6 Human variation: shifting perspectives

To the extent that social and cultural anthropologists have been interested in the issue of human variation, for them it has usually referred to differences in cultural practices and social institutions – to comparisons of, for instance, "culture areas" and the mosaic, ethnographic samples covered by the Human Relations Area Files. Such comparison has been vastly complicated in recent decades by doubts about the autonomy of the samples being compared and postmodern challenges to ethnographic description. Arguably, as we will see, language, speech, and accent, and other "embodied" skills and practices studied by social and cultural anthropologists, represent aspects of human variation, no less than DNA signatures and cephalic measurements. Human variation, however, has been conventionally understood as something different, and usually left for those concerned with the "biological" domain – in both anthropology and other fields, including biology and medicine. While biological and physical anthropologists have been keenly interested in human variation, however, often treating it as the *defining* element of their subdiscipline(s), for them the scope of "difference" has tended to be taken for granted, remaining strangely inert as if the framework of observation and the parameters of variance to be explored had been fixed for all times.

What counts as difference, in fact, may not be that clear. One reason is continued uncertainty about what counts as *human*, the demarcation and definition of "our" species. Adding to these uncertainties, as we will see, a series of developments (including studies of the human microbiome and its coevolution with humans) have challenged current understandings of the boundaries and signatures of the human. What counts as "us" and what is more-than-human? Furthermore, the prospects of the *post*-human raise fundamental questions about human futures and identities. More fundamentally, I suggest, theoretical developments in anthropology, sociology, philosophy, biology, and related fields – developments often associated with the notions of biosociality, nature-cultures, embodiment, epigenetics, and entanglement – contribute to the growing evidence and perception of an expanded and relational body. Drawing upon recent works on "biosocial becomings" (Ingold and Palsson 2013), "body worlds" (Harris and Robb 2013a, 2013b), and

"polygenomic organisms" (Dupré 2010, 2012), I suggest it is pertinent to rethink human variation. Not only have the notions of "biology" and "the body" been radically socialized (Meloni 2014), also the notions of "social theory" and "society" have been thoroughly embodied and materialized.

In their attempt to historicize the body and to move beyond the master narrative of the pre-cultural, biologically necessary body, Harris and Robb (2013a: 3) have developed the notion of "body worlds":

> A body world . . . encompasses the totality of bodily experiences, practices and representations in a specific place and time. These . . . are at the heart of how we understand the world . . . for all human beings body worlds are the worlds all of us inhabit all the time. Far from being boring, natural or universal, they are in fact fascinating, diverse and culturally specific.

A social turn in physical and biological anthropology seems imminent, a new body world – a paradigmatic change in "thought style," in Fleck's sense of gestalt shift in intellectual interests.

In this chapter I discuss the histories of physical and biological anthropology, their characteristic understanding of human variation, the challenges posed by recent studies of the porous and relational body, the nature of the biosocial turn which seems to be taking place in anthropology and related fields, and its implications for representations of human variability. Given such rethinking, I argue, the exploration of human variation becomes the joint project of "social" and "natural" fields of scholarship. In such a project, however, variation should not be seen as the mapping of essences and states of being but of relations and becoming.

6.1 Physical and biological anthropology

Early on, during the age of discovery and colonialism, racial thought relegated some of us to the sub-human, often on the basis of skin color. The eighteenth-century slave trade across the Middle Passage highlighted and inscribed a fundamental distinction between free people and slaves, black and white (Davis 2006). Voltaire described "prodigious differences" between Africans and non-Africans, declaring them different "species of man" (Jablonski 2012: 136). Sub-human ideas have persisted in some circles until recent times, including Nazi Germany and Maoist China (Proctor 1988, Feuchtwang 2006).

Leaving aside uncertainties about the human, the variation *within* humanity to document and to compare continues to be contested and revised, among anthropologists, geneticists, and the general public (see, for instance, Keita *et al.* 2004 and Richardson 2013 on "race" and "sex itself," respectively). In the seventh edition of their popular textbook on physical anthropology, Stein and Rowe (2000: 433) make a fundamental distinction between folk

and scientific classifications of humans, emphasizing the biases and the instability of the former:

> Scientific classifications of people, like folk taxonomies of people, are attempts to divide human beings into specific groups, but this is where the similarity ends. A scientific classification is a means of discovering the processes that create the phenomenon being classified, in this case human variation … Folk taxonomies are usually based on ethnocentric ideas about the inherent differences in physical appearance and behavior between groups. Although some of these beliefs may be partially based on observation, most are based on folklore stereotypes. In contrast, the criteria used in scientific classification must be derived from empirical studies.

One should not forget, however, that nineteenth-century science badly mismeasured humans, misinformed by, and misinforming, the public. Observations and empirical studies cannot be easily separated from the body worlds within which they are embedded. Interestingly, one of the key illustrations in Fleck's pioneering book on thought styles, originally published in 1935, demonstrated the usefulness of his perspective through discussion of changing understandings of human anatomy. "To obtain an even clearer picture of how scientific observation differs when two different thought styles are involved," he suggested, "it is perhaps appropriate to compare anatomical descriptions and illustrations in early and recent text books" (Fleck 1979: 133). "Human variation" remains a shifting and contested terrain in both scientific and folk accounts.

For a long time the study of human bones was an important component of physical anthropological and archaeological research on human variation and history. Passionate bone collection and measurements continued in some contexts throughout the twentieth century, both constituting and being constituted by the imagined communities of nations, cultures, and disciplines and their traditions of remembrance and authority (Connerton 1989). As Verdery (1999: 27) notes, because bones are material things and "indisputably there" they have political lives of their own: "A body's materiality can be critical to its symbolic efficacy." The measurement and classification of bones became an obsession. This is underlined by the extensive cross-cultural bone collections of the Peabody Museum at Harvard University stored in hundreds of cardboard boxes in a large hall of the museum, labeled with the names of nations, peoples, and places.

Bone collections, however, would have been unthinkable, at least meaningless, in the absence of a shift in European body worlds. As Harris and Robb show (2013b), while at the beginning of the Early Modern period bodies were considered to be extremely porous to influences of environment and external events, later on, with the rise of the Enlightenment view, they were rendered as machines, with firm, policed boundaries and a specific habitat. At the same time, the idea of race acquired its full biological definition.

Skulls – a particularly important part of the body machine, as the seat of rationality, mind, personhood, and identity – were endlessly recovered from graves, measured, classified, analyzed, stored, and displayed in museums and archives.

With its set of tools for measuring human bodies, from the "anthropometron" of the seventeenth century and the "craniometer" of the nineteenth century onwards, physical anthropology carried an aura of objectivity and precision, of proper science. It helped, too, that rules were drawn up for the standardizing of anthropological measurements, at the International Congress of Anthropology in Monaco in 1906 and at Geneva in 1912. Often devoid of theory and focusing on preconceived human types, passionate skeletal studies and catalogs continued in some contexts throughout the twentieth century. Sometimes the goal was partly to understand particular medical conditions evident in the skeletal structures of particular populations. From the beginning of national projects, with the emergence of nation states and empires, phenotypic markers played important roles in identifying and demarcating social groups, and in establishing criteria of citizenship (Lindee and Ventura Santos 2012). While national projects were focused on the broad and apparently neutral and culture-free documentation of "difference" and "variation," they usually separated "us" from "them," expressing ethnocentric concerns with race and purity.

In her early historical account of the instruments of physical anthropology, Hoyme (1953) had no doubts about the bright future ahead. Speculating about the next fifty years, at the time of the discovery of the double helix, she suggested:

> (it is) fairly certain ... that anthropometry, the hallmark of physical anthropology, will be retained among the techniques of the anthropologist, although techniques from other biological sciences will undoubtedly be adopted where needed ... There are many problems involving size and proportion not yet solved, and perhaps not yet suggested by genetics, physiology, ecology, and comparative anatomy, for which anthropometry can provide basic data. (Hoyme 1953: 425)

Yet, modern readers cannot help but wonder why people bothered with all the measurements and indices produced. Hoyme (1953: 423) admitted that it "is somewhat ... difficult to draw conclusions as to why these measurements and indices were considered worthy of investigation," adding that "it is necessary to examine the studies against the climate of opinion of the period in which they were carried out." One of their main justifications was their role in sustaining national projects, establishing variation, maintaining identities and boundaries. Bodies, like biology, remained static while history was dynamic.

There was an important counter voice, however. Franz Boas, who studied the cranial form (the cephalic index or the ratio of the length to the width of the head) of immigrants and their children living in New York, argued that adult

phenotypes were dependent upon environmental exposures during human development; head shapes converged to a common type due to similar environmental pressures, and, as a result, he concluded, "we are necessarily led to grant ... the great plasticity of the mental make-up of human types" (Boas 1911: 64–65). Presented as a critique of biological determinism and the thought style of racial classification, Boas's work was controversial and largely ignored. As Stephen Jay Gould (1996: 58) observed in *The Mismeasure of Man*, "[s]cientists are used to analyzing the data of their peers, but few are sufficiently interested in history to apply the method to their predecessors." Recent reanalysis of Boas's results, applying analytical techniques not available to him, provides strong support for his claim about the plasticity of human biology (Gravlee, Bernard, and Leonard 2003). Perhaps this signaled an early, and somewhat premature, social turn in physical anthropology.

Modern genetics was born at the beginning of the twentieth century with the rediscovery of Mendel's laws of inheritance. By the middle of the century, a series of critical developments revealed the molecular mechanisms involved. Twentieth-century advances in cell research also made it possible to extract, store, and manipulate cellular material outside the host organism. With the "modern evolutionary synthesis" of the 1940s and the "new genetics" of the 1960s onwards, biological anthropology took off. Theoretical and technical innovations allowed geneticists and scholars in related fields to explore the contours and structures of genetic material, to "voyage" into the "universe within," in the language of the Human Genome Project in 2000.

It was not until the 1990s, however, that DNA began to replace skeletal material and other sources (texts, languages, and archaeological remains) as *the* avenue into human history and variation. The study of phenotypic variation (skin color, skull shapes, hair texture, fingerprints, and so on) that for decades was seen as the hallmark of physical anthropology no longer had center stage. A few geneticists and biological anthropologists began to see bones as almost trivial antiques in the history of studies of human variation (see Sommer 2008), somewhat like ancient manuscripts, secondary to DNA sequences and gene frequencies. Keeping in mind, however, that formerly discarded sources of data sometimes acquire new meaning as a result of conceptual and methodological advances (ancient DNA being one pertinent example), skeletal morphology should not be discounted.

The new genetics necessarily redefined the conceptual landscape and biometrics of human difference. Genotypic differences seem not to correspond or submit to earlier framings of phenotypic differences and classifications. Many biological anthropologists, in fact, have sought to change popular understandings of race, emphasizing that race has no biological basis. This does not, however, rule out the possibility of somehow reintroducing earlier

categorizations of races under the modern labels of genotypes, populations, and ethnic groups (Haraway 1996, Bliss 2012).

As genomics acquired a central place in national projects, as a powerful avenue into variation and history, the issue of the genetics of race and health became an important concern. National collections and genetic databases drew upon a series of developments in the history of states and bureaucracies, including practices of writing, accounting, and monitoring. Developed in one nation state after another, statistics represented biopolitical concerns with monitoring and governing the health of the national body. Health statistics, in a sense, establish the birthmarks of the national body. One of the recent territories of biomedicine is the move beyond "national" genomes to comparative datasets such as that of the International Haplotype Map Project and the Human Genome Diversity Project, building on the power of genome-wide scans and related technological and methodological advances. Drawing upon its comparative tool kits, anthropology has often been involved in such projects, sometimes as a key player (M'charek 2005, Reardon 2005).

Just as the anthropometry of past centuries was moved from the center of national projects and studies of human variation, the focus on "human" genomics of recent decades is bound to change. While genomic avenues into history, difference, and relatedness have proved quite powerful, it seems likely that they, too, will be redirected. Already, a series of developments can be observed on the horizon, among them the escalation of computing power with advances in bioinformatics and computer technology facilitating complete genome sequencing at a low price, the growth of personal genomics and digital networking, and new forms of biopolitics and governance (Prainsack, Schicktanz, and Werner-Felmayer 2014).

One advancing empirical issue for students of human genome variability is that of the stability and temporality of the genome. While there is a tendency to assume that the genetic signatures of a person are present in every cell in the body and, moreover, the same throughout the life course, this does not seem to be the case (Barnes and Dupré 2008: 76). The same body may exhibit different signatures and, moreover, the signatures may change during the lifetime. One reason is that of gestational chimerism, the intermingling during pregnancy of cells from two or more genetically distinct bodies. In the orthodox view of human reproduction, the human foetus and the mother are two distinct individuals with distinct evolutionary objectives, maintaining the status of "all self" during the process of gestation. It seems that a woman who has been pregnant is likely to be a chimera, acquiring "foreign" cells and genomes from every pregnancy. Her body, in other words, is potentially inscribed with each pregnancy, whether or not it resulted in birth, and hence the presence of some genetic material from the father in her body. This highlights troubled body boundaries or interfaces between sexual partners, siblings, and across

generations (Dupré 2010, Martin 2010, Kelly 2012). Human variation, then, in genomic terms, is not as fixed and stable an epistemic field as often assumed. The "book of life," given the rhetoric developed in the course of the mapping of the human genome, seems unstable, inconsistent, and poorly edited. Clearly, the genome has a "social" aspect, embodying context and historical practices, much like phenotypic markers such as cephalic indexes and skin color.

6.2 The relational superhuman

Boas's conclusions about environmental influences on cephalic proportions were debated and eventually more or less forgotten. Recently, however, in the wake of developments in epigenetics, they have been brought back to the agenda and reconsidered (Lock 2015). Environmental exposures, it is argued, become *literally* embodied, with consequences for health and illness, possibly inherited over generations (Landecker and Panofsky 2013). The lives of our parents and ancestors, in other words, and the traditions and conditions of their communities in all their complexity, from dietary factors and exposure to toxic substances to behavioral habits, are embodied and memorized in our genomes, turning on some genes and silencing others, leaving a lasting "hereditary" impact in a somewhat neo-Lamarckian fashion. Given the growing evidence of epigenetics, the body is inevitably entangled, firmly connected to the environment.

Another form of entanglement is that of microbiomes. The human genome, it turns out, is fundamentally conflated with the genomes of other organisms, mainly in the guts. It seems likely that studies of the human microbiome will profoundly affect anthropology (Benezra, DeStephano, and Gordon 2012). Microbes are partly vertically transmitted, between people more or less belonging to the same community, and, as a result, knowledge of their variation and history enhances understanding of population ancestry in the conventional sense, tracking the migrations of individuals and populations. The entangled view, on the other hand, seems to necessitate reconsideration of current thinking with populations. The evidence already accumulated necessarily destabilizes the issue of human variation and national genomes.

The fact that what is normally considered the "human" genome is fundamentally mixed with the genomes of other organisms complicates the picture of human variation. Anthropologists, it seems, need to qualify their language about the microbiome as "more-than-human," as an addition to a host, independent of human variation. Not only is the microbiome mostly inside our bodies, in a fundamental sense it is "us." Keeping in mind that the microbiome plays an important role for our immune system and that it is often used to separate self and non-self, it is "difficult to characterize our symbiotic partners as entirely distinct from ourselves" (Dupré 2010: 28). The geopolitical

metaphors of "invasion," "foreign" entities, and bodies "at war," one may add, common in immunology, seem to be on the defense (Martin 2010).

If the microbiome is "us," the human genome that has been heralded as the key to practically everything human is only a fraction of the whole picture. It seems likely that casting the genomic net more widely to incorporate the vast terrain of microbiomes, vastly expanding the range to explore, is bound to radically change current notions of both *Homo sapiens* and human variation. The first results of this trend, based on a very small sample, indicated that while the composition of the microbiota within the guts of different individuals is distinct they cluster as three "enterotypes." These enterotypes, it seemed, did not correlate with classical categorizations based on "race," color, morphology, and continental background (Arumugam *et al.* 2011). Some, however, warn that because of the relentless change of the microbiota due to modification of lifestyle and diet categorization may not be that useful. Also, it would make more sense to speak of a "continuum or gradient of species functionality rather than discontinuous variation with segregated types" (Jeffrey, Claesson, and O'Toole 2012: 592). This is an argument that echoes debates on the clustering and geography of "human" genomes in the narrower sense (Serre and Pääbo 2004). Microbiomes, no doubt, will be an important issue in the coming years. Anthropologists should attend to the unfolding discussion and contribute, with their perspectives on human variation and becoming.

Drawing upon research on the microbiome, some scholars suggest that the common notions of "gut feelings" and "gut reactions" should not be simply seen as metaphors but rather as indications of a post-humanist "gut sociality":

> While I may pay little attention to the intestinal flora that colonize my gut, I am co-implicated with these more-than-human embodied others in various intra- and extracorporeal circuits of sociality … Gut sociality thus problematizes the idea that sociality would be solely an *interhuman* mode of relation, and instead suggests a notion of sociality that is posthumanist in orientation; this understanding opens up the term "sociality" beyond its common privileging of the human subject. (Neimanis 2013: 218; emphasis in the original)

To some extent, the idea of the relational supraorganism envisioned by studies of chimera, microbiomes, and epigenetic processes is echoed by Amazonian and Melanesian ideas about chronically unstable bodies. Vilaça (2005: 459) suggests that many Amazonian ethnographies "challenge the understanding of the body founded on a biological substrate," since "substances transmitted through conception are less important than or at most equally important to those acquired and exchanged through social practice." Similarly, Strathern (2004: 11) argues, in the context of Melanesian ethnography, that the whole "dividual" person, "as part of a nexus of relationships," is only "completed by relationships with others." This also resonates with pre-Enlightenment European views of porous bodies, open to influence through social practice.

What would Charles Darwin, one may wonder, have made of recent studies of human microbiomes? Would they testify to porous dividual kinds of beings with continually becoming varieties? The questions may be more relevant than one might think. During his *Beagle* voyage in 1835, Darwin was often preoccupied with human variation in the tropics: "Whence have these people come from?," he wondered. While he was puzzled by the bodily mixtures he saw, his language was remarkably devoid of derogatory racial judgment. His encounter with the inhabitants of the Chiloè Islands off the coast of Chile prompted interesting questions about race and species, humans and parasites. The large, black lice that he collected were different from the English lice he knew and, he was told, they died promptly when crawling on British sailors. Different species of lice seemed to adapt to different races of humans. "Man springing from one stock according his *varieties* having different parasites," he observed, probably reasoning that lice, just as humans, diverged from a common ancestor (see Desmond and Moore 2009: 98). Then he bluntly stated: "It leads one into many reflections." Later he speculated if this could mean that humans were different species. Unlike many of his British contemporaries, however, he concluded this was not the case, producing evidence that different species of parasite can infect the same race and that minor changes in the host body can repel its parasites (Desmond and Moore 2009: 389, n. 57).

6.3 Human variation after the biosocial turn

Inevitably, the discipline of anthropology is part of the ongoing negotiation of the social and the biological, the biosocial turn, given its conventional fragmenting of *Anthropos* under the labels of bodies and societies. This is shown, as I have argued, by the central notion of human variation and differences. Indeed, it may represent one of the cutting edges of the current biosocial turn. Students of human variation – of skeletal material, genomes, as well as microbiomes – need to attend to biosocial relations and body worlds.

While the measurements of the bone people during the last century were exceedingly detailed, the classificatory scheme within which they were placed was usually highly simplistic and archaic, with an implicit racial tone. Inevitably, the arrival of human genetics and biological anthropology after World War II provided a new avenue into the understanding of human variability, moving the kinds of measurements and classifications of skeletal material typically practiced by physical anthropologists during the first half of the twentieth century to the side-lines. Now, as the evidence on the epigenome, chimera, and polygenomic humans unfolds, the issue needs to be problematized and reframed once again. While studies of both skeletal material and genomics will continue to revise the story of human differences and history,

national projects and the sciences of human variation – in particular, genomics and anthropology – are bound to undergo conceptual change.

Observations on human variation, of course, are based on measurements at a particular time and place, capturing snapshots of human life at high speed. Whatever the definition of human "biology" adhered to, the *assembly* of such snapshots should be informed by a meaningful theory of variation. Although observers of variation sometimes have an intuition about what matters and some of their snapshots later generate unexpected insights, the old positivist "problem orientation" of many physical anthropologists – namely, "amass enough data and problems will sort themselves out" (Scott *et al.* 2000: 347) – will not do. The anthropology of variation would benefit from attending to the nature of body worlds and the biosocial realities of variation, moving beyond material fetishes and geneticized bodies.

Also, when *reading* available snapshots it is important to keep in mind the relational and the temporal. As Gare (1995: 107) argues in the context of nature/culture debates, it is important "to develop a science which takes becoming as basic ... and conceives 'beings' as islands of stability within the flux of becoming." Social and cultural anthropologists have often referred to their observations from the field as the "ethnographic present," acknowledging the limits of their field of vision and emphasizing the need to accommodate the flux and connections of becoming. Similarly, it makes sense, for the purpose of capturing the moment of becoming in the flux of human life, to speak of human variation as a moving "biosocial present," as shifting "local biologies" in Lock and Kaufert's sense (2001), continually situated in a dynamic context. This is not just an academic, anthropological exercise; it has profound implications for the understanding of health and well-being, justice and inequality – for meaningful future biopolitics.