studio phenomenon; and hard disk recording systems have been fully integrated by a number of software manufacturers into their sequencer programs, allowing for the simultaneous editing and synchronization of MIDI and digital audio data.[1] At a deeper level, the minute editing capability of digital audio systems on computers is not unlike the kind of sound manipulating possibilities offered by samplers and synthesizers: "Workstations mimic synthesis because the cut-and-paste editing occurs at such a minute level that it is transformed into a generative operation independent of its source" (Kahn 1990: 75).

What interests me here is how these developments both sum up some of the main issues addressed throughout this book and extend them even further. Two events, in particular, that occurred during the summer of 1992—the introduction of a new product by the Alesis Corporation and the demise of a company known as New England Digital—appeared to be important signs of these new trends in the marketplace: The former seemed like an indication of things to come, and the latter, a sign of the end of an era. More importantly, these events struck me as being symptomatic of the entire process of innovations in music technology during the past two decades. Both events were greeted in the trade and consumer press with a certain surprise, or even dismay:

> I'm not sure whether this is a review of a product or a phenomenon, as no device in the recent history of professional audio has created such controversy, speculation and conjecture as the Alesis ADAT. . . . The long-awaited system uses a modular approach to digital multitrack recording, at a price that's comparable to the least expensive pro analog decks available.
>
> The repercussions are far-reaching indeed.
>
> . . .
>
> (George Peterson in *Mix* 16 [10], October 1992: 180)

> New England Digital is out of business. The New Hampshire-based company, whose Synclavier systems defined current trends in digital hard-disk recording, ceased to exist on July 1, 1992. . . . [Robert L. Doerschuk]
>
> "The 300 people who use the Synclavier every day, and the other 700 people who own one, are basically fucked and far from home."
>
> [Shelton Leigh Palmer quoted by Doerschuk]
>
> (*Keyboard* 18 [10], October 1992: 40–41)

In certain respects, it could be argued that these two events were precipitated by the development of MIDI during the 1980s. On the one hand, the Alesis Corporation owes its very existence to MIDI and microprocessors. Founded in 1985, it established itself as a bold, market-driven company that rode the crest of the MIDI wave with a series of innovative, low-cost products—drum machines, MIDI sequencers, and digital reverbs—aimed at the broadest possible market of professional and amateur musicians. By 1989, Alesis had become one of the top twenty musical

instrument suppliers in the United States.[2] Their decision to develop the ADAT was both consistent with their previous successes in the marketplace and a gamble, since it brought them into a new area of technology (multitrack digital audio) and, equally important, into potential conflict with a group of already well-established competitors.

New England Digital (NED), on the other hand, was founded during the early 1970s by composer Jon Appleton and engineers Sydney Alonso and Cameron Jones. In this regard, the company was an outgrowth of the kind of collaboration between academic composers and entrepreneurial engineers that was typical of the early years of electronic synthesizer development during the 1960s and '70s. NED produced the first fully digital synthesizer, the Synclavier, in 1976 and went on to become a leader in audio, film, and video post-production systems. Unlike Alesis, however, NED's product development strategy was aimed resolutely at the "high-end" user. Early systems were priced at approximately $50,000, and by the late '80s, a fully equipped post-production system could cost close to $500,000. NED thus represented the opposite pole of the music instrument and audio industry market, one populated exclusively by superstar recording artists (e.g., Sting, Frank Zappa, and Stevie Wonder), professional studios, and Hollywood post-production facilities. In fact, because of the costs involved, the Synclavier was never even sold through music retailers; it was only available through a small network of company sales representatives and independent dealers.

With the introduction of inexpensive digital synthesizers, samplers, and MIDI sequencers during the mid-1980s and, more recently, with the advent of PC-based digital recording and editing systems, the capabilities (if not the sound quality and integration) of the Synclavier could be achieved at a fraction of the cost. Incapable of producing (or unwilling to produce) product innovations for the mass market, it was perhaps inevitable that NED would eventually succumb to the market forces unleashed by MIDI and microprocessor technology, as did its early competitor in the high-end digital synthesizer market, the Fairlight company of Australia. Indeed, with the closure of NED in July of 1992, it could be argued that there no longer exists a "high-end" in digital synthesizer technology; MIDI technology and the "democratic" consumer marketing strategy that it represents is triumphant.

The company has since been revived but is little more than a shadow of its former self. Perhaps not surprisingly, its once coveted sound library, formerly available only to Synclavier owners, has now been released as a series of CD-ROMs in formats for Akai, Roland, and other popular samplers and is distributed by third-party interests. In a sense, the Synclavier

has been relegated to the status of a "vintage" synth—little more than a set of "sounds" from a unique instrument of the past that has failed to survive the periodic, volatile upheavals of the keyboard marketplace.

It is precisely this kind of volatility in the electronic instrument and audio industries that made the introduction of the Alesis ADAT appear to have such far-reaching implications. The ADAT was the first concrete realization of what many in the music instrument industry had long been predicting as the coming "revolution" in consumer hardware for musicians in the 1990s. It seemed poised to do for the world of digital audio what the introduction of low-cost microprocessor technology and MIDI had done for the world of synthesizers during the 1980s.

Alesis was certainly not unaware of such predictions within the industry, and it helped fuel those very sentiments by promoting the ADAT as more than just a digital tape recorder. Indeed, everything about the ADAT appeared to have been planned so that it became something of a "phenomenon" in the minds of consumers and industry observers alike, even before it achieved concrete form as a product. To achieve a status of product-as-phenomenon, Alesis drew on all the marketing strategies and promotional rhetorics commonly utilized within the electronics industries throughout the 1980s.

First, the ADAT was announced with great fanfare in January of 1991 at the National Association of Music Merchants (NAMM) winter trade show held in Anaheim, California, the largest industry gathering of its kind in North America. Although the device itself was not scheduled for release until December of 1991, advertisements and product brochures touting the capabilities of the new recorder began to appear almost immediately. When December had passed and even the winter and spring months of 1992 and the ADAT was still not ready for commercial release, local retailers (in Montréal and elsewhere) began to speak of the ADAT as little more than "vaporware." Although such talk had the potential for seriously damaging the reputation of Alesis in the marketplace, clearly the "controversy, speculation, and conjecture" caused by both the pre-release publicity and the subsequent design and manufacturing delays had created an undeniable "buzz" within the industry.

When the ADAT was finally ready for release, advance units were sent to reviewers and testers in what must have been one of the most coordinated promotional efforts seen within the industry in recent years. In the fall of 1992, virtually every special interest magazine devoted to producers, recording engineers, and so-called "electronic musicians" carried detailed reviews of the ADAT. In Britain, *Music Technology* and *Recording Musician* (September issues) and, in North America, *Electronic Musician* and *Mix* (October issues) and *Keyboard* (November issue) carried feature articles proclaiming the ADAT as an almost unqualified success. Alesis's strategy of advance promotion and the (only partially planned) long delays in releasing the device had paid off: The majority of the reviews were not merely generous in their praise of the ADAT, they were positively, and somewhat uncharacteristically, effusive. One magazine editor even felt it necessary to offer a mock apology for the unabashed enthusiasm of the review.

The design and pricing of the ADAT left no doubt in anyone's mind about the market for whom this product had been created. Modular in concept, the basic system begins with an 8-track configuration and is expandable up to an unheard-of 128-track capability simply by adding additional units and external controllers. The formidable task of synchronizing the machines is made possible through Alesis's innovations in microprocessor chip design. It is clearly the basic 8-track system, however, that positions this product for the semi-professional and amateur home recording market. Alesis had played no small part in the construction of the idea of the home studio as a viable production environment, with its line of digital reverbs and MIDI products during the late 1980s, and, significantly, the ADAT is fully compatible with MIDI synchronization standards (a feature seldom found on professional multitracks). Even the tape format chosen for the ADAT seemed geared to the home rather than for the professional recording studio. Instead of the standard reel-to-reel tape format familiar to studio recording, Alesis chose the most ubiquitous home entertainment technology of the '80s—the VHS cassette—as its entry vehicle into the arena of digital recording. Unlike other digital tape mediums already in use, VHS has the distinct advantage of being universally available, thus supporting Alesis's worldwide marketing aspirations for the ADAT.

The promise of the ADAT extends beyond the home as well. Because of its modular design, ADAT-equipped home studios are potentially compatible with more elaborate professional studios (possessing multiple ADATs) to a degree never before attainable, and it is this potential that had the music press proclaiming the ADAT as "a major recording revolution in the making" (*Mix* 16 [10], October 1992: 185). For its part, Alesis began coining new slogans to promote the ideal of total compatibility and expandability: "8 Tracks to Megatracks" became a registered trademark of the corporation. In addition, in a move quite familiar within the computer and electronic musical instrument industries during the past decade, Alesis announced, in a second wave of ads launched simultaneously with the appearance of ADAT reviews in major publications, the establishment of a company-sponsored "user group" known as the ADAT Worldwide Net-

work™, ostensibly formed to facilitate communication between ADAT owners as well as to foster direct contact with Alesis's marketing department: "Imagine a network of ADAT users from bands, composers and project studios to professional studios, video editing suites and broadcast production studios. All recording master quality tracks with full compatibility and no barriers between their creative disciplines" (Alesis product ad, *Mix* 16 [10], October 1992: 6–7). The idea of "no barriers" between low- and high-end users reflects the same utopian rhetoric—a rhetoric that assumes "democratization" of the marketplace—that has been typical of consumer culture throughout the twentieth century. The particular conflation of simple technical compatibility with social equality and a unified artistic aesthetic, however, has been a peculiar articulation of this rhetoric within the computer and electronic musical instrument industries during the past decade.

Certainly no single product could hope to fulfill the promises that have been made on behalf of the ADAT since it was first launched. At first glance, the ADAT simply looks like one more incompatible format within an audio industry already fraught with incompatible formats, sampling frequencies, digital communications protocols, and the like. In a bid to re-create the enormous success of MIDI as a de facto standard within the synthesizer industry during the 1980s, however, Alesis has entered into licensing agreements with Fostex, Panasonic, Digidesign, and other leading manufacturers of consumer and professional recording equipment in the hope of establishing the ADAT technology as an industry standard (Tascam, the manufacturer of a competing modular, digital multitrack format has made similar licensing agreements with Sony). The tradeoff in the early '90s was as clear as with MIDI a decade earlier: Risk greater competition in the hope of stabilizing the marketplace and stimulating consumer confidence. As before, the gamble has paid off; by the end of 1995, Alesis had reportedly sold over 70,000 units worldwide and was poised to launch the second generation of ADAT technology.

What about the musician in this grandiose scenario? The reality for most popular musicians in the 1990s is that a successful career in the music business is as elusive as ever (if not more so). Advances in technology have not made access to recording industry executives any easier; indeed, it has made the former luxury of producing a competitive, professional-sounding demo tape a necessity. The Alesis ADAT and the various hard disk recording systems currently available are contributing, in their own way, to the growth of such expectations and to the further transformation of the home into a production environment. These new devices, especially the computer-based recording systems, have once again placed microprocessor technologies at the center of contemporary music-making, escalating demands on musicians to attain the knowledge and skill required to operate them. A serious conversation between musicians in the '90s is as likely to be concerned with the problems of optimizing hard drive and CPU performance as with adjusting the action on an electric guitar.

The demise of the Synclavier and the rise of digital multitrack recording for the home studio are logical outcomes of the various forces at play within the music industries since the late 1970s. Beyond the confines of the music instrument and audio industries, the music periodicals, and the musicians' community, however, the developments within this cultural formation may be part of a much larger change in the nature of cultural production and consumption in the late twentieth century that is perhaps, in structural terms, similar to what occurred nearly a century ago. In this regard, Craig H. Roell's (1989) interpretation of the changes within the piano industry at the turn of the century (in particular, the rise of the automatic player piano) as part of larger pressures within capitalism toward the creation of a broad-based consumer culture is perhaps key. Among those pressures was the development of powerful new technologies of mechanical reproduction: not only the player piano but, more characteristically, the phonograph and the cinema.

In contrast to the cultural values of the previous Victorian era, with its "producer ethic"—its notions of creativity and personal achievement—the consumer culture associated with the new technologies was characterized by its apparent "passivity"—its emphasis on effortless recreation, leisure, and instant gratification (ibid.: 156–59). Of course, much recent scholarship has attempted to overcome the legacy of early twentieth-century theories of "passive" consumption; within Roell's overall discussion, production and consumption are described in terms of a shift in cultural *values* rather than evaluated as to their actual character. What I want to argue here, however, is that in the late twentieth century, electronic and digital technologies have become associated with a new kind of consumer practice that is quite different from both those associated with the piano during the nineteenth century and those connected with mechanical reproduction during the early part of the twentieth.

The contours of such an emerging pattern of consumption (I hesitate to call it an "ethic") can be observed in a number of areas in popular culture, but especially in popular music. For example, the kind of consumer practice within musical production that I have described appears to have been complemented by a new kind of active engagement with recorded material on the part of consumers, thus constituting a kind of production practice within consumption. At the most general level, such a complementarity

of practices can be discerned in the way in which consumers have used cassette technology during the past two decades: "Sounds are selected, sampled, folded in and cut up by both the producers (DJs, rap crews, dub masters, recording engineers) and the consumers (we put together our personal play lists, skip some tracks, repeat others, turn up the volume to block out the external soundtrack or flip between the two)" (Chambers 1990: 2). Interestingly, the roles and responses of the various industry players have been similar in this instance to those described throughout this book. On the one hand, the introduction of cassette tape recorders during the 1960s made it possible for consumers to create their own listening programs in the first place. Once established as a consumer practice, hardware manufacturers had a field day making it as easy as possible for consumers to indulge in their preferences: Dual cassette decks with automatic dubbing facilities now dominate the marketplace. For their part, the record industry responded with outrage and demanded compensation for their supposed losses due to home taping. For the record industry, the issues surrounding home taping (often conflated with those of cassette piracy) were simply the flip side of the sampling controversy writ large. Indeed, the financial stakes were perhaps much greater in the world of distribution and consumption (piracy and home taping) than they ever were in the smaller world of production (studio sampling).[3]

A more recent, and perhaps more intriguing, instance of change in production and consumption can be found in *Karaoke*, a practice originating in Japan but increasingly popular in the West during the late 1980s and early '90s, where consumers are invited not only to sing along with their favorite songs but actually to take on the role of lead vocalist, performing with pre-recorded arrangements of popular hits.[4] In a panel discussion at the conference of the International Association for the Study of Popular Music held in Berlin in 1991, Japanese scholar Toru Mitsui described this practice as a form of "participatory consumption" and argued that it should be regarded as significantly different from older patterns of consumption with which we have become accustomed. Similarly, ethnomusicologist Charles Keil has suggested that we need to consider this novel form of "mediated-and-live" performance as a kind of "humanizing or, better still, personalization of mechanical processes" (Keil 1984: 94).

In fact, the idea of "participatory consumption" could describe a wide range of similar activities, such as DJ "talkover" in reggae "dub" music (Hebdige 1987); the mixing and "scratch" practices of hip-hop, rap, and dance music (Langlois 1992); the use of various cassette distribution/exchange networks (Erlhoff 1984; Pareles 1987) that have become common in popular music during the past two decades; and the more recent uses of

the Internet as an alternative forum for the distribution and discussion of music. It is perhaps ironic that, at a time when professional singers have been accused of using electronic technology to foist lip-synched performances upon an unsuspecting public, an increasing number of that same public, at home, in dance clubs, in *Karaoke* bars, or on the Internet, have been using technology as a means of reclaiming their own "voices."

Elsewhere, manufacturers such as Roland and software developers such as Passport Designs have been developing MIDI technologies for the home computer market in the hope of tapping the amateur musical interests of computer owners. By creating standardized hardware and software formats that allow for both the playback and manipulation of songs in the form of pre-recorded MIDI sequencer files (some music publishers have used the term "songware" to describe the new format), these technologies grant the listener an unprecedented ability to control their listening experiences and to rearrange popular songs to suit their own tastes. In effect, the listener is invited to act as producer/engineer, to experiment in arranging and re-recording material that is familiar, pre-formed, and yet still in a malleable state.

Similarly, recent music releases on CD-ROM and CD-I (Compact Disc Interactive), by artists such as David Bowie, Peter Gabriel, and Todd Rundgren, offer consumers an expanded set of options for not only accessing certain types of material (text, sound, or image) but, in some instances, for shaping and rearranging that material as well.[5] Certainly, for the industry at least, many of these new releases are intended simply as novel ways for fans to "interact" with pop stars, hence the emphasis on biographical material, baby pictures, and the like. At least one of these projects, however—Todd Rundgren's CD-I version of *No World Order*—allows users to manipulate and reassemble various components of the musical recordings themselves. In this way, not only are notions of "passive" consumption called into question but, also, the integrity of the musical work and claims of authorship and originality—key components of the star system itself.

On the one hand, such strategies, if successful, would go a long way toward realizing the dreams of unconventional creative artists such as Glenn Gould, who, during the 1960s, advocated the development of technologies that would give the listener greater editorial decision-making power over their listening experience (Gould 1966: 59–60). Interestingly, Gould used expressions not unlike Mitsui's to describe the new consumer with editorial prerogatives: the "participant listener" (ibid.) or the "listener-consumer-participant" (ibid.: 61). Gould's call for a new technology gave concrete form to similar (though more abstract) concerns voiced by theorists during the same period. For example, Roland Barthes

lamented a form of "musica practica" that had virtually disappeared at the end of the bourgeois period ("Who plays the piano today?"), the remnants of which can only be found today in the intimate relationship between popular music and amateur guitar playing (Barthes 1977: 149–50). He wished for a renewed form of musical practice that would invite textual collaboration: "Not to give to hear but to give to write" (ibid.: 153).

On the other hand, however, such possibilities can be limited by the available technology and, more importantly, by the manufacturers' own perception of the needs and interests of this new class of consumers. Here again is a parallel with nineteenth-century salon music and the manner in which publishers consciously created a music for the home and the technical competence of its players. Indeed, although the new technologies increase the level of freedom and creativity afforded the listener, the consumer relationship may simply shift to another level of practice, as occurred with digital synthesizers and prefabricated sounds. The industry creates its consumers and their needs as much as it responds to them.

Outside of music, consumers have adopted a wide assortment of electronic and digital devices during the 1980s and '90s, ranging from home VCRs to CD-ROMs and computer games. On the surface, the various uses of these devices would seem to challenge conventional notions of "passive" consumption and, in many cases, an emphasis has been placed (for marketing purposes) on the "interactive" character of the new technologies. Indeed, the term "interactive" has become one of the most hyped buzzwords of the personal computer industry. The specific meaning of "interaction" promoted in these instances is significant, however. It speaks of an idealized form of "interaction" between subject and object (i.e., user and machine) and ignores the more problematic relationship between individuals as consumers and the industry as supplier of the new technologies. Whether the demands placed on the consumer to "interact" with the objects of consumption result in a form of self-realization or simply in more consumption is still an open question. Each of these new technologies incorporates the same ambiguities of empowerment and dependency, creative potential and formal constraints, that lead to renewed levels of consumption.

The changes in the relationship between production and consumption that I have described throughout this book can perhaps be seen as part of a broader cultural phenomenon occurring in a range of other media as well. Significantly, virtually all these new forms of cultural activity operate within the bounds of technical reproduction; that is, the reproduction and manipulation of prefabricated elements is a central component of the consumer practice associated with these devices (audio reproduction for digital musical instruments; and audio, visual, and textual reproduction for interactive computer technologies). Also, these practices tend to foster an intimate relationship between user and machine; "interaction" is, in this sense, as much a technically conceived and managed task as it is a social relationship.

There is still, nevertheless, something quite unique in how these new consumer practices have been articulated within the sphere of music production in the late twentieth century. By becoming "consumers of technology," many musicians have been able to take advantage of the enormous productive potential of new digital technologies. At the same time, however, they have witnessed the incursion of capitalist relations upon their creative practices at the most fundamental level and found it necessary to adopt increasingly mediated forms of communication with one another. Within the high-intensity context of technical innovation and capitalist marketing, this tension—between the desire to create, communicate, and consume—has become increasingly problematic, especially for young, amateur musicians and aspiring semi-professionals:

> I could not believe how many possibilities these instruments offered me—particularly the computer and software combination. My only *real* problem was coming to terms with the continuing march of technology. A couple of great drum machines were released. . . . Samplers, too, improved dramatically and came down in price. I salivated in shops and wondered how I was going to manage without them. (Kofi Busia, in *Electronic Musician* 4 [7], July 1988: 24)

Indeed, as the technologies of electronic and digital reproduction have increasingly become the central mode of production, distribution, and consumption in popular music, learning "to manage," both with and without new technology, has become one of the essential ways in which many contemporary musicians learn to define themselves, their relations with others, and the "sound" of their music.