This article addresses the sociological, economical, and political relationships between electronic media art and its modes of production and dissemination. The core of the text is based on a series of quotes from recent literature on the subject of digital media art and music making on the World Wide Web. I begin with some basic definitions of technology and the media in the 20th century, and then go on to apply simple sociological principles to an analysis of the infrastructure and the use of digital tools in the arts. The next section investigates the political economy of the new media, applying these same principles to the Web as a platform for creating and delivering music. Finally, I refer back to La Radia, the 1930s Italian futurist dream of radio as a free and decentralized “people’s” medium, as described in the Futurist Manifesto (Marinetti and Masnata 1933), as a point of comparison with the current state of the Web.

While I take a critical stance toward many uses of the Web, I do not wish to be considered a “Web-Luddite”; I use the Web daily, and it is a major component of my research in computer music. I am concerned, however, by several trends that I see in the Web culture and by the expectations of its future, and I feel that it is necessary to draw attention to them.

**Technology and Music Sociology**

Media theorists such as Marshall McLuhan, Umberto Eco, and Roger Johnson have noted at least since the 1960s that the most important changes in the performing arts to emerge from 20th-century technologies were precipitated by two industries that evolved from 19th-century technology: recording and broadcasting. Sound (and later visual) recording gave the audience freedom of time—one did not have to hear (or watch) an event at the same moment of its production. Instead of relying entirely on oral or written accounts, which had served as the medium for the recording of history up to this time, recording technology allowed for a direct archival of artifacts (recordings). The advent of radio broadcasting (and, later, television broadcasting) granted the 20th-century audience freedom of place: an event taking place in one city could be simultaneously “witnessed” by audiences throughout the world. Coupled with recording, this technology vastly increased people’s access to musical talent and content, and spawned the archives to which many of us have access today.

In the area of 20th-century music, three recent developments based on the digital technology of the 1970s give us three more “degrees of freedom.” Digital sound synthesis gives the musical performer freedom of gesture; for example, one can control an organ sound with the gestures of playing a saxophone. Techniques of digital recording and compact-disc mastering give musicians freedom of production: today there is no significant technical differentiator between “low-budget” and “high-budget” recordings. Finally, electronic distribution, especially via the Web, gives creative artists freedom of availability—one does not need a major commercial or corporate organization or widespread distribution channels to find an audience for one’s music, graphics, or video.s

Technological advances like these have changed our relationship to the arts. As Michel Foucault has argued, “many of the elements that are supposed to provide access to music actually impoverish our relationship with it” (1988, p. 316). Two
possible interpretations of this are that [1] musical performance skill is in fact less widely distributed today than it was in the last century, owing in part to the public’s easy access to recorded and broadcast music, and [2] the diversity of interpretations of the music literature is less than it was before the advent of recording. The alienation from the direct experience of music that Foucault mentions comes from the fact that music making and music consuming have become completely disjoint for the majority of listeners. Instead, Jacques Attali has argued [in Noise] that “music has...shifted from a medium of creation to the excessive archiving and consuming enterprise” [quoted by Richard 1994, p. 31]. Again, this is a two-edged sword; it can be considered an important societal advance that one can listen to a 1950s recording of great classical music while at the workplace or in the car, but the cost is that fewer and fewer people are actually involved in active music making.

Several voices in the computer music community have noted that the new media have not brought significant new art forms or aesthetics with them. For example, F. Richard Moore noted in these pages that “the new face of computer music is as shallow as it is broad....Rather than promoting research into basic musical questions, most computer music now merely substitutes newer, cheaper technology for strings and pipes. In that sense, the field of music has effectively ‘absorbed’ computer music with little or no effect on what music is produced or our understanding of it” [1996, p. 40]. On the other hand, one could argue that it took over a generation from the invention of recording to the development of musique concrète, and that we can expect new art forms to appear that make proper use of these technological advances.

Technology and Societal Power Systems

Technology is, by nature, socially neutral, but much can be determined by how a new technology is applied within a society. Especially in the 20th century, we have seen examples of new technologies that are used to link people together, to lessen the distance between the “haves” and the “have-nots,” and to make it easier for a person’s voice to be heard. Media theorists often point to the telephone as a good example of such a technology; they cite that [in the developed world, at least] telephones are widely available and relatively inexpensive. This availability is, however, arguably owing to telephone service being, historically, either entirely state-run [as in most of the developed world] or heavily government regulated [as in the USA]. The converse is that because of its generally wide availability, we have also tended to lose sight completely of those who—because of choice, poverty, geographical location, etc.—do not have access to telephones [or who choose not to use them]; they are simply no longer members of society [at some level]. On a political level, this aspect of electronic technology has led to an even more strongly stratified society. The example of the telephone shows how the same technologies that can be said to empower people, and to lessen stratification within society, can in fact separate us even more, and further enforce economic and social boundaries.

Art and Commerce

The technologies of recording and broadcast have been widely recognized as instruments of economic and social power, and have also been widely exploited by large corporations according to the capitalist value structure. Roger Johnson observes that “music has always been about power. Sound itself is power, and it was clearly understood in that sense in traditional cultures. Empowerment is then represented in socially and economically determined sites, from sacred sweat lodges and Stonehenges, to cathedrals and courts, to concert halls and universities, to ABC and MTV....All tools empower their user [and] electronic media are the empowered sites of our time....They are the core of power in an industrial economy” [1994, pp. 28–29].

Because there is no mass market for it, and no social power associated with it, art is being marginalized and replaced by entertainment. Heinz-Klaus Metzger has argued that “the social status of modern music is characterized by the fact that an innumerable mass of people from all classes
and layers of the population consider entertainment music as such, and do not even know that modern [art] music exists. It is moreover impossible to correct this view....Entertainment music is the modern instrument of power" [1983, p. 67].

From an economic perspective, there have been three major shifts in art making, brought about by the emerging commercial age: [1] the transition from use value [the value to the producer] to exchange value [the value to the consumer] as a quality metric in the arts, [2] the centralized [and economics-based] decision-making related to arts production and distribution, and [3] the centralization of control of the electronic media. We will discuss each of these three factors below.

**Mass Market Exchange Value as an Artistic Metric**

Creative artists, especially in the USA, have long understood [and lamented] the predominance of the commercial market as a determinant of artistic success. Laurie Spiegel’s analysis is that “approval-seeking behavior aimed at the general public is considered inappropriate in creative individuals...but is seen as positive or even essential in commercial enterprises....The desire for public approval can be as inhibiting to technological or scientific creativity as it is to other creative arts....Profound and powerful changes have resulted from the dissemination of computer-based technology through market channels—essentially, from computer music’s commercialization,...the transition from use value to exchange value as the common and expected motivation for technological research and development for musical applications” [1996, pp. 44–45].

It is an ongoing struggle for each of us to resist being drawn into this kind of mass-market oriented “Web-site hit counting” behavior, and to denounce it as a quality metric for art music.

**Centralized Decision-Making**

One can identify the 1970s as the dawn of the commercial era in both popular entertainment music and in art music practice. In the 1980s, digital recording technology brought the “freedom of production” described above, and the 1990s Internet technology promises a “freedom of distribution.” The problem, however, is that all of these technologies rely heavily on large corporate structures in order to function. Even though the Internet is currently a haven for “cottage” industry, there will inevitably be a consolidation of power in a small number of large corporations, just as there has been in other powerful media- and technology-related industries (e.g., software).

Although the Internet has been praised by some as “the world’s largest functioning anarchy,” it is rapidly changing as governments start to regulate it, and large corporations get more and more involved. Two extreme views of this situation are provided by Richard Povall and Roger Johnson. As Richard Povall points out, “the paradox is that there is a highly personalized, contained art that fits into the confines of a small screen, and yet...belongs to a global network that relies on a huge governmental or otherwise bureaucratic entity to support it. Personal computers may be just that [personal], but the technology needed to make them talk to one another...relies on just the kind of establishment that networked art is trying to subvert” [1997, p. 19]. Conversely, while the Internet relies on the kind of technology made possible by the government and large corporations, Roger Johnson cautiously suggests that “the tendency toward decentralization, even in the face of the enormous concentrations of power in the entertainment and broadcasting industries, is an exciting and optimistic sign...In some circles, there is an argument that technology and information systems invariably decentralize and thus challenge the powers that created them. This has a utopian and romantic ring to it” [1994, p. 31].

The unrealized positive potential of the new media reminds one of the 1960s satirical drawing [from The New Yorker] that shows an adult couple sitting before their television with one of them saying to the other, “When you consider television’s awesome power to educate, aren’t you thankful it doesn’t?” [McLuhan and Fiore 1967, p. 128].
Control of the Media

In the past, decisions about what music was performed (or what visual art was shown) in the (centralized) societally powerful venues were made by trained concert programmers or museum curators. The modern-day optimist believes that new media art will break down the traditional “art delivery systems” and replace them with an open, pluralistic anarchy run by artists. Richard Povall writes that “Electronic art has little or nothing to do with traditional gallery or concert hall spaces. It is a medium that belongs in the ether, and one that is capable of entirely new models of presentation and creation. If the [galleries and concert halls] are not to become marginalized themselves in the next century, then they need to be paying attention to their models of function and presentation, and to their relationships with creators and audience. The electronic artist is also at fault in attempting to fit within this tired construct” (1997, p. 19). Mr. Povall states that “true guerrilla art is almost oxymoronic on the Net, and Net artists tend to be those individuals with the most highly developed technological sensibility—white, young, male, educated, middle class” (1997, p. 21).

Even though I am basically optimistic about the Web’s future, I believe it to be hopelessly unrealistic to expect the current state of affairs to continue, with so many small-scale, not-for-profit Web content providers and “cowboy” Internet service providers being the rule rather than the exception. I can only cite the histories of radio, film, television, and recording as precedents. Andrew Shapiro wrote, “Surely there are reasons to be apprehensive about media regulation. The whole history of state censorship counsels against it. But the increasing concentration of media outlets in a few powerful hands is creating a compelling counter-argument—that ‘the state might become the friend, rather than the enemy, of freedom,’ as Owen Fiss puts it in his new book, The Irony of Free Speech” (1995, p. 29).

Observations on the Web

Moving from the theoretical to the practical, I would like to present several observations about modern Web usage. Taking a historical look at the Web and its related technology (and their use in our culture), it is important to note that the theoretical underpinnings of the Web come from the hypertext experiments of Douglas Engelbart and Ted Nelson—work that was centered around accessing stored text in a nonlinear fashion, and multi-user interactive collaboration. These theorists saw interactive hypertext more as an extension of the face-to-face meeting or the telephone than as an extension to the record player or the television. Like so many other inventions, it is being used for applications for which it was not designed.

Musicians and artists should be aware that the two standards on which the current Web is based—HTML (Hypertext Markup Language) and HTTP (Hypertext Transfer Protocol)—are aimed toward representing and distributing text and still images (based on the SGML text markup language). There is no basic provision in them for dynamic images, sound, music, or real-time data—these have all been added as afterthoughts, and are currently handled by Web-browsing software via a collection of different scripting languages and mutually incompatible, nonportable “plug-in” software modules. This has been turned into an advantage for the technology in that there is an ever-increasing number of Web-browser plug-ins that support new and interesting content-dissemination formats [e.g., compressed audio] and higher-level downloadable processing [e.g., three-dimensional modeling for virtual-reality visualizations]. The true small-scale Web innovator of today might be found debugging a new Netscape plug-in at this very moment.

The Web as an Art Medium

It is widely acknowledged that the content of a new medium begins with that of its closest prior relative (McLuhan and Fiore 1967), as the examples of early cinema and television demonstrate. The arrival of a new medium may also have a liberating effect on the older medium that it augments or replaces. Umberto Eco and others have noted that “it is no accident that the style of im-
pressionistic painting followed closely on the heels of the invention of photography. Photography freed painting from the need to be pure representation” [1995]. Are acoustical instruments used today to make “freed” music?

The content creator, however, is often the driving factor in the limitation of a new medium. Laurie Spiegel said that “those who adopt a new technology that they themselves did not create tend to expect [it] to solve problems inherent in whatever older, more established technologies they were accustomed to using. The new is usually seen through the filter of the old, and may be altogether invisible through that filter” [1996, p. 44]. This raises the natural question of what effect Web-based publishing and distribution might have, for example, on the print media. How has instrumental music changed since the advent of electroacoustic music? How has live music changed because of recording and broadcast?

There is also the danger of being enthralled by the technology and losing sight of the aesthetic goal, as has often been the case in electroacoustic music. In terms of Web technology, the jury of the 1996 Prix Ars Electronica found that “we were magically attracted to what we dubbed ‘true’ Net pages—home pages that use technology and narrative structures that are only available and only meaningful on the Net, and try to take those a step further….On the down side, these true Net pages sometimes gorge themselves on new Net technologies, in spite of the fact that they don’t yet know what to do with it” (Leopoldseder and Schöpf 1996, p. 70). I could repeat the questions I posed above as to how each of us is creating new art forms appropriate to the technology we use.

The “Web Station” as a Personal Performance Space

In the field of computer music, there are two contradictory tendencies with respect to the performance space: some composers produce their works for CD distribution rather than live concerts, while others produce multichannel compositions that cannot be reproduced on stereophonic systems. In Leibnitz’s best of all possible worlds, the Web-connected computer could be an excellent private or semi-private performance space (just like the television can be a home theater). With a touch of irony, Richard Povall suggests that electronic art is “ultimately, a personal medium. It tends to be as trapped within its means of reproduction as it is within its means of production [despite its paradoxical potential for instant worldwide transmission]. It should [best] be enjoyed by the individual or small group in an environment where that means of reproduction can flourish—the home, the computer screen, the telephone, the bar, the automobile” [1997, p. 19]. Given this, the use of the Web as a distribution medium for multimedia content to a potentially wide audience becomes problematic.

The Web as a Distribution Medium

One of the Web’s greatest advantages, and also its most fatal shortcoming, is its “portability.” Web browsers run on all common brands of computers, even text-only terminals with no facilities for graphical display, let alone multimedia output. Owing also to the finite [though constantly increasing] bandwidth of the underlying wide-area networks, and variations in the home-to-host connections, it is impossible to configure a multimedia Web site for truly universal consumption. It seems that the line between “haves” and “have-nots” is now drawn according to who can afford enough bandwidth to run their Web browsers with image display turned on [without suffering from “World Wide Wait” syndrome]. Note also that this situation can only be expected to be exacerbated by the introduction of new kinds of Web-TVs, Web-boys, palm-top Web surfers, etc., many of which will provide less resolution, lower bandwidth, and fewer multimedia output facilities.

Laurie Spiegel summarizes some of the issues raised by this technology: “the [other] major problems to be addressed in the evolution of computer-mediated [content] distribution are not just the obvious technical ones of bandwidth, quality, multimedia formats, and Internet protocols. These are all being worked on already. The major problems...stem from the entrenched legal and...
economic structures, which will fight their own obsolescence, and for which no adequate replacement structures have yet been designed” (1996, p. 44). This situation is indeed different from that at the time of the introduction of the telephone; none of the “competing” media sought to control its commercialization, and there was general agreement about the role that the state should play in its introduction and regulation (though this role was different in the USA and elsewhere). As introduced above, there are a wide range of technical, legal, and economic issues that are today being addressed in a variety of ways in the use of the Web as an art-distribution medium.

The Web as La Radia

So what is the shared societal vision for the World Wide Web? Anyone who spends time reading about the Web will come across ecstatic proclamations about its potential to serve society via education, the arts, public information, and other aspects (for example, commerce). In looking for a good expression of the vision of what the Web could be (were it not for all of the forces I have been discussing), I am reminded of the Italian futurists of the 1930s and their grand utopian design for the use of radio: La Radia. The Futurist Manifesto [Marinetti and Masnata 1933] describes a utopian vision of a future in which technology is applied for the greater good of the broad populace, and technology policy is developed with no consideration of commercial factors. Their description of La Radia rings quite familiar when related to today's Web evangelism:

I. La Radia, the name that we futurists give to the great manifestations of the radio is:
   [1] realistic;
   [2] enclosed at a fixed stage;
   [3] idiotized by music that, instead of developing toward greater originality and variety, has attained a repulsive, gloomy, or languid monotony; and
   [4] a too-timid imitation of the futurist synthetic theater and words in freedom for the writers of the avant garde.

II. La Radia must not be:
   [1] theater, because radio has killed theater already defeated by sound cinema;
   [2] cinema, because cinema is dying:
      [a] from rancid sentimentalism of subject matter;
      [b] from realism that involved even certain simultaneous syntheses;
      [c] infinite technical complications;
   [d] from fatal banalizing collaborationism;
   [e] from reflected brilliance inferior to the self-emitted brilliance of radio/television;
   [3] books, because the book, which is guilty of having made humanity myopic, implies something heavy, strangled, stifled, fossilized, and frozen.

III. La Radia abolishes:
   [1] the space and stage necessary to theater [...];
   [2] time;
   [3] unity of action;
   [4] dramatic character; and
   [5] the audience as self-appointed judging mass, systematically hostile and servile, always against the new, always retrograde.

IV. La Radia shall be:
   [1] freedom from all contact with literary and artistic tradition (any attempt to link La Radia with tradition is grotesque);
   [2] a new art that begins where theater, cinema, and narrative end;
   [3] the immensification of space (no longer visible and framable, the stage becomes universal and cosmic);
   [6] a pure organism of radio sensations; and
   [7] an art without time or space, without yesterday or tomorrow” [Marinetti and Masnata 1933, as quoted by Kahn and Whitehead 1992, pp. 266–268].

This manifesto represents an aggressive plan to create a new populist medium that surpasses all
previous media in immediacy, passion, and social relevance. How does today’s commercial (or independent) broadcasting medium live up to this vision of 65 years ago? To what extent can we expect the Web to do so? Many of the aspects of La Radia appear at first glance to be even easier to achieve on the Web than with the technology of broadcasting—the freedom from narrative and abolition of time as a factor, for example. The challenge is to keep the Web from becoming “heavy, strangled, stifled, fossilized, and frozen.”

Conclusions

My examination of Internet technology is not intended to cast doubt on the potential of the Web to serve as a medium for artistic expression; in fact, much of the research at centers like CREATE (where I work) is focused on developing new technology for Web-based art. I am, however, concerned about the Web’s future as an open, noncommercial anarchy, and am skeptical of its ability to live up to all of the expectations we have of its future.

Perhaps it is a function of my recent move from the San Francisco Bay Area (where I had lived for ten years) to “within earshot” of Los Angeles (and Hollywood) that is making me so wary of the gradual commercialization of the Web. Perhaps my concern is fueled by the combination of my ongoing frustration about the state of the public broadcast media in the USA, the recent deregulation of the telecommunications market, the incredible consolidation in the entertainment media industry since 1996, and the cutbacks in public funding for the arts.

It has been my observation [shared by several of the authors cited above] that the people who are creating and working with the new media do not generally seem to be caught up in the crises of modern aesthetics, nor do they address the issues of audience relations, social relevance, or imbalances of economic power in which the arts find themselves today—crises that were created, or at least exacerbated, by the media of broadcasting and recording. I would assert that along with the new dimensions of freedom that are given to us by the technologies of the 20th century, there are an equal number of new duties—the duties being that we concern ourselves more with the sociological aspects of music making and with the manner in which our music is disseminated and consumed.

In attempting to address the problems indicated above, I remain torn between two perspectives: that of Carol Duncan, who describes the situation as “art and discourse in the 19th century distorted and idealized the external world and celebrated it as Beauty. Modern art celebrates alienation from that world and idealizes it as Freedom” (Shapiro 1995, p. 43); and the contrasting idea that we can keep the Web alive and free as an exciting playground for experimenters of all sorts looking to invent new forms of narrative, collaborative creation, and personal expression. As Nicholas Negroponte declares, “New information and entertainment services are not waiting on fiber to the home; they are waiting on the imagination” (1995).

It is my hope that this article will trigger a lively discussion of the issues it raises, and perhaps lead to deeper insights into the sociological, political, and economic aspects of the future of distributed multimedia. I do believe that this understanding would allow us to better control the development of the new media.

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