KulturCrisis! Cultural Evolution Going Round in Circles

KENNETH WEISS AND FRANCES HAYASHIDA

Culture changes over time and has geographic and other patterns. Evolutionary models have often been proposed to account for this. What has become of those ideas?

"There is no such thing as 'natural law' " muses Julien Sorel, the hero of Stendahl's 1831 novel *The Red and the Black,* shortly before he is to be executed for a single crime of passion. Natural law, he says, is a construct of the powerful by which they justify their own myriad offenses against society and control the small and the poor. Twenty-eight years later, Charles Darwin's famous book appeared with the contrary message that not only are there natural laws,[1] but they apply to the entire living world. Hadn't physics also shown that nature was law-like?

The concept of evolution stimulated much of western thinking, about society as well as organisms, and anthropologists have used evolutionary metaphors off and on ever since. However, social change by means of laws like natural selection was conveniently compatible with the competitive worldview of colonial nations at their peak of power, and many anthropologists have objected even to the search for such laws, agreeing with Sorel that they are self-serving political constructs rather than essential truth.

Nonetheless, an idea that's politically convenient can also be true. Anyone who has overlooked the Roman Forum and the main square at Teotihuacan might be reminded of the old phrase "the psychic unity of mankind." There must be *something* about human culture that explains these striking similarities. What are the basic facts that theories of culture have tried to explain, and what are the connections between evolutionary notions across the subfields of anthropology?

CULTURAL EVOLUTION: PROCESS OR HISTORY?

The "laws" of biological evolution involve vertical (parent to offspring) inheritance of particulate elements (genes) following specifiable rules with specifiably probabilistic mutational change, and quantifiable effects of differential transmission (selection) and geographic diffusion. A major part of the sticking power of darwinian biology is that these principles make it possible to develop a formal theory of evolution that can relate what is testable in a laboratory to what is observable in biodiversity, biogeography, and paleontology.

There have been several attempts to develop a comparably comprehensive theory of culture, as we'll discuss (and see Harris, 1968). These have tried to explain the perceptions that (1) cultures can be classified, in western terms at least, on a scale of technical sophistication and association with population size; (2) geographically close peoples share similar cultural traits, like pottery styles or language; (3) local traits and short-term change, based as they are in symbol, often seem wholly arbitrary relative to attributes of the physical world; yet, (4) similar cultural traits were found (in the "ethnographic present") in disconnected places around the earth, such as similar kinship systems on different continents.

How does this apparent patterning arise? The 19th century's heady belief in universal laws of nature led to grand theories about culture, associated with EB Tylor, LH Morgan, and of course those fellows Marx and Engels. Herbert Spencer specifically accounted for culture change in terms of natural selection, and it was he, not Darwin, who coined the phrase "survival of the fittest." Anthropologists scouted the world of cultures, much as biologists scouted for beetles and butterflies for the drawing rooms of Europe. They sought to classify cultures by finding worldwide patterns in traits like kinship structures, mythology, art styles, and tools (Figure 1).

Theories were developed to explain observed patterns of similarity among world cultures, typically invoking strong determinism, usually by vaguely specified forces, and a kind of inevitability that was often accompanied by notions of progress. Taxonomies ranked cultures in broad universal sequences, from "simple" to "complex" such as Morgan's stages of savagery, barbarism, and civilization. Guess who was "naturally" at the top?

Not all views of cultural regularities

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[1]For example, the universal consequences of over-reproduction in a finite world of resources.

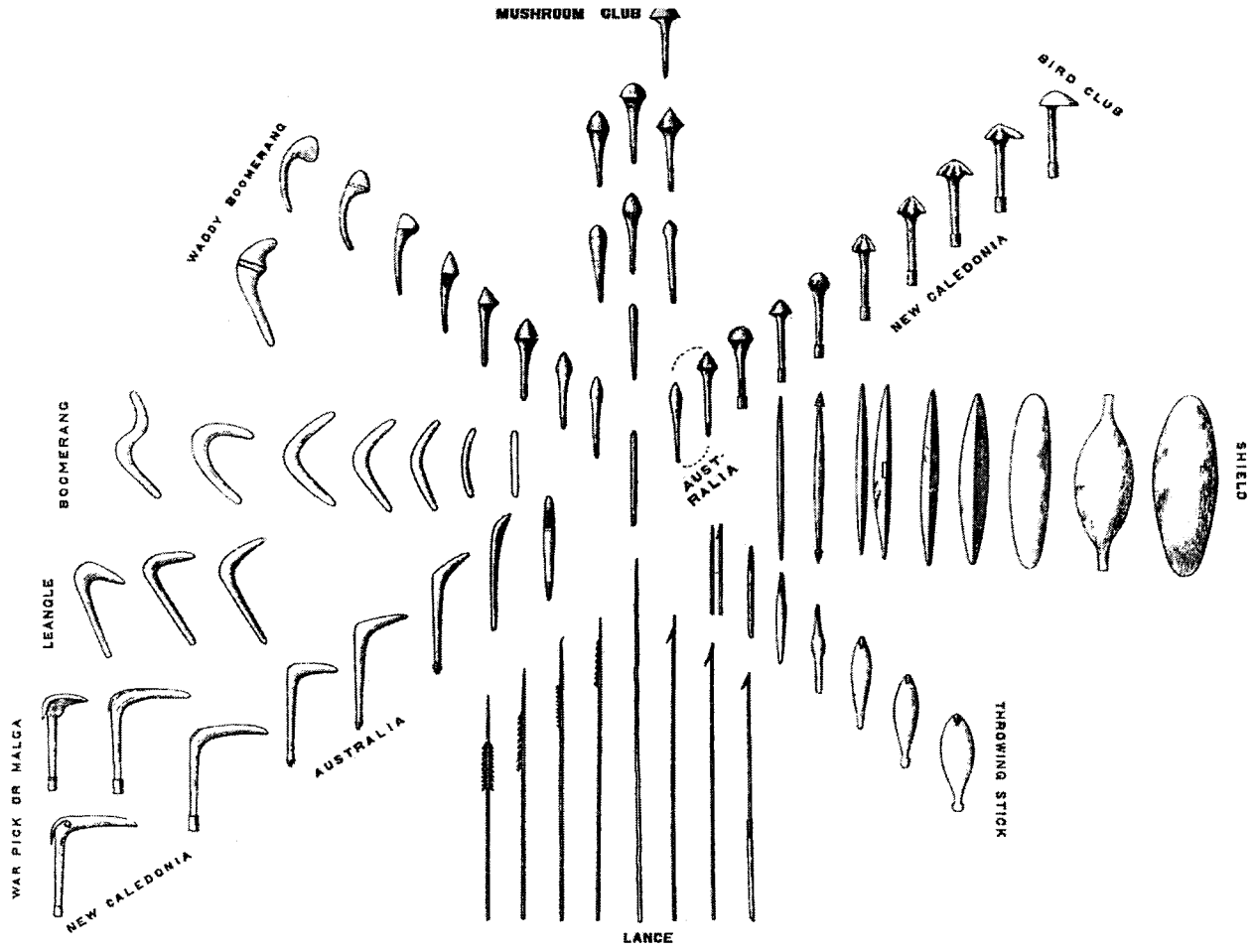

Figure 1. Pitt-River's scheme of the universal development of weaponry from a simple stick (center) to more complex forms, as represented in examples distributed around Australia (Pitt-Rivers, 1906).

rested on deterministic forces, however. Some investigators viewed patterns of culture as due to the continuity of history: patterns arose from the diffusion of traits by population movement or borrowing over time and space. Culture-area maps were assembled, much as was also being done by biogeographers.

Perhaps the extreme diffusionist view was the *Kulturkreis*, or culture circle theory, most closely associated with the Austrians Fritz Graebner and Wilhelm Schmidt. They hypothesized a set of primary culture circles (*Kreise*) that corresponded to the same ladder of complexity the cultural evolutionists were suggesting (Figure 2). But rather than parallel evolution, their notion was that similar cultures have diffused from a common source, no matter where they were found in the world. This was not completely silly, because culture circles were defined by multiple rather than individual traits, for which the chance of independent invention would seem to be trivially small. Although this assumption did not rest on causal process or parallel inevitability, some of the same progressive stage ideas were buried within their strong historicism (see Harris, 1968).

In many ways, this grand historicism was as encompassing as the evolutionary theories, and both went far beyond tight explanations, which induced the strong reaction we most closely associate with Franz Boas. He thought such generalizations were speculative and exaggerated at best. Similarities between traits plucked from their cultural contexts may be superficial or just projections of the researcher's perceptions, rather than meaningful and real. Rather than generalizing across cultures, and going far beyond the actual data, Boas advocated a concentrated examination of individual cultures and how they operated as integrated wholes, rather than invoking over-arching natural laws.

The particularistic and contextual approach dominated American ethnology for the first half of the 20th Century. But its lack of interest in generalities or process was not very satisfying to some, and induced a backlash of renewed evolutionary and comparative thinking, largely led by Leslie White and Julian Steward. White advocated an unabashed return to a science of culture that he dubbed *culturology*, rather than mere description. He also explicitly revived the 19th century lineal and universal evolutionism of Tylor and Morgan (White, 1969), but he added a universal thermody-

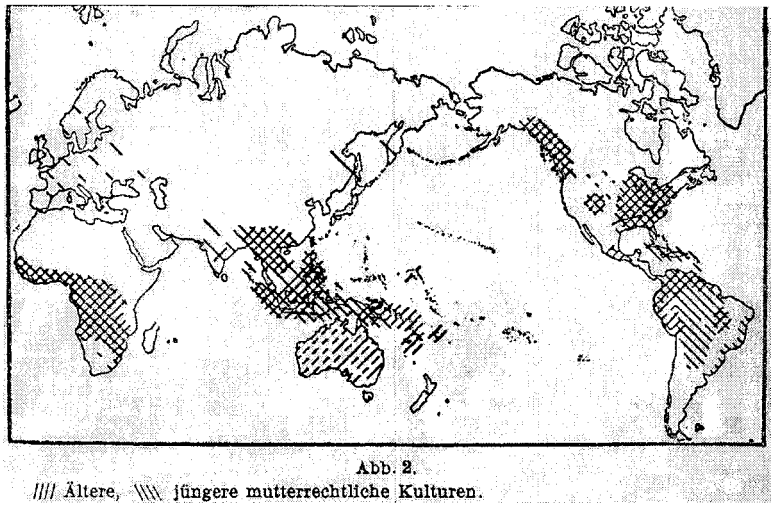

Figure 2. *Kulturkreise:* Graebner's distribution of matrilineal cultures (Source: Graebner, 1924).

namic causal engine, that a culture's structure reflected its *per capita* energy extracting ability. As a tribe became larger or more technically complex, it would have to evolve hierarchical and heritable power structures with control hierarchies and economic specialization characteristics of chiefdoms, etc.

A generation of researchers attempted to explain culture traits and change in terms of such causal forces. The old evolutionary stages became the familiar band-tribe-chiefdom-state sequence. Cultural anthropologists (such as Sahlins, Service, and Wolf) and archaeologists (such as Sanders and Adams) used comparative approaches to identify processes underlying major shifts in sociopolitical organization. Other views, like Steward's, were less globally sweeping than White's, but attempted to show how cultural similarities reflected adaptive responses to similar environments.

White was quite vehement about one core principle: culture may be mediated by human symboling, but it is driven by material forces, and *not* Great Men (including God), Free Will, biology, or mentalism. We might say that this resurrected 19th century wars, cultural and literal: The French Julien Sorel dreamed wistfully of the glory of Napoleon, but from the other side of the Borodino battlefield the Russian Leo Tolstoy wrote *War and Peace* to show how greater forces, *not* that Great Man, controlled history.

Comparative evolutionary approaches that focus on nonbiological traits are still around, particularly among archaeologists, to explain things like the emergence of political inequality or the escalating and increasingly coercive means of elites to impose their will. But by the 1970s the pendulum in ethnology began its natural cycle back, and a majority of the next generation of ethnologists rejected scientific generalizations. They strongly object to biological or ecological determinism, that neglect the obvious effects of individual agency, history, meaning, and context.

BIOLOGY OR CULTURE?

Because culture is borne by humans, many would argue that it must somehow be intertwined with biology. Do the two *coevolve,* does one determine the other, or are they really unrelated? Anthropologists have weighed in with a range of views and opinions.

Culture as Extra-Somatic

To White, cultural was a superorganic phenomenon that changed *sui generis,* that is, on its own terms and independent of the specific biological traits of its bearers. Regardless of their views of cultural evolutionism, most ethnologists certainly view culture as explicable in non-biological terms. That the two of us are here in North America, read books, eat tortillas, and speak English manifestly shows what he meant. For Steward and many ecologically minded anthropologists (such as human behavioral ecologists [Winterhalder and Smith, 2000] and many processual archaeologists), culture may be adaptive in the general darwinian sense, but its dynamics and change relate to the rational use of material resources.

Culture as Somatic, Determined by Genetic Traits

Ever since Darwin's other famous book (*Descent of Man,* 1871), there has been interest in the degree to which human behavioral and cultural traits might have an evolutionary, biological basis. Darwin rested human evolution heavily on sexual selection (competitive mate choice behavior). In the 1960's and 70's, largely led by Washburn and DeVore, the comparative method of biology used numerous primate field studies, to explain human behavior. Male dominance hierarchies, harem family structures, ritual symbolism related to territory and resource access and distribution are examples of its targets. Because such traits were built by natural selection into a species' genes, comparative social structures among species were implicitly assumed to reflect genetic species-specific differences. With this perspective, one can ask questions such as whether display behavior, made symbolic by language, drove the genetic evolution of the human species—as Livingstone asked, did Neanderthals sing?

This darwinian genetic perspective morphed into sociobiology (or behavior biology), but with a subtle addition. Comparative primate studies search for fixed, behavior-related genetic differences between species. But many of the same traits, such as altruism and dominance hierarchies, are not found in all human societies. So is every man a born brute, or should we now equate cultural variation to genetic variation *among* human beings?

Can a Yanomamo be a Quaker? Cultural anthropologists would almost universally say "yes," and vigorously

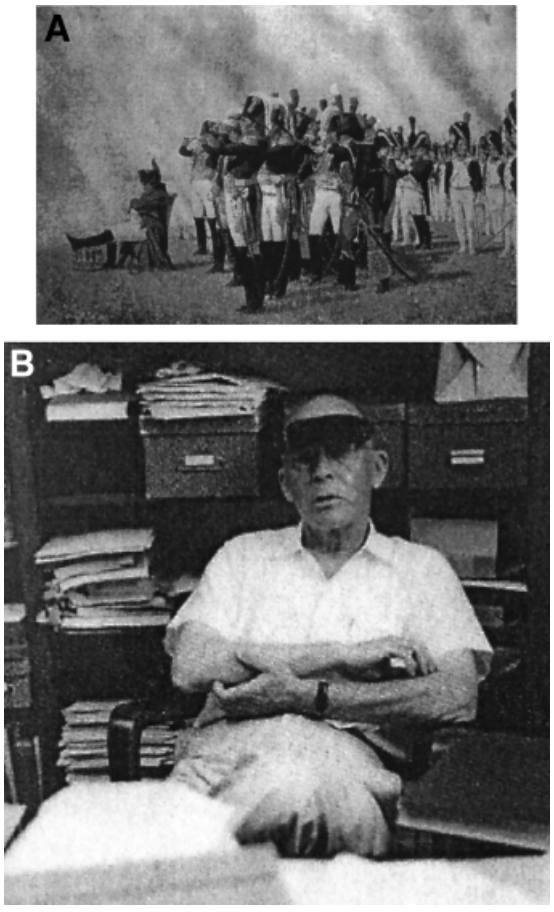

Figure 3. Who controls history? (A) Napoleon at Borodino (by Vereschagin; source: http://www.100megsfree4.com/rusgeneral/index.html); (B) Leslie White in his office at the University of Michigan, 1966 (Source: Dillingham and Carneiro, 1987).

oppose any such encroachment of biologism into human culture (they may even oppose the encroachment of biological anthropologists into their departments). Most would scoff at the notion that the Yanomamo are violent (if they are) because they have violence genes not found, say, in the calm Khoisan in Botswana. But this is just the kind of argument that is sometimes made. Sociobiologists eagerly tend to accept or even extrapolate any evidence that suggests an inherited component to behavior, from criminality to wanderlust to sexual preference. But genetic determinism can have potentially serious societal implications. In an age in which genes can now be found and their actual effects evaluated rather than assumed, a common lesson is that the effects lessen and lessen as they are studied more closely. The stronger their implications, the more we should insist that testable assertions about genes for behavior actually be tested.

Coevolution

In principle there's a kind of middle ground between culturology and sociobiology. A number of authors (Cavalli-Sforza and Feldman, 1981; Laland et al., 2000; Lumsden and Wilson, 1981; Boyd and Richerson, 1985; Durham, 1994), including "darwinian" archaeologists (O'Brien and Lyman 2002) have attempted to characterize culture change by a joint theory that relates parameters of culture to those of biology. The theory usually rests on strong analogies to darwinian evolution, with an emphasis on adaptive natural selection, treated with formal analysis also derived from biology. The core conceptual elements of evolutionary biology (inheritance, modification, selection) are modified to fit ways cultural traits (whatever they are!) are transmitted (if that's what happens!) by populations or individuals (whichever it is!), and compete (whatever that means!).

This has proved hard to operationalize for culture, and one result is that the potential coevolution middle ground has often been a no-man's-land. On one side, behavioral biologists use culture as a kind of extension of the biological organism, with biological evolution as the primary driving force, while they face archaeologists and ethnologists on the other side, who tend to stick more closely to efforts to apply the darwinian analogy to explain cultural traits strictly on their own terms.

Integration?

There should be better ways to reach a peaceful middle ground, if it exists, at least for a happy Christmas football match. Scholars in disparate fields have independently questioned a fundamental implicit notion of darwinism, that genes are internal blueprints for life, and nature something external to which the organism adapts (e.g., Lewontin, 2000; Oyama, 1998; Ingold, 1998). Instead, organisms and environment are seen as dynamically integrated. From the same supposed "blueprint" a myriad of outcomes are possible as the developing organism shapes and is shaped by its environment. To understand evolution, we have to understand the life history of individuals, from conception to death. For humans, that life history includes what we call culture, for which there are also "blueprints" (cultural structures or norms) that likewise affect but never determine outcomes as each individual reproduces, approximates, recasts, or rejects existing ideas, behaviors, styles, and objects.

Such a view naturally crosses disciplinary and subdisciplinary boundaries. It is probably misleading to think of an artifact as being a purely cultural trait or disease a biological one. Instead they are phenomena of the life-long interaction between the traits of individuals and their environment, physical and cultural. We may identify traits as "cultural" because we find them in archaeological sites; they did not arise by purely cultural processes but instead have multiple interacting causes, endogenous to individuals, exogenous from the environment, and in their interactions. Similarly with traits we usually classify as biological, like disease; it is not

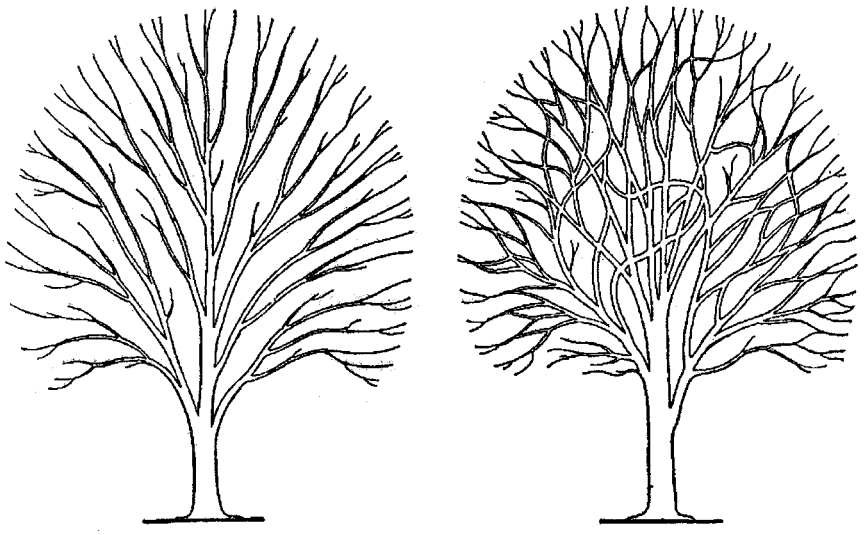

Figure 4. Biological vs. cultural evolution (Source: Kroeber, 1948).

just what an organism is made of but where it is and what it does that makes the difference between illness and health.

To understand these phenomena we should consider the various causal levels and interactions simultaneously. We're learning the painful lesson that even in the study of disease (where most research interest and dollars are), we can't just bypass the actions and perceptions of individuals at risk, or the physical, social, political, and historical context of those actions and perceptions.

Starting Over?

The fit of culture to darwinian theory has never been all that convincing, except when a trait is rather biological to begin with or the argument very generic. Important aspects of the analogy just don't match up very well; for example, cultural traits may intertwine over time rather than diverging the way a tree of evolving species does (Moore, 1994) (Figure 4).

So if the shoe dosen't fit maybe we should find a different shoe. What might it entail to erase the board and start over?

To model their behavior, units or phenomena under study need to be sufficiently well-defined and properly-behaved entities. This may not always be the case with culture "traits." For example, we can "analyze" anything we choose, but these should be entities relevant to the behavior under study. We can define 2 game wardens, 7 hunters, and a pure-bred Guernsey cow[2] as the elements of a hunting trait if we want to, and we could test for statistically significant change in their frequencies over time. But (most) readers may agree that this is not obviously a very useful trait to understand the evolution of hunting.

Models typically used in evolutionary theory require that traits follow the axioms of probability. But culture traits as often defined may not satisfy even these minimal criteria. For example, the laws of set membership are usually assumed. Traits should be defined in terms of sets of disjoint elements whose frequencies sum to 1.0. That allows us to speak of the relative probabilities of events like transmission, change, and relative adaptive success. Projectile points such as arrowheads may be easy to collect, but may not constitute a properly closed set of hunting tools as actually used in the culture: clubs, spears, natural rocks, and bare hands may also be used. Indeed, there may be no such sufficiently closed, stable set.

Scientific models also implicitly assume the law of the excluded middle, that something simultaneously cannot be X and not-X. But this may not hold for culture. An arrowhead may be a tool and not a tool; it may be used to hunt, ward off spirits, practice stone-knapping, or trade. Was a convert in Inquisition Spain a Christian or a Jew? A trait's frequency, persistence, transmission, etc. may depend heavily on its multiple identities, with dynamics unique for each individual in the culture.

Darwinian theory is based on discrete *events,* whose relative probabilities we can specify at least in principle. All the genes in an individual share a synchronous transmission event, but "transmission" of cultural traits may not have event-like properties. Genes are true biological entities, and that's why they follow laws of inheritance, but their cultural equivalent (sometimes imitatively called "memes") may often be made up by us as observers and need not follow analogous laws (see Marks, 1992). Culture traits may mix ("blend," an anathema to Darwinism) and change, with no real distinction between vertical (generational) or horizontal (contemporary) aspects of their dynamics. What is the "generation" for a chief's ceremonial garb, in which a cloth robe and metal ornament have related functions, but entirely unrelated temporal dynamics?

Cultural traits need not breed true or change according to specifiable rules of probability, or within a specifiable space of possible outcomes. Genes are causally related to proteins, but proteins do not feed information back to the genes that code for them. But culture traits may change (even reversibly) depending on their context and may modify their causative process.

Scientific inference also depends on *repeatability* of events. Many cultural phenomena are essentially unique, or may not persist or change as instances of identical entities, as required to test whether hypotheses about them are satisfied. If we repeatedly observe an arrowhead, but sometimes it is a weapon and sometimes a charm, and we don't adequately account for that, we will not understand hunting behavior in terms of arrowheads, or arrowheads in terms of hunting.

Scientific models usually stipulate that entities and events are *independent,* or that dependencies are consis-

[2]Tom Lehrer's *The Hunting Song.*

tent enough to be accurately expressed. Thus, in natural selection, there are winners and losers. But humans evaluate a set of perceived possible outcomes and invest actions in them accordingly. Individual culture traits need not be running a darwinian race that, like gambling, follows the laws of relative probability leading to specifiably circumscribed outcomes.

We can see how the above issues may frustrate attempts to derive formal models for culture. We may wish to suggest that hunting culture will evolve higher efficiency when hunters are well-trained, have confidence, and use better tools. We try to express this more formally in ways like Hunting Success = a(no. of archery transmitters) + b(relationship with prey totem) + c(arrowhead shape). It can be seen that this assumes the (Platonic?) reality of the relational coefficients (a,b,c) that apply equally to every teacher, totem, and tool. If the traits of hunting have been misperceived, or mischaracterized, our inferences about hunting will be false. Facing these problems may put us back to scientific square zero, but need *not* make a theory of culture impossible, or mystic.

KULTURKREIS OR KULTURCRISIS?

Julien Sorel was a Quixote-like fanciful character, but anthropologists on both ends of the political spectrum think there is nothing fanciful about whether natural laws govern human societies. Social and biological theorizing is not just an abstract exercise, but can have very real impact that history has shown often to be damaging to people. Justification of eugenics and colonialism are examples. Yet many would argue that understanding is better than ignorance, and even an unwelcome truth (e.g., that some behavioral trait really is genetically determined) is less harmful than wishful-thinking.

It's not unusual for difficult issues to cycle through the attention span of any scientific profession, and perhaps we're all just repeating Plato and Aristotle. Interestingly, the nature-nurture wheel turns in similar ways in both biology and ethnology. The issues have been careering (yes, a pun!) around in anthropological circles for 150 years or more, generating jobs if not understanding. Do biological and cultural anthropology have to continue recycling the same battles, snarling at each other from across a great divide (or from opposite ends of campus)? A pax on both your houses! It is not clear whether consensus will be possible, but more integrative approaches certainly seem to be. The traditional antipodes of particularism and evolutionary approaches need not be as incompatible as often thought. Darwin himself said wistfully in his old age that he had "become a kind of machine for grinding general laws out of large collections of facts."[3]

If by "evolution" one means the phenomenon of spatio-temporal variation and change, we need not be conceptually constrained by Darwin, which has been the most contentious problem. A reintegrated anthropology might begin to break free from those shackles, as we've tried to suggest. Are we brave enough to come out of our foxholes and communicate across no-man's-land? At least we could send out our students, who may not yet be too shell-shocked, to scout more integrated ways of doing business and—let's really be radical—try learning each other's language and perspectives and develop a deeper understanding of the complexities of human biology and culture. Perhaps possibility and plasticity have their own "laws" that do not depend on Darwin. Could a (r)evolutionary frontier in anthropology beckon?

NOTES

Send any comments on this column to: kmw4@psu.edu.

We thank Anne Buchanan for reading this text in draft, and Jeffrey Kurland for thought-provoking discussions.

One of us (KW) was a graduate student in White's last lively History of Anthropology (Anth 691) at Michigan, but didn't think much about the problem for 30 years. The other (FH) had a memorable and broad-based undergraduate education in a department that has since split in two (Stanford), and then attended the serenely unified department at Michigan. We have wondered if there might be an alternative where differences in training and theoretical outlook lead to vision rather than division.

[3]From Darwin's *Life and Letters*, cited in Keynes (2002).

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