1 Introduction

All technologies incite around them that whirlwind of new worlds. Far from primarily fulfilling a purpose, they start by exploring heterogeneous universes that nothing, up to that point, could have foreseen and behind which trail new functions.

—Bruno Latour, "Morality and Technology: The End of the Means," 250

Newlyweds Joyce, a twenty-four-year-old Ghanaian woman, and George, a fifty-one-year-old Canadian man, sat across from me at a pizza restaurant in mid-November 2004. From balcony seats, lit dimly by strings of Christmas lights, we relaxed into the interminable wait for our soggy pizzas. Below us lay the teeming streets of La Paz at dusk, a mixed middle- to low-income suburb of Accra, Ghana's coastal capital city. Street sellers piled their sour, green oranges and lined up mobile phone accessories on tables and tarps lit by kerosene lamps. Rigged sound systems drew attention to the wares of cassette tape sellers who pumped music so loudly the speakers visibly vibrated. *Tro-tro* drivers screeched confidently and recklessly between vehicles and pedestrians, the driver's *mate* hanging precariously from the window, rhythmically shouting his route. This was George's first visit to Accra and first time setting foot on the African continent that had no particular draw to him apart from this young woman whom he had just married.

George and Joyce had met five months prior on an Internet matchmaking Web site called plentyoffish.com. In our conversation they described how travel visa troubles thwarted their initial plan for Joyce to come to Canada to pursue the relationship in person. They believed that marrying would help Joyce acquire a visa and subsequently relocate, something George thought would likely happen within the year. Their modest

nuptials had taken place a few days before. Joyce wore a white chiffon wedding dress that George had picked out and gingerly carried with him on his multileg journey from Ottawa to Accra. They carried out the civil ceremony and license signing in the presence of only a few friends and onlookers and a hired videographer.

Our face-to-face meeting offered some concrete proof (much to my skeptical surprise) of what young Internet café users in Accra had been saying all along about how the Internet really works. Joyce described a personal history that, similar to so many young Ghanaians, was marked by the struggle to keep the momentum of her education going. She had migrated toward urban opportunity a few years back with a boyfriend from her rural hometown. He had promised to help fund her education. He was a similarly aged young man, whose jealousy eventually led to their breakup, though he did make good on paying for her secretarial training. Turning away from such "young boys," she shifted her preference to older, foreign men whom she characterized as more loving and less stingy. The Internet offered a new way to meet men who fit this description through its numerous dating sites. For his part George still had questions about their fast-moving relationship and about her attraction to him. He appeared taken aback by the young, high-spirited woman he had just wed who didn't talk as much as giggle in his direction. Joyce admitted that she was reluctant to inform her extended family of the marriage for fear of judgment and requests for support, revealing some of her unease about the relationship in terms of its social appearance. As some indication of the validity of Joyce's concerns, when I relayed the story to the young Ghanaian mother of the family I was staying with, she bluntly reduced Joyce's motives to one word: *money*.

The initial, fateful meeting of George and Joyce transpired, in a sense, at a place only a short walk away. If one were to descend from the pizza restaurant into the streets, across the main paved highway, and down wide, dusty, potholed roads, past walled compound houses into a darker, quieter part of La Paz, one would arrive approximately ten minutes later at a small Internet café of the sort typical for Accra. The owner had named it *Sky Harbour* after the Phoenix, Arizona, airport, the city where his sons were living. It was situated on the ground floor of a two-story concrete brick building in a bare but air-conditioned room. The room held ten computer workstations, each separated by wooden privacy partitions. Though such

small businesses referred to themselves as Internet cafés this was generally a misnomer because no food or drink was served.

Throughout the day activity levels at Sky Harbour waxed and waned. At midday it was often still and silent, with one or two users sitting attentively before the computer screen, often deaf to any surrounding activity. Deeply immersed in online social experiences, their physical presence in the café became muted and hollow. Such users could be carrying on conversations with someone who might be almost anywhere in the world: Indonesia, Palestine, China, Poland, or the United States. In the afternoons, groups of schoolmates sometimes wandered through to view American hip-hop and rap music videos. From the evenings until late into the night activity shifted toward a relaxed, lively, even mildly sociable atmosphere. Bright fluorescent lights illuminated the digital oasis and very loud music played, sometimes from the chop bar upstairs or from the machines themselves with one song layered incongruously over another. In her daily chats with George, Joyce had been one of the very purposeful and focused users in this space, her eyes trained on the scrolling chat conversation and the Webcam image of her beloved, indifferent to her physical surroundings.

At my first meeting with Joyce and George, Joyce seemed poised to realize an idealized vision of the Internet and its promise that was pursued by so many youth in Accra's Internet cafés. Her experience points to the more general shared view among these youth of the Internet as a mechanism for expanding one's social network, specifically in order to acquire foreign contacts. The desired outcome was a profound alteration or acceleration of one's life course with support from these well-situated outsiders. In Joyce's case, she had formed a bond online that was so powerful it compelled her foreign contact to make a physical appearance in Ghana and unlocked a flow of resources in her direction. The course their relationship had taken held the very real promise of liberating her from her state of geographic boundedness transporting her *aburokyire* (meaning *abroad* in Twi or more literally *beyond horizon*) as well as elevating her (through marriage) from a prolonged youth into respectable adult status. The image of fishing evoked by the plentyoffish.com matchmaking site's name is apt. Fishing in an abstract sense leverages the barest thread of connection (similar to a low-bandwidth digital channel) to hook something from the vast sea of possibilities. It also evokes something of the practice of

phishing, the form of Internet fraud that involves persuading random contacts to give up passwords and financial and identity information. Joyce saw the applicability of the metaphor in her match with George, as she commented: "I thank God that I got my fish." From repeated conversations and encounters with Joyce during the course of five years, I do not doubt that there was a genuine bond in her relationship with George. Yet there was also an inkling of the potential fissures in their relationship in Joyce's rushed pursuit of George and the role he was coming to play as the primary person on whom she projected the full weight of her aspirations.

George noted that Joyce had proposed marriage to him very early on but her seeming impatience ought to be put into its material context. Paying to use the Internet per minute or hour is expensive in Accra and such expenses quickly accumulate over time. It was George who had insisted on the five-month period of getting to know one another because, at first, he was "still pretty clueless as to what her motivation might be." Even after marrying Joyce, he still seemed not to have resolved this question satisfactorily for himself noting, "I still don't know why; I tried to find out and you don't get a good answer. She just liked the look of me I guess." Their relationship had developed a kind of intimacy in five months of constant chatting online though given the physical distance between them they had only an abstract sense of what a life together would be like . . . Despite this, they shared a sense of optimism and a mutual reluctance to probe too deeply into any dark corners of doubt.

This book considers nonelite, urban youth such as Joyce and their changing sense of the wider world and their place within it as formulated through their involvement in Accra's Internet café scene. Specifically, the Internet became a key resource for enacting a more cosmopolitan self. With the rapid acquisition of foreign ties, the geographic scope of operation for these youth began to expand. They navigated this new social terrain in a number of roles—as individuals, as members of various social groups, as citizens of the nation-state, and in transnational or diasporic spheres. The anthropologist Arjun Appadurai argues for *imagination* as "a constitutive feature of modern subjectivity" (Appadurai 1996, 3), noting how narratives and imagery circulating in the electronic mass media are tied to aspiration and agency (Appadurai 1996). One can see that the Internet cafés offered a whole new realm of mediated exposures for youth. Yet the Internet in

Accra did not serve simply as a resource of imagery and ideas for these youth, a stimulus for activities carried out elsewhere in the mode of Appadurai's work. Rather it was a deeply interactive space in its own right to be acted on and through. In the digital traces and encounters of users on the Internet, the work of imagination is critical social practice but in the context of the very real possibility of failure and disappointment—the pushback of engaged materiality. Joyce's success story belies the more miserable record of many Internet café users in Accra in successfully forming and leveraging partnerships with foreign contacts. Youth in Accra's Internet cafés frequently struggled to decode the implicit social norms in virtual online spaces (derived from Euro-American codes of social interaction) and were often met with silence, avoidance, and exclusion when they fell short.

Some specific changes in the capabilities and practices of youth and the broader social order that emerged from the Internet cafés are worth noting. First, the public space of the Internet café in Accra offered a new capacity to orchestrate encounters across distance and to accumulate foreign ties. This capacity, once limited to the elite, university-going, transnational class in Ghana, was extended to a new segment of the youth population through the relatively accessible café space. These young Internet users were decidedly nonelite, marginally employed, and had a degree of education that they had struggled to obtain and subsequently struggled to leverage. Tellingly, the youth who were particularly drawn to the Internet café were often those for whom other avenues of similar enactment (particularly migrating abroad) were blocked. A second area of change emerged from the way these users contended with the spatial ambiguities of the online environment. In chat room conversations and online profiles, these youth constructed an alternate online self through text and imagery seizing on the possibilities of altering race, gender, age, and location. Although previous research has linked this capacity in virtual spaces to the self-focused identity exploration of users in the West, in Ghana it was recognized and leveraged in a very different mode to perform for and persuade foreign others and at the furthest extreme to carry out Internet scams. Finally, there was also a change taking place in the extension of religious cosmologies to the online realm. For some religious leaders and faithful followers, the enhancements of the Internet generated a new sense of supernatural force as traversing electronic links to encompass sites and

subjects globally. Formerly distant outsiders came to be placed in relational roles and subjected to forces once reserved for kin. This was shaped, in part, by the distance-defying sense of co-presence and the immediacy of feedback online.

Interpreting Technology in the Peripheries

The chapters that follow offer a richly descriptive cultural account of how the Internet came to be distinctively materialized in urban Ghana and elaborate on the claims made in the previous section. This account demonstrates in numerous ways the interpretive flexibility of technology, that the meanings and uses of a machine or system are not predetermined by the form alone but come to be understood in distinctive ways by different user populations and other relevant groups. In taking this stance, this book joins many other works of ethnography and historiography (Miller and Slater 2000; Lally 2002; Horst and Miller 2006; Fischer 1992; Bijker 1995). These prior works treat a range of social circumstances as sources for the diverse interpretations of technology. The structuring of gender relations and gender identities has been especially well considered (Fischer 1992; Bijker 1995; Kline and Pinch 1996; Cockburn and Ormrod 1993). Additionally, national identity (Miller and Slater 2000; Nye 1996), accepted practices of social and economic obligation (Horst and Miller 2006; Donner 2007), and the cultivation of domestic life (Lally 2002; Silverstone, Hirsch, and Morley 1992; Shove 2003) are all offered as interpretive frames. By and large these works consider the negotiation of new technology taking place within a continuous (if contested) "cultural zone"[1] (Oudshoorn and Pinch 2008, 549). However, a move to the fringes, into spaces of cross-cultural encounter in particular and where the more erratic processes of globalization are operative (as considered in this book), means confronting discontinuity and some odd and novel surprises in technology's circulation and interpretation. Once brought into the conversation, such discontinuities stretch and deform prevailing analytical models of the relationship that connects users, developers, and technological artifacts and in this way have the potential to contribute new insights to the literature.

The culture of Internet use in urban Ghana developed from historical Global North–South relations and inequalities. It was shaped by the country's peripheral political and economic standing as experienced in the

day-to-day lives of its citizens. The legacies of colonialism and subsequent independence movements across the continent, the rise of global governance and the international aid industry, and increasing exposure to the global economy through the neoliberal reforms of the 1980s and 1990s have all contributed to forming Ghanaian national and ethnic self-conceptions and modes of acting. It shaped the yearning for foreign contacts, travel experiences, and an entrenched notion of success as related to one's ties to abroad and to one's global mobility, which guided Ghanaian youth in their online forays. What I observed in Accra's Internet cafés suggests that the experience of the enduring marginality of these users, as related to these historical trajectories, is an additional interpretive frame. This marginality can be defined as a position of relational disadvantage, of noncentrality but not absolute exclusion. It was reflected in the power dynamics between young Ghanaians and foreign others online. To consider such asymmetries within a state of connectivity is to move beyond the digital divide as the defining concept in conversations around digital inequality. The metaphor of the divide is framed around a binary of access and nonaccess and an absolute distinction between users and nonusers. Anthropologist Brian Larkin in his study of media and technological infrastructures in Nigeria suggests that what makes this discourse problematic is that it "looks through rather than at the object at hand" (Larkin 2008, 235). I further assert that in light of the spread of global connectivity, the tendency to consider populations in Ghana and other economic peripheries principally as nonusers is becoming more and more of an analytical dead end.

What the Internet has become in Ghana stems in part from a particular global ordering and the situated perspective of young, urban Ghanaians within it. It is not a product of something as static and self-contained as what might be referred to as the Traditional Culture[2] of Ghana or of its many ethnic groups. I wish to clarify briefly how culture is instead understood in this book. Appadurai suggests that despite the ambiguities of the term there is value in retaining culture "as a heuristic device that we can use to talk about difference" (1996, 13). What must be resisted, he adds, is the notion of culture as a substance or "property of individuals and groups" and in this way as bounded, naturalized, and depoliticized (1996, 13). Along these lines I wish to refocus on a notion of culture as constituted in practices that come to be distinctively patterned and situated in place

and time but that may feed on and integrate a multitude of influences and resources including those that are distant in origins or global in scope. This is not a new definition of culture but rather aligns with performative and practice-oriented definitions consistent with recent directions in the science and technology studies (STS) literature[3] that heavily informs this book. Such an understanding of culture as practice also best accommodates the potential for change through the initiation of its members. What I add to this is a particular sensibility about culture as dynamic, syncretic, and unbounded as reflected in some of the writing on globalization (Hannerz 1987; Appadurai 1996; Hannerz 1992; Lee and LiPuma 2002). Culture is forged in the ongoing push and pull between competing cultural threads and in the unique hybridization of forms.

By titling this book *Invisible Users* I have selected a multivalent term to characterize the experiences of this marginality in particular among Ghanaian youth who inhabited Accra's Internet cafés. On the one hand, their invisibility follows from this noncentrality as defined by a lack of accommodation by those in power (ranging from distant technology designers and network administrators to local politicians and other authorities). On the other hand, invisibility may be conceived of as its own form of power allowing forms of transgressive behavior to go unchecked. In this mode, law scholar Lawrence Lessig speaks explicitly about invisibility in conjunction with the freedom of the early Internet where users had greater anonymity. Users who were not identifiable were thus beyond regulation. As Lessig notes, this has changed over time with the encoding of new layers of traceability into the network infrastructure (Lessig 2006). The consequences of such a transition toward visibility and the implications for Ghanaian youth and their forays on the Internet are revisited in this book's conclusion.

One form of invisibility with this particular group of Internet café users follows from their uptake of the technology outside of formal design, manufacturing, and distribution processes. Here it should be noted that the Internet cafés of Accra were primarily equipped with secondhand computers that came to be distributed via gray market processes.[4] These machines were imported from abroad typically through the efforts of Ghanaian transnational small businesses. A lack of influence on the production end of the process limited the adaptive practices of Ghanaian youth to post hoc efforts to make up for the gaps between technological possibilities

and local needs, realities, and interests by leveraging unintentional and serendipitous compatibilities.

The invisibility of this user population is also apparent in the communication processes taking place around and through the Internet. Young Ghanaian Internet users in Accra's cafés find themselves negotiating representations of Africa and Africans in their online encounters with foreigners. Ghanaians experienced a particular form of invisibility in virtual online spaces through their struggle to be seen beyond Western mass media caricatures of Africa. For example, Internet scammers found that adopting and manipulating Western representations of Africa by representing themselves as a corrupt politician or a needy African orphan was an avenue to financial gain. A struggle over representation is similarly underway in the international aid sector where the recent efforts by institutions such as the United Nations (UN) and the World Bank to claim digital technology for socioeconomic development practices has often meant denying the existence of competent technology users in "developing" countries such as Ghana. Such a discussion has remained anchored to the digital divide's simplified dichotomy between users and nonusers. Africa is thus depicted as a blank slate where technology has yet to arrive or, as one article described it, "a technological desert" ripe for intervention (Odedra et al. 1993, 25).[5] This is another process that renders these users invisible.

A larger story here is the way Africa and Africans are continually invoked as a metaphor in Western modernist projects—specifically, as a metaphor for deprivation, breakdown, or absence (Ferguson 2006; Mbembe 2001) or alternately for the authentic (Ebron 2002), closeness to nature, and a romanticized communalism. This work in metaphors emerges once again in more recent discussions of Africa's place in the digital age. For example, it is apparent where Manuel Castells situates Africa's significance in the global order as the place of humankind's origins, "the land that nurtured the birth of Lucy," but whose economic and social collapse "denies humanity to African people, as well as to all of us in our inner selves" (Castells 1998, 82–83). A developmentalist path to progress is apparent in such depictions that contrast the natural state of humankind's origins (as disordered, sensual, and timeless) with the advanced progress of Great Nations.

I seek to replace such metaphors with an account of one small corner of the African continent as a real place, one that is complex, changing, and unique and that can be more richly understood through a stronger

commitment to the empirical and to the specific grounding offered by fieldwork. Work within the African studies literature has rarely been brought together with STS. The following section considers the unexplored possibilities in leveraging the accumulated base of such regionally specific knowledge and insight. Among other issues, this literature confronts the various ways Africa has become a projection of Western fantasy and what the consequences are for Africans in the real world. These projections now also extend into the virtual worlds inhabited by these invisible users such as the youth who frequent Ghana's Internet cafés.

Weak and Strong Materiality in Cultural Accounts

One principle aim of this book is to fill a void between scholarship on the global transitions and problems of inequality in the digital age and localized cultural accounts of the uptake of such technologies found in media studies, some parts of mainstream anthropology, and in occasional work in African studies. There is in these separate areas of scholarship an emerging and implicit opposition between two methodological and theoretical stances. One is best exemplified in the works of Manuel Castells, which depict the general weight of a worldwide shift as it is accompanied, accelerated, or initiated by some new material reality (Castells 1996, 1997, 2001; Castells et al. 2006). For Castells it is network structures in general and the Internet specifically that play a leading role in this transformation. In the writings of Negroponte (1995) and Mitchell (1996) the critical shift is from atoms to bits. An opposing viewpoint pursued using an ethnographic approach and explicitly contending with questions of culture points alternately to diverse and regionally particular patterns of media engagement (e.g., Ginsburg, Abu-Lughod, and Larkin 2002). This ethnographic work takes issue with totalizing claims of global transformation and points instead to the resilience of locality and of diverse systems of social value. Such work highlights locally peculiar trajectories of change in the wake of transformations to the media environment. Yet such assertions ultimately do not evaluate the claims of these digital age thinkers (which I maintain is still sorely needed) but instead embark from a separate premise. Such cultural accounts often implicitly adopt a kind of weak materiality that presumes certain limits on the consequentiality of objects and infrastructures. Technological form is subsumed under ostensibly more social

projects of state building, class conflict, or forms of activism positioning the technology as a handy resource but not in any sense an initiating force. In this way, such scholarship opts out of the discussion of what precisely is *new* about new media technologies.

This book begins from an alternate starting point by insisting that some socially constitutive process necessarily occurs whenever populations engage with new material possibilities for any sustained period of time. That indeed "all technologies incite around them that whirlwind of new worlds" as Latour (2002, 250) notes in the epigraph at the beginning of this chapter. The question is what such a change looks like and how enduring and extensive it is in the particular setting in question. The repositioning I propose is greatly influenced by the work of anthropologist Daniel Miller, who in his decades-long critique of the "tyranny of the subject" in social anthropology (Miller 2005, 36) challenges the way material culture is relegated to the role of a passive, supporting player for an a priori social structure (Miller 1987). Following from this starting point, my intent is to devise a framework to guide the analysis of material forms and technologies of mediation in terms of their regular and specific qualities. Marshall McLuhan attempted this in his idiosyncratic consideration of the way light directionality, television screen resolution, and other technical properties can yield profound social reconfigurations (McLuhan 1964). Walter Benjamin does it as well in examining mechanical reproduction and the photographic arts that make possible images beyond ordinary visual perception. This reproduction, he suggests, destroys the aura of original art forms, reflecting and enabling a societal urge "to bring things 'closer' spatially and humanly" (Benjamin 2001 [1936], 52). McLuhan's fixed and immanent theory of materiality (where television screen characteristics seem to directly yield a societal shift toward communalism) is not precisely what I have in mind for this book but the principle of considering directly and at close range the technical and material as socially consequential is well worth keeping in mind.

In what follows I will consider some of the terrain of analysis so far left unexplored in cultural accounts of technology diffusion and appropriation among Africa specialists as they comment on colonial and postcolonial conditions. The specific works I refer to as *cultural accounts* are those that are historically and regionally well specified, often drawing on the richness and holism of ethnography and the accumulated work of

Africanist anthropology. By referring to the weak materiality of such cultural accounts my intent is not to judge such work as unscholarly (as in a weak argument). Instead *weak* should be read as a property or attribute (as in weak tea). It reflects a kind of self-imposed limit on how much sway a social scientist might admit to the material.

To take on a materialist stance (whether weak or strong) is to acknowledge that the consequentiality of objects in the social world in some way goes beyond what human intentions invest in them. Often it is a general durability and visibility of things (as opposed to ephemeral human interactions) that are seen as contributing to the making of society. Thus Douglas and Isherwood in their theoretical exploration of how goods compose a system of cultural expression note that "goods are most definitely not mere messages; they constitute the very system itself. Take them out of human intercourse and you have dismantled the whole thing" (Douglas and Isherwood 1979, 72). Law, Latour, and other elaborators of Actor-network theory (ANT) make this point by imagining the limitations of a purely somatic society perpetuated by bodies and their interactions alone (Law 2002; Latour 1991, 1992). As Law notes the material world is especially significant in sustaining the coherence and endurance of societies over time and across distances: "some materials last better than others. And some travel better than others. Voices don't last for long, and they don't travel very far. If social ordering depended on voices alone, it would be a very local affair" (Law 1994, 102). Some works of media theory also pick up on this, notably Anderson's work on imagined communities, which considers the role of print newspapers in connecting and sustaining the nation-state as an entity (Anderson 1983).

Existing scholarship reflects different degrees of commitment to a materialist stance. Analysis underpinned by a weak materiality acknowledges the significance of the durability and visibility of objects and yet dwells mostly in the realm of the symbolic. In this mode objects demonstrate one's status or communicate nonverbally some aspect of identity. For example, the sewing machine sitting as a kind of monument in front of the home of a tribal chief is put forward as an example of the prestige object's capacity to totally overcome and supplant its more mundane utility. At the heart of this formulation is an act of divorcing the aspect of an object available to sociocultural analysis from its (presumably nonsocial and material) properties and functions. This division goes back to Marx,

whose notion of use-value referred to what was inherent to the commodity in isolation, the needs it served. Exchange-value, by contrast, was tied to a commodity's mediating role in society. Douglas and Isherwood employ this division between base functional uses versus cultural uses as their primary analytical angle stating, "Forget that commodities are good for eating, clothing, and shelter; forget their usefulness and try instead the idea that commodities are good for thinking" (Douglas and Isherwood 1979, 62). A further marker of a weak materiality is the nonspecificity or interchangeability of artifacts such that the case made for an object's role in social processes would be essentially the same if it were swapped with any other object. It is rather defined by its social history, where it has traveled, and with whom (Appadurai 1988). Theories of gift exchange exhibit this quality—it is the act of gifting (in relation to the sequence and nature of previous acts) irrespective of the particular thing gifted that strengthens social ties (Mauss 1990 [1950]; Bourdieu 1977). Such work is helpful in showing the broader ways that things are productively used in sustaining society beyond the more self-evident functions (e.g., that food is for eating), though they do not do much to challenge this naturalization of function as fixed and inherent to the material form.

Generally speaking, an analysis that validates the uses of commodities beyond apparent function has been valuable to the study of foreign commodities entering into colonial or postcolonial societies. Larkin refers to the way past African studies analyses of technology "stress how Africans understand and indigenize foreign technologies in their own conceptual schema" (Larkin 2008, 8–9). This type of work, he notes, has played an important role in countering colonial narratives of African incomprehension and the inability to "correctly" adapt to such alien artifacts. For example, Luise White's study of rumors about colonial vampires considers stories that employ fire trucks, hospitals, and other tools and practices as part of a symbolic repertoire composing a local commentary on the "extractions and invasions" (White 2000, 5) East Africans suffered under colonial rule. The acquisition and use of Western material artifacts or practices of wearing Western clothing styles has also been multiply interpreted. Anthropologist Jean Comaroff considers the partial embrace of Western dress evidenced by a Kwena chief in southern Africa who had a European-style suit made out of leopard skin. This act of combining symbols of chiefly office and Western authority she interprets as "a desire to harness the

power of *sekgoa* [*white things*], yet evade white authority and discipline" (Comaroff 1996, 30). Ferguson, however, has argued against the notion that emulation is necessarily a form of resistance or subversion. He gives the example of one Sesotho man's expressed desire for a Western-style house with a steel roof and multiple rooms—something that in certain ways can be said to be unsound or "inappropriate" for the setting. This desire he reads as a "claim to a chance for transformed conditions of life—a place-in-the-world, a standard of living" (Ferguson 2006, 19). Such cultural accounts of how foreign commodities were received specifically in African urban and rural settings typically consider the valence of these impositions—whether they were in some sense left undigested constituting a kind of consent to domination or were rather redirected toward self-defined projects and sense-making among native Africans.

Work undertaken by Africanist scholars in particular has begun to carve out a niche examining especially breakdowns, maintenance, make-do, and bricolage as part of the equation of materiality (Verrips and Meyer 2001; Larkin 2008; Spitulnik 2002b). Verrips and Meyer (2001), for example, contrast the maintaining of cars by any and all available means in Ghana with the alienation of Westerners to their own cars, whose inner workings are mysterious and opaque and handed over to be managed by specialists. The Ghanaian jalopy continually projects itself not as singular whole but makes visible its true composition of many elements. This type of work on the constancy of breakdowns in everyday life is at odds with more mainstream STS in which breakdowns are portrayed as out of the ordinary, as sudden and transitory events.[6] Instead they are a fact of everyday life in places marked by scarcity and supplied with secondhand and overworn commodities. This raises the question of what behind-the-scenes upkeep enables a perception of material durability and to what extent this durability is itself illusory. This emerging work on breakdowns-as-everyday-life challenges a weak materiality that naturalizes the stability of material forms.

Brian Larkin must be credited for taking a concern with breakdowns the furthest as a defining concept in an African studies analysis of technology. As he documents, when British colonial powers in Nigeria built an electrical system or radio network they sought to employ it as a kind of spectacle to draw the association between colonial power and these particular awe-inspiring forms. When infrastructure breaks down, however, as long as

such a symbolic projection remains in place, claims of power and progress are undermined. The radio network in its nonoperative state offers incompetence or disorganization instead. Larkin describes how, running counter to efforts at enrollment of those in power, "infrastructures have become the means to critique the state and lament the failed promises of elites" (Larkin 2008, 246–247). This engages a theme of recent social theory pertaining to materiality—the potential for material betrayal of artifacts deployed in social projects.[7] The betrayal Larkin notes is of a particular kind—linked to the way the material reality of an artifact or system is always unavoidably surplus to intentional manipulations of its symbolism. And yet this argument exhibits a kind of nonspecificity about form in dealing with the general entropic inevitability of things falling apart. One breakdown is no different than any other and has little to do with the regularities of the form, its specific properties, the distinctive mediation role or functionality of radio, or any other media infrastructure.

The reason for drawing a distinction between weak and strong materiality is ultimately to show how they operate quite differently in cultural critique. What a weak materiality offers principally is a mode of cultural reproduction via material adaptation. It is the malleability of form and its meanings and uses that are foregrounded. The previous examples demonstrate a push and pull between prevailing colonial or postcolonial institutions and the populations coping with or enduring such upheaval as it is rendered on a material medium. Yet the material is no more than a kind of firm surface that carries social forms unperturbed across time and space, a mute pawn in what is at its base a sociopolitical struggle. To get beyond a weak materiality we must consider instead a deeper entanglement whereby the novel constitution of the social takes place through the refractions of the material.[8] Although it is certainly the case that new, foreign commodities may be accommodated by a given cultural scheme, they are not simply reduced to this scheme. Larkin's consideration of breakdowns, of the material undermining symbolic projections, represents one view on the surplus spillover of the material. The strong materiality I argue for goes a step further to consider how the regularities of different forms become socially consequential.

In the quest to reconceive cultural accounts of technological engagement, I find analytical purchase in the notion of *relational materiality,* a term John Law employs to refer to a semiotics rendered in the object world

(Law 1999). Objects themselves are "effects of stable arrays or networks of relations" (Law 2002, 91). This means that rather than look for an object's immanent material properties (presuming its consistent, invariable material effect in the world), one looks for how this materiality is distinctively expressed in the way an object comes to be situated in unfolding actions. An object may thus be made material by what surrounds and engages it. In particular, it may be materialized by users (and other actors) who define novel ways of relating it to the other entities in their life world. The enduring value of a relational materiality to the pursuit of cultural accounts is the way of treating objects and specifically technologies as materially consequential but flexibly and nondeterministically. This materiality is not fixed, not arbitrary, not purely a "social construction," but situated and thus demanding in situ analysis.

Law's work on relational materiality is often grouped with the broader literature on ANT, which is most closely linked to the theoretical work of Bruno Latour. Latour has in the past argued provocatively and controversially for a symmetrical treatment of humans and nonhumans in their contributions to social processes. He makes a strong claim for the agency of nonhuman entities. This particular notion of agency is linked to the way an entity may "modify a state of affairs" (Latour 2005, 71). Latour's agency of nonhumans is without reference to intent and thus diverges from other writing on agency in which intentionality is core to the concept (Gell 1998; Ahearn 2001). I wish to take a few steps back from the analytical precipice of such rigorous symmetry between human and nonhuman, which is not, I find, essential to re-envisioning cultural accounts in a more materially grounded way and furthermore requires untenable sacrifices to accommodate. This notion of agency without intent creates a problem of explaining especially the initiation of action.[9] In considering technology adoption decisions that are wholly voluntary as in Accra's Internet cafés, this matter of initiation is a critical question. Furthermore, rather than necessarily elevate the nonhuman to a human status, such a symmetry can easily render humans to be little more than a behavioralist reading of their actions.[10] In this vein, there is also a tendency for ANT's human actors to be rendered mute. Actors instead come to be known principally through their manipulations of machines and other entities and in language performances only to the extent that they index the immediate situation. Language production and speech acts in particular have long had an

ambiguous and underdefined role in ANT, something I critique in chapter 4 in terms of the materiality of rumor. Matters of human motive and meaning, which are so often made apparent linguistically along with matters of enduring human history are what tend to fall to the wayside in the prioritization and circumscription of this form of materialist accounting. These particular silences and omissions as a tendency of such an analytical framework are a source of concern in light of the book's task of chronicling a population already prone toward invisibility. It is something I attempt to compensate for in the analytical framework proposed in the next section.

In the end this book is not strictly an ANT study. To address the alternate agenda I bring to the current case, I do something very un-ANT-like by carrying forward a regionally distinctive history that is fixed in the African studies literature revisiting this history with contemporary observations from the field. I raid the stores of the contemporary ethnography of Africa to enroll a conceptually rich body of work on orality and rumor, commentary on capitalist consumer culture from the periphery, colonialism and its aftermath, cosmopolitanism and youth culture, and the spread of world religions.

Reconceiving Users in Global Technology Studies

In this section I outline the analytical framework that structures subsequent chapters and offer it as a possible guide for scholarship in technology studies moving beyond the Euro-American settings of the field's early work and into the world's diverse peripheries. This book offers a contribution to the way the user is conceptualized in STS by considering this special class of invisible users. Certain adjustments to the prevailing analytical models of the user are necessary to render such a population more fully visible within the narrative of this book as well as to STS theory. In particular, this entails loosening up on the tendency to account for users in ways that are too narrowly circumscribed around their direct engagement at the human-machine interface. In a structured way I propose an expansion into other relevant cultural formations and to the broader political economy of Ghana as a nation-state and of Ghanaians in a global order,[11] showing how this comes back around to shape the experience of users at the machine interface.

The relationally material or material-semiotic logic I have described and advocated for has some precedent as a framework for user studies. The key examples are Woolgar's technology-as-text analogy and Akrich and Latour's similar notion of the inscription and description of technical objects (Woolgar 1991; Akrich 1992; Akrich and Latour 1992). These models define the user principally in relation to two other entities: (1) the developers of the technology and (2) the material form of the technology itself. Developers are understood to write the technological form, inscribing in it their ideas about the user and his or her expected and preferred behavior. Users, for their part, are credited with some degree of interpretive freedom. They read the material artifact and, as these models suggest, either conform to or alternately resist the developer's inscriptions. An influential pair of studies has used this approach in African fieldsites. These studies highlight the flexibility or rigidity built into material forms and how this affects whether such technologies can be successfully appropriated. A photoelectric lighting system designed by a French NGO for villagers in an unspecified African country (a design depicted as rigidly designed and closed off to prevent repair or alteration by users) is given as a case of design failure (Akrich 1992). By contrast, the built-in flexibility or "fluidity" of the Zimbabwe Bush pump (for pumping well water) is the source of its enduring use through the decades according to De Laet and Mol (2000). Both cases deal with user populations for which the item was intentionally (if misguidedly in Akrich's case) designed. This triadic model of developer-technology-user and the questions it generates about user acceptance of technology and the capacity for user agency is an invaluable initial reference model but needs to be tinkered with and expanded to accommodate the case of youth in Accra's Internet cafés.

What hinders this triadic model's broader applicability is the political-economic context of design and use that it presumes. This model is framed around customer-oriented design and engineering work for known markets. By contrast, in the Internet cafés of Accra one finds a space of access and use shaped, in part, by gray market processes that divert a technology (imported secondhand computers) to a user population and setting of use wholly unanticipated by its developers in the US-centric high-tech industry.[12] Therefore, the first adjustment to the model that I propose is to deprivilege the developer's role and to excise this language of conformity or resistance, which becomes meaningless when users are so absolutely

disconnected from design and development processes. Users in Accra, for their part, contend with newly available material capacities of the networked computer in whatever way is flexibly accommodated. To speak of this as resistance implies a tie to production processes and an ability to intuit the mind-set of the developer, which is particularly inapplicable in this case.

With the developer's role thus set aside, what I incorporate into the model instead is a broader set of proximate roles—fellow users at the café, Internet café operators, and further afield, family as well as community authorities such as elders, church pastors, or teachers. These figures all play their role in sharing interpretations and collectively materializing the technology. The neglect of the broader social world of users is an established critique of this triadic model and the notion of technology-as-text (see Oudshoorn and Pinch 2008). It furthermore reflects another part of the implicit political economy of the triadic model—an assumption of individual engagement with the technology in private spaces, an arrangement that follows generally from equipment ownership. In shared and public access settings, such as the Internet café, where two people are often seated together before the screen speaking with one another in person while they travel online, where a user may peek at other adjacent screens, and where a nosy or helpful Internet café operator might direct use, the narrow focus on the isolated user contending with the machine interface alone is more apparently unsuitable.

This brings us to another challenge of the technology-as-text analogy and of its broader applicability stemming from the burden it places on the technological artifact to be internally coherent and self-communicating.[13] Such an analogy situates direct material manipulation of the given technology as the principle and definitive mode of sense-making. Technology's material form as a kind of text or script suggests that it has an inherent temporal dimension, an implicit sequencing and linearity. Yet the initial experience of entering the Internet café, as recounted by young Ghanaians, drew attention instead to the confusing multiplicity and simultaneity of the computer screens' interface elements, software applications, and peripherals (keyboard, mouse, monitor, Webcam). Of these first experiences, youth often described how the initial work of parsing and prioritizing interface elements came through other sorts of scripts. These young Internet users generally mentioned the key role played by a friend, cousin,

teacher, or café attendant who offered a verbal characterization of the technology; physically demonstrated its use; and indicated where to start, the sequence of steps to take, and perhaps most important, a sense of why one would bother to use it at all. The script of the technology as communicated in its material form (to the extent that there was one) appeared to be crucially propped up by various other scripts that were in turn written by this great variety of proximate actors. A key consideration in the chapters that follow are the diverse scripts of this sociocultural setting with a focus on some key formats—namely rumors and church sermons—that have not yet been seriously considered as elements in technological sense-making.

Incorporating these necessary adjustments to a prevailing material-semiotic model of user behavior, interpretation, and agency, what I propose as an alternate framework begins with but then spirals outward and away from the human-machine interface (see figure 1.1). A spiral is an apt image because its outward movement occurs simultaneously with a notion of traversing back and forth across the social world under study. It implies

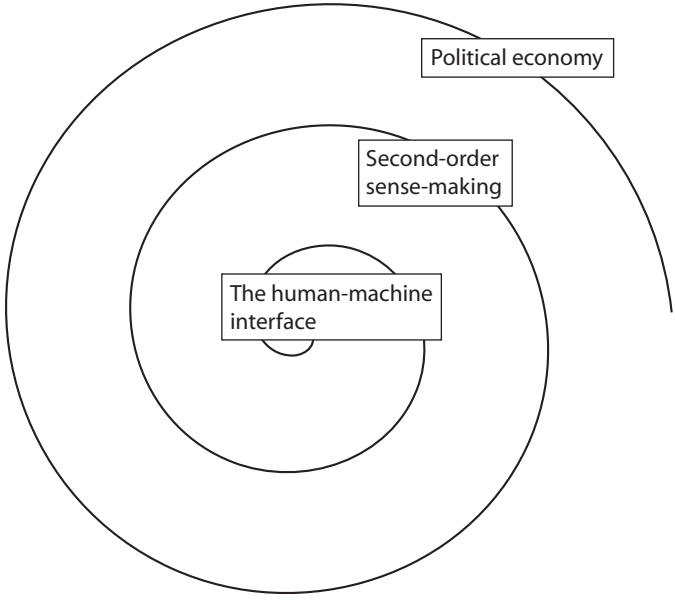

Figure 1.1
Accounting for the materialization of a technology in global peripheries

neither a hierarchy nor the containment of one level of analysis within another. The initial level of analysis, the center of the spiral, begins in proximity to the interface attending to human-machine engagements. In this particular case, attending to these engagements means also considering how computers, as a portal to the Internet, are situated within the space of the Internet café and how the Internet café is itself situated within its urban surrounds as considered in chapter 2. Additionally, what young Ghanaians do seated before the screen, how they present themselves to others they encounter online, is examined in chapter 3. These offer a foundational understanding of what the Internet has become in urban Ghana, its meaning as tied to its materiality in these particular spaces of access and use.

Moving beyond the immediacy of these Internet-use practices, in the pursuit of a broader cultural account of the technology, a second level of analysis is carried out in spaces of second-order sense-making. The practices carried out in these spaces deal with the technology in question but without direct manipulation of technological interfaces. The possible sites may cover the breadth of a society's cultural formations including speech genres, popular culture, educational and religious institutions, and forms of governing. Dwelling in these spaces illuminates additional cultural trajectories that implicate the Internet. Here is where one finds many of the supporting scripts that contribute to the coherence of the machine interface. This work away from the interface does not mark a departure from a materialist form of accounting but involves extending it into new arenas. In particular, maintaining an agnosticism about the relative durability of bodies (the somatic) and language performances (particularly speech acts) in relation to the built environment and technical artifacts helps to unsettle the assumption that the computer interface will always and automatically be the primary site of sense-making and material manipulation of the Internet. The primacy of the interface implied by the triadic model is instead treated as a question for empirical consideration.

Moving still further outward, the third level in this framework considers the distribution, refurbishment, circulation, and disposal of the technology in question. Delving into the domain of exchange complements the focus on the consumption of the technology via its direct use at the human-machine interface and in practices of second-order sense-making. Clearly such use is possible only when arrangements are in place to facilitate

access. And how access is thought about, problematized, planned, and accomplished in urban Ghana shapes the specifics of how the technology is interpreted and used. Accra's Internet cafés were equipped with second-hand computers previously used in schools, businesses, and homes in the United States and Europe. A key role was played by Ghanaian transnational family businesses, which through a process of ad hoc and opportunistic trade constructed and channeled a flow of surplus technology from economic centers where the relentless course of technological upgrades and advancements deemed them obsolete and waste. The small, neighborhood Internet cafés throughout Accra were also the effort of small-scale entrepreneurship by Ghanaians locally and in the diaspora. Neither high-tech corporations through marketing or advertising campaigns nor the instructive and educational direction of planned public access campaigns of the state or by foreign aid agencies entered into this process. One result was a certain degree of interpretive freedom among young Ghanaians who were left to make sense of the technology without a human or institutional mastermind overseeing, guiding, or policing their efforts. This was one crucial way that the political economy of Internet access provisioning was consequential to the unfolding of direct human-machine engagements.

A conscious effort to work through these levels constitutes an approach to material-semiotic analysis that is more flexibly relocatable and adaptable to the full diversity of political economic processes around the world that bring technological artifacts together with user populations. As a demonstration of this framework, the chapters of this book are organized as a movement along this spiral and through a series of sites starting from the center. Each contributes to an understanding of the social world of youth and the processes that distinctively materialize the Internet in the Internet cafés of Accra, Ghana. These sites include the built and configured environment of the Internet café within urban space (chapter 2); virtual, online spaces (chapter 3); the social imaginary generated through rumor (chapter 4); churches and other spaces of religious or spiritual practice (chapter 5); the cloistered sphere of development work (chapter 6); and finally marketplaces (and dump sites) where computing equipment circulates before and after its deployment in the Internet cafés (chapter 7). The point is to define with progressively greater scope and from a variety of angles the transecting local and global processes that materialize the Internet in a particular way in Accra.

The first two chapters are the most straightforward as material-semiotic accounts. They illustrate how attending to interfaces—the meeting of spaces with material resources and human populations—can yield a better understanding of the surprising extensions and creative redirection that users undertake as well as the hard reality of their position in the margins. Chapter 2 introduces the populations and fieldsites that are the subject of this ethnography. It considers the way the Internet café is distinctively situated in the urban space of Accra. The Internet café as a space apart from the urban fray is accomplished through the maintenance of its threshold and the ambience and décor of the interior space but also through the kinds of interactions the equipment lends itself to. The materiality of the Internet café as a grounding for the social pressures and aspirations of urban youth produced a space of traveling through rather than of face-to-face sociability. With these observations I call into question the notion that Africanization or localization is the outcome of the successful appropriation of a technology of foreign origins. Youth who frequented the Internet cafés in Accra preserved the foreignness of the technology, resisted rendering it mundane, and in doing so embraced the suggestive possibilities of the Internet as an indeterminate entity.

Chapter 3 looks at the push and pull between young Ghanaians and the foreigners they encounter online and how the Internet as a mediation technology intervenes in this process. In particular, this chapter considers the innovation of Internet scamming known colloquially in the West Africa region as *419* or *sakawa*. Scamming activities are contextualized and explained in this chapter in relation to broader patterns of interactional breakdown in online cross-cultural encounters between young Ghanaians and their foreign chat partners. Text-based chat conversations or emails, though narrowly channeled through a low bandwidth and a time-constrained connection, were nonetheless a setting of more immediate and direct intimacy with foreigners than was regularly possible for young Ghanaians before the arrival of the Internet. However, this chapter also shows how the particular materialization of the Internet historically and the particular mediation of interactions between Ghanaians and foreigners worked against the creation of tolerant and mutual relationships that these youth so often keenly sought. This chapter handles the way young Ghanaians experienced a kind of social and interactional marginalization online and their distinctive response to it.

The next two chapters delve into what I have termed *second-order sense-making*. They consider specifically the critical question of how an interest in the technology was initiated as well as continually maintained and motivated from a socioaffective perspective. Chapter 4 examines the way anxiety and moral uncertainty around the newly arrived technology in Accra came to be handled through storytelling. In this chapter various rumors about Internet scamming that were in widespread circulation among youth who inhabited Accra's Internet cafés are considered as a source for local understanding and conviction in how the Internet works. In so doing, the analysis challenges a notion of speech as weakly ephemeral in contrast to the hard consequentiality of things, a characterization often implicit in the way theories of materiality in STS are applied to cases. Rather, the circulation of rumors, the way they compel retelling, indicates how different speech forms exhibit different degrees of durability. In particular, the narratives unfolding in rumors about "big gains" young Ghanaians had made through the Internet were important to maintaining the equilibrium of Internet use in light of users who often had disappointing experiences and faced indefinite delays in realizing material gains from these practices. Stories that reconciled moral questions (for example, by placing ultrarich figures conceived of as impervious to harm such as Oprah Winfrey and Bill Gates in the position of scam victim) highlight how the question of understanding the Internet was not simply about effective use but also about creating a morally sound portrait of one's role within it.

Chapter 5 describes how the functioning of the Internet and its apparent breakdowns came to be distinctively understood in a society in which supernatural forces are widely believed to operate in the everyday world from the "realm of the spirit" as one preacher put it. This chapter is principally about efficacy rather than morality in keeping with the main bent of a metaphysics promoted especially by the Pentecostal Charismatic Christian sects that are currently flourishing in Accra., From around 1979 such churches began to grow rapidly in urban Ghana becoming an increasingly visible urban presence through the 1990s. They promoted what has come to be known as the prosperity gospel, that one's properly aligned faith is rewarded materially and financially in this life rather than in the hereafter (Gifford 2004). In recent years, this has come to be related directly to the success of young Ghanaians' Internet-based social networking through emerging notions of the way such forces traverse electronic links.

The failure of the Internet to function as desired, including breakdowns in online relationships, might be attributed to such forces and resolved through rituals of the church or even visits to a fetish priest or mallam. The argument of this chapter refutes an aspect of digital age rhetoric, specifically an excessively sociological and disenchanted notion of how religion operates in the digital realm which reduces religion to no more than a form of affiliation and a community of belonging.

Finally, chapters 6 and 7 move further outward to consider some aspects of the political economy of the Internet cafés in Accra. Development institutions and aid agencies are very much a visible presence and produce an influential and ubiquitous discourse in this part of the world. In recent years agencies such as the UN, United States Agency for International Development (USAID), and others have taken a role in promoting the Internet and other information and communication technologies (ICTs) as tools of development. Chapter 6 explores the rhetoric emerging from development institutions that imagine what the Internet and other new digital and networked technologies will inevitably mean to marginalized populations in the Global South. In this chapter, I recount my participation in a relevant UN event, the World Summit on the Information Society (WSIS) Africa regional conference that was held in Accra in February 2005 in the midst of my initial period of extended fieldwork. This chapter considers the particular appeal of the information society as a unifying concept around which to organize a world summit. The rhetoric at this WSIS event was mapped out in the performances of participants and the documents that came out of the proceedings. Altogether they portrayed a dematerialized image of unencumbered, global information circulations, an image absent any sense of costs or trade-offs to joining the digital age. The efforts of organizers and participants at the WSIS demonstrated a profound disconnect between the depoliticized and impersonal framing around *information* and the *information society* of this institutional expert culture versus the perceptions of an active, racialized, and politicized exclusion online that was the major concern of Internet café users in Accra.

Chapter 7 functions as a kind of epilogue to chapter 6 by considering the hard materiality of computing technology and the Internet as it became increasingly apparent to ordinary citizens and the political elite in Ghana. The overtaxed electricity infrastructure, the influx of computers and other electronics as a burden on waste-handling systems, and the financial flows

necessary for the business of enabling connectivity were part of an emerging awareness of the true costs of gaining Internet access in Ghana. This chapter considers import policies and practices as shaped by national interests as well as by external agents, such as the US-based NGOs that have recently begun to push for reform in the export of used computing equipment to places such as Ghana. These goods have been recast as toxic waste through the activist work of NGOs bolstered by Western media coverage. This chapter considers the perspective of local entrepreneurs, specifically Ghanaian computer importers and scrap metal dealers, and how they navigate and enroll resources within this structure of opportunity and regulation. This shifting political landscape has potential consequences for the ongoing viability of Internet cafés as small businesses in Accra.

Finally, the account comes back around in the conclusion to relate this case of the Internet cafés of Accra to some of the broader claims of digital age thinkers. During the course of the six years of this study, the Internet café scene in Accra changed along with the increasing visibility of Ghanaians online. The conclusion looks specifically at how geographically localized security threats (such as the scamming strategies associated with the West Africa region) are coming to be managed in network nodes located in the United States and elsewhere. I show how over the six-year period from my initial fieldwork in 2004 to my most recent trip in June to July 2010 a process of encoded exclusion has taken hold as practices deemed illegitimate (reflecting the peripheral position of this user population) led to country- or region-level blocking. In light of this new visibility we may ask whether the activities of youth in these Internet cafés and their pursuit of cosmopolitan longings and foreign contacts will remain viable. This chapter also delves into the recent debate over network neutrality in the United States, which has once again enlivened discussion of the founding ideals of the Internet as they relate to more recent trends toward the Internet's commercialization. This discussion touches on particular conceptions of discrimination and user and consumer rights that are propelled forward with concern principally for US industries, US consumers, and US federal regulation. There are possible, perhaps inadvertent, global consequences of such debates.

A prime challenge of studying any very new technology in its earlier stages of diffusion and uptake is of separating the consequential and enduring new capacities from the more faddish and transitory enthusiasms.

There is a well-documented history of the tendency for untamed rhetoric to erupt (ranging from optimistic fantasies to dystopian nightmares) whenever new technologies arrive that capture the public imagination (Nye 1996; Marvin 1988; Adas 1989). The grounding in lived experience offered by ethnography is a vital tool for addressing this challenge. Underlying the more specific study of the Internet, youth culture, and urban Ghana undertaken in this book is a broader concern with understanding the possibilities and implications of materially mediated human encounter, an essential matter of interpersonal communication that is foundational to theories of society. In recent years a range of new possibilities for mediation have emerged, reconfiguring and extending human interchange in novel ways. Although the Internet is a focus of this book it is done with an eye on the larger conclusions to be drawn about connection and culture and also the enduring realities of marginalization in the ongoing global reordering of the twenty-first century.