VITAL TOPICS FORUM

What Is Science in Anthropology?

Peter Peregrine, Yolanda T. Moses, Alan Goodman, Louise Lamphere, and James Lowe Peacock

INTRODUCTION

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> *"The purposes of the Association shall be . . . to advance anthropology as the science that studies humankind in all its aspects . . . "* AAA Statement of Purpose

The governing documents of the American Anthropological Association repeatedly refer to anthropology as a "science." What does *science* mean in this context? And is it true that anthropology is a "science"? These are questions with which anthropologists have wrestled for generations, yet no clear answer has emerged. That these questions are still important was demonstrated following the 2010 AAA annual meeting. The executive board removed the word *science* from the association's long-range plan and sparked a brief, though widely publicized, controversy. The important point is that if members of the AAA did not find "science" in anthropology important, the changes to the long-range plan would not have been controversial.

Earlier discussions of science in anthropology suggest that anthropologists have always been confused about what science means in the context of anthropology. Leslie White (1949:3–7), for example, defined *anthropological science* as "sciencing"; that is, what people who call themselves anthropological scientists do. Although this idea seems almost prophetic of contemporary understandings of science, it is not a particularly useful definition. Eric Wolf (1964:13) provided a similarly ineffectual definition: "Anthropology is both a natural science, concerned with the organization and function of matter, and a humanistic discipline, concerned with the organization and function of mind." Psychologists might argue that the organization and function of mind is a scientific concern, and there are certainly those in fields such as environmental ethics who would see a concern with the organization and function of matter as an obviously humanistic one. Marvin Harris (1979:27) defined *science* in anthropology as "an epistemology which seeks to restrict fields of inquiry to events, entities, and relationships that are knowable by means of explicit, logicoempirical, inductive–deductive, quantifiable public procedures or 'operations' subject to replication by independent observers." This definition seems so narrow that much of anthropological research—for example, field research done by a lone participant-observer—might not be included.

Although definitions of *science* in anthropology may be incongruous, there does seem to be a general agreement that at least two opposing modes of thought are present in anthropology: one focusing on logical, reasoned argumentation; the other on more inventive, insightful exploration (e.g., Boyer 2003; see also Wolf 1964:1–3). The former tends to be called a "scientific" approach, the latter a "humanistic" or "interpretive" approach. But one has to question whether these two modes of thought are truly different. Are "humanistic" approaches devoid of logic or reasoned argument? Are "scientific" approaches devoid of insight and inventiveness? These kinds of dichotomies are found elsewhere in discussions of science in anthropology and raise similar questions. Science is said to be concerned with generalizations rather than particulars; science is concerned with exploring evolution rather than history; science emphasizes theory at the expense of context; science uses measurements and statistics rather than words and interpretations; science employs a hypotheticodeductive approach; science is empirical; science is replicable, science is . . . what? What is science in anthropology?

SCIENCE AND HUMANITIES: A FALSE DICHOTOMY

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Science and *humanities* are broad terms used to convey ideas and concepts about anthropology. We are a four-field department at the University of California, Riverside, and as a faculty member I try to integrate a wide range of conceptual frameworks and methodologies to indicate a wide range of ways of knowing and understanding humans and human behavior. Science and the scientific method is a particular way of looking at existential phenomena to make sense of it. It is useful, for example, when one is looking at large data

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sets and trying to extrapolate patterns. The lens of the humanities is also a way of taking those patterns and exploring what they mean on the ground in more nuanced culturally textured contexts. In doing so, one can call on the study of local knowledges and history (written and/or oral) as well as discourse analysis.

This range of complex anthropological approaches must be used to adequately explain how we got to be who we are as humans by being able to track our social–cultural, ecological, and biological choices from prehistorical to modern to postmodern societies. This continuum of ways of knowing also provides us with a more robust way of bringing an anthropological perspective to very complex societal and global problem-solving strategies in the 21st century. For example, to answer the question "what is the meaning of race in contemporary U.S. culture?" means that we have to take a look both diachronically and synchronically through the scientific lenses of culture, biology, archaeology, and linguistics. The historical archaeology of diverse ancestral communities provides a lens through which to examine the spatial and material cultural implications of this socially constructed edifice called the United States beginning in the colonial era. Linguistics allows us to research the power of language and identity, especially exploring discourses of power and appropriation. For example, how has the language of privilege and subjugation manifested itself in the past? How does it continue to do so now?

Biology shows in very concrete ways how science, politics, social norms, and religion colluded to create a very tightly controlled social construct about racial hierarchy and inferiority that still exists today in the form of structural and institutionalized racism. Biological anthropology demonstrates that race, or the concept that we call "race," is about explaining human variation. And cultural anthropology helps to make transparent how culture creates race and how it continues to be perpetuated through institutionalized processes of subordination and domination.

In our future anthropological engagements, we will need to continue to utilize both the sciences and humanities to provide the robust conceptual frameworks that will guide our multilayered and multisited research and praxis projects. For it is only through utilizing both concepts that we will be able to tackle such intractable problems as world poverty, the differential impact of globalization, global health disparities, ethnic and religious animosities, the widening gap between the haves and have nots in our own country and elsewhere, and a more sophisticated class analysis in the United States and elsewhere that uses an understanding of intersectionalities as its framework.

WILL SCIENCE TAKE AN ANTHROPOLOGICAL TURN?

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Dental enamel hypoplasias (DEHs), areas of decreased enamel thickness, are permanent, chronological records of physiological perturbations (commonly thought of as stress) during the period of enamel formation: prenatally through childhood. The number and location of DEHs provides a chronological history of early life stresses, and as such, they are an established part of the toolkit of biological anthropology and bioarchaeology. I study hypoplasia patterns to document nutrition and health changes associated with early agriculture, enslavement, globalization, and other forms of poverty and inequality.

For a century, ameloblasts, the enamel-forming cells, have been known to be under strong genetic control. They start enamel formation at a precise place and time and proceed methodically to secrete enamel protein matrix in an orchestrated, well-timed fashion, some four microns every day until the process is complete. Voila.

However, under stress the ameloblasts might stop secreting enamel matrix, and the result is a permanent record of underformed enamel—the hypoplasia. The enamel development literature presents a uniformitarian explanation that makes sense: if the perturbation is sufficiently severe and long lasting, all ameloblasts in the sheet-making enamel matrix will react in the same way and stop secreting enamel matrix. Because enamel once formed cannot self-repair, a hypoplasia, an undergrowth of enamel, is the permanent result.

But that is not what I observe. I see incredible variability in how enamel-secreting ameloblasts responded to the same perturbation. Even though the resulting hypoplasia is formed by the same sheet of ameloblasts, it is often thick in some places, thinner in others, and in still other places, the enamel appears unaffected. The ameloblasts that made a particular line of enamel are specialized epithelial cells, genetic and developmental clones, whose purpose is to make enamel. They are bathed in the same blood-supplied soup of chemicals. However, individual ameloblasts respond differently. Why is the response less uniform than the scientific literature suggests, and at times downright chaotic?

I do not think anyone knows why two genetically identical cells that are located right beside each other and are by all measures exposed to the same environmental conditions behave so differently. But when an anthropologist thinks about it, the results should not be surprising.

Biologists once had a simple explanation for variation. Nature plus nurture plus some interactive factor equaled phenotype. We now know that that this additive equation fails to usefully explain relatively "simple" processes like the formation of enamel by ameloblasts. As Richard Lewontin and others have argued, natures and nurtures are, at the very least, interwoven multiplicities. Molecules, cells, organisms, and societies somehow direct their own scripts and often follow unpredicted trajectories. Life develops, is emergent, contingent, context dependent, and fabulously surprising.

A cell can become cancerous in a myriad of different ways. Why? How does one capture the complex web of context, reason, and result of a human thought or action? Instead of expecting the regularity of enamel development that our cultural brains have trained us to see, asking

questions about the surprising variation could lead to new insights into what goes on within and between ameloblasts and to better interpretations of the resulting record of perturbations.

If simple enamel formation is that complex, then what of real people's lives? Anthropology, if it is still to some degree "the science of humanity," is certainly not so much about figuring out how humans and cultures obey equations and laws that are to be proven true or false. Rather, humans and cultures are fascinating to us for much the same reasons they fascinate novelists: their counterintuitive nature, their surprises, their complexities, and their contradictions.

For me, the question is not whether anthropology is a science; anthropology is a type of science. The more central question is whether anthropology can help other sciences to catch up to the complexities of lives, humanities, and global cultures. Anthropology can provide lessons for the biological sciences and perhaps science in general. Anthropology can be a model of the science to come by its embracing of site specificity, the importance of context, the importance of multiple sources of information and evidence, and what we find out when we listen to and observe real people in real places living their complex lives.

Controlled experiments are important as are experiments that study parts of systems. But let's also provide ample support for the observation of humans and cultures in context. Let's remember that ethnographic and anthropological studies of real lives are bound to be messy and contradictory. Results might change depending on context, and we may be unable to explain everything simply because the processes are not themselves simple. Maybe science will take an anthropological turn.

WHAT IS SCIENCE IN ANTHROPOLOGY? TAKING A PAGE FROM BOAS

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In answering the question of "What is science in anthropology?," it is useful to go back to Franz Boas, the founding "father" of American anthropology, whose work is based on the German distinction between *Geisteswissenschaft* and *Naturwissenschaft*. In his famous essay "The Study of Geography" (1887), Boas distinguished between the thorough understanding of individual phenomena through historical contexts (what Boas called "cosmography") and the deduction of the laws that governed the physical world (e.g., as studied by the physicist). Geography, astronomy, geology, and history could all be thought of as branches of knowledge studied through Geisteswissenschaft, while physics, chemistry, physiology, and experimental psychology were part of Naturwissenschaft. For Boas, the physicist's work was rooted in a logical, objective, and aesthetic approach that broke a phenomenon "into its elements" rather than one that was motivated by "affective" impulses and that treated a phenomenon with "a subjective" unity or as a whole. There is no doubt that Boas felt these two approaches were of equal importance and both were "science" (the usual translation of the German word *Wissenschaft*).

Since Boas's time, anthropology has continued to evolve these two parallel visions of science, both grounded in empirical observation. On the one hand, the nomethetic impulse uses quantitative methods to test hypotheses, producing public knowledge that can be verified or revised by additional research. This has become the norm in much of biological anthropology and archaeology, as well as some approaches to cultural anthropology. On the other hand, the ideographic or "cosmographic" approach has been developed through ethnography, at first the lone ethnographer in a small isolated community but increasing through participant-observation, lengthy interviews, archival research, and other qualitative methods, often by a team of anthropologists or other researchers. One could argue that Geisteswissenschaft is really just "interpretive" anthropology, but I would counter that unlike literary and philosophical studies where the "text" is the center of analysis, in cultural anthropology, texts (field notes, transcribed interviews, texts written by members of a community under study) are the "data" or empirical core for making an analysis of culturally constructed categories and on-the-ground relationships between individuals and groups.

In developing this "cosmographic" approach, many cultural anthropologists over the last 30 years have spent a great deal of time doing two things: (1) interrogating our own concepts so as to unpack Western assumptions and better translate the categories used by our interviewees and (2) finding ways to include in our published texts the voices of those we study as well as invite their coparticipation in research and writing. In other words, there is an effort to transform "informants" or "subjects" into collaborators. But these efforts, though influenced by some postmodernists (e.g., Foucault and de Certeau but not Derrida or Lyotard), have not turned most of us into postmodernists. We are still committed to empirical work, to grounding our arguments in analysis of what people say and do. We still urge our students to write dissertation proposals focused on a problem, to have a clear methodology for researching that problem, to use their fieldwork material (the "data") to make an argument, to relate that argument to the anthropological literature, and to point to "findings" and "conclusions" about those they study and with whom they collaborate.

But there should also be room within anthropology for those who feel uncomfortable adopting the mantle of "science" and who see themselves as taking an interpretive or humanistic approach. These might include folklorists, or those committed to collecting oral histories, making ethnographic films or studying artistic traditions. As a "big-tent" discipline, anthropology builds on "knowledge from the social and biological sciences as well as the humanities and physical sciences" (AAA n.d.).

The commitment to science is widespread in the discipline just as it was 125 years ago when Boas first articulated the contours of science within anthropology.

SCIENCE IN ANTHROPOLOGY

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In the early 1990s, a resolution was introduced at the annual meeting of the American Anthropological Association to fire the editors of the *American Anthropologist* on the grounds that they forsook a scientific perspective to emphasize a humanistic, postmodernist one. While that resolution was defeated, it demonstrated a division of the field much like the current one, a division that could be argued to have been with anthropology from the beginning. What seems new is that media coverage of the recent controversy gave the impression that anthropology had given up a claim to being a science, or at least AAA had given up that claim. Without judging the claim itself, it is worth noting a few possible implications. For example, while I was AAA president a senator proposed to eliminate the social science program in the National Science Foundation. The American Association for the Advancement of Science (AAAS) held a meeting of all its member organizations, including AAA, to address this threat. I attended, as did many other "scientists." A speaker from the government advised us not to overestimate the clout of science, that it was a fraction of the clout of the Christian Right, for example, because the Right mounted a strong lobbying effort influencing congresspersons. We developed a strategy of contacting specific congresspersons whom we knew and who we thought would support us. This strategy possibly helped head off the cuts. Without membership in AAAS, would anthropology have been equipped to join this effort? Having deleted its identity as a "science," is AAA still eligible to representation in AAAS? As the humanistic wing of AAA knows well, identity matters.

A less formal example of identity mattering is the presence or lack thereof of anthropology in the wider culture. A glance at airport bookstores and newsstands shows few contributions by anthropologists and fewer still labeled as such. Those few noted in passing recently are in newspapers (e.g., the item about AAA giving up science), periodicals (primarily those treating science and dealing with archaeology and biological anthropology), and two books, one giving an evolutionary view of civilization and another tracing the contributions of a physician with anthropological training. A common denominator in much such writing is science of some sort mixed with major issues about history and humanity, thus joining science and humanities. The pieces are written in clear simple language, sometimes by science writers. These tendencies are mirrored in nonprint media as well.

Bread and butter for the discipline is course enrollments. Anthropology courses have increased enrollments enormously if one compares figures over the century-plus of AAA. One reason is scope. Students can choose from a menu including biological and cultural, archaeological, and other aspects represented more or less by the many sections of the AAA. An example is my own department in a state university. Our general education and arts and sciences curriculum is currently subdivided into sciences, humanities, and other aspects such as "philosophical" and "aesthetic." Anthropology is notable in offering courses that fulfill requirements in virtually all the categories. That scope and diversity, which includes "science" and "humanities," doubtless explains the department's survival and growth over decades of budget cuts (not to mention fads and trends including online courses, neotheories, etc.).

In evaluating the debate about anthropology's identity, it is useful to go beyond anthropology. For example, in creating a program in global studies and in pursuing global work opportunities for students, my institution has involved many disciplines and nonacademic efforts. A few of the aspects are as follows: a major in global studies, now almost a thousand majors, area studies centers, study-abroad programs, and numerous projects, housed in an 83,000-square-foot building financed largely by a bond package supported by the 100 counties of the state. What is the point of noting this work? The point is that aspects of both "science" and "humanities" prove useful and necessary in such work, while others are less so. For example, the generalizing mandate of "science" is useful and necessary as is the "particularizing" aspect of "humanities," yet both aspects impact negatively when pushed to extremes. Overly personal and particularistic introspection tries the patience of practitioners and policy makers, as do overgeneralizing analyses. Artful and shrewd applications of both scientific and humanistic aspects, however, can be very useful and even transformative.

UNDERSTANDING DIFFERENCE

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In his classic essay "Thick Description" (1973), Clifford Geertz builds a metaphor for culture around a Beethoven quartet. He argues that, like culture, a Beethoven quartet cannot be reduced to the score, the skills of the performers, the understanding of the audience, or any particular performance. Rather, a Beethoven quartet is "a temporally developed tonal structure, a coherent sequence of modeled sound . . . and not anybody's knowledge of or belief about anything" (Geertz 1973:11–12). Indeed, only "incorrigibles" or "reductionists and reifiers" would think it is anything else (Geertz 1973:11). I happen to teach at an institution with a conservatory of music, and quite a few of my students are training to be professional musicians. They must all be "incorrigibles" because Geertz's statement sends them into fits. For my music students, a Beethoven quartet is all of the things Geertz lists. They find Geertz naïve in not understanding that the score, the musical skills, the specific performance, even

the audience are all part of the music, and that the music itself changes as scores are edited and analyzed, as musician's skills and the instruments they play change, and as audiences develop new tastes and expectations. Not only do they think Geertz is wrong to limit a Beethoven quartet to "a temporally developed tonal structure," but they feel that he insults them in effectively calling them either limited or foolish for not assenting to his perspective.

It would seem from recent controversies that a lot of anthropologists have followed Geertz in their failure to understand, failure to accept, and failure to validate scholarship conducted under different "paradigms" than their own. This is contrary to tolerance for other ways of knowing, tolerance that is the primary theme that I see running through the essays of this "Vital Topics" forum. Moses suggests we need to "embrace a wide range of conceptual frameworks and methods" to understand humans and human behavior. Goodman calls for an acceptance of "noise" in both our methods and our findings. Lamphere notes that anthropology has always been a "big tent" discipline and should continue as one. And Peacock argues that anthropology's success and influence is directly related to the degree to which we retain the historic breadth of the discipline. I agree with these points—tolerance of multiple perspectives makes sense for anthropology. The practice of anthropology is as diverse as the subjects we study, and for obvious reasons. We are an holistic discipline, and we need holistic methods to serve our interests. With that in mind, it seems counterintuitive to limit our methods to one form, or even to value one form of method above another. Our questions are diverse, and our methods must be diverse as well.

It was my hope that this Vital Topics Forum would come up with a definition of *science in anthropology*. That has not happened, but perhaps the forum has produced a more useful result: an affirmation that anthropology is a discipline that embraces multiple perspectives, multiple methods, and multiple ways of understanding humans and human behavior. Anthropology cannot succeed without tolerance for this diversity of approaches. Perhaps our task, then, is not to seek definitions of *scientific* or *humanistic* approaches but, rather, to implement whatever approach satisfies our interests and helps us answer our questions. In doing so, we must be mindful that other anthropologists may have different interests and questions for which our chosen approach is not useful. Rather than accusing them of being "incorrigible" for not thinking the way we do, we should seek to understand what our colleagues are doing and why they are doing it. After all, isn't understanding difference what anthropology is all about?

VITAL TOPICS FORUM COMBINED

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