General Anthropology

Volume 20, Number 2 *Bulletin of the General Anthropology Division* *Fall, 2013*

The Political Gene

Human Genomics and Anthropology*

By *Jonathan Marks*
University of North Carolina-Charlotte

The question I want to pose is pedagogical, namely: When all is said and done, what do we actually want people—students, informed citizens—to know about human genomics?

To begin with, a course in human genetics or genomics is not normative in undergraduate university education, and is certainly not a science requirement, like, say,

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In This Issue

Handling Artifacts

Please don't Wash the Artifacts

By *Vaughn M. Bryant*
Texas University College Station

Please don't Wash or Clean the Artifacts! That statement was on a large sign hanging over the temporary sink in the tent where busy students were unloading bags full of chipped flint, pottery, and grinding stones to be examined and cataloged. This was a major excavation of an early agricultural site and the archaeologist in charge wanted to be certain she didn't lose any of the evidence. But, "Why keep dirty artifacts I wondered?"

The first dig I worked on was more than half a century ago. I was one of the dirt screeners and later I advanced to the shade of the tent where I cleaned and labeled the artifacts being found. In those days we were given scrub brushes, toothbrushes and other cleaning tools that we used to make sure that every artifact ended up spotless before we painted on the "white-out" and then used a Crow Quill pen and India ink to add the permanent accession numbers. The only precaution we were told to follow was not to "scrub the pottery" so hard that we left incising marks from our brushes. We took pride in making sure that at the end of each day the cleaned artifacts glistened in their drying trays when they were examined by the archaeologist and other students in the light of a Coleman lantern. What that archaeologist and the rest of us didn't know back then was that each day we were probably destroying some of the most valuable evidence the site contained.

Today, most archaeologists are careful "not to clean" their recovered artifacts. Instead, many of the artifacts receive minimal

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Teaching Strategy

Anthropology in the News: Introducing the Scope of General Anthropology

By *Katherine A. Nelson*
Riverland Community College

Many students have not heard much about anthropology and are not familiar with the work that anthropologists do. To remedy this, you can introduce the range of the discipline and outline the similarities and differences among the four sub-disciplines of American anthropology through the following activity: Anthropology in the News. In addition, you can introduce students to applied perspectives of

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Teaching Strategy

A Tourism Concept Collage

By *Joyce D. Hammond*
Western Washington University

Tourism is increasingly recognized for its significance by anthropologists as one of the world's largest industries in which people of very different backgrounds, religions, socioeconomic statuses, and ages interact. Most anthropology students do not become professional anthropologists, but many of them will have repeated interactions with people of other cultures as tourists. This activity accomplishes several goals simultaneously. It provides students with practice in analyzing ubiquitous tourism messages; it introduces them to some contemporary concepts that are applied to the phenomenon of tourism, as well as other

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Intro Chemistry, despite the obvious relevance of the subject to the lives of students as citizens. They might get a couple of lectures in a general biology class, perhaps from the local fruitfly geneticist, but a course focused concurrently on processes of biological heredity, and on the special aspects of the human case, even for biology majors, is generally reserved for the post-graduate curriculum.

So here is the question I want to put to you: Suppose a class in human genetics/genomics were the norm in the undergraduate curriculum, what would we want to make certain that students learned about the subject? What would it take to impart to the educated, informed citizen, a critical and useful knowledge of human genomics? Of course you would want to teach A, C, T, and G, histones, and *Alu* repeats. But genomics is so much more, and so different from what we used to think science was all about.

General Anthropology

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General Anthropology ISSN 1537-1727 is published semiannually by the Gerneral Anthropology Division of the American Anthropological Association. The goal of *General Anthropology* is to provide useful, timely, and readable information and ideas from the four fields of anthropology and applied anthropology. All requests for reprints and copyright permission should be sent to journalsrights@oxon.blackwellpublishing.com or by mail: Wiley-Blackwell Permissions Controller, Blackwell Publishing Ltd., PO Box 805 9600 Garsington Road, Oxford OX4 2ZG, United Kingdom

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But when it comes to human genetics, we actually have the opposite problem. As the sociologist Dorothy Nelkin and historian Susan Lindee observed in their 1995 classic, *The DNA Mystique*, the gene is a cultural icon, and scientific discourse about it is invariably a social, political, and moral discourse, as well as a scientific discourse. What Nelkin and Lindee called "genetic essentialism" is not simply about genetics; it is about politics as well. We are actually afraid that people will take the science too seriously, and believe the bio-political rubbish demagogues often tell them. And it has always been that way. It's not as if the eugenics movement was an aberration in this regard, much as it may be in the interests of geneticists to frame it that way.

Eugenics

In fact, if you want to use an educational video documentary about the eugenics movement for a class, there isn't any. We still keep it under wraps. In my home state of North Carolina, it recently came out that they accelerated sterilizing citizens after World War II, and after most other US states had abandoned their sterilization programs. They were actually sterilizing poor black women into the 1970s.

And the idea that some people are not worthy of procreation is an important idea to get out in the open, because the argument that they are unfit to breed is the same argument that they are unfit to live. And if you are swayed by those arguments, it will always be cheaper and easier to kill people than to operate on them.

So, yes, it is important to confront the eugenics movement, in which science education was extraordinarily effective, and indeed to argue against it was to incur the wrath of those who spoke for Darwin, as well as those who spoke for Mendel. (And it was different in the US and the UK; in the UK it was primarily about class, and in the US it was primarily about race and immigration patterns, specifically whether the southeast European race was as good as the northwest European race.) And like a lot of Americans, it becomes a personal story for me, because when I read geneticists a hundred years ago denouncing the germ-plasm of Russian immigrants to America as being inherently paupers and criminals, they're talking about my grandparents.

Eugenics Society Medal 1928

In the figure above you see a medallion that they used to give out at county fairs in America in 1928. You could enter your family in the Fitter Families Contest, and if your family was white enough, educated enough, abstemious and prolific enough, you could win this medal, which is inscribed with a Nordic couple passing the torch to a Nordic child, and bearing the legend, Yea, I have a Goodly Heritage. Presented by the American Eugenics Society.

The point is that this was about the things we are concerned about today – science education, human genetics, human variation and evolution, the confrontation of science with human rights – and there is an important lesson that gets lost if you don't teach about it, namely the intersecting scientific and political discourses. This was not merely wrong science, but evil politics as well. And that good/evil axis is important to acknowledge, because it shows that the science was not value-neutral. It was part

of a cultural and moral discourse.

A student once asked me, Why do we pay attention to history and bioethics? I said, Because we aren't Nazis, and we want to make sure we stay that way.

So why are students still surprised to hear about the eugenics movement? Why didn't they get it in their biology classes? And the answer is that it conveys the wrong message about scientific authority. If you begin with the separation of facts from values, and imagine that science is value neutral, with only good or bad applications, then you can throw the eugenics movement in its varied manifestations by the wayside, as simply wrong ideas wrongly applied, and thus not worth engaging.

Bio-politics

But if, on the other hand, you follow *The DNA Mystique* and recognize that the science of human genomics has inherent political and moral dimensions, you are obliged to confront the eugenics movement not just as bad Nazi genetics, which was surprisingly difficult to distinguish from good American genetics, but as part of a broader stream of thought of the meaning of human differences, in this case, the natural basis of class distinctions.

Is social inequality the result of history —that is to say, of unjust practices—or of nature, in which case there is still inequality, but it is not unjust? If you think it is caused by social injustice, the solution is to work for social justice. Genomics doesn't really enter into it. If, on the other hand, you think social inequality is caused by underlying natural inequality, then you might invest in science to identify that natural basis—skull size or shape, IQ, degraded germ-plasm.

The very first English textbook on the new genetics, published in 1905 by Reginald C. Punnett, known eponymously to biology students as the source of the Punnett Square, has an unexpected conclusion. "Permanent progress is a matter of breeding, rather than of pedagogics; a matter of gametes, not of training. As our knowledge of heredity clears and the mists of superstition are dispelled, there grows upon us with an ever increasing and relentless force the conviction that the creature is not made but born."

Well, of course, that's not a statement of biology at all; that is a statement of biopolitics. And that's 1905, shortly after the rediscovery of Mendel, and before Bateson has even coined the term genetics. Now we flash forward to 1989, and James Watson, known eponymously to biology students as the source of the Watson-Crick double helix, tells *Time Magazine* as head of the Human Genome Project, "We used to think our fate was in the stars. Now we know in large measure our fate is in our genes." As if we have fates, we have localized them to our cellular nuclei, and genomics is just like astrology, only presumably more accurate.

There are two things going on here, connecting those thoughts that frame the life sciences in the 20th century. First, we have the context of these statements in the folk ideologies of heredity, the inherited social and political statuses, whose existence might be rationalized if they have a naturalistic basis, and if only we could find it. And second, we have the fact that it may actually be in the geneticist's interest to have you believe that your fate is in your genes. The point is that biological, genetic, genomic statements about human difference have an intrinsic political conflict of interest, in that they reify social and political difference, as the rest of us came to appreciate gradually over the course of the century. The unifying theme is that there is a synergy between science and politics in the premise that people are rankable by virtue of their inherent familial qualities.

We need to understand genetics simultaneously as scientific and as political discourse, and that fact is, I want to suggest, at least as fundamental a fact of human genetics as are segregation, independent assortment, pleiotropy, epistasis, and cytosine methylation. Even if you don't necessarily believe that one's station in life ought to be dictated by one's ancestry, if you are a geneticist, it's good for business if people think that your genes are the most important thing about you. The eugenicists realized it then, and the genomicists realize it now.

Mammon

Which brings us to the third thing I want a student to know about genomics. Not only are there political and ideological conflicts of interest that co-determine the truth value of genetic statements, which a century of human genetics shows quite well, but there is also a tremendous difference between modern genomics and simply the last generation's human genetics. And this goes back to a dinner in 1998, when that same James Watson found himself at a banquet seated next to the science reporter for *The New York Times*. She asks him what's up, and he goes on about a friend of his at Harvard, named Judah Folkman, who is using a new drug to study tumor suppression in mice, and how he's going to be the new Darwin, only better, and cure cancer in two years. All of which duly appeared on the front page of *The New York Times* on 3 May 1998. And the following day the price of the stock of the company that made the drug used by the researcher whose work Watson was touting, quadrupled (see Marks 2009).

Suffice it to say that if cancer had in fact been cured between 1998 and now, I'd like to think we would have heard about it. But suddenly it became clear that, with venture capital and biotechnology and big pharma all closely intertwined here, fortunes could be made in genomics, based on what Stephen Colbert called "truthiness," regardless of the actual truth value in the scientific proposition. And especially in America, where anyone is entitled to make a dishonest buck, you find that the already-conflicted interests of human genetics are even more conflicted by the profit motive. The poster child here is BiDil, a drug that was approved by the US Food and Drug Administration in 2005 as a heart medication specifically for black patients, on the presumption that the drug worked better in blacks because of an imaginary genetic difference between the races. And as Jonathan Kahn has recently detailed in his book, *Race in a Bottle* (2012), pretty much everything that was ever said about BiDil was wrong.

Now in a lot of sciences, something like that might be scandalous, or challenge the epistemological foundations of the science, but not in this one. You see, this is a new kind of science, one in which you are allowed to stretch the truth if it will make you a few bucks, and your colleagues will wink at it. So we have genetic tests available now to tell you what African tribe your ancestors were taken to America from, if you have the Y chromosome of Moses or Genghis Khan,

the mitochondrial DNA of clan mother Xenia, whether your child will be a sprinter, how long you will live (from your telomeres), how much Neandertal you have in you, and of course, your genome sequenced so you can know your genetic health risks, but without the mediating services of a genetic counselor to tell you what the information might actually mean. Some of these may well be true, or may be close enough to true, as determined by lawyers, that that the question of their truth value as determined by scientists is simply moot.

And that strikes me as the other important thing I want students to know about genomics. If you want to know how true a certain proposition is likely to be, you need to know if someone is making money from it (Bolnick et al., 2007). There is something distinctly unsavory about even thinking about science that way, for after all, even Jesus knew that money corrupts truth (Matthew 6:24). Which raises in my mind the question of the relative standards of God and science. If Ye cannot serve both God and Mammon, as Jesus said, can ye serve both genomics and Mammon? It's kind of a shame Richard Dawkins isn't here to answer that.

The point, though, is that it is these unusual conflicts of interests that inhere in human genomics that make it an unusual kind of science, and one whose attributes need to be understood in order for its claims to be rendered sensible. It is the only science I know of whose claims are regularly rejected by other mainstream scientists—so science and anti-science can actually coexist here. Whether it's the gay gene on Xq28, which some of you older folks may remember (Hamer et al., 1993), or the ENCODE consortium's (2012) claim that over 80% of the genome is actually functional, and the invisible hand of selection is far more pervasive than anyone thought, you can see the science and know it's wrong, and yet it still gets attention and has impact. And its claims tend to have great prominence and a short shelf life. Unlike, say, evolution, there is an intellectual space available in human genomics, to anticipate that any particular claim is likely to be baloney, and to reject a significant fraction of scientific claims outright without threatening the integrity of the scientific enterprise. I mean, who really thought that we were actually going to cure all genetic diseases, and reveal the ultimate secrets of human existence with the Human Genome Project? Such a person would probably be mighty disappointed in human genomics now.

Of course, on the other hand we have known for a long time that the biotechnology industry sees our bodies as little more than free raw materials for them, haven't we? We have just rarely acknowledged it publicly. I can remember being taught in undergraduate cell biology at Johns Hopkins in 1973, that HeLa cells were donated by a woman named Helen Lane. I now suspect that my professors may have been dissimulating to create some plausible deniability in case the family of Henrietta Lacks ever thought of taking anyone to court, to share in the financial profits ultimately derived from her cancer cells. And even if the Lacks story didn't violate any ethical codes, as an essay in *Science* magazine asserted last year (Truog et al., 2012), 99% of the people who read Rebecca Skloot's (2010) account of it, find it immoral and unjust.

If that is the model for 21st century genomics—corporatized, prevaricating, exploitative—it may not be an entirely admirable one. So here is my punch line. Students and citizens need to know about human genomics, but educating them about it may be too important a task to trust entirely to geneticists. It is a public education challenge for both science and science studies, or genetics and anthropology.

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Footnote

*Based on a talk given at the Closing Conference of the ESRC (Economic and Social Research Council) Genomics Network, London, 30 April 2013. □

~~**The General Anthropology Division at the Chicago AAA Meetings Presents the GAD Distinguished Lecture**~~

~~**Bruno Latour**~~

~~**Speaking on**~~

~~**What is the Recommended Dose of Ontological Pluralism for a Safe Anthropological Diplomacy?**~~

~~**Bruno Latour is Professor of Sciences at Po, Paris and director of the Sciences Po Medialab. He is the 2013 winner of the Holberg Prize.**~~

~~**Time: Friday, 12:15 to 1:30**~~
~~**Check the meeting program for place**~~

