Preface to the 2nd Edition

I experience a heightened sense of awareness, but that awareness is not of my playing, it is my playing. Just as with speech or song, the performance embodies both intentionality and feeling. But the intention is carried forward in the activity itself, it does not consist in an internal mental representation formed in advance and lined up for instrumentally assisted, bodily execution. And the feeling, likewise, is not an index of some inner, emotional state, for it inheres in my very gestures.

(Ingold 2000: 41, original emphasis)

If we want to know what words like nature and technology mean, then rather than seeking some delimited set of phenomena in the world – as though one could point to them and say “There, that’s nature!” or “that’s technology!” – we should be trying to discover what sorts of claims are being made with these words, and whether they are justified. In the history of modern thought these claims have been concerned, above all, with the ultimate supremacy of human reason.

(Ingold 2000: 312)

I bring down my finger onto the Q and turn the knob down with a whole arm twist which I continue into a whole body turn as I disengage from both knob and key. SOH brings in a low quiet sound precisely as I find myself turned to face him. We are in the valley before the finale. I turn back to the synthesiser front panel and gradually swell sound Q into the intense texture it is required to be. At maximum, I hold my right hand over the volume control and bring in my left to introduce a high frequency boost and then a modulation to the filtering. As I turn the knobs, I gradually lean towards the front panel. When the modulation is on the edge of excess, I lean back and face SOH. He looks over. I move my left hand away from the panel, leaving my right poised on the volume knob. I arch myself
Preface to the 2nd Edition

backwards a little further and then project my torso down while turning the knob anticyclvise. I continue my hand through and away from the panel. SOH has also stopped playing. As the considerable reverberation dies down, we relax together, face the audience and gently bow. We have finished.

(Bowers 2002: 32)

The image of improvised electro-acoustic music that I want to experiment with is one where these contingencies of place, structure, technology and the rest are not seen as problematic obstructions to an idealised performance but are topicalised in performance itself. Improvised electro-acoustic music, on this account, precisely is that form of music where those affairs are worked through publicly and in real-time. The contingency of technology-rich music making environments is the performance thematic. The whole point is to exhibit the everyday embodied means by which flesh and blood performers engage with their machines in the production of music. The point of it all does not lie elsewhere or in addition to that. It is in our abilities to work with and display a manifold of human–machine relationships that our accountability of performance should reside.

(Bowers 2002: 44)

My preface by way of an extended epigraph marks the frame of this book and introduces its themes: the irreducibility of lived practice, embodied and enacted; the value of empirical investigation over categorical debate; the displacement of reason from a position of supremacy to one among many ways of knowing in acting; the heterogeneous sociomateriality and real-time contingency of performance; and the new agencies and accountabilities effected through reconfigured relations of human and machine. That these excerpts appear as a preface reflects the contingent practicalities of the authoring process itself. Coming upon these books after having finished my own, I found them so richly consonant with its themes that they could not be left unacknowledged. They appear as an afterthought, in other words, but their position at the beginning is meant to give them pride of place. Moreover, their responsiveness each to the other, however unanticipated, sets up a resonance that seemed in turn to clarify and extend my argument in ways both familiar and new. Taken together, Ingold’s painstaking anthropology of traditional and contemporary craftwork and Bower’s experimental ethnography of emerging future practices of improvising machines work to trace the arc of my own argument in ways that I hope will become clear in the pages that follow.

Introduction

My aim in this book is to rethink the intricate, and increasingly intimate, configurations of the human and the machine. Human–machine configurations matter not only for their central place in contemporary imaginaries but also because cultural conceptions have material effects. As our relations with machines elaborate and intensify, questions of the humanlike capacities of machines, and machinelike attributes of humans, arise again and again. I share with Casper (1994), moreover, the concern that the wider recognition of “nonhuman agency” within science and technology studies begs the question of “how entities are configured as human and nonhuman prior to our analyses” (ibid.: 4). Casper proposes that discussions of nonhuman agency need to be reframed from categorical debates to empirical investigations of the concrete practices through which categories of human and nonhuman are mobilized and become salient within particular fields of action. And in thinking through relations of sameness and difference more broadly, 1

1 The word imaginary in this context is a term of art in recent cultural studies (see Braidotti 2002: 143; Marcus 1995: 4; Verran 1998). It shares with the more colloquial term imagination an evocation of both vision and fantasy. In addition, however, it references the ways in which we see and what we imagine the world to be is shaped not only by our individual experiences but also by the specific cultural and historical resources that the world makes available to us, based on our particular location within it. And perhaps most important for my purposes here, cultural imaginaries are realized in material ways. My inspiration for this approach is Haraway’s commitment to what she names “materialized refraction (1997: 21), a trope that I return to in Chapter 13. The particular imaginaries at stake in this text are those that circulate through and in relation to the information and communication networks of what we might call the hyperdeveloped countries of Europe and North America.
Ahmed (1998) proposes a shift from a concern with these questions as something to be settled once and for all to the occasioned inquiry of "which differences matter, here?" (ibid.: 4). In that spirit, the question for this book shifts from one of whether humans and machines are the same or different to how and when the categories of human or machine become relevant, how relations of sameness or difference between them are enacted on particular occasions, and with what discursive and material consequences.

In taking up these questions through this second expanded edition of *Plants and Situated Actions*, I rejoin a discussion in which I first participated some twenty years ago, on the question of how capacities for action are figured at the human–machine interface and how they might be imaginatively and materially reconfigured. Almost two decades after the publication of the original text, and across a plethora of subsequent projects in artificial intelligence (AI) and human–computer interaction (HCI), the questions that animated my argument are as compelling, and I believe as relevant, as ever. My starting point in this volume is a critical reflection on my previous position in the debate, in light of what has happened since. More specifically, my renewed interest in questions of machine agency is inspired by contemporary developments both in relevant areas of computing and in the discussion of human–nonhuman relations within social studies of science and technology. What I offer here is another attempt at working these fields together in what I hope will be a new and useful way. The newness comprises less a radical shift in where we draw the boundaries between persons and machines than a reexamination of how—on what bases—those boundaries are drawn. My interest is not to argue the question of machine agency from first principles, in other words, but rather to take as my focus the study of how the effect of machines-as-agents is generated and the latter's implications for theorizing the human. This includes the translations that render former objects as emergent subjects, shifting associated interests and concerns across the human–artifact boundary. We can then move on to questions of what is at stake in these particular translations—in-progress and why we might want to resist or refigure them.

Chapter 1 of this edition provides some background on the original text and reflects on its reception, taking the opportunity so rarely available to authors to respond to readings both anticipated and unexpected. Chapters 2 through 10 comprise the original text as published in 1987. In each of these chapters, new footnotes provide updated references, commentaries, and clarifications, primarily on particular choices of wording that have subsequently proven problematic in ways that I did not foresee. I have made only very minor editorial changes to the text itself, on the grounds that it is important that the argument as stated remain unaltered. This is true, I believe, for two reasons. First, the original publication of the book marked an intervention at a particular historical moment into the fields of artificial intelligence and human–computer interaction, and I think that the significance of the argument is tied in important ways to that context. The second reason for my decision to maintain the original text, and perhaps the more significant one, is that I believe that the argument made at the time of publication holds equally well today, across the many developments that have occurred since. The turn to so-called situated computing notwithstanding, the basic problems identified previously—briefly, the ways in which prescriptive representations presuppose contingent forms of action that they cannot fully specify, and the implications of that for the design of intelligent, interactive interfaces—continue to haunt contemporary projects in the design of the "smart" machine.

The book that follows comprises a kind of object lesson as well in disciplinary affiliations and boundaries. The original text perhaps shows some peculiarities understandable only in light of my location at the time of its writing. In particular, I was engaged in doctoral research for a Ph.D. in anthropology, albeit with a supervisory committee carefully chosen for their expansive and nonprogrammatic relations to disciplinary boundaries. Although the field of American anthropology in the 1980s was well into the period of "studying up," or investigation of institutions at "home" in the United States, my dissertation project

---

3 Part of the discussion in Chapter 1 is drawn from opportunities provided earlier, in two discussion forums in the journals *Cognitive Science* 17(1), 1993, and the *Journal of the Learning Sciences* 12(5), 2003.

4 My committee included Gerald Berreman and John Gumperz, from the Department of Anthropology, and Hubert Dreyfus, from the Department of Philosophy, all at the University of California at Berkeley.

interchange; that is, through actions of the user that actually change the machine's state. The radical asymmetries in relative access of user and machine to contingencies of the unfolding situation profoundly limit possibilities for interactivity, at least in anything like the sense that it proceeds between persons in interaction. Chapter 10, the conclusion to the original text, provides a gesture toward alternative directions in interface design and reaffirms the generative potential of the human-computer interface as a site for further research.

Readers familiar with the original text of P6SA may choose to pass over Chapters 2 through 10 or to focus more on the footnotes that offer further reflections, references, and clarifications. The chapters that follow the original text expand and update the arguments. Chapter 11, "Plans, Scripts, and Other Ordering Devices," makes clear, I hope, that although the focus of the preceding chapters is on plans (as understood within dominant AI projects of the time), the research object is a much larger class of artifacts. In this chapter I review developments both in theorizing these artifacts in their various manifestations and in empirical investigations of their workings within culturally and historically specific locales. Chapter 12, "Agencies at the Interface," takes up the question of what specific forms agency takes at the contemporary human-computer interface. I begin with a review of the rise of computer graphics and animation, and the attendant figure of the "software agent." Reading across the cases of software agents, wearable, and so-called pervasive or ubiquitous computing, I explore the proposition that these new initiatives can be understood as recent manifestations of the very old dream of a perfect, invisible infrastructure; a dream that I locate now within the particular historical frame of the "service economy." Chapter 13, "Figuring the Human in AI and Robotics," explores more deeply the question of what conceptions of the human inform current projects in AI and robotics, drawing on critiques, cases, and theoretical resources not available to me at the time of my earlier writing. In both chapters I consider developments in relevant areas of research—software agents, wearable computers and "smart" environments, situated robotics, affective computing, and social machines—since the 1980s and reflect on their implications. Rather than a comprehensive survey,

---

5 I should make clear at the outset that I in no way believe that human-computer interactions broadly defined, as the kinds of assemblages or configurations that I discuss in Chapters 14 and 15 are confined to this narrow point. Rather, I am attempting to be specific here about just how events register themselves from the machine's "point of view."
my aim is to identify recurring practices and familiar imaginaries across these diverse initiatives.

Finally, Chapter 14, “Demystifications and Reenchantments of the Humanlike Machine,” and Chapter 15, “Reconfigurations,” turn to the question of how it might be otherwise, both in the staging of human–machine encounters and through the reconfiguration of relations, practices, and projects of technology design and use. As will become clear, I see the most significant developments over the last twenty years, at least with respect to the argument of this book, as having occurred less in AI than in the area of digital media more broadly on the one hand (including graphical interfaces, animation, and sensor technologies) and science and technology studies (STS) on the other. The first set of developments has opened up new possibilities not only in the design of so-called animated interface agents but also—more radically—I will argue—in mundane forms of computing and the new media arts. The further areas of relevant change are both in the field of STS, which has exploded with new conceptualizations of the sociotechnical, and also in my own intellectual and professional position. The latter has involved encounters since the 1980s with feminist science studies, recent writings on science and technology within cultural anthropology, and other forms of theorizing that have provided me with resources lacking in my earlier consideration of human–machine relations. During that same period, I have had the opportunity with colleagues at PARC to explore radical alternatives to prevailing practices of system design, informed by an international community of research colleagues. Engaging in a series of iterative attempts to enact a practice of small-scale, case-based codesign, aimed at creating new configurations of information technologies, has left me with a more concrete and embodied sense of both problems and possibilities in reconfiguring relations and practices of professional system design. I have tried in these chapters to indicate my indebtedness to these various communities and the insights that I believe they afford for innovative thinking across the interface of human and machine. Inevitably, both my discussion of new insights from science and technology studies and of new developments in computing is partial at best, drawing selectively from those projects and perspectives with which I am most familiar and that I have found most generative or compelling. Drawing on these resources, I argue for the value of research aimed at articulating the differences within particular human–machine configurations, expanding our unit of analysis to include extended networks of social and material production, and recognizing the agencies, and attendant responsibilities, involved in the inevitable cuts through which bounded sociomaterial entities are made.

The expansion of the text in terms of both technologies and theoretical resources is accompanied by a commitment to writing for new audiences. In particular, the new chapters of this book attempt to engage more deeply with those working in the anthropology and sociology of technology who are, and always have been, my compass and point of reference. Somewhat ironically, my location at PARC and the marketing of the original text as a contribution in computer science have meant that the book contained in Chapters 2 through 10 of this edition received much greater visibility in computing—particularly HCI—and in cognitive science than in either anthropology or STS. Although I am deeply appreciative of that readership and the friends from whom I have learned within those communities, it is as a contribution to science and technology studies that the present volume is most deliberately designed.