These are Daniel Dennett's introductory remarks on the workshop on cultural evolution he conveyed in Santa Fe in May 2014.

(Footnotes contain comments by Richerson and Sperber.)

Ever since Darwin's Descent of Man (1871), the idea of adopting an evolutionary perspective on human culture has seemed to many to be a natural move, obviously worth trying—and to many others to be a dangerous, "nihilistic," "reductionistic", "scientistic," assault on everything we hold dear. Work on cultural evolution has been making good progress in recent years, but has been hindered by distortions, some perhaps deliberate, but others are misunderstandings that naturally arise between slightly different traditions. I formed this working party to try to find common ground and resolve differences among some of the leading theorists and experimentalists. The ten participants included the trio of Boyd, Henrich and Richerson (BRH), a French trio of Sperber, Claidière and Morin (SCM), the memeticists Blackmore and myself, and two philosophers of biology who have been particularly engaged with issues of cultural evolution, Peter Godfrey Smith and Kim Sterelny. Several other leading figures were invited but could not participate for various reasons.

Each participant was invited to send in two or three recent papers or chapters for everyone to read in advance — the list of these papers is available here –, and then the first three days were devoted to the "X on Y sessions", in which each participant (X) in turn took on the task of briefly introducing the work of another participant (Y). I invited all to send me their preferred list of people to introduce, and more or less optimized the pairings to make sure each X-Y pair were drawn from different traditions and no two introduced each other's work. After fifteen or twenty minutes introduction, each Y then had a chance to respond, followed by general discussion. The atmosphere was informal, permitting frequent interruptions for questions and comments.

Before the working group convened there was some skepticism and grumbling about the X on Y obligation from various participants, but everybody graciously acceded to my request and the results, in my opinion, confirmed the value of the practice. After the workshop all participants submitted a brief summary of the week, citing what was learned, what was agreed upon, and issues still unresolved. Quoting a few comments from participants: Peter Richerson: "I do think that the disagreements among the various 'schools' of cultural evolution represented at the meeting are relatively modest." Peter Godfrey Smith: "I think that a lot of progress was made on clarifying disagreements, even where the remaining disagreements remain genuine. . . . It's progress when an initially cloudy situation gives way to a sharper and more definite set of empiricial uncertainties." Dan Sperber: "It has been a wonderful workshop of serious, demanding, insightful, informal, friendly discussion of a kind and quality rarely experienced." Nicholas Claidière noted that part of the distortion is generated by the way we tend to talk about our work to people outside the field, giving the (wrong) impression that there are schools of thought at war with each other: "Given the amount of agreement that we have seen during this meeting, I think it would be more productive to present ourselves as having a common goal with diverging interests rather than competing views of the same phenomena."

Terminological headaches.

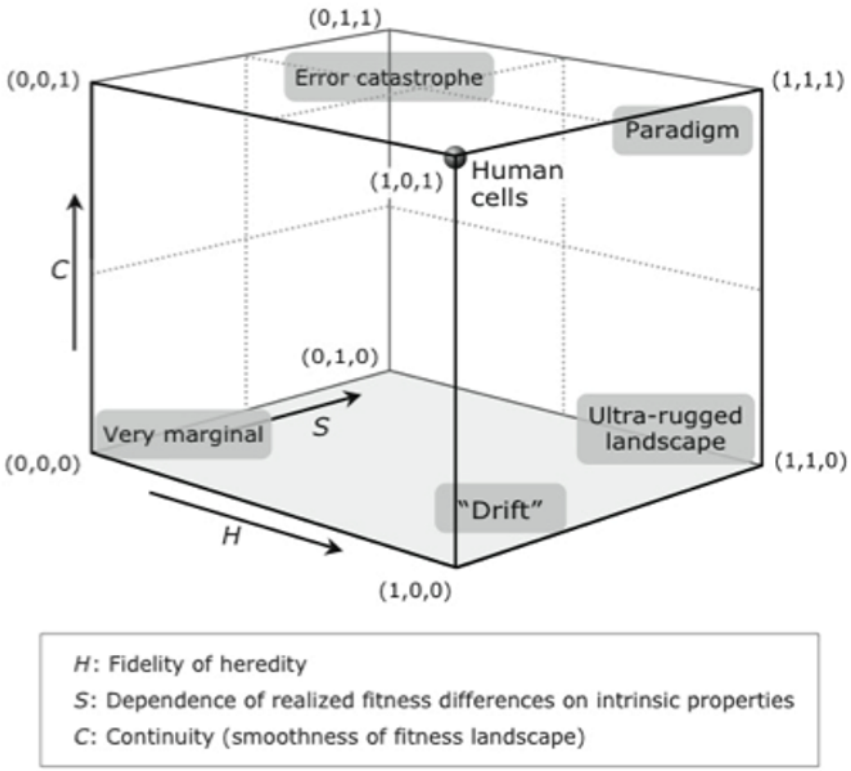
Three frustrating terminological problems were exposed, but we didn't resolve how to correct them: "cultural group selection," "meme," and "Darwinian" are all good terms, historically justifiable and useful in context, but by now all are so burdened with legacies of ideological conflict that any use of them invites misbegotten "refutation" or dismissal. Should we abandon the terms in favor of emotionally inert replacements, or should we persist with them, always accompanying their use with a wreath of explanation? These are questions of diplomacy or pedagogical policy, not serious theoretical issues, but still, alas, unignorable.

As Boyd explained, the adoption by BRH of the term “cultural group selection” had its roots in the relatively uncontroversial theoretical terrain of Sewall Wright’s population genetics (and shifting balance theory), not in later, more dubious and controversial variants. But this is hard to explain to people who have already taken sides for or against “group selection” as an important phenomenon in evolution. In any event, the working group, enlightened about what BRH mean—and don’t mean—by cultural group selection, while still harboring somewhat different hunches about its importance, acknowledged that Steve Pinker’s recent “extreme and dismissive” (Henrich) position on Edge.org did not find a target in the work of BRH.

The popular hijacking of Dawkins’ term “meme” for any cultural item that “goes viral” on the Internet, regardless of whether it was intelligently designed or evolved by imitation and natural selection, has been seen by some to subvert the theoretical utility of the term altogether. There is also the unreasoned antipathy the term evokes in many quarters (reminiscent of the antipathy towards the term “sociobiology” that led to its abandonment). Alternatively, if one is “Darwinian about Darwinism” we should expect the existence of cultural items that are merely “memish” to one degree or another, and we might as well go on using the term “meme” to refer to any relatively well-individuated culturally transmitted item that can serve as a building block or trackable element of culture however it arrives on the scene. Other terms, such as Boyd and Richerson’s “cultural variant”, have been proposed, but the term “meme” has become so familiar in popular culture that whatever alternative is used will be immediately compared to, identified with, assimilated to meme(a Sperberian attractor, apparently), so perhaps the least arduous course is to adopt the term, leaving open its theoretical definition, in much the way the term “gene” has lost its strict definition as protein-recipe in many quarters. Since the long-term fate of such an item will be settled by differential reproduction (or something similar to differential reproduction) however much insight or “improvisational intelligence” went into its birth, it has a kind of Darwinian fitness.

But should we go on talking about whether or not a phenomenon is “Darwinian”? Some think the term gets in the way, since we are seldom if ever alluding to what Darwin himself thought, but rather to the neo-Darwinian, post-DNA synthesis, itself an evolving landmark. On the other hand, there is general agreement within the group that some important elements of human culture evolve by processes strongly analogous to genetic natural selection, and the variations in these processes can be usefully diagrammed using Peter Godfrey Smith’s “Darwinian spaces” (See figure 1 for an instance), in which the similarities and differences can be arrayed in three dimensions. Since, moreover, there is agreement that these cultural regularities can set selection pressures (e.g., a “cultural niche”) for co-evolutionary processes, generating genetic responses (such as adult lactose tolerance), a unified evolutionary perspective, in which the trade-offs between cultural and genetic evolution can be plotted, is a valuable organizer of phenomena, some “more Darwinian” than others. No other term suggests itself for the set of features that mark paradigmatic (neo-)Darwinian phenomena, so perhaps the misunderstandings the term tends to generate can be deflected.

Figure 1:



Consensus:

The working group agreed on a number of points, some methodological and some substantial, that are still considered controversial by others, or in some cases just not yet considered:

1. We should be Darwinian about Darwinism; there are few if any bright lines between phenomena of cultural change for which cultural natural selection is clearly at work and phenomena of cultural change that are not at all Darwinian. The intermediate and mixed cases need not be marginal or degenerate, a fact nicely portrayed in Godfrey-Smith's Darwinian Spaces.

2. Models must always "over-"simplify, and the existence of complications and even "counterexamples" relative to any model does not automatically show that the model isn't valid when used with discretion. For instance, the absence of explicit treatment of SCM's "hetero-impacts" in BRH's models "does not amount to a denial of its importance"(Godfrey-Smith). Grain level of modeling and explaining can vary appropriately depending on the questions being addressed.

3. The traditional idea that human culture advances primarily by "improvisational intelligence," the contributions of insightful, intentional, comprehending individual minds, is largely mistaken. Just as plants and animals can be the beneficiaries of brilliant design enhancements that they cannot, and need not, understand, so we human beings enjoy culturally evolved competences that far outstrip our individual comprehension. Not only do we not need to "re-invent the wheel," we do not need to appreciate or understand the design of many human institutions, technologies, and customs that nevertheless contribute to our welfare in various ways. Moreover (a point of agreement between Sperber and Boyd, for instance), the opacity of some cultural memes (their inscrutability to human comprehension) is often an enhancement to their fitness: "This opacity—which is a matter of degree, of course—is what makes social transmission so important. It plays, I believe, a crucial role in the acceptability of cultural traits: it is, in important ways easier to trust what you don't fully understand and hence cannot properly evaluate on its own merits." (Sperber)

4. The persistence of cultural features that are not fitness-enhancing, and may even be fitness-reducing, is to be expected in cultural evolution, and can have a variety of explanations.

New questions:

1. Rob Boyd, in his post-working group summary, proposed a way in which the Evolutionary Causal Matrix idea developed by Sperber and Claidière can be re-expressed in the population genetics formalism used by BRH, raising questions about how—if at all—the homo-impact/hetero-impact distinction introduced by SCM appears in the population genetics formalism. Do SCM have a reply?[1]

2. SCM propose that cultural attraction, not differential replication, accounts for much of the dynamics of cultural evolution [2](in the neutral sense: change over time), but several expressed concern that only a (quasi-)Darwinian process can initiate and refine adaptations (lifting in Design Space). One line of thought suggests that attraction and replication can sometimes work together: attractors act rather like norms to somewhat digitize otherwise continuous variations, making exemplars stable and distinct enough to be eligible for iterated replication and selection. Another line of thought is that the distinction between attraction and differential replication is maybe just a question of "zoom": if you zoom in on apparent replicators, you may find that they are not, strictly speaking, replicating at all, but if you zoom out, the results are as if there was replication going on.[3] Which of these suggestions will survive further research? For instance, are there experiments (Claidière's question) that can distinguish the roles of transformative and selective processes, shedding light on the conditions under which each plays the dominant role?

3. "If individuals are smart enough in their choices, the BRH meso-level picture fades. When people are smart and make good choices, the recurrence of good options and accumulation of design can occur without imitation-and-selection." (Godfrey-Smith) But Sperber points out that this need not pose a dichotomous choice between evolutionary and rational-choice explanations: "adding attraction to the cultural evolution story allows us to integrate evolved mechanisms that tend to produce rational choices, not as an alternative kind of explanation, but as a factor of attraction among many." Under what conditions can this proposed unification do serious explanatory work? Since attractors can be both enhancers and decelerators of adaptive change, are they too versatile to be explanatory (at least in this context)? [4]

4. Is cultural evolution "de-Darwinizing" (Godfrey-Smith's term for phenomena that evolve into less Darwinian phenomena)? Dennett says yes: in the earliest days of human cultural evolution, individuals were largely uncomprehending beneficiaries of their new tools and customs, only gradually becoming reflective, critical, foresighted users of those tools. Today they aspire to be intelligent (re-)designers of every aspect of their environments, and some of the major changes in culture today are the products of quite concentrated, not distributed, R&D.[5] Blackmore says no: on the contrary, technology has raised the proportion of high-fidelity copying and transmission, and is beginning to usurp the role of the supposedly intelligent designer thanks to automated search and evaluation systems. Will all roles for human "improvisational intelligence" become obsolete, and "inventors" as rare are telephone operators, coopers, and scythe-sharpeners in the future? Or will the heretofore unreachable ideal of the intelligent designer be approximated by individual human beings, thanks to their reliance on technology (including especially instruction and the cascade of scientific knowledge that creates new platforms from which to begin one's exploration)? Human civilization today appears to be a volatile mix of these opposing trends; are there investigations that can clarify the resultant direction in which we are heading?

5. Richerson raises an issue (among many others) that we did not have time to discuss: "Natural selection on genes admits of a number of modes. . . . . .Throw in density and frequency-dependent

selection. . . . . Mate choice and artificial selection introduce agent-based rather than natural selection, demi-god designers if you want. With cultural evolution agent-based social selection runs wild." Does this point to a good way to organize the intermediate space between paradigmatic "Darwinian" natural selection and intelligent design? One thing that is changing in this progression might be called the focus of the selection pressure. At the Darwinian pole (simple natural selection) the selection pressure is "just" a statistical net effect of a kazillion independent events that determine which candidates get replicated; in the middle-ground, mate choice (as Geoffrey Miller has argued) is focused through the perceptual/cognitive/emotional dispositions of individual (usually female) "minds," with varying degrees of comprehension and reflection; it is like Darwin's "unconscious" selection which bridges the gap between agentless natural selection and reflective, intentional "methodical" selection. As agents (conceived as mere concentrations of selective efficacy, selective "hot spots" in the environment)[6]become more discerning, the importance of high-fidelity replication does not lapse, but the breadth of "search" contracts and R&D can become more efficient (it can also hasten the ruin of ill-informed R&D). As reflectivity about this very process increases, R&D becomes faster and more efficient—but gradually, allowing for opaque attractors to play a large role relative to genuinely insightful or comprehending quality judgments. Does this proposal withstand scrutiny?

[1] Richerson commented on the draft of this document and Sperber replied:

Richerson: I thought that the attraction concept had become sufficiently generalized as to obviate this distinction. Perhaps complete resolution of this issue need to await SCM's development of their models. With a fully functional model in hand, we can see if the structure of them differs in some fundamental way from the population genetics based models I'm more familiar with.

Sperber: My first reaction to Rob's comments was, to begin with, sheer joy at having him discuss ECM seriously. Given Rob's experience and competence, this cannot but be good for the science. Were Rob to find that there is a basic flow in the ECM approach, then we would be spared going in the wrong direction, and again, good for science. Rob might also find ways to correct and improve the ECM format at least for some use, and this would be nice, of course.

Now, regarding, the fact that "the ECM formalism can be equivalent ways of representing exactly the same underlying processes," I like Rob's illustration, and Nicolas and I had found other examples in our work in the past. I don't see this as an objection, especially since we didn't propose the ECM format as it stands as an alternative way to model population phenomena of interest, let alone as a better way. We offered it as to begin with a Dennettian 'intuition pump', leaving open the question whether it could, at least in some cases, be developed into a perspicuous way of modeling. The intuition pump effectiveness was, for me, demonstrated at our workshop and in several other exchanges I have had: people who didn't quite 'get' the attraction idea, found it much easier and even congenial when so presented.

On the further more technical points raised by Rob, I would like to coordinate at least with Nicolas and Thom before providing a careful reaction.

[2] Sperber: What we propose is that hetero-attraction is likely to be more or much more than a marginal factor in cultural evolution, making a generalized notion of attraction that includes both homo and hetero-attraction – I agree with Pete with his comment on this point – potentially quite useful. This by itself does not determine which is the best way to model cultural evolution, or precludes the possibility that different models may be better for different types of cases.

[3] Sperber: Here I agree with a remark Rob made in his comments: yes we, the attraction people tend to zoom towards greater details, but this doesn't necessarily preclude the possibility that on

some issues at least, a more standard population genetics provides for a better zoom.

[4] Sperber: Here you want to talk about specific factors of attraction and the way they may contribute to adaptiveness, or to the resilience of non-adaptive features. The relevant point here is that the evolved ability to recognize and, under certain conditions, even design well-adapted things is a powerful factor of attraction that contribute to explaining the cultural success of well-adapted things. You get your evolutionary explanation, as usual by looking at micro-processes at a population scale. The fact that, in this case, rational choice modeling can also make the right prediction does not in any way undermine a more standard evolutionary approach (that moreover does better at least in terms of generality and of psychological plausibility).

[5] Richerson: Nuts Dan! Highly innovative places like Silicon Valley are Darwinian pressure cookers. First, the finest engineering training available in the world dumps the max amount of accumulated wisdom into the heads of the best and brightest. Then the B&B are set to work finding marginal improvements in existing designs to patent. Entrepreneurial teams funded by venture capitalists recombine old designs and add the latest new patented ideas to create products that are selected in ruthlessly competitive markets.

Dennett responds: But this Darwinian “pressure cooker” is distant from the Darwinian paradigm in several important dimensions: it is what Darwin himself called “methodical selection” (in his wonderful introductory passage that segues from the (intelligent) selective actions of plant and animal breeders, through the “unconscious selection” of the inadvertent, or largely purposeless biases of human beings in the early days of agriculture, to “natural selection” (in which no mind, intelligent or clueless, is required). The search space is pinched by many preconceptions, good and bad, and, as in sexual selection, the winners have been aggressively tested by nervous systems tuned to detect quality.

[6] Sperber: Yes, let’s not overdo ‘agents’. ‘“Hot spots” in the environment’ is a nice metaphor. Another, more detailed way to go is to see cognition both as massively modular and heavily situated/distributed. At this point, the individual organism is still in play, but most cultural phenomena are both infra- and trans-individual (or to use Dennettian terms, sub-personal and collective) The agents that rational choice theorist theorize about not only don’t exist – that is not too bad –, they are not, I believe, a very good idealization for modeling cultural evolution (this might be a point of difference between the attraction approach and the agents-choose-variant approach).