



{ Open House }*

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A few years ago I found myself on a stage at the MIT Media Lab, arguing with Nicholas Negroponte in front of 700 people. Nick was rhapsodizing about a world in which computerized "intelligent agents" will answer our every need. To illustrate Nick's idea, an actor dressed as a butler introduced speakers and entertained the audience with snide remarks. The butler was fun, up to a point, but also distracting and intrusive. Fortunately, Nick was wrong about what to expect from the third wave in

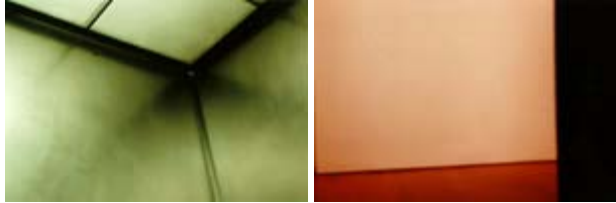
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computing. The defining words will not be "intelligent" or "agent", but rather "invisible" and "calm" and "connection".



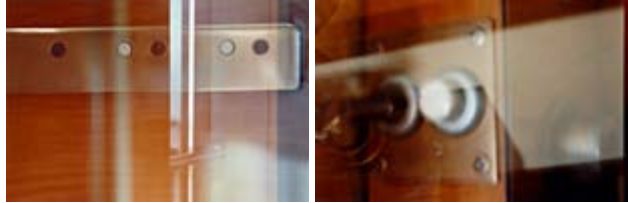
The first wave of computing, from 1940 to about 1980, was dominated by many people serving one computer. The second wave, still peaking, has one person and one computer in uneasy symbiosis, staring at each other across the desktop without really inhabiting each other's worlds. The third wave, just beginning, has many computers serving each person everywhere in the world. I call this last wave "ubiquitous computing" or ["ubicomp"](#).



Over the next twenty years computers will inhabit the most trivial things: clothes labels (to track washing), coffee cups (to alert cleaning staff to moldy cups), light switches (to save energy if no one is in the room), and pencils (to digitize everything we draw). In such a world, we must dwell with computers, not just interact with them.

Interacting with something keeps it distant and foreign. If you are only interacting with your spouse the relationship may be in trouble. We dwell with nature, and roommates, and anything that we let enter us, and we it. Dwelling with computers means that they have their place, and we ours, and we co-exist comfortably. Unfortunately, our existing metaphors for computers (and

nature, for that matter) are inadequate to describe the "dwelling" relationship. And no metaphor is more misleading than "smart".



"Smart House": Does this mean any more than
a house with a computer in it? Does it mean anything like "Better House"? Do we really think that everything in the world would be better if it were smarter? Smart Cappuccino? Smart Park? The "Smart House" of 1935 had an electric light in every room. The "Smart House" of 1955 dared to put a TV and a telephone in every room. And the "Smart House" of 2005 will have computers in every room. But what will they do?



I believe that the smart house of 2005 will be a lot like the smart house of 1801, which had a *book* in every room. Those books brought other worlds and ideas into the homes and minds of the time. Similarly, the imbedded computers of 2005 will bring other worlds to us in new ways-- sometimes in ways so unobtrusive we will not even notice our increased ability for informed action.

We will dwell with these computers, whose presence we will ignore most of the time, and they will provide us with constant clues about our environment, our loved ones, our own past, the objects around us and the world beyond our home. Computers will act like books, windows, walks around the block, phone calls to relatives. They won't replace these, but augment them, make them easier, more fun.

Dwelling with computers, they become part of the informing environment, like weather, like street sounds. A house that is true to its house nature must have a

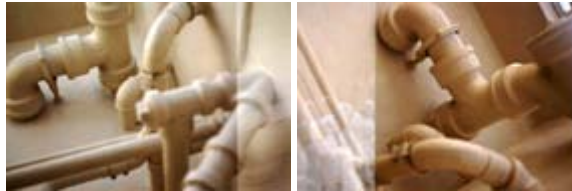
certain quiet, even stolidness. Through a thousand subtle cues, computers will help turn our houses into homes.



A few examples of how some of these clues might work: the kind of tune the computer plays to wake me up will tell me something about my first few appointments of the day. A quickurgent tune: 8am important meeting. Quiet, reflective music: nothing until noon.

Once woodsmen could walk through the forest and see the signs of all the animals that had passed by in the previous few hours. Similarly, my see-through display and picture window will show me the traces of the neighborhood as faintly glowing

trails: purple for cats, red for dogs,
green for people, other colors
as I request.



What of the alienating effects of so much technology? Good for you if you're concerned; don't take any engineer's word for how great it will be. But mediation is a red herring. As Donna Haraway says, to be human is to be a cyborg. There is no "natural" experience: the eyeball, the middle ear, the visual cortex, are far more sophisticated than the personal computer.

And a computer can be suggestive without being intermediating. In the above example, the computer's choice of music does not force my mood. I may know the 8am event is a pushover, or that I have the morning open only because I left time to prepare for the

killer afternoon salary review. It offers a
point of view, nothing more.



Ubiquitous computing will not make our houses "smarter". It is commonly believed that thinking makes one smart. But it's frequently the opposite: in many situations, the less you have to think about the smarter you are. Who's smarter, the beginning piano student who thinks about each note, or the artist who thinks about the music and lets the notes take care of themselves? Who's smarter, Deep Blue analyzing billions of moves, or Kasparov, who wins the game after analyzing three hundred?

In each case the expert can think about *less* because long practice has made it unnecessary to attend to the details. Previous revolutions in computing were about bigger, better, faster, smarter. In the next revolution, as we learn to make machines that take care of our

unconscious details, we might finally have
smarter people.



We become smarter as we put our roots
deeper
into what is around us. The house of the
future will become one giant connection to
the world-- quietly and unobtrusively, as
naturally as we know it is raining, or cold,
or that someone is up before us in the
kitchen making breakfast.

Ubiquitous computing just might help to
free our minds from unnecessary work, and
connect us to the fundamental challenge
that humans have always had:
to understand the patterns in the
universe and ourselves within them.