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The Epidemiology of Ideas

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The Evolution of Culture

Cultures evolve. In one sense, this is a truism; in other senses, it asserts one or another controversial, speculative, unconfirmed theory of culture. Consider a cultural inventory of some culture at some time—say A.D. 1900. It should include all the languages, practices, ceremonies, edifices, methods, tools, myths, music, art, and so forth, that compose that culture. Over time, that inventory changes. Today, a hundred years later, some items will have disappeared, some multiplied, some merged, some changed, and many new elements will appear for the first time. A verbatim record of this changing inventory through history would not be science; it would be a data base. That is the truism: cultures evolve over time. Everybody agrees about that. Now let's turn to the controversial question: how are we to explain the patterns to be found in that data base? Are there any good theories or models of cultural evolution?

1. Science or Narrative?

One possibility is that the only patterns to be found in cultural evolution defy scientific explanation. They are, some might want to say, *narrative* patterns, not scientific patterns. There is clearly something to this, but it won't do as it stands, for many scientific patterns are also historical patterns, and hence are revealed and explained in narratives—of sorts. Cosmology, geology, and biology are all historical sciences. The great biologist D'Arcy Thompson once said; "Everything is the way it is because it got that way."

If he is right—if *everything* is the way it is because it got that way—then every science must be, in part, a historical science. But not all history—all recounting of events in temporal sequence—is *narrative*, some might want to say. Human history is unique in that the patterns it exhibits require a different *form* of understanding: *hermeneutical* understanding or *Verstehen*, or—you can count on the Germans to have lots of

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words for claims like this—*Geisteswissenschaft* (approximately: spiritual science). I think this too is partly right; there *is* a particular sort of understanding that is used to make sense of narratives about human agents. It is also true that the mark of a *good* story is that its episodes unfold *not* as the predicted consequences of general laws and initial conditions, but in delightfully surprising ways. These important facts do not show, however, that cultural evolution escapes the clutches of science and must be addressed in some other realm of inquiry. Quite the contrary; the humanistic comprehension of narratives and the scientific explanation of life processes, for all their differences of style and emphasis, have the same logical backbone. We can see this by examining the special form of understanding we use when following—and creating—good narratives.

Mediocre narratives are either a pointless series of episodes in temporal order—just "one damn thing after another"—or else so utterly predictable as to be boring. Between randomness and routine lie the good stories, whose surprising moments make sense in retrospect, in the framework provided by the unsurprising moments. The perspective from which we can understand these narratives is what I have called *the intentional stance*: the strategy of analyzing the flux of events into *agents* and their (rational) *actions* and *reactions*. Such agents—people, in this case—*do things for reasons*, and can be predicted—up to a point—by cataloguing their reasons, their beliefs and desires, and calculating what, given those reasons, the most rational course of action for each agent would be. Sometimes the most rational course is flat obvious, so while the narrative is predictive (or true), it is uninteresting and unenlightening. To take a usefully simple case, a particular game of chess is interesting to the extent that we are surprised by either the brilliant moves that outstrip our own calculations of what it would be rational to do, or the blunders, which we thought too sub-optimal to predict.

In the wider world of human activity, the same holds true. We don't find the tale of Jane going to the supermarket on her way home from work interesting precisely because it all unfolds so predictably from the intentional stance; today she never encountered any interesting options, given her circumstances. Other times, however, the most rational thing for an agent to do is far from obvious, and may be practically incalculable. When we encounter these narratives, we are surprised (and sometimes delighted, sometimes appalled) by the actual outcome. It makes sense in retrospect,

but who'd have guessed that she'd decide to do *that*? The vast mass of routinely rational human behavior doesn't make good novels, but it is just such humdrum rational narrative that provides the background pattern that permits us to make sense, retrospectively, of the intriguing vagaries we encounter. It also permits us to anticipate the complications that will arise when the trains of events they put in motion collide.

The traditional model used by historians and anthropologists to try to explain cultural evolution uses the intentional stance as its explanatory framework. These theorists treat culture as composed of goods, possessions of the people, who husband them in various ways, wisely or foolishly. People carefully preserve their traditions of fire-lighting, house-building, speaking, counting, justice, etc. They trade cultural items as they trade other goods. And of course some cultural items (wagons, pasta, recipes for chocolate cake, etc.) are definitely goods, and so we can plot their trajectories using the tools of economics. It is clear from this perspective that highly prized cultural entities will be protected as the expense of less favored cultural entities, and there will be a competitive market where agents both "buy" and "sell" cultural wares. If a new method of house-building or farming or a new style of music sweeps through the culture, it will be because people perceive advantages to these novelties.

The people, on this model, are seen as having an autonomous rationality: deprive a person of his goods, and he stands there, naked but rational and full of informed desires. When he clothes himself and arms himself and equips himself with goods, he increases his powers, complicates his desires. If Coca-cola bottles proliferate around the world, it is because more and more people prefer to buy a Coke. Advertising may fool them. But then we look to the advertisers, or those who have hired them, to find the relevant agents whose desires fix the values for our cost-benefit calculations. *Cui bono*? Who benefits? The purveyors of the goods, and those they hire to help them, etc. On this way of thinking, then, the relative "replicative" power of various cultural goods—whether Coke bottles, building styles or religious creeds—is measured in the marketplace of cost-benefit calculations performed by the people.

Biologists, too, can often make sense of the evolution (in the neutral sense) of features of the natural world by treating them as goods belonging to various members of various species: one's food, one's nest, one's burrow,

one's territory, one's mate[s], one's time and energy. Cost-benefit analyses shed light on the husbandry engaged in by the members of the different species inhabiting some shared environment.[1] Not every "possession" is considered a good, however. The dirt and grime that accumulates on one's body, to say nothing of the accompanying lies and fleas, are of no value, or of negative value, for instance. These hitchhikers are not normally considered as goods by biologists, except when the benefits derived from them (by whom?) are manifest.

This traditional perspective can obviously explain many features of cultural and biological evolution, but it is not uniformly illuminating, nor is it obligatory. I want to show how theorists of culture—historians, anthropologists, economists, psychologists, and others—can benefit from adopting a different vantage point on these phenomena. It is a different application of the intentional stance, one which still quite properly gives pride of place to the *Cui bono* question, but which can provide alternative answers that are often overlooked. The perspective I am talking about is Richard Dawkins's *meme's-eye point of view*, which recognizes—and takes seriously—the possibility that cultural entities may evolve according to selectional regimes that make sense only when the answer to the *Cui bono* question is that it is the cultural items *themselves* that benefit from the adaptations they exhibit.[2]

2. *Memes and Cultural Viruses*

Whenever costs and benefits are the issue we need to ask *Cui bono*? A benefit by itself is not explanatory; a benefit in a vacuum is indeed a sort of mystery; until it can be shown how the benefit actually rebounds to enhance the replicative power of a replicator, it just sits there, alluring, perhaps, but incapable of explaining anything.

We see an ant laboriously climbing up a stalk of grass. Why is it doing that? Why is that adaptive? What good accrues to the ant by doing that? That is the wrong question to ask. No good at all accrues to the ant. Is it just a fluke, then? In fact, that's exactly what it is: a fluke! Its brain has been invaded by a fluke (*Dicrocoelium dendriticum*), one of a gang of tiny parasites that need to get themselves into the intestines of a sheep in order to reproduce (Ridley, 1995, p. 258). (Salmon swim up stream; these parasitic worms drive ants up grass stalks to improve their chances of

being ingested by a passing sheep.) The benefit is not to the reproductive prospects of the ant but to the reproductive prospects of the fluke.[3]

Dawkins points out that we can think of cultural items, memes, as parasites, too. Actually, they are more like a simple virus than a worm. Memes are supposed to be analogous to genes, the replicating entities of the cultural media, but they also have vehicles, or phenotypes; they are like not-so-naked genes. They are like viruses (Dawkins, 1993). Basically, a virus is just a string of nucleic acid with attitude—and a protein overcoat. (A viroid is an even more naked gene.) And similarly, a meme is an information-packet with attitude—with some phenotypic clothing that has differential effects in the world that thereby influence its chances of getting replicated. (What is a meme *made of*? it is made of information, which can be carried in *any* physical medium. More on this later.)

And in the domain of memes, the ultimate beneficiary, the beneficiary in terms of which the final cost-benefit calculations must apply is: the meme itself, not its carriers. This is not to be heard as a bold empirical claim, ruling out (for instance) the role of individual human agents in devising, appreciating and securing the spread and prolongation of cultural items. As I have already noted, the traditional perspective on cultural evolution handsomely explains many of the patterns to be observed. My proposal is rather that we adopt a perspective or point of view from which a wide variety of different empirical claims can be compared, *including the traditional claims*, and the evidence for them considered in a neutral setting, a setting that does not prejudge these hot-button questions.

In the analogy with the fluke, we are invited to consider a meme to be like a parasite which commandeers an organism for its own replicative benefit, but we should remember that such hitchhikers or *symbionts* can be classified into three fundamental categories:

> *parasites*, whose presence lowers the fitness of their host;
>
> *commensals*, whose presence is neutral (though, as the etymology reminds us, they "share the same table"); and
>
> *mutualists*, whose presence enhances the fitness of both host and guest.

Since these varieties are arrayed along a continuum, the boundaries between them need not be too finely drawn; just where benefit drops to zero or turns to harm is not something to be directly measured by any practical test, though we can explore the consequences of these turning points in models.

We should expect memes to come in all three varieties, too. This means, for instance, that it is a mistake to assume that the "cultural selection" of a cultural trait is always "for cause"—always because of some perceived (or even misperceived) benefit it provides to the host. We can always ask if the hosts, the human agents that are the *vectors*, perceive some benefit and (for that reason, good or bad) assist in the preservation and replication of the cultural item in question, but we must be prepared to entertain the answer that they do not. In other words, we must consider as a real possibility the hypothesis that the human hosts are, individually or as a group, either oblivious to, or agnostic about, or even positively dead set against, some cultural item, which nevertheless is able to exploit its hosts as vectors.

The most familiar cases of cultural transmission and evolution—the cases that tend to be in the spotlight—are innovations that are obviously of some direct or indirect benefit to the genetic fitness of the host. A better fishhook catches more fish, feeds more bellies, makes for more surviving grandchildren, etc. The only difference between stronger arms and a better fishhook in the (imagined) calculation of impact on fitness is that the stronger arms might be passed on quite directly through the germ line, while the fishhook definitely must be culturally transmitted. (The stronger arms *could* be culturally transmitted as well. A tradition of body-building, for instance, could explain why there was very low [genetic] heritability for strong adult arms, and yet a very high rate of strong adult arms in a population.) But however it might be that strong arms or fishhooks are transmitted, they are typically supposed to be a good bargain from the perspective of genetic fitness. The bargain might, however, be myopic—only good in the short run. After all, even agriculture, in the long run, may be a dubious bargain if what you are taking as your *summum bonum* is Darwinian fitness (see Diamond, 1997, for fascinating reflections on the uncertain benefits of abandoning the hunter-gatherer lifestyle). What alternatives are there?

First, we need to note that in the short run (evolutionarily speaking—that is, from the perspective of a few centuries or even millennia) something might flourish in a culture independently of whether it was of actual benefit to genetic fitness, but strongly linked to whether it was of *apparent* benefit to genetic fitness. Even if you think that Darwinian fitness enhancement is the principle driving engine of cultural evolution, you have to posit some swifter, more immediate mechanism of retention and transmission. It's not hard to find one. We are genetically endowed with a biased quality space: some things feel good and some things don't. We tend to live by the rule: *if it feels good, keep it*. This rough-and-ready rule can be tricked, of course, The sweet tooth is a standard example. The explosion of cultural items—artifacts, practices, recipes, patterns of agriculture, trade routes—that depend quite directly on the exploitation of the sweet tooth has probably had a considerable net *negative* effect on human genetic fitness. Notice that explaining the emergence of these cultural items by citing their "apparent" benefit to genetic fitness does not in any way commit us to the claim that people think that they are enhancing their genetic fitness by acquiring and consuming sugar. The rationale is not theirs, but Mother Nature's. They just go with what they like.

Still, given what people innately like, they go on to figure out, ingeniously and often with impressive foresight, how to obtain what they like. This is still the traditional model of cultural evolution, with people husbanding their goods in order to maximize what they prefer—and getting their preferences quite directly from their genetic heritage. But this very process of rational calculation can lead to more interesting possibilities. As such an agent complicates her life, she will almost certainly acquire new preferences that are themselves culturally transmitted symbionts of one sort or another. Her sweet tooth may lead her to buy a cookbook, which inspires her to enroll in a culinary arts program, which turns out to be so poorly organized that she starts a student protest movement, in which she is so successful that she is invited to head an educational reform movement, for which a law degree would be a useful credential, and so on. Each new goal will have to bootstrap itself into the memosphere by exploiting some pre-established preference, but this recursive process, which can proceed at breakneck speed relative to the glacial pace of genetic evolution, can transform human agents indefinitely far away from

their genetic beginnings. In an oft-quoted passage, E. O. Wilson claimed otherwise:

> The genes hold culture on a leash. The leash is very long, but inevitably values will be constrained in accordance with their effects on the human gene pool. (Wilson, 1978, p. 167)

But Wilson's leash is indefinitely long and elastic. Consider the huge space of *imaginable* cultural entities, practices, values. Is there any point in that vast space that is utterly unreachable? Not that I can see. The constraints Wilson speaks of can be so co-opted, exploited, and blunted in a recursive cascade of cultural products and meta-products that there may well be traversable paths to every point in that space of imaginable possibilities. I am suggesting, that is, that cultural possibility is less constrained than genetic possibility. We can articulate persuasive biological arguments to the effect that certain imaginable species are unlikely in the extreme—flying horses, unicorns, talking trees, carnivourous cows, spiders the size of whales—but neither Wilson nor anybody else to my knowledge has yet offered parallel grounds for believing that there are similar obstacles to trajectories in imaginable cultural design space. Many of these imaginable points in design space would no doubt be genetic cul-de-sacs, in the sense that any lineage of *H. sapiens* that ever occupied them would eventually go extinct as a result, but this dire prospect is no barrier to the evolution and adoption of such memes in the swift time of cultural history.[4] To combat Wilson's metaphor with one of my own: the genes provide not a leash but a launching pad, from which you can get almost anywhere, by one devious route or another. It is precisely in order to explain the patterns in cultural evolution that are *not* strongly constrained by genetic forces that we need the memetic approach.

The memes that proliferate will be the memes that replicate one way or another—by hook or by crook. Think of them as entering the brains of culture members, making phenotypic alterations thereupon, and then submitting themselves to the great selection tournament—not the Darwinian genetic fitness tournament (life is too short for that) but the Dawkinsian meme-fitness tournament. It is their fitness as memes that is on the line, not their host's genetic fitness. And the environments that embody the selective pressures that determine their fitness are composed in large measure of other memes.

Why do their hosts put up with this? Why should the overhead costs of establishing a whole new system of differential reproduction be borne by members of *H. sapiens*? Note that the question to be asked and answered here is parallel to the question we ask about any symbiont-host relationship: why do the hosts put up with it? And the short answer is that it is too costly to eradicate, but this just means that the benefits accruing to the machinery that is being exploited by the parasites are so great that keeping the machinery and tolerating the parasites (to the extent that they are tolerated) has so far been the best deal available. And whether or not in the long run (millions of years) this infestation will be viewed as mutualism or commensalism or parasitism, in the short run (the last few millennia) the results have been spectacular: the creation of a new biological type of entity: a person.

I like to compare this development to the revolution that happened among the bacteria roughly a billion years ago. Relatively simple *prokaryotes* got invaded by some of their neighbors, and the resulting *endosymbiotic* teams were more fit than their uninfected cousins, and prospered. These *eukaryotes*, living alongside their prokaryotic cousins, but enormously more complex, versatile and competent thanks to their hitchhikers, opened up the design space of multi-cellular organisms. Similarly, the emergence of culture-infected hominids has opened up yet another region of hitherto unoccupied and untraversable design space. We live alongside our animal cousins, but we are enormously more complex, versatile and competent. Our brains are bigger, to be sure, but it is mainly due to their infestation by memes that they gain their powers. Joining forces with our own memes, we create new candidates for the locus of benefit, new answers to *Cui bono*?

3. Darwin's Path to Memetic Engineering

The meme's-eye view doesn't just open up new vistas for the understanding of patterns in culture; it also provides the foundation for answering a question left dangling by the traditional model of cultural evolution. The traditional view presupposes rational self-interested agents, intent on buying and selling, and improving their lot. *Where did they come from*? The standard background assumption is that they are just animals, whose *Cui bono?* question is to be dealt with in terms of the

impact on genetic fitness, as we have seen. But when people acquire other interests, including interests directly opposed to their genetic interests, they enter a new space of possibilities—something no salmon or fruitfly or bear can do. How could this great river of novelty get started?

Here I think we can get help from Darwin's opening exposition of the theory of natural selection. In the first chapter of *Origin of Species*, Darwin introduces his great idea of natural selection by an ingenious expository device, an instance of the very gradualism that he was about to discuss. He begins not with natural selection—his destination—but what he calls *methodical selection*: the deliberate, foresighted, intended "improvement of the breed" by animal and plant breeders. He begins, in short, with familiar and uncontroversial ground that he can expect his readers to share with him.

> We cannot suppose that all the breeds were suddenly produced as perfect and as useful as we now see them; indeed, in several cases, we know that this has not been their history. The key is man's power of accumulative selection: nature gives successive variations; man adds them up in certain directions useful to him. [p. 30, Harvard facsimile ed'n.]

But, he goes on to note, in addition to such methodical selection, there is another process, which lacks the foresight and intention, which he calls *unconscious selection*:

> At the present time, eminent breeders try by methodical selection, with a distinct object in view, to make a new strain or sub-breed, superior to anything existing in the country. But, for our purpose, a kind of Selection, which may be called Unconscious, and which results from every one trying to possess and breed from the best individual animals, is more important. Thus, a man who intends keeping pointers naturally tries to get as good dogs as he can, and afterwards breeds from his own best dogs, but he has no wish or expectation of permanently altering the breed. [p. 34].

Long before there was deliberate breeding, unconscious selection was the process that created and refined all our domesticated species, and even at the present time, unconscious selection continues. Darwin gives a famous example:

> There is reason to believe that King Charles's spaniel has been unconsciously modified to a large extent since the time of that monarch. [p. 35]

There is no doubt that unconscious selection has been a major force in the evolution of domesticated species. For a lucid account of unconscious

selection of both domesticated plants and animals, see Jared Diamond (1997), *Guns, Germs and Steel*. In our own time, unconscious selection goes on apace. And we ignore it at our peril. Unconscious selection in bacteria and viruses for resistance to antibiotics is only the most notorious and important example. Consider the "genes for longevity" that have recently been bred into laboratory animals such as mice and rats. It may be true, however, that much if not all of the effect that has been obtained in these laboratory breeding experiments has simply undone the unconscious selection for short-livedness at the hands of the suppliers of those laboratory animals. The stock the experimenters started with had shorter life expectancy than their wild cousins simply because they had been bred for many generations for early reproductive maturity, and robustness, and short lives came along as an unintended (unconscious) side consequence (Daniel Promislow, personal correspondence).

Darwin pointed out that the line between unconscious and methodical selection was itself a fuzzy, gradual boundary:

> The man who first selected a pigeon with a slightly larger tail, never dreamed what the descendants of that pigeon would become through long-continued, partly unconscious and partly methodical selection. [p. 39]

And both unconscious and methodical selection, he notes finally, are but special cases of an even more inclusive process, natural selection, in which the role of human intelligence and choice can stand at zero. From the perspective of natural selection, changes in lineages due to unconscious or methodical selection are merely changes in which one of the most prominent selective pressures in the environment is human activity.

This nesting of different processes of natural selection now has a new member: genetic engineering. How does it differ from the methodical selection of Darwin's day? It is just less dependent on the pre-existing variation in the gene pool, and proceeds more directly to new candidate genomes, with less overt and time-consuming trial and error. Darwin had noted that in his day,

> Man can hardly select, or only with much difficulty, any deviation of structure excepting such as is externally visible; and indeed he rarely cares for what is internal. [p. 38]

But today's genetic engineers have carried their insight into the molecular innards of the organisms they are trying to create. There is ever more

accurate foresight, but even here, if we look closely at the practices in the laboratory, we will find a large measure of exploratory trial and error in their search for the best combinations of genes.

We can use Darwin's three levels of genetic selection, plus our own fourth level, genetic engineering, as a model for four parallel levels of *memetic* selection in human culture. In a speculative spirit, I am going to sketch how it might go, using an example that has particularly challenged some Darwinians, and hence been held up as a worthy stumbling block: a cultural treasure untouchable by evolutionists: music. Music is unique to our species, but found in every human culture. It is manifestly complex, intricately designed, an expensive consumer of time, energy and materials. How did music start? What was or is the answer to its *Cui bono* question? Steven Pinker (1997) is one Darwinian who has recently declared himself baffled about the possible evolutionary origins and survival of music, but that is because he has been looking at music in the old-fashioned way, looking for music to have some contribution to make to the genetic fitness of those who make and participate in the proliferation of music.[5] There may well be some such effect that is important, but I want to make the case that there might also be a purely *memetic* explanation of the origin of music. Here, then, is my Just-so Story, working gradually up Darwin's hierarchy of kinds of selection.

Natural selection of musical memes.

One day one of our distant hominid ancestors sitting on a fallen log happened to start banging on it with a stick—*boom boom boom*. For *no good reason at all*. This was just idle diddling, a byproduct, perhaps, of a slightly out-of-balance endocrine system. This was, you might say, mere nervous fidgeting, but the repetitive sounds striking his ears just happened to feel to him like a slight improvement on silence. A feedback loop was closed, and the *repetition—boom boom boom*—was "rewarding." if we leave this individual all by himself, drumming away on his log, then we would say that he had simply developed a habit, *possibly* therapeutic in that it "relieved anxiety," but just as possibly a *bad* habit—a habit that did him and his genes no good at all, but just exploited a wrinkle that happened to exist in his nervous system, creating a feedback loop that tended to lead to individual replications of drumming by him under various circumstances. No musical appreciation, no insight, no goal or ideal or project need be imputed to our solitary drummer.

Now introduce some other ancestors who happen to see and hear this drummer. They might pay no attention, or be irritated enough to make him stop or drive him away, or they might, again *for no reason*, find their imitator-circuits tickled into action; they might feel an urge to drum along with musical Adam. What are these imitator circuits I've postulated? Just whatever it takes to make it somewhat more likely than not that some activities by conspecifics are imitated, a mere reflex if you like—of which we may see a fossil trace when spectators at a football match cannot help making shadow kicking motions more or less in unison with the players on the field. One can postulate reasons why having some such imitative talents built-in would be a valuable adaptation—one that enhances one's genetic fitness—but while this is both plausible and widely accepted, it is, strictly speaking, unnecessary for my Just-so Story. The imitative urge might just as well be a functionless byproduct of some other adaptive feature of the human nervous system. Suppose, then, that for no good reason at all, the drumming habit is *infectious.* When one hominid starts drumming, soon others start drumming along in imitation. This could happen. A perfectly pointless practice, of no utility or fitness-enhancing benefit at all, could become established in a community. It might be positively detrimental: the drumming scares away the food, or uses up lots of precious energy. It would then be just like a disease, spreading simply because it *could* spread, and lasting as long as it could find hosts to infect. If it was detrimental in this way, variant habits that were less detrimental—less virulent—would tend to evolve to replace it, other things being equal, for they would tend to find more available healthy hosts to migrate to. And of course such a habit *might* even provide a positive benefit to its hosts (enhancing their reproductive chances—a familiar dream of musicians everywhere, and it might be true, or have been true in the past). But providing a genetic benefit of this sort is only one of the paths such a habit might pursue in its mindless quest for immortality. Habits—good, bad and indifferent—could persist and replicate, unappreciated and unrecognized, for an indefinite period of time, provided only that the replicative and dispersal machinery is provided for them. The drumming virus is born.

Let me pause to ask the question: what is such a habit made of? What gets passed from individual to individual when a habit is copied? Not stuff, not packets of material, but pure information, the information that

generates the pattern of behavior that replicates. A cultural virus, unlike a biological virus, is not tethered to any particular physical medium of transmission.[6]

Unconscious selection of memes.

On with our Just-so Story. Some of the drummers begin to hum, and of all the different hums, a few are more infectious than the rest, and those hominids who happen to start the humming in these ways become the focus of attention, as sources of humming. A competition between different humming patterns emerges. Here we can begin to see the gradual transition to unconscious selection. Suppose that being such a focus of humming happens to feel good—whether or not it enhances one's genetic fitness slightly (it might, of course; perhaps the females tend to be more receptive to those who start the winning hums). The same transition to unconscious selection can be seen among viruses and other pathogens, by the way. If scratching an itch feels good, and also has the side effect of keeping a ready supply of viral emigrés on one's fingertips, the part of the body most likely to come in contact with another host, one is unconsciously selecting for just such a mode of transmission by one's myopic and uncomprehending preference for scratching when one itches—and this does not depend on scratching having any fitness-enhancing benefits *for you*: it may be, like the ant's hankering for the top of the grass stem, a desire that benefits the parasite, not the host. Similarly, if varying tempo and pitch of one's hums feels good, and also happens to create a ready supply of more attention-holding noises for spreading to conspecifics, one's primitive aesthetic preference can begin to shape, unconsciously, the lineages of humming habit that spread through one's community.

Brains in the community begin to be infected by a variety of these memes. Competition for time and space in these brains becomes more severe. The infected brains begin to take on a structure, as the memes that enter "learn" to cooperative on the task of turning a brain into a proper meme-nest, with lots of opportunities for entrance and exit (and hence replication).[7] Meanwhile, any memes out there "looking for" hosts, will have to compete for available space therein. Just like germs.

Methodical Selection of memes.

As the structure grows, it begins to take on a more active role in selecting. That is to say, the brains of the hosts, like the brains of the

owners of domesticated animals, become ever more potent and discerning selective agencies—still largely unwitting, but nevertheless having a powerful influence. Some people, it turns out, are better at this than others. As Darwin says of animal breeders,

> Not one man in a thousand has accuracy of eye and judgment sufficient to become an eminent breeder. (p. 32)

We honor Bach, the artistic genius. But he was no "natural" doodler, an intuitive genius just "playing by ear." He was the master musical technologist of his day, the inheritor of musical instruments that had had their designs honed over several millennia, as well as some relatively recent additions to the music-maker's toolbox—a fine system of musical notation, keyboard instruments that permitted the musician to play many notes at once, and an explicit, codified, rationalized *theory* of counterpoint. These mind-tools were revolutionary in the way they opened up musical design space for Bach and his successors.

And Bach, like the one man in a thousand who has the discernment to be an eminent animal breeder, knew how to breed new strains of music from old. Consider, for instance, his hugely successful chorale cantatas. Bach shrewdly chose, for his breeding stock, chorales—hymn melodies that had already proven themselves to be robust inhabitors of their human hosts, *already domesticated* tunes his audiences had been humming for generations, building up associations and memories, memes that had already sunk their hooks deeply into the emotional habits and triggers of the brains where they had been replicating for years. Then he used his technology to create variations on these memes, seeking to strengthen their strengths and damp their weaknesses, putting them in new environments, inducing new hybrids.

Memetic Engineering.

What about memetic engineering? Was Bach, in virtue of his highly sophisticated approach to the design of replicable musical memes, not just a *meme-breeder* but a *memetic engineer*? In the light of Darwin's admiring comment on the rare skill—the genius—of the good breeder, it is interesting to note how sharply our prevailing attitudes distinguish between our honoring the "art" of selective breeding and our deep suspicion and disapproval of the "technology" of gene-splicing. Let's hear it for *art*, but not for *technology*, we say, forgetting that the words share a common

ancestor, *technē*, the Greek word for art, skill, or craft in any work. We retreat in horror from genetically engineered tomatoes, and turn up our noses at "artificial" fibers in our clothing, while extolling such "organic" and "natural" products as whole-grain flour or cotton and wool, forgetting that grains and cotton plants and sheep are themselves products of human technology, of skillful hybridization and rearing techniques. He who would clothe himself in fibers unimproved by technology and live on food from non-domesticated sources is going to be cold and hungry indeed.

Besides, just as genetic engineers, for all their foresight and insight into the innards of things, are still at the mercy of natural selection when it comes to the fate of their creations (that is why, after all, we are so cautious about letting them release their brainchildren in the outside world), so too the memetic engineer, no matter how sophisticated, still has to contend with the daunting task of winning the replication tournaments in the memosphere. One of the most sophisticated musical memetic engineers of the age, Leonard Bernstein, wryly noted this in a wonderful piece he published in 1955 entitled "Why Don't You Run Upstairs and Write a Nice Gershwin Tune?" (*New York Times*, April 1955. Reprinted in *The Joy of Music*, 1959, pp. 52–62). Bernstein had credentials and academic honors aplenty in 1955, but no songs on the Hit Parade.

> A few weeks ago a serious composer-friend and I . . . got boiling mad about it. Why shouldn't we be able to come up with a hit, we said, if the standard is as low as it seems to be? We decided that all we had to do was to put ourselves into the mental state of an idiot and write a ridiculous hillbilly tune.

They failed—and not for lack of trying. As Bernstein wistfully remarked,

> "It's just that it would be nice to hear someone accidentally whistle something of mine, somewhere, just once." [p. 54]

His wish came true, of course, a few years later in 1961, when *West Side Story* burst into the memosphere.

4. Conclusions

There is surely much, much more to be said—to be discovered—about the evolution of music. I chose it as my topic because it so nicely illustrates the way the traditional perspective on culture and the evolution-

ary perspective can join forces, instead of being seen to be in irresolvable conflict. If you believe that music is *sui generis*, a wonderful, idiosyncratic feature of our species that we prize in spite of the fact that it has *not* been created to enhance our chances of having more offspring, you may well be right—*and if so, there is an evolutionary explanation of how this can be true*. You cannot evade the obligation to explain how such an expensive, time-consuming activity came to flourish in this cruel world, and a Darwinian theory of culture is an ally, not an opponent, in this investigation.

While it is true that Darwin wished to contrast the utter lack of foresight or intention in natural selection with the deliberate goal-seeking of the artificial or methodical selectors, in order to show how the natural process could in principle proceed without any mentality at all, he did not thereby establish (as many seem to have supposed) that deliberate, goal-directed, intentional selection is not a sub-variety of natural selection! There is no conflict between the claim that artifacts (including abstract artifacts—memes) are the products of natural selection, and the claim that they are (often) the foreseen, designed products of intentional human activity.

Some memes are like domesticated animals; they are prized for their benefits, and their replication is closely fostered and relatively well understood by their human owners. Some memes are more like rats; they thrive in the human environment in spite of being positively selected against—ineffectually—by their unwilling hosts. And some are more like bacteria or viruses, commandeering aspects of human behavior (provoking sneezing, for instance) in their "efforts" to propagate from host to host. There is artificial selection of "good" memes—like the memes of arithmetic and writing, the theory of counterpoint, and Bach's cantatas, which are carefully taught to each new generation. And there is unconscious selection of memes of all sorts—like the subtle mutations in pronunciation that spread through linguistic groups, presumably with some efficiency advantage, but perhaps just hitchhiking on some quirk of human preference. And there is unconscious selection of memes that are positively a menace, but which prey on flaws in the human decision-making apparatus, as provided for in the genome and enhanced and adjusted by other cultural innovations—such as the abducted-by-aliens meme, which makes perfect sense when its own fitness as a cultural repli-

cator is considered. Only the meme's-eye perspective unites all these possibilities under one view.

Finally, one of the most persistent sources of discomfort about memes is the dread suspicion that an account of human minds in terms of brains being parasitized by memes will undermine the precious traditions of human creativity. On the contrary, I think it is clear that *only* an account of creativity in terms of memes has much of a chance of giving us any way to *identify with* the products of our own minds. We human beings extrude other products, on a daily basis, but, after childhood, we don't tend to view our feces with the pride of an author or artist. These are mere biological byproducts, and although they have their own modest individuality and idiosyncracy, it is not anything we cherish. How could we justify viewing the secretions of our poor infected brains with any more pride? Because we *identify with* some subset of the memes we harbor. Why? Because among the memes we harbor are those that put a premium on identifying with just such a subset of memes! Lacking that meme-borne attitude, we would be mere *loci* of interaction, but we have such memes—that is who we are.

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NOTES

1. Such organisms need not be deemed to be making conscious decisions, of course, but the rationality, such as it is, of the "decisions" they make is typically anchored to the expected benefit to the individual organism. See Sober and Wilson (1998) for important discussions of gene, individual, and group benefits of such decision-making.

2. Sober and Wilson (1998) note that there is a gap in their model of cultural evolution: "We can say that functionless [relative to human individual and group fitness] behavior should be more common in humans than other species, but we cannot explain why a particular functionless behavior has evolved in a particular culture. That kind of understanding probably requires detailed historical knowledge of the culture, and it may turn out that some behaviors evolved mainly by chance." p. 171. Dawkins's theory of memes, as briefly sketched in a single chapter of *The Selfish Gene* (1976, but see also Dawkins, 1993), is hardly a theory at all, especially compared to the models of cultural evolution developed by other biologists, such as Cavalli-Sforza and Feldman (1981), Lumsden and Wilson (1981), and Boyd and Richerson (1985). Unlike these others, Dawkins offers no formal development, no mathematical models, no quantitative predic-

tions, no systematic survey of relevant empirical findings. But Dawkins does present an idea that is overlooked by all the others, including Sober and Wilson in this passage, and it is, I think, a most important idea. It is the key to understanding how we can be not just guardians and transmitters of culture, but cultural entities ourselves—all the way in.

3. Strictly speaking, to the reproductive prospects of the fluke's genes (or the fluke's "group"'s genes), for as Sober and Wilson (1998) point out (p. 18) in their use of *D. dendriticum* as an example of altruistic behavior, the fluke that actually does the driving in the brain is a sort of kamikaze pilot, who dies without any chance of passing on its own genes, benefiting its [asexually reproduced] near-clones in other parts of the ant.

4. Boyd and Richerson (1992) show that "Virtually *any* behavior can become stable within a social group if it is sufficiently buttressed by social norms." (Sober and Wilson, 1998, p. 152) Our biology strongly biases us to value health, nutritious food, the avoidance of bodily injury, and of course having lots of offspring, so a sheltered theorist might suppose that it is highly unlikely that any human group could *ever* support a fashion for, say, bodily fragility or bulimia, or the piercing of bodily parts or suicide, or celibacy. If even these practices can so readily overturn our innate biases, where can Wilson's leash do any serious constraining?

5. "What benefit could there be to diverting time and energy to the making of plinking noises, or to feeling sad when no one has died?. . . . As far as biological cause and effect are concerned, music is useless." (p. 528) On p. 538, he contrasts music with the other topics of his book: "I chose them as topics because they show the clearest signs of being adaptations. I chose music because it shows the clearest signs of not being one."

6. This is not the decisive difference some critics of memes have declared. We can readily enough imagine virus-like symbionts that have alternate transmission media—that are (roughly) indifferent to whether they arrive at new hosts by direct transportation (as with regular bacteria, viruses, viroids, fungi . . .) or by something akin to the messenger-RNA transcription process: they stay in their original hosts, but imprint their information on some messenger element (rather like a prion, we may imagine) that then is broadcast, only to get transcribed in the host into a copy of the "sender." And if there could be two such communication channels, there could be twelve or a hundred, just as there are for transmission of cultural habits.

7. Sober and Wilson (1998) describe circumstances in which individuals of unrelated lineages thrown into group situations can be selected for cooperativity. Just how—if at all—this model can be adapted for memic coalescence is a topic for further research.

REFERENCES

Boyd, Robert, and Richerson, Peter J., 1985, *Culture and the Evolutionary Process*, Chicago: University of Chicago press.

_____, 1992, "Punishment Allows the Evolution of Cooperation (or Anything Else) in Sizable Groups," *Ethology and Sociobiology*, **13**, pp. 171–95.

Cavalli-Sforza, Luca, and Feldman, Marcus, 1981, *Cultural Transmission and Evolution: A Quantitative Approach*, Princeton, NJ: Princeton University Press.

Dawkins, Richard, 1976, *The Selfish Gene*, (2nd ed'n., 1989), Oxford: Oxford University Press.

_____ 1993, "Viruses of the Mind," in Bo Dahlbom, ed., *Dennett and His Critics*, Oxford: Blackwell.

Diamond, Jared, 1997, *Guns, Germs and Steel*, New York, Norton.
Lumsden, C. and Wilson, E. O. 1981, *Genes, Mind and Culture*, Cambridge, MA: Harvard University Press.
Pinker, Steven, 1997, *How the Mind Works*, New York: Norton.
Ridley, Mark, 1995, *Animal Behaviour* (2nd ed'n.), Boston: Blackwell Science.
Sober, Elliott and Wilson, David Sloan, 1998, *Unto Others: The Evolution of Unselfish Behavior*, Cambridge, MA: Harvard University Press.
Wilson, E. O., 1978, *On Human Nature*, Cambridge, MA: Harvard University Press.

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