PHOEBE SENGERS

INTERVIEW BY GARNET HERTZ

Hertz: How do you see the term critical technical practice both developing and relating to your work? How has it been loved, abandoned, taken up or used in different ways?

Sengers: Critical technical practice is one of the key terms behind my work, a key inspiration for what I do. When Phil Agre's *Computation and Human Experience* came out – it was right before I finished my PhD and I already had been doing work in the same vein – it brought together a lot of the things that I'd been thinking about... and so that book's become really important for me. The key idea behind critical technical practice as far as I'm concerned is to tie the idea of technology building to the idea that one can be critical during the process of technology building. So often we think either you're building or making things, or you're just criticizing. So to me, the power of critical technical practice is to really articulate why thinking about things critically and culturally can make a difference within technical practice.

Over the course of the years I've been working with this term, one part has become clearer and clearer to me – and I don't know how much this is in the mind of everybody who does critical practice – critical technical practice is about rhetorical formations. It's about how technology is created as a way of thinking. Critical technical practice isn't about one individual person building something technically and then thinking critically about it – that's an important part, of course – but it's also about how ways of technology-building bring in particular

assumptions about the way that the world is... and to be able to question those assumptions in order to be able to open up new spaces for making and new spaces for thinking about technology and people. That may or may not be an important distinction with critical making.

Some of the kinds of references that you were talking about in regard to critical making seemed to be more about individuals getting a sense of personal enlightenment out of the making and I think that that's a part of critical technical practice, but it's also important to think about it in terms of larger cultural institutions and formations. The reason I think that that's really important is because in the end it's about a political agenda of saying technologists are building the world - not all of the world, but a large part of it - and it's important that there be a critical voice within that practice to make sure that engineers around the world are building things that we want to have as a society or that are making the world a better place and not just a more high tech place.

In terms of the development of the term, I'm not sure who uses the term critical technical practice. To me critical technical practice is a little bit of an insider term. There are people like me who write on *Computation and Human Experience* and then there's the rest of the world that doesn't really know what you're talking about. *[laughter]*

Right.

So it's hard for me to talk about the development of the term, because it's not clear to me how it's developed beyond a pretty small inner circle of

people who talk about it. And maybe you actually know that better than me. Because I think there's more people at Irvine talking about it then there are at Cornell.

I've seen it used by a number of artists or people who know Phil Agre, but I haven't seen it used very widely. A number of the terms, whether it's critical making, critical technical practice, critical design, those terms are terms that have a lot of of currency with a few people but I don't see them generally as wide terms. I see the idea of "maker" as being quite a bit of a wider term and that's part of another thing I'm interested in asking you: How do you see critical technical practice in relationship to a concept like maker or making? And I definitely think that O'Reilly and Make magazine has been pivotal behind promoting this type of term.

The answer to your question from my perspective is pretty complicated. In one sense, this idea of making and the idea of critical technical practice really go hand in hand, because one of the ideas behind critical technical practice is that your understanding of what you're doing is deeply tied in with the material practices of making these things, and this hands-on building is an important part of critical technical practice. So from that perspective I think they're quite aligned. Also, within the idea of being a maker or making is this idea of a built-in critique of consumer society as being part of what you're trying to do with making. So that again is potentially an alignment, although I don't know that Agre would say that that was one. For him, the critical process was more around critiquing the technology process from within, but not so much about bringing in particular kinds of political or cultural modes of critique that you wanted to bring to the technology; that's an area where critical design is quite different in its orientation. The critique of consumer society is a key element of what critical design is supposed to be.

To follow up on that: What does critical technical practice have that the maker movement doesn't have?

I think the key difference between the two is the focus on the maker movement on the amateur, and that has pluses and minuses. Critical technical practice is very much oriented towards critiquing and intervening in the major modes of professional technology production. So trying to get engineering as a profession, both as a kind of research area and an industrial area, to change its ways. And making is much more focused on the amateur and getting these tools into individuals' hands, and not focused on institutional interventions and engineering as a discipline.

What about the critical component of it... as opposed to just the amateur/DIY versus the expert component. In what ways is the maker movement, as it's popularly known, critical? I think you mentioned consumer culture, and I'd agree with that, but can you expand on this?

I have to say my understanding of critical technical practice is a lot deeper than my understanding of everything that's going on in the maker movement. I've watched it as an interested outside,r but there could be a lot things going on there that I don't know about. I think a lot of it, in terms of critique, is about raising more personal awareness that things could be different, that you can lead your life or structure your life in a different kind of way if you take making as central instead of consuming as central. And that's a dominant, critical path that's been taken in the maker movement.

I guess another way of putting it is, instead of saying expert versus amateur is consumer versus producer. Then critical technical practice is about trying to intervene at the production level, and making is about trying to turn consumers into producers. And those certainly aren't incompatible, but they're a little bit different in emphasis. From that point of view, one the things quite interesting about the maker movement is a conviction in the political importance of individuals' experiences with making technology. Some interest in individual experience is implicit in critical technical practice, autobiographical things that Phil would agree with, for instance, in talking about his own transformation in thinking about and experiencing technology. But the maker

movement's got a big jump on critical technical practice in terms of a wide reach, in being able to reach people in a kind of personal way that critical technical practice wasn't intended to do and probably wouldn't be able to do.

What do you make of Matt Ratto's term critical making? Do you see it as somewhere in between making and critical technical practice?

I think that's Matt's aim is for it to be drawing on ideas from those two realms. I've talked with Matt about this before, and I do think that in terms of the distinction in making between critical making and critical technical practice, that he's definitely making that distinction from trying to intervene in the profession of engineering, to trying to place these kinds of tools in everybody's hands. I think that's exactly the kind of interpolation that he's trying to make between those two terms. To bring in more of a critical agenda with critical technical practice, and tying that to this kind of maker –shifting consumers into producers – kind of way of thinking.

Yeah, when I've talked to him, I've seen him describe the term as almost aimed at the humanities. Aimed at getting the people in the humanities to think about technology – and sometimes that means electronics or media technologies – by scholars actually building things.

Yeah, I've definitely seen that.

That's an interesting angle and I've talked to him at some length about this: I don't see critical making as he uses the term as primarily getting engineers to be more critical.

No, no. I don't think that that's his agenda.

I see it more as getting critical people to think about technology and making.

Yeah.

Can you describe how the fieldwork you're currently doing fits in with either the concept of critical technical practice or

making or maybe critical making – or maybe it doesn't fit with that – and can you give an overview of what you're working on and how it relates to those concepts?

What I've been working on for the last couple of years is an ethnographic and historical field study in Change Islands, a small Newfoundland fishing village which up until fairly recently has lived a very traditional lifestyle. Since the 60's, they've undergone rapid technological transformation. So in the 60's, they had no running water, no electricity, no telephone, no TV, no roads, no transportation off the island in the winter. And now they've got broadband Internet and everything.

I've been talking a lot to the people there about the changes they're seen over the course of their lives with the introduction of these technologies. And as you might imagine, living on the coast of Newfoundland, well, they do a lot of making. There aren't a lot of consumer goods. Consumer goods aren't so easy to get hold of and you make do a lot and you make a lot of stuff yourself. Of course, that's changed over the course of technologization, now there's a lot of car transportation, it's much easier to go off the island to go to the Walmart two hours away and go shopping there. But, still, people there do a lot of stuff really hands on. And when I lived on that island, I ended up doing a lot of making-do and making things myself, just because it was easier. So as an experience for me, that was also a new experience to realize how much more intricately tied into the world of consumer goods I was than I thought.

A key aspect of the Change Islands community is that it is working-class, and that involves a different kind of perspective on making and on what we might call 'manual labor' than was typical in the urban, educated communities I had been used to living in before I came to the island. In terms of making and all the other questions that you were asking, I wonder about the class issues that are tied to the maker movement. I wonder whether making, and to what extent critical making, becomes a kind of elite activity that only a few people can do and whether, and to what

extent, it ties to the already widely existing making practices that exist among people who are blue collar. Are those people part of the maker movement? I don't know if they are or if they aren't.

I recently saw a study that was paid for by Intel and done by O'Reilly and Make magazine. They did a market research study of several hundred online respondents that had either subscribed to Make magazine or gone to Maker Faire. The median income was $106,000 per year, and 8 out 10 were male. I had sort of assumed that that would be the case but I hadn't seen any questionnaires or information about that... so I think that you are right in that it isn't a blue collar type of thing and it's not a rural thing.

I've briefly written about spending time growing up on a rural farm in Canada, and I don't think it has the exact dynamic as what you're dealing with in Newfoundland, but it's where it can be difficult to purchase things and stuff ends up just being made out of necessity. I've always felt in that way the maker movement as kind of like an elite, affluent leisure time kind of activity that is very different from what poor people do with technology or in developing nations...It's sort of completely removed from that and the politics of class and income.

I don't mean this so much as a downer on the maker movement, but I do think that there's an incredible opportunity there to think about what making actually means for many of people for whom making is just a part of everyday life. A researcher in my group, Maria Håkansson, has been working with Gilly Leshed on a study on farm families around Ithaca, and a lot of these issues have been coming up. The relation with technology and what they want technology to do is so different from the way that we imagine it when we're building technology for or with white-collar people who live in the city.

I think there's a huge opportunity to say: what are working-class people and rural people doing with

technology? They're definitely making. Are they doing critical making? To some degree I would argue that it is inherently critical in the sense that they develop a very different relationship to what technology should or could do. We should be thinking about how that should be valued within critical making or could be folded into critical making – because if there is an important political agenda built into the maker movement, then that agenda should be made available more widely than to the cultural elite. *[laughter]*

Yeah... I think you're correct.

There's also a little bit of hubris. We need to be careful not to seem like we're the first people who have invented the making of things.

Right, just because you have a laser cutter and a 3D printer and an Arduino doesn't mean that you are some new generation of homesteader that's doing everything from scratch. It's kind of naïve to think that you're doing that.

One of the major the themes I'm looking at in my study is what happens during modernization. What happens when you modernize, how do people change, how do people's experiences change? Tom Hughes says that one big shift that comes with modernization is that you become deeply embedded in large technological systems, so that your whole life exists in interaction with these large technical systems that partly determine what you do. One shift that you can definitely see very clearly on Change Islands is over time getting more and more into larger technological systems that help to determine what is possible.

A simple example is getting electricity on the island, which meant that people had to start paying regular bills. Which meant that people had to join the monetary economy, when before that they been in a barter economy. Which meant that people had to engage in other kinds of employment that generated wages. Which meant that it became harder to engage in a subsistence lifestyle. And so on. One way to think about making is that it would be nice if the maker movement was one way in which we could start

trying to escape some of that dominance of very large technical systems. And it's not clear to me how much high tech making actually allows for that anymore, because you're so dependent on all the pieces of code that everybody else made and what everybody else is doing. It's not clear to me whether it's entirely achievable to do that.

I think with people wanting to raise their own chickens, or cooking everything from scratch and raising your own food, that it's imaginable that you could achieve a declaration of independence from some of those technological systems, at least in some parts of your life. I'm not sure it's possible with that kind of Arduino set-up you were talking about. I think the problem's a lot more complicated.

Yeah, I think you're right. Have you read Matthew Crawford's Shop Class as Soulcraft?

No, I read a review of that, but I haven't actually read the book itself. I've been thinking about that while we've been talking about this.

It's published by Penguin and it's quite easy to read but it's quite insightful. I don't personally know him or anything, but he did a PhD in political philosophy and then moved out of academia and started repairing motorbikes. The book describes of the devaluation and badmouthing of blue collar labor in America, and blue collar versus white collar... and the skill and intelligence of hands-on building. It's really quite easy to read and it's quite nicely put: I'm sure you at least would at least find it interesting or useful.

Thanks... I appreciate it.

I'll ask you another question here in regards to Newfoundland. Something that I've been thinking of is this idea of the kludge, the physical hack where something is done maybe not in a stylish way but in quick and functional way, like using duct tape to put on your rear view mirror that fell off. In what way in these fishing

villages do you see that the work is kludged or put together in a hasty or unprofessional way that maybe there is not a lot of craftsmanship to it? What ways do you see it where people take a lot of pride in these handmade or hand built technologies?

I think you see a wide range *[laughter]*. You definitely see kludges... there's no doubt about it, but you also see a lot of incredibly skilled labor. Some of it just depends on the personality of the person who's doing it, but other things depend on what the situation is. If you're building an extension on your house, then that might be different from:"of jeez, the phone isn't working again, I'm just gonna drill another hole in the wall and make a new connection", or whatever. It's hard to make universal judgements.

I do think there is a difference though in the way that Newfoundlanders think about or at least traditionally think about material architecture compared to what we might consider normal or professional in urban settings. Traditional Newfoundland architecture is intentionally ephemeral, so houses are pulled apart and reassembled frequently. In traditional architecture, whole houses are moved frequently, and parts of houses are moved frequently. The architect Robert Mellin says in some ways that building a house in Newfoundland was like building a ship: it built on the same manual skills, and was intended as something that could move from place to place. The impermanence of physical structures is a little bit different from what we're used to and in the city. And it's intended like that. You expect that if you have some kind of structure that you're going to have to basically rebuild large parts of it every ten years, and continuously maintain it to make sure it doesn't biodegrade, essentially. A big advantage of that is that when things aren't actively used any more, they disappear. And that's just the way that things are done. So to us that might look like kludge, but it's actually a natural reaction to the way the climate works there and the ways in which the houses fit into the practices that people have who are living in them.

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