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**Apes, Essences, and Races:
What Natural Scientists Believed about Human Variation,
1700-1900**

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Abstract:

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Scientific views on human variation and the relationship between humans and apes changed dramatically between 1700-1900. This paper traces the history of those changes from an initial consensus on the homogeneity of man and on casual models tied to environmental contrasts to the turn of the 20th century when "race was everything". Over the course of these two centuries new sciences were born and matured and vast quantities of data were collected, generated and digested. Yet, paradoxically, while the overwhelming majority of data indicated that discrete interpopulational contrasts among humans were elusive, the broader social constructs, likely among them economics, would rely on a scientific foundation that viewed the differences as innate and fixed. By the turn of the twentieth century Europeans and European-Americans would explain their economic and military superiority in biological terms, even if contradicted by the data. Through an analysis of changing perspectives on the key underlying constructs of essentialism, fixity and ranking, we try to understand these shifting views on the nature of human variation.

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**Apes, Essences, and Races:
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Economists (and their enemies) were not alone in the eighteenth and nineteenth centuries in trying to understand why Europeans and some of their descendants dominated the rest of the world militarily and economically. Practitioners of the sciences that would later be called

anthropology and biology tackled this question, too, as well as the deeper and more fundamental questions of what human beings are, how they fit into the scheme of the natural world, and how they differ from one another.

In this paper we will try to give a brief overview of what those answers were and how they changed. We will not try to demonstrate direct links between natural scientists and economists; such close textual analysis is beyond our capabilities and the scope of this paper. We think it highly likely, though, that economists were influenced by the natural science of the day, just as today's environmental economists pay close attention to what meteorologists say about global warming. We are examining the ocean in which classical and early neoclassical economists swam, not the molecules that passed through their gills.

Our basic story is this: An initial consensus on the homogeneity of man and on causal models tied to environmental contrasts would be recast to an increasing focus on the heterogeneity of humankind and the innate and fixed nature of his condition. While the cultural superiority of the European was rarely in doubt, by the close of the 19th century his rank would be validated not only by behavior but by biology as well. This fundamental shift was concomitant with a flurry of scientific research into the nature of human variation, the culmination of which would be the formal birth of the discipline of physical anthropology in the early 20th century. One paradox is that while the overwhelming majority of data indicated that discrete interpopulational contrasts among humans were elusive, broader social constructs would rely on a scientific foundation that saw, to use anatomist Robert Knox's aphorism, "With me, race or hereditary descent is everything: it stamps the man." (1862, p. 6).

Throughout the paper we will maintain the assumption that the consensus among leading natural scientists today about human variation and race is correct. That is presumptuous, but it is the best we can do. It follows that almost everything that almost all the natural scientists we

consider wrote about race was wrong--and many of them were wrong in a way that we take today to be hideously immoral. No surprise--we wouldn't use Galen's writings to treat a sick child or Newton's to hook up a stereo. Following the example of the classical economists, we will think these natural scientists as neither mean nor stupid.

The puzzle in the record of natural science in this time period is that the bad ideas not only persisted, they got worse in many senses. Ordinarily, most economists think that bad ideas--incorrect beliefs about people or technology--should die out, either quickly or gradually. Over time, evidence accumulates, and forces the rejection of more propositions (for instance, believing that centrally planned economies are likely to grow fast in the long run was a lot easier in 1910 than it is in 2002). Moreover, people whose beliefs are correct will in most cases do better than people whose beliefs are wrong, and either put them out of business or induce them to imitate. Our implicit belief that these two processes are at work means that almost all of us think that scholars know more than they did 40 years ago, that what we ourselves personally believe today is better than what we believed ten years ago, and that technological progress will continue over the next half century.

In our case, though, as evidence accumulated, conclusions got worse. Later scientists had better data, better resources, better methods--but they missed the big point by a much wider margin. One task of this paper will be trying to understand why. We will concentrate on the question of why better evidence failed to give scientists a better understanding of race. Why the economic process--prosperity and survival for the fittest ideas--also failed, is a question for other papers.

We begin our history of thought with a necessary preliminary: the background, both intellectual and factual, that set the stage for the often dramatic changes in logic and reasoning and practice, that took place as natural science grappled with the question of human variation in

the 18th and 19th centuries. The importance of these underlying constructs can not be understated as they will be revived repeatedly; many rising from the ashes to serve as pillars for racial ideology.

I. Background

By 1700, the Renaissance and several centuries of overseas voyages had brought Europeans, northern Europeans especially, into contact with plants, animals and civilizations they had never before dreamed of. The Americas, the Pacific Ocean, most of Asia, sub-Saharan Africa, Russia, and even northern Scandinavia presented Europeans with new plants and animals and introduced them to people who looked, talked, and acted differently from all the people they had known. The primary sources of knowledge, the "empirical" data, were the accounts of travellers, missionaries, merchants, and other explorers who recorded what they had seen. Blumenbach cited 80 such sources in his work including the writings of Marco Polo. Bernier (1684) stands as a rarity, a classifier who had actually travelled and seen those whom he was classifying. Understanding how all these new discoveries fit together and how they could be made consistent with what Europeans knew already was the fundamental challenge that Enlightenment science faced.

For the history of race, one of the most important discoveries at this time were the true apes. For Europeans, Andrew Battel's 1625 report of a creature that is likely a chimpanzee is the first definitive account of a true ape (although short anecdotes appear in Marco Polo and similar travelogues). It is not until 1699 and the publication of Edward Tyson's dissection of an infant chimp that we see the formal entry of apes into the consciousness of Western science.

And so, when the early taxonomists write about the apes, they reference newly encountered and barely studied creatures. It will not be until well into the 1800s and the

increased importation of zoological specimens and the Congress of Vienna agreements allowing cross-national access to materials, that broad based and comprehensive anatomical analyses could be conducted. It wasn't until 1795 that Geoffrey St. Hilaire and Cuvier clearly differentiated the chimpanzee from the orang utan. In fact, the first gorillas specimens for study were not obtained until 1847 and the first live gorillas did not arrive in Europe and the US until 1855 and 1898, respectively. The mountain gorilla was not even known until 1902.

European literature is, of course, replete with references to "apes" before Battel and Tyson. But these references aren't about true apes at all; they are actually about monkeys, most probably tailless barbary macaques. True apes approximate human form and behavior much more closely than barbary macaques do; This is evident even in the names used by local inhabitants, for example, "orang utan" means "man of the forest" in Malay. Europeans first met apes at the same time they met sub-Saharan Africans--an association that would have a long history.

In trying to understand the apes and the many other new discoveries, Europeans turned first to their intellectual inheritance in both the classics and in Christianity. As Hannaford (1996) cogently demonstrates, the writings of Plato, Aristotle, Herodotus, Tacitus, Strabo, and others would be "plundered", and often distorted and misconstrued in an attempt at validation. Herodotus, for example, often regarded as the first anthropologist, would be used to categorize the races of Europe, and Plato's myth of the metals would be used by Davenport in the 20th century for eugenicist ideas on race mixing.

The majority of modern classicists support the view that the Greco-Roman world was devoid of a concept of race in the modern sense, that it classified by political status and not by variability of physical form. Nevertheless, classical antiquity would provide seminal philosophical concepts for burgeoning taxonomy, central among them: Essentialistic thought,

the Great Chain of Being, and an environmental theory of human variation.

Plato's gift, essentialistic or typological thinking would have the greatest longevity; it was intrinsic to racial classifications until after World War II. Some would even argue that it is still with us. To quote paleoanthropologist Milford Wolpoff, "Typological thinking is part of our cultural heritage, a part of our mind-set; it is the way most of us organize the world. And even if we 'know' not to apply it to biology, it seeps in anyway." (1997, p.317) Rooted in the concept of the eidos, the world is seen as composed of distinct elements that are reflections of pure, fixed ideals or essences. Variations among those elements are merely deviations, imperfections around the ideal type.

The second concept, the Great Chain of Being, would at times be met with direct challenge but it too would play a critical role at several historical junctures. The idea was derived by medieval scholars from Aristotle for whom the universe was filled with distinct biotic elements ordered according to imperceptible continuous gradations. A biological link between forms was not implied; rather all life was held fixed positions or ranks along a linear chain of being.

The final element, dating back to Hippocrates, attempts to provide an environmental explanation for human variation. Differences, both physical and behavioral, were seen resulting from diverse environmental phenomena, not innate contrasts. While there were different variants of this perspective, among them Aristotle's polar principles and Diodorus' global zones, the Greco-Roman Environmental Theory was the basis for the classical view of other peoples (Hannaford, 1996). This is not to say that these views represent a monolithic construct in Greco-Roman thought; there was indeed some ambiguity. The vital point, however, is that the taxonomies of the 1700s and 1800s, including the classification of humans, would be built firmly on a foundation of essentialistic thinking, and for some upon a static chain, and/or an

environmental theory of causation.

Classical attitudes toward the apes they knew (i.e., barbary macaques) also influenced how Europeans thought about true apes. The general attitude was summed up by poet Quintus Ennius: "*Simia quam similis turpissima bestia nobis*" (the ape, how similar that most ugly beast is to us). In a classical world with blurry lines between men and gods and apes, Aristotle and Galen were not troubled by their findings of great morphological similarity; though apes were ugly.

Blurry lines between man and god and ape were not a feature of Christianity, the other great intellectual tradition the Enlightenment inherited. The overriding principles were a single origin of all life and the unity of mankind. The basis for this unity was man's rationality and morality. Augustine's formulation was clear:

"Whoever is anywhere born a man, that is, a rational mortal animal, no matter what unusual appearance...or how peculiar in some part they are human, descended from Adam."

Thus the Church discouraged the idea that humans were more than one species. Bruno (1591) and Vanini (1619) both put forward this idea, but it was not well received. Bruno was burned at the stake while Vanini's tongue was cut out. Then he was strangled at the stake and his body burned to ashes.

Christianity also forced a change in how apes were viewed. With the rise of Christianity, the ape would turn into a "*figura diabolica*", then to a sinner, and ultimately into a fool. Thomas Aquinas' anatomical analysis found, contrary to Galen, that there were no anatomical similarities between "apes" and humans.

II. The Enlightenment

A. How Nature and Humanity Fit Together

The big problems that Enlightenment anthropology and biology confronted were first, how to reconcile the apparent fact that creatures very similar to the dogs, cats, sheep and humans that we now see had always existed with the readily observed diversity of those creatures today. The Egyptians had cats just like we do, but no two cats are exactly the same. Enlightenment anthropologists also had to explain how humans could be both animals in physical appearance and bodily functioning, but also (obviously) superior to them.

The interfertility criterion for species membership, sometimes attributed to Ray (1691), started the Enlightenment on the way to sorting out these puzzling new phenomena. The basic idea, two individuals are members of the same species if they can breed together and produce fertile offspring. The utility of this criterion becomes apparent in the grand natural systems of Linnaeus (1740) and Buffon (1749-1802).

Voegelin (1998, p. 29) explains how Linnaeus used the interfertility criterion to solve the first of the Enlightenment's two great puzzles. Since all living creatures emerge from an egg and each egg produces a creature that resembles its parents, no new species are produced in the current epoch. Thus each species must have an original ancestor (either a hermaphrodite or a pair differing in gender). Each species is a unity that can be traced back to God.

The essence or germ (to use Kant's term) of each species was thus present at its creation, and passes down from generation to generation. But the germ is an algorithm, not a blueprint; it carries a rule for reacting to the circumstances a member of the species may confront. The phenotypes of various members of the species are just realizations of the underlying invisible essence. Nothing new is added as the history of a species unfolds; contingencies are just played out according to rules that were embedded in the germ in the beginning.

While nothing could be added to the instructions with which each species was endowed, it was possible (various thinkers differed on this point) for parts of those instructions to be lost through atrophy. "The potential of developing in one or another direction was already present, but it was realized only when particular external conditions occurred, which then favored the unfolding of one potential while allowing others to wither." (Voegelin, 1998 p. 36) The phenotypes of the original members of the species, while not necessarily perfect representatives of the essence, were thus better representations than subsequent generations because they were closer to the God's hand, and because no potential had been allowed to wither. The dogs in the Garden of Eden had within them both the instructions for creating collies and the instructions for creating cocker spaniels; but today's collies have lost the instructions for creating cocker spaniels.

This combination of eternal essences and contingent realizations neatly solves the Enlightenment's biological problem. It reconciles the fixity of species and the diversity of individuals.

The second problem, reconciling humans to the natural world, did not call forth such a neat solution. The interfertility criterion would not permit scientists to look at humans as anything other than a single species, since most claimed to be aware of inter-breeding between different types of people ("mulatto" is first cited by the Oxford English Dictionary in 1595; "quadroon" in 1707). Beyond the fact of interfertility, scientists need a way of telling one species from another, a *differentia specifica* (per Aristotle) or a *differentia essentialis* (per Ray). I know that two creatures cannot produce fertile offspring, but how do I know which is a mosquito and which a pig? The Enlightenment's second problem then boiled down to finding a *differentia essentialis* for humans. A *differentia essentialis* that was purely somatic would place humans on a par with animals; one that was purely spiritual would place animals on a par with humans.

Enlightenment writers tried several different approaches to this problem. Linnaeus in the first edition of *Systema Naturae* in 1735 places man within the category Anthropomorpha, the first division of the Quadrupedia, under the category for clawed animals (the grouping for animals with four incisors, four fingers and hairy bodies). His classification was based on morphological similarity; for him, the unique distinguishing characteristic of man was the possession of a rational soul (*nosce te ipsum*), and as such irrelevant to this taxonomy.

"I cannot discover the difference between man and the orangoutang, although all of my attention was brought to bear on this point, except for laying hold of some uncertain characteristics." (Cited in Stepan, 1982, p. 7)

Linnaeus' 1758 edition offered refinements. He replaced the term Anthropomorpha with Primates, the first order, a category that included four genera: *Homo*, *Simia* (for monkeys and

apes), *Lemur* and *Vespertillo* (bats). Even with this change, there was insistence that the distinction between man and other animals be drawn more sharply. Thomas Penant would write (1771), "I reject {Linnaeus's} first division, which he calls Primates, or foremost in creation, because my vanity will not suffer me to rank mankind with apes monkeys and bats." (Cited in Thomas, 1982, p. 110)

Buffon (1749), took an approach that was in many ways the opposite of Linnaeus: "[That there is an infinite distance between the faculties of man and those of the most perfect animal evidently proves that man is of a different nature...one passes all at once from the thinking being to the material being, from the intellectual power to mechanical force, from order and design to blind movement, from reflection to appetite." (Cited in Voegelin, 1998, p. 48)

Only at the end of the Enlightenment, in Blumenbach and in Kant is there a recognizably modern resolution to this problem. They define humans as part of nature in purely somatic terms. Blumenbach (1779/1780) would focus on morphology and its concomitant functional ties (including language and reason) to distinguish man. For him, man is distinguished from the ape by, "[T]he power of walking erect ...; the facility with which he uses two perfect hands; and the prominence of his chin, with the perpendicular direction of the lower incisor teeth." (p. 67) (Notice we are comparing "man" and "the Ape", two essences, not "humans" and "apes", two populations.) Based on these characteristics, Blumenbach called for the ordinal separation of humans with the former in *Bimanus* and the rest of the primates in *Quadrumana*.

B. Varieties of Humans

Enlightenment scientists looked at the different varieties of humans in this context. The human essence was created once, and had been passed down to us since then. There were several important implications: Variety came from environment, the number of races was small, many different traits mattered, races were not ordered in a hierarchy, and Africans were currently problematic. We will discuss each of these implications in turn.

1. Variety Comes from Environment

Although all humans shared the same essence, they differed because they lived in different environments. Some people found themselves in the tropics and the algorithm produced dark skin, wide lips, and woolly hair. Others found themselves in the arctic and the algorithm produced epicanthic folds and tawny skin, and so on. In general, people who lived in different places should look and act differently, in response to their environment.

Buffon sets forth this theory of causation most emphatically. He offers three causative factors, chief among them climate, followed by diet and to a minor extent customs. With such an environmental theory and dynamic view of nature, human differences are seen as superficial. Moreover, they are seen as flexible; change was possible (within 8-12 generations), and "race persists as long as the milieu remains."

Blumenbach echoes the same environmental explanation: "Color... is at all events, an adventitious and easily changeable thing and can never constitute a diversity of species." (Cited Gould, 1994 p. 68.) He also attributed most of the diversity in head form to mode of life and to art.

2. The Number of Races is Small

Enlightenment typologies generally required that the number of principal varieties or

racess be a half dozen or less.¹ Partly this desire for a small number of races grew out of taxonomic neatness, but it was validated by an implicit theory of natural history. In modern terms, this theory of natural history is called the ancient candelabra (and it has very little modern support). The idea is that certain large groups of people have been separated from each other, isolated and restricted to breeding with cousins, for very long periods of time. Thus Kant, in defining the term "race", emphasizes that it is part of natural history, not nature, a source of information about causes, not a static descriptor.

The ancient candelabra theory is perhaps best illustrated in the predominant Christian view of the origins of Africans, which probably influenced the scientists of the time. Sub-Saharan Africans were descendants of Ham, one of Noah's children. In particular, all of their ancestors after Ham were also Ham's descendants; no inter-breeding with non-descendants occurred in the intervening millennia.

Enlightenment scientists knew that environment worked slowly--Europeans who went to the tropics did not develop wide noses--and so long periods of reproductive isolation were needed to produce the diversity they were finding among humans. But reproductive isolation was plausible only for big bunches of people--blocks on the order of continents, not countries--and so the number of races had to be small.

Thus, for instance, Bernier and Camper both had four (the latter's followed the division of the continents), and Leibnitz distinguished five. Blumenbach has four races in his first edition and five in his second. And Kant, coming from philosophy, has four races based on climate, the two by two interaction of temperature and humidity.

3. Many Traits Matter

Man's special place in nature implied that salient differences should not merely be confined to the somatic realm. Unlike those of animals, the human essence was spiritual and

intellectual as well as physical, and so the distinctions among human varieties should be made on these grounds as well. Throughout the Enlightenment typologies, then, we find groups distinguished by philosophy, culture, habits of mind and general beauty.

Giordano Bruno and Jean Bodin both attempted an elementary geographic arrangement of populations using skin color. The latter's account was purely descriptive, and included such neutral terms as "dusky colour, like roasted quince, black, chestnut, fairish and white" (cited in Slotkin, 1965, p. 43). These were followed by philosopher Gottfried Leibniz (1690/1718) who focused on skin color and hair color and form and John Ray (1691) who relied on stature, shape, skin color as well as food habits. Brief descriptions of other "peculiarities" were also offered often--comments that today would sound like, "New Yorkers talk fast and they wear black."

Linnaeus, whose approach to taxonomy would be adopted by future generations, does not offer any subdivisions among men in his first edition of *Systema Naturae* in 1735. In the 1740 version he adds four geographical subdivisions (Europaeus, Americanus, Asiaticus, and Africanus). These divisions would remain through the 12th and final edition in 1768. Critically, they are presented as categories below level of species, and they are not ranked any more than divisions of a genus. It is only with the 10th edition, the edition in which he created the Primates as the first order, that he abandons his heretofore exclusive reliance on anatomical features. The tenth edition is important, not only because it marks for many the beginning of taxonomy proper (due to the consistency in methodology) but also because it marks a dramatic change in the treatment of differences among humans. Here, his approach to humans will differ from his classification of other animals because sociocultural aspects of temperament, character, clothing and customs become part of the classification. While he is not the first taxonomist to include such data, he was the first to make it scientific. He draws on ancient and medieval theories of the link between the four humors and temperament. For example: Americanus is choleric and

ruled by custom, Europaeus is sanguine and ruled by laws, Asiaticus is melancholy and ruled by opinion, Afer is phlegmatic and ruled by caprice (Slotkin, 1944 pp. 461-462).

One of the most long-lasting contributions of Linnaeus was to legitimize for future generations the idea that they could be subdivided into groups. As Marks states, "This assumption is ultimately what students of human diversity owe to Linnaeus." (1995, p. 52)

4. There is No Hierarchy

The scientists who enumerated these types of mankind did so without ranking them. They considered the majority of contrasts superficial in nature and the divisions themselves, arbitrary. Europeans were seen by Buffon and Blumenbach as the most likely original form from which changes occurred but this did not imply deterioration, but only environmentally produced modification. Linnaeus does not even rank his non-human categories. While his attitudes to the superiority of humans appear evident, his seminal approach was to replace a unidimensional great chain with a two dimensional pattern, horizontal and vertical with categories of equal rank. There was hierarchy but all classes were equally classes and not ranked.

Blumenbach added another reason for rejecting hierarchy:

"Innumerable varieties of mankind run into one another by insensible degrees....[N]o variety exists, whether of colour, countenance, or stature...as not to be connected with others of the same kind by such an imperceptible transition, that it is very clear they are all related, or only differ from each other in degree." (1776/1795, p. 35.)

He emphasized that discrete divisions among humans were elusive and that the process was often arbitrary. This lack of discreteness as human form graded from one people to the next would be central to Blumenbach's view of the unity of mankind. As noted earlier, his argument for an ordinal separation of man was part of an overall goal to emphasize the unity of the species. For Blumenbach, all human races were alike, they were united in mind, "The human mind is one. The soul is one." (Cited in Stepan, 1982, p.10)

Contra to Linnaeus, by his third edition Blumenbach relied solely on physical criteria and explicitly omitted reference to cultural traits and broad inferences about personality. For Blumenbach, "There is no single character so peculiar and so universal among the Ethiopians [i.e., Africans], but that it may be observed on the one hand everywhere in other varieties of men." (Cited in Gould, 1994, p. 68).

In his first publication, Blumenbach adopted Linnaeus' four varieties, in his third, he would add a fifth, Malay. With this step, as Gould (1994) argues, he forever changed the geometry of race from cartographic to one that could be misinterpreted as indicating a linear hierarchy of worth, and would be. As for the Great Chain of Being, Blumenbach's rejection of the concept would serve as the standard for British students of racial science in the early part of the 19th century (Stepan, 1982).

5. Africans are Currently Problematic

Though many different divisions of mankind into races were developed, they had one element in common: almost all Europeans were always in one race, and almost all sub-Saharan Africans were always in another. All the differences are among other groups (and extreme polar Africans and Europeans, the Hottentots and the Laplanders).

Enlightenment writers also generally say better things about Europeans than they about other races, and worse things about Africans. This view that Europeans are better than Africans differs from the similar view that later scientists held in two important dimensions. First, the Enlightenment scientists (except for Sömmering) did not claim to have objective data to support their beliefs; they just took it as a common understanding, a shared social belief. You don't need to write a footnote when you claim, for instance, that India is poorer than the United States or that malaria is bad for people.

Second, little, if any, hierarchy is implied by these distinctions. Europeans are handsome

because they live in a better climate, Africans are ugly because they live in a horrible climate.

Thus Buffon (1749, p. 15) writes:

"The most temperate climate lies between the 40th and 50th degrees of latitude, and it produces the most handsome and beautiful men. It is from this climate that the ideas of the genuine color of mankind, and the various degrees of beauty, ought to be derived. The two extremes are equally remote from truth and from beauty."

Consistent with this notion that lousy climate produces lousy people is the low opinion that many writers (Bernier and Buffon especially) held of Laplanders, whom even Blumenbach excluded from the European race). According to Bernier: "They are little, stunted creatures with thick legs, large shoulders, short neck, and a face elongated immensely; very ugly and partaking much of the bear...[T]hey are wretched animals." (1684, p.3)²

Not all Enlightenment thinkers were in step with scientists on this weak view of European superiority. There was considerable evidence in favor of a stronger position. European military superiority, for one thing, was becoming overwhelming; you couldn't make money placing bets on non-European countries. Incomes were beginning to diverge notably. And it is not inconsistent, if you base your belief in the unity of mankind on the Bible and Christian tradition, to value possession of that tradition.

Thus Kant (1775, p. 55) writes:

The Negroes of Africa have by nature no feeling that rises above the trifling. Mr. Hume challenges anyone to cite a single example in which a Negro has shown talents, and asserts that among the hundreds of thousands of blacks who are transported elsewhere from their countries, although many of them have even been set free, still not a single one was ever found who presented anything great in art or science or any other praiseworthy quality; even though among the whites some continually rise aloft from the lowest rabble, and through superior gifts earn respect in the world. So fundamental is the difference between those two races of men, and it appears to be as great in regard to mental capacities as in color. The religion of fetishes so widespread among them is perhaps a sort of idolatry that sinks as deeply into the trifling as appears to be possible to human nature.

(By contrast, Blumenbach established a special library in his house devoted exclusively to African-descent authors, and praised especially the poetry of Phillis Wheatley.)

C. An African-American Looks at the Enlightenment

Although most Enlightenment writers accepted the current inferiority of non-Europeans, at least implicitly, much of the Enlightenment approach was well received among African-American thinkers. As late as 1854, when Frederick Douglass addressed *The Claims of the Negro, Ethnologically Considered*, he uses familiar reasoning to argue for the unity of the human race: polygenism would throw into question the Genesis account, animals are instinctively subject to the domain of Negroes as well as whites, and mental and physical differences arise from the environment, not from heredity.

"[F]lat feet, long arms, high cheek bones and retreating forehead" result from strenuous labor with little intellectual engagement; they are not immutable." (p. 29)

Douglass, like John Stuart Mill, is echoing familiar themes from the Enlightenment. Humans are essentially united and distinct from the apes, environment causes differences and can eliminate them, and science demands no hierarchy. But he is echoing them in 1854 and science has moved on.

III. Natural Science after the Enlightenment

As Stanton (1960, p. 11) states, in the 1700s the, "concept of equality was a scientific concept." It rested on the unity of mankind through a single origin, on a similar morphology and on the importance of environmental factors in explaining man's physical as well as his mental diversity. The consensus on equality began to fray at the end of the 18th century. As both Europe and North America became embroiled in controversies over slavery and colonialism, new, dramatically different perspectives arose. In Europe, the Great Chain of Being was revived. In the U.S., monogenism was contested and lost its primacy. On both sides of the Atlantic, environmental explanations were rejected and human differences, both physical and behavioral, came to be seen increasingly as fixed, discrete, and indicative of an ordering. As a result, by midcentury, the fate of science and racial thought would be linked. It would be impossible to separate them, and within the broader social sphere, a biological rooted pessimism about the human condition prevailed.

While economic, political, and social factors all played important roles, this reorientation can also be linked to fundamental changes in science. We may not like their conclusions better but the 19th century produced better empirical scientists than the 18th.

A. The Great Chain Returns

It is difficult to pinpoint the reasons for the reemergence of the Great Chain. One explanation points to the sheer "naturalness" of it, as increasing complexity in life forms could be seen at all turns (Stepan, 1982). Another alternative is that the association and seeming proximity between man and apes was too deeply embedded in Western European thought to disappear. A third approach relates directly to methodological and theoretical changes within the practice of science, and while not necessarily precluding the other ideas, appears as the most

substantial. In brief, the early 1800s (1800-1830) saw the development of the fields of comparative anatomy, physiology, histology as well as paleontology. The idea of gradation proved central to these comparative studies and interestingly, was central to the biological work of both Cuvier and Lamarck who held polar views on the idea of evolutionary change (Figlio, 1976). Friedrich Tiedemann's (1816) classic embryological work examined the gradations among life forms and linked them to the development of human fetuses and children. While he never linked embryology to racial differences (in fact he would argue counter to most of his contemporaries in another famous work (1836) that there were no differences between the brains of Africans and Europeans) others would make that association, saying that some races are more like children; others are more like adults. By mid-century the idea that the races formed a graded series had become a foundation in racial science.

Despite the fact that the repudiation of the Great Chain had been a central element of the British monogenist argument, from this time on even ardent monogenists spoke of gradations in form. Situating human diversity on the Great Chain meant that what was once seen as superficial and arbitrary was now rigid and innate; a permanent difference in the essential natures of these groups. This ranking pertained to physical traits as well as to moral, intellectual and social qualities. It was nature, not man that prevented civilized behavior. Now that the hierarchy was firmly reentrenched, the only question was how best to measure it. The initial answer through roughly 1850 was an overwhelming (though not monolithic) chorus of non-European biological inferiority as voiced by the likes of White, Smith, Prichard, Lawrence, Cuvier, Morton, Agassiz, and Broca. The continuing search for answers would be the goal of research for the remainder of the century.

The new position of Africans on the Great Chain would place them in closer proximity to the apes. Now, beliefs that had circulated perhaps since the earliest English encounters (virtually

simultaneous), with both the human and ape inhabitants of Africa, were given scientific support.

While some researchers would avoid or object ((Huxley, Owen) to any such association, others saw it clearly in one or more features (Hunt, Lawrence, Cuvier). Charles White, for example, in *An Account of the Regular Gradation in Man* (1799) compared Africans to apes with respect to genitalia and menstrual cycles. In 1817, George Cuvier, continental Europe's preeminent biologist wrote about the 'Negro' race, "The projection of the lower parts of the face, and the thick lips, evidently approximate it to the monkey tribe...." (p. 44)

In Britain, too, scientists moved away from fundamental conclusions of Enlightenment science. James Prichard, who held for flexibility and change, looked to biological "sports" as the causative agent for variation. For him, climate could have an influence though it did not create biological diversity. Further, he saw the original or stemrace as African with Europeans as the later development. William Lawrence's comments suggest the looming shadow of the Great Chain "That the Negro is more like a monkey than the European...cannot be denied as a general observation." (Cited in Gossett, 1965, p. 57)

B. Polygeny Gains Ground

1. History

Polygeny, the view that different races have different origins and are different species, was the major challenge to Enlightenment science in the first half of the 19th century. As noted earlier, the overwhelming consensus of scientists in the 18th century was that despite the evident diversity in form and behavior, mankind represented a single type, a single species, bound by a common origin. Towards the end of the 1700s, polygenist theories reappeared. Influential voices, such as those of Voltaire and Kames would pose their challenge primarily to church dogma rather than to science (as would also be later be the case with Nott and Gliddon). Hume

was a polygenist. In the next century these ideas would find broad based support.

The trajectory of this debate takes different courses in Britain, on the Continent, and in the US. In Europe the debate was quashed dramatically on March 9, 1830 when Cuvier, a strict creationist, thoroughly routed Geoffroy Saint Hillaire in debate at the Academy of Science in Paris. As a result, the analysis of human variability in Europe was nearly silenced through the first half of the century.

In Britain, where scientists tended to be more religiously orthodox than those in Europe (Stepan, 1982), the leading students of race, Prichard and Lawrence, stood firmly with the views of Linnaeus, Buffon and Blumenbach on origins. They put forth a formidable challenge to the polygenist voices that began to gain strength in the 1840s. By 1860 James Hunt would lead the polygenist voice in British science, but while it would have important implications for the future of anthropology as a discipline in Britain, it clearly remained a minority view.

The United States, in contrast, was the prime battlefield for the debate over origins. Proponents of slavery and of abolition were on both sides of the issue. In fact, among the leading voices championing the monogenist perspective in the US, most were proslavery (Bachman, Cartwright, Fitzhugh). Further, few would attempt to argue from a scientific perspective. John Bachman, a clergyman, challenged Morton (on the fertility of hybrids and "natural repugnance") and Agassiz (on the existence of discrete geographic divisions among races), though increasingly his positions would be rejected as unscientific.

On the other side of the debate, science would not only join other polygenist voices, it would take the lead in constructing a formidable argument. Samuel George Morton's classic comparative analysis of cranial capacity, *Crania Americana*, would be coupled with Louis Agassiz's theoretical base. The result, by 1850, through the allure of numbers and the muscle of data, Morton convinced most of the scientists of this time that the multiple origins theory was the

most parsimonious way of explaining human variability. The belief long-held in the wider social sphere of the relative ranking of Europeans, Native Americans, and Africans was now validated by "objective" scientific evidence. At this point and hereafter, scientific method and theory become integral to any social construct of race.³

After Morton's death, Josiah Clark Nott and George Robin Gliddon would cloak themselves in the guise of science to continue as Morton's disciples. Their 730 page tome, *Types of Mankind* published in 1854 was the leading American work on human races at the time. In it, the association between Africans and apes was clearly highlighted through juxtaposed illustrations that typically exaggerated the "simian" features of the former and the "human" features of the later (pp. 458-459). The comment on one comparison of an Algerian, a Saharran and a gorilla states, "The palpable analogies and dissimilitudes between an inferior type of mankind and a superior type of monkey require no comment." (Cited in Gould, 1981 p. 67) As with Voltaire, Nott and Gliddon aimed their attack at conservative theology, as Nott would call it, "parson skinning" (Gossett, 1965). Still, their lectures on "niggerology", as they described it, brought the issue to a broader audience using the voice of science.

2. Thought

Why did polygenists replace monogenists in the U.S.? Why did race become more important than environment?

Part of the story are the obvious weaknesses and empirical shortcomings of the Enlightenment theories. Thinking of the essence of a species as an algorithm was a nice move for explaining intra-species diversity, but it had the unfortunate empirical implications that acquired characteristics could be inherited and that "blacks" should turn "white" within a few generations in a temperate climate. (And that the tans that Englishmen picked up in the tropics would be passed on to their children.) Even without the efforts of scientists to acquire new information, the Enlightenment view of what species were became increasingly difficult to maintain as the 19th century wore on.

Two new kinds of scientific findings also hurt the Enlightenment view. The first was the vast expansion in the variety of plants and animals that scientists were learning about. Each new part of the world opened up to serious study by Europeans resulted in the discovery of new varieties, most of them fairly specific to that place. Simultaneously, knowledge of ancient Egypt was growing rapidly. The pyramids had been dated fairly accurately to about 3,000 years ago; and the recovered artifacts indicated that the people, animals, and plants of that era were quite similar to those of present-day Egypt and the Mediterranean.

Together these new findings made the idea of essence-as-algorithm untenable. Since Noah's Ark beached at Ararat about 4,100 years ago--a fact that no one had any reason to question--and since varieties changed very little in the last 3,000 years, there was no reason to think they had changed much in the 1100 years between Ararat and the pyramids. The algorithms just could not work fast enough to produce in only 1100 years, from only a few species, the vast variety scientists were finding in the natural world. God and Noah must have

done a whole lot more work 4100 years ago than the Enlightenment scientists gave them credit for.

Thus, for instance, Louis Agassiz, the great Swiss and American naturalist, developed a theory about "centers of creation": species were created in the locations that were meant for them, and generally did not wander far from those places.

Early 19th century scientists maintained the notion of species-as-essence and of creation (even of the date of creation). The part of Enlightenment science they jettisoned was the idea that the essence was an algorithm. There were more species (Morton, for instance, "[R]egarded several breeds of dogs as separate species because their skeletons resided in the Egyptian catacombs, as recognizable and distinct from other breeds as they are now." [Gould, 1981, p.52]), and they were less malleable. God hard-wired you at creation.

In anthropology, the Enlightenment approach also suffered because it seemed old-fashioned. As those sciences that made no appeal to spiritual qualities of humans experienced greater success, the paeans that the Enlightenment wrote about humanity seemed increasingly a diversion from the serious study of nature. Similarly, the insistence on a literal interpretation of Genesis--a single creation event--seemed outmoded. Paradoxically, it was the least modern parts of Enlightenment science that created the space that let it sound so modern.

The 19th century also saw a growing gap between Europeans (and their descendants) and the rest of the world, not the convergence the Enlightenment foresaw as Africans abroad adjusted to a better climate and they and all the other non-European races absorbed European wisdom and religion. European military dominance increased. Miscegenation became prevalent enough that any dark-skinned person who was successful or educated could be assumed to have European blood.

Some peculiarly American forces may have been at work, too. Blumenbach's chief somatic argument for the unity of mankind was the lack of any sharp distinction between races. Thus in the Old World, French shaded into Italians, Italians into Sicilians, Sicilians into Berbers, Berbers into Moors, and Moors into Senegambians. But in the US, no such intermediate groups existed: with Native Americans either exterminated or transported to the West, there were only Africans and northern Europeans. It was much easier to believe races were discrete.

The extraordinary success that Europeans had enjoyed in displacing Native Americans may also have reinforced the perception of European superiority. So, too, did the prosperity and abundance of the new nation: how could climate count for so much and race for so little when you contrasted with the Native Americans had accomplished in a few millennia in, say, Ohio, with what Europeans had done there in a few decades? A sympathetic reviewer of Morton's *Crania Americana* wrote:

"One of the most singular features in the history of this continent, is, that the aboriginal races, with few exceptions, have perished or constantly receded, before the Anglo-Saxon race, and have in no instance...mingled with them as equals...These phenomena must have a cause...." (Combe, 1840, p. 252, cited by Gould, 1981, p. 51)

But while polygeny and the greatly enhanced role for genetic inheritance that it implied were good ways of maintaining important elements of Enlightenment thought--essentialism, divine creation, the Biblical chronology--in the face of mounting disconfirming evidence, this new way of looking at nature faced a major challenge in partitioning individuals into species. Ray's interfertility criterion and the scholastic *differentia specifica* had done this job for the Enlightenment but neither tool could be used easily in the world of polygenesis.

The problem that the interfertility criterion presented for polygeny is obvious: one cannot simultaneously maintain that races are different species, that mulattoes are fertile, and that individuals are partitioned into species by the interfertility criterion.

The polygenists solved this problem by relaxing both of the other propositions enough that they could still believe the first. They rewrote the interfertility criterion to require only that the offspring of different species have a certain quality, and then they argued that mulattos had that quality. Exactly what that quality was, the polygenists had some difficulty in articulating. Our best translation is, "sufficiently infertile that a dynasty will die out after a few generations." And they maintained, in the absence of good demographic data to the contrary, that the mulatto population was going to die out soon.⁴ A scientist like Agassiz was following popular convention when in 1863 he contrasted the "manly population descended from the cognate nations of the United States" with the "effeminate progeny of mixed races." (Gould, 1981, p. 40).

Weakening the interfertility criterion, while it helped solve the polygenists' original problem, was not without consequences. Weak or relative infertility of hybrids ensured that at any time the vast majority of individuals would have inherited the essence of their species undiluted, and so in this regard it worked almost as well as the Enlightenment's strong infertility criterion. As an operational matter, however, weak infertility is a much more cumbersome criterion than strong. With strong infertility, if you want to find out whether individual A and individual B are members of the same species, all you need to do is breed them and see if the progeny are fertile; a matter of a generation. With weak infertility, you need to wait several generations to answer this most basic question. For studying fruit-flies this waiting is not a serious cost, but for studying humans it is.

Because the weak infertility criterion was a much less useful tool than the strong for studying long-lived populations, polygenists had to put more emphasis on physical differences instead of on fertility behavior in drawing lines between species. For races of humanity, finding a *differentia specifica* (or *differentia essentialis*) became a much more pressing, and in 1850, a still unsolved problem.

Notice that everything the polygenists did added to the burden that the untestable and unobservable essence of each race had to bear. For the Enlightenment, racial essences didn't even exist, since only species could have essences (because only within species was descent restricted). Polygeny created the idea of a racial essence, and then forced on it most of the weight of assigning individuals to races in the short run, since the only kind of fertility information that could be used was long-run and a *differential specifica* had not yet been found.

By the publication of Darwin's, *Origin of Species* in 1859, typological thinking supported the discrete separation of mankind into hierarchically ranked races each fixed in position along the Great Chain of Being. Environmental theories for diversity had been replaced by the new majority view of separate origins. This helped to fix the contrasts as innate and permanent--part of each person's essential nature. Body form was inextricably linked to behavior (in part a contribution from phrenology) and then abstracted to race.

IV. The Darwinian Revolution

In 1859 Darwin's *Origin of Species* appeared in print and sold out on the first day. Within ten to fifteen years most biologists accepted evolution as a general theory of the living world.

A. What Darwin Said

Mankind was once again united as one species, now the product of evolutionary processes. Darwin's theory of a biological continuum of man and animals, physically, mentally and morally should have marked the demise of the Great Chain but puzzlingly, the key concepts of fixity, ranking, and essentialism remained intact. Researchers would call themselves evolutionists while keeping alive a racial science of fixed essential types, the direct antithesis of Darwin's focus on populational variability, the food for natural selection's continuous change.

Darwin provided an account of natural history that was simpler and more complete than the Genesis narrative. Since one of the strongest arguments for polygeny depended on the Biblical timetable, this reduced the appeal of polygeny. On the other hand, a major part of the Enlightenment argument also rested on Genesis--Adam and Eve as the source of mankind's unity--and so traditional monogeny also suffered.

With respect to fixity, the early Darwinian theorists generally held that natural selection was no longer operating on man (for Wallace, man had escaped it because of his inventiveness). Thus the diversity that presently existed, be it a result of adaptation or sexual selection, came about long ago and had since remained fixed. In *The Descent of Man*, Darwin offers a hypothesis of early race formation and stasis (Stepan, 1982).⁵ Further, as Stepan says, by viewing races as now fixed units, Darwin unintentionally bolstered the idea of fixed types, reinforcing instead of undermining essentialistic thinking.

Explanations for the persistence of ranking are also complex but may be rooted in the analyses of anatomical gradations that had become central to science in the early part of the century and had helped to revive the Great Chain. In structuring the argument for a relationship among forms and for the descent of man, Darwin needed small steps of continuity and the "lower races" would serve this role. In his early notebooks Darwin had written about the gradation in

moral conscience in human races and later about the scale of civilization. While Darwin was trying to argue for the continuity of a single human species, it was all too easy to misinterpret his meaning to see races as forming an evolutionary scale. The new evolutionary language as applied to race would argue that the "lower races" had evolved the least far, they had lost the struggle for survival, that they were unfit.⁶

The partial ordering that evolution contained allowed scientists to rank races in terms of "development". Europeans were the most highly developed race because they used to live like the other races now live, but no longer do so; and because they conquered the other races. Africans lived like Europeans lived a long time ago; therefore they were not as developed. James Bryce, a British Liberal, for instance, gave a well-received series of lectures in 1902 entitled, *The Relations of the Advanced and Backward Races of Mankind*.

B. What Race Science Heard

Darwin didn't provide any new facts about humans or refute any old ones. The predominant response in biology was to maintain as much of the old way of looking at human variation as possible, and to pluck a little of the low-hanging fruit that Darwin had exposed. Thus Darwin did not upset the stylized fact of relative mulatto infertility that the polygenists had established. Therefore, you could still think of Africans as descendants of Ham and Europeans as descendants of Shem, even though you no longer believed in "Ham" and "Shem;" the picture of separate strains remained.

As far as causality is concerned, the polygenists' view of the role of environment was easy to rephrase and replaced the long-held Enlightenment view. Instead of relying on the Creator's wisdom to match type with environment, scientists could now rely on evolution (either natural selection, mutation, or inheritance of acquired characteristics--all three mechanisms had their adherents in the late 19th century). Unlike the Enlightenment thinkers who believed Europeans were beautiful because their climate was salubrious, post-Darwinian anthropologists thought Europeans were smart and diligent because their climate was harsh: "[The Negro's] environment has not been such as would tend to produce in him the restless energy which has led to the progress of the white race; and the easy conditions of tropical life and the fertility of the soil have reduced the struggle for existence to a minimum...[S]kill in reckoning is necessary for the White race, and it has cultivated this faculty; but it is not necessary to the Negro." (Willcox, 1911)

Darwinism was thus compatible with the idea that each race has its own essence, and so the idea of racial essence survived the Darwinian revolution intact. For each environment, there is some best way of coping, a combination of mental and physical capacities that best allowed humans to thrive, and the body and mind that represented these was the ideal type, the essence of the race that inhabited that environment.

With racial essences (and separate lineages) intact, whether or not races were considered separate species became a semantic question to which great attention did not have to be devoted. Perhaps we all had some common ancestors who were recognizably human a long time ago; perhaps we didn't. Because races had essences and species didn't, race was a more important division than species. (Who can make an emotional appeal to the good of all mammal-kind?)

In regard to apes, Darwin's ideas served to provide a natural, not merely conventional and nominal tie between them and humans. Darwin obliterated Buffon's infinite gap between man and animals. God didn't create humans *ex nihilo*; they evolved with chimps from an ape ancestor, just as mosquitoes and radishes evolved from other animals and plants.

The other piece of evidence for African inferiority was the alleged similarity between them and apes--in appearance (e.g. prognathism) and habitat. After Darwin, the inference was obvious: because they resembled apes more than Europeans did, Africans had travelled less far on the road of human development, the road that started with apes. Merit was uni-dimensional, and Africans, like apes, lacked it.

In sum, fixity persisted, ranking persisted and essentialistic thinking persisted. Now, within the framework of evolutionary theory, the association between apes and some humans, specifically Africans, was given "scientific validation".

IV. Racial Science after Darwin

After Darwin and the Civil War, racial science faced two great challenges. The first was scientific: Finding a *differentia specifica* to tell the races apart. The second was policy-oriented: figuring out how to predict and manage the interface between advanced and less developed races. Neither of these challenges could even be articulated in the language of Enlightenment science or in the language we use today. Still, after the return of the Great Chain, polygenism and Darwin, these concerns were both obvious and pressing.

A. Telling Races Apart

1. Why it Mattered

For race scientists after Darwin, finding some physical characteristic that partitioned humans by the geographical location of their ancestors circa 1500 AD was thus crucial for maintaining the reality of races. If races had essences, then the essence of each race had to show up some way (at least in 1500) other than mailing address. Mere correlation would not do (unless perhaps it was dazzlingly high). Essences are like noses and mothers: everybody (except half-breeds) must have precisely one--no more, no less. To make racial essences part of hard science, you had to find their physical expressions. That is what race scientists set out to do.

2. How They Tried

In the second half of the 1800s the basic definition of physical anthropology was the study of human variation defined as group comparison. As the study of race became more professional, new and more precise techniques were developed. Even if racial types were conceived of as fixed in the past and to some extent intermingled now, it was still thought by some that one could discern elements of the original types. Measurement would be used not only to quantify contrasts but to help chart the evolutionary trajectory of human diversity.

In the 18th century, Camper had begun modern craniometry with his introduction of the facial angle (another debt to Aristotle).⁷ Now all aspects of the skull would be examined including cranial dimensions, patterns of growth, suture closure, and the all-important contents of the cranium--the brain. By the century's close, Ripley (1899) would report that over ten million children and half a million adults in the US and Europe had been measured for their "racial identity". The cephalic index, the ratio of head length to head breadth, was the next standard of measurement scientists used. Developed by Anders Retzius in 1842, it would

become the most important measure of head shape used in the second half of the 19th century. Its most common use was in distinguishing among different European "peoples" or "races". While there is no general attempt at this point to assign relative worth according the cephalic index, these data would be used in the interpretations of past and present history.

While populations were being sorted by cranial form, others focused on different features, often using them directly to point to the evolutionary inferiority of some races, most particularly of the African (Gossett, 1965). Gratiolet had earlier argued that coronal suture closure happened earlier in Africans, thus limiting the potential growth of their brains. Now, in the wake of Darwin, this could take on evolutionary significance.

Another primary area of research included the brain. In addition to the work conducted by Paul Broca, founder of the Anthropological Society of Paris and father of French Anthropology, others followed suit. Researchers such as Bean, Fiske, Mall and Deniker, to name just a few, compared weights, convolutional patterns and various aspects of cerebellar form. While some would find racial differences (Bean, Fiske), in the end Bean would virtually stand alone against the wealth of data (Deniker, Mall, Broca) and the conclusion first offered by Tiedemann (1836) that clear distinctions across racial lines could not be drawn.

When skulls and their contents failed to provide a criterion to distinguish among races, many cast a wider net in the search for useful criteria. These included body lice (Darwin, Murray) as well as hair (Bory de Saint-Vincent, Broca, Browne, Haeckel, Huxley, Keane, Muller and Prunner-Bey).⁸

Ultimately, by the end of the 19th century, the leading scientists who had studied skulls, brains, hair, skin, etc. had arrived at the same conclusion: the search for distinct human types was an exercise in futility. Keane (1889), Ranke (1894), Deniker (1900) and Virchow (1896) would all find insufficient grounds for distinguishing races of humans.

Despite the development of new techniques, scientific rigor and exhaustive research, by the end of the century physical anthropology, the science of human variation, had failed to validate the reality of racial types. John Wesley Powell, director of the Bureau of Ethnology of the Smithsonian would say in the 1880s that, "there is no science of ethnology" (meaning the determination of race differences) (Gossett, 1965, p. 83).

Topinard, Broca's disciple, would also arrive at the conclusion that races were abstractions. His comments sound eerily modern.

"[R]ace is only a subjective notion. The only objective reality is what we have before our eyes: peoples and tribes. Under such conditions one questions whether it would not be preferable to be less free with the word race...."(1892, p. 176)

Yet, typological thinking did not disappear. There was still faith in the reality of racial distinctions that were innate, biologically based, and through their relative worth, indicative of evolutionary success.⁹

B. Managing the Inferiors

1. Institutionalizing Anthropology

The institutionalization of anthropology in the US and abroad would serve to solidify an image of ranked races. Practitioners in this field on both sides of the Atlantic were called upon for their expertise in "managing the inferiors". In Britain, the newly formed Anthropological Institute worked to restore respectability to the field of race science and saw its contribution as an imperative for administering a multiracial empire (Lorimer, 1977 p. 26). The same held for the expanding colonial empires of France, The Netherlands and Germany as they called on both physical and cultural anthropology for the information needed to deal with populations in Africa, the Indies and South America.

In the US, the field was shaped by the unique situation of internal colonialism. The Smithsonian Institution was founded in 1846 and was followed by the Bureau of American Ethnology in 1872. The goal of the latter echoes that of the AI in Britain, as they would study the native American in order to know how best to deal with them, "for their own good".

Critically, the dominant intellectual perspective of the day, evolution, now undergirded cultural anthropology (ethnology) as well as the biological sphere. The scientific study of society/culture was based on the "biological laws" of struggle, survival and adaptation, and upon progress along an evolutionary scale. The cultural evolution of E.B. Tyler, Herbert Spencer and Lewis Henry Morgan served as a complement to biological inquiry. Baker (1998) cogently demonstrates the important role of institutionalized anthropology, most notably that of the Smithsonian, in presenting to the public a "scientific" representation of the hierarchy of races through living ethnology displays at turn of the century expositions and World's Fairs.

Lorimer (1997, p. 23) argues that in Victorian England, the role that science played with respect to race served to reconcile, at least to some degree, "the contradictions between democracy at home and imperialism abroad." The same argument can be put forth for the treatment of so-called lower races within the confines of the US. A skewed take on Darwinian theory would be used in the US to account for social, political, economic and even physical inequality.

2. Apes and Medicine

The link between Africans and apes evident at earlier historical junctures was now revitalized not by the field of physical anthropology but by medicine. Physicians made numerous comparisons between apes and the varieties of man, typically finding African-Americans approximating apes in one dimension or another. Comments on various aspects of facial form such as the breadth of the nasal aperture or receding chin (apes lack a true chin and

only anatomically modern humans, not even Neandertals possess one) supplemented the now familiar remarks about the degree of African facial prognathism. Moreover, the medical profession moved beyond the craniometric focus that had been at the heart of physical anthropology. Through their analyses of postcranial anatomy, they would call into question the African-American condition with respect to one of the principal defining human characteristics--erect posture. From Aristotle (man as a featherless biped) through Blumenbach and even today, erect posture and concomitant bipedalism distinguish humankind. While presented in seemingly innocuous tones, comments about the "simian nature" of the African pelvis, vertebral column, or limb form clearly resonated the African-ape tie. For example: "Dr. Van Evrie felt that because of the Negro's physiological place in nature, he was 'incapable of an erect or direct perpendicular posture.' The structure of his limbs, the form of his pelvis and spine, and the way the head was set on the shoulders gave the Negro a 'slightly stooping posture.'" (Haller, 1971, p.49). In 1899, the *Journal of Anatomy and Physiology* would publish an article by J. Arthur Thomson entitled, "The influence of posture on the form of the articular surfaces of the tibia and astragalus in the different races of man and the higher apes." (Haller, 1971).

3. *Anticipating Extinction*

What happened when advanced and backward races came into contact with each other? Opinions were divided, but the consensus was that the backward race was doomed. In the end, in the evolutionary struggle of the most fit, the fate of the African was sealed. Drawing on the dictum that ontogeny recapitulates phylogeny, the foetal African (and infantile Asian) would be no match for the European. Based on the "hard" data from anthropometry, medicine and the census, physical and mental decline was inevitable. In 1862, Joseph Camp, statistician and superintendent of the 1860 census, stated that the "gradual extinction of the Negro was an 'unerring certainty.'" (Haller, 1971, p. 40) The next census would strengthen this view as it

incorrectly reported that the growth rate for African-American population was only 9.86%, a sharp contrast to the 29.98% average for this population from 1790-1850 and 24.5% less than that of European-Americans for the decade (Haller, 1970a, pp. 317-318). This supposed decrease in population growth was almost entirely due to severe underenumeration in the Southern states, which were still undergoing Reconstruction. (The Census Bureau now publishes alternative estimates for 1870).

The strains of Spencer and social Darwinism can be seen in a response to optimistic claims by sociologists that the African-American population was increasing. Dr. Eugene R. Corson writes in *The New York Medical Times* in 1887,

"Thrown into 'the struggle for existence' with a civilization 'of which he is not the product,' the Negro 'must suffer physically, a result which forbids any undue increase of the race, as well as the preservation of the race characteristics.'" (Cited in Haller, 1971, pp.47-48)

A sampling of titles from the medical journals of the time further serves to illustrate this preoccupation: "The Negro problem from a medical standpoint", 1886; "The future of the colored race in the United States from an ethnic and medical standpoint", 1887; "The effects of emancipation upon the mental and physical qualifications of the Negro in the South, 1896"; "The effect of freedom upon the physical and psychological development of the Negro", 1900; "The future of the negro from the standpoint of the southern physician", 1902; and "Deterioration of the American Negro", 1903. (Haller, 1970b)

The demise of the African in America was one of the most widespread beliefs in medicine and anthropology in the late 1800s (Haller, 1971). (Darity, 1994, documents the impact of this belief on the American Economics Association). Policy would match biology with segregation and disenfranchisement among the, "first steps toward preparing the Negro race for its extinction." (Haller, 1970b p. 167). The impact of this belief can be seen on a practical level as, for example, some of the largest insurers of African-Americans reduced the benefits of those who had been issued policies based on European-American mortality rates.

While the prognosis of extinction would be amended in the early 1900s, the evolutionary fate of African-Americans was far from optimistic. In losing the struggle for survival they would be left as a remnant and peripheral population.

4. Partially Dissenting Voices

Not all thinkers agreed that backward races in contact with advanced races were doomed. A sizeable neo-Lamarckian minority thought that backward races could be slowly uplifted through the right kind of contact with advanced races. The best known proponents of this view at the turn of the century were Theodore Roosevelt and Booker T. Washington. Neither was a professional scientist himself, but both were in contact with leading scientists. As it became clearer, however, that Mendelian genetics rather than the inheritance of acquired characteristics was the mechanism through which evolution proceeded, neo-Lamarckianism became untenable and faded away.¹⁰

Another partially dissenting stream was also represented within the African-American community: the religious writers like Harvey Johnson, and more secular W.E.B. DuBois. Johnson (1891), a Baltimore Baptist minister, argues for the superiority of the African race over the Caucasian because of the more honorable origins of the African in the Biblical story of Ham and the great empire of Egypt, compared with the bizarre and heathen origins of the Caucasian

race with Romulus and Remus.

DuBois, on the other hand, rejects the Great Chain of Being and argues, like an economist, that different races have different comparative advantages; a one-dimensional scale of merit is not appropriate:

"We are that people whose subtle sense of song has given America its only American music, its only American fairy tales, its only touch of pathos and humor amid its mad money-getting plutocracy." (1897, p. 114)

What is most telling, though, for the purposes of our argument, is that by the end of the 19th century, all of the leading voices in the African-American community accept race-essentialism, even though they differ among themselves and with the Euro-American mainstream on the future and ranking of the races. Indeed, it is hard to find a more eloquent expression of essentialism than DuBois (1897):

"[T]he history of the world is the history, not of individuals, but of groups, not of nations, but of races, and he who ignores or seeks to override the race idea in human history ignores and overrides the central thought of all history.... We see the Pharaohs, Caesars, Toussaints and Napoleons of history and forget the vast races of which they were but epitomized expressions." (p. 110)

The distance from Frederick Douglass less than a half century before is immense--at least as great as the distance from Mill to Marshall.¹¹

By the dawn of the new century, the general perspective on human diversity on both sides of the Atlantic was tightly swathed in the language of biology, though not supported by the results of a century of scientific investigation. Differences were innate, fixed, and ranked. The future was clearly marked.

VI. Conclusion

It should not be surprising that economists changed how they viewed race between 1700 and 1900; everybody else did, too--most especially natural scientists. At the beginning of the period we've look at, scientists had a very poor understanding of how nature operated--so poor that they could not explain how Europeans became stronger, richer, and better than other people around the world. Over the course of two hundred years and through the combined efforts of scientists from a variety of newly forming disciplines, vast quantities of information were gathered and digested. Biology and anthropology struggled to understand not only man's relationship to other animals and his place in the natural world but also sought insights into the relationships among men, how they differed from one another and why. By 1900 Europeans and European-Americans could finally explain coherently why they were superior. "Science" had provided an answer, nearly. It is not a happy tale that we tell.

But it is an instructive one. Not many people today are smarter than Linnaeus, Darwin or DuBois, or more moral than Kant or Blumenbach. The questions we ask are not that different either: why people in some parts of the world are so much richer than people in other parts; why police are corrupt in Mexico City; why African-Americans are about six times as likely to be incarcerated or murdered as European-Americans; why only five of the 316 people who graduated with one of the authors from a Newark public high school 30 years ago still maintain addresses in Newark; how humans got to be the way they are.

Of course, today these questions have solid answers that don't appeal to racial essentialism or to the Great Chain of Being. Each question, in fact, has several such solid answers--and none of them is so convincing and simple that the questions have really been answered. If natural and social scientists today really knew the answers to these questions, they wouldn't have to spend so much time looking for and arguing about those answers.

As we look among ourselves (or to our closest relatives, the other apes), Plato's gift is still with us. If clear, simple, convincing answers for these questions don't exist outside the world of biological or cultural racial essentialism, why should we be surprised that for many ordinary people trying to understand the world around them, racial essentialism is still the answer?

Endnotes

1. Prior to the 1700s terms like race and species were used by learned persons in a loose generic sense that was roughly synonymous with kind, type and variety. Further, none of the terms referred specifically or exclusively to physical traits though such features were normally a part of the general description. Blumenbach takes "principal variety" as a synonym for "race"; and only in Kant is the term "race" used and formally defined.
2. This concern with good climate and with beauty also led to the naming of the "Caucasian" race. The story begins with Bernier, who encountered Circassian slave women in Turkey and Persia, and concluded on the basis of this evidence that people from the Caucasus were the handsomest on earth. Buffon echoed this sentiment. Blumenbach, using their accounts and also having in his possession a single skull from the region, came to the same conclusion. He thought it likely, therefore, that mankind in general and Europeans in particular had originated from this region, and so named the European race after Mount Caucasus. From Blumenbach, "I have taken the name of this variety from Mount Caucasus...because its neighborhood...produces the most beautiful race of men,...; and because all physiological reasons converge to this, that in that region if anywhere, it seems we ought with greatest probability place the autochthones of mankind. For in the first place, that stock displays, as we have seen..., the most beautiful form of the skull....Besides it is white in color, which we may fairly assume to have been the primitive color of mankind, since, as we have shown above..., it is very easy for that to degenerate into brown, but very much more difficult for dark to become white, when the secretion and precipitation of this carbonaceous pigment...has once deeply struck." (1776/1795, p. 36)
3. For a full analysis of Morton's results see Gould (1981/1996) and for a critique and reanalysis more favorable to Morton see Michael (1988).
4. In a world where most slave traders were polygenists and you were not, you could make money by outbidding them for mulatto women, since their fertility expectations were irrational. But not much money, since Fogel *et al.* estimate that a fecund woman was worth only about 8% more than a sterile woman (1992, p. 325) and any differential fertility was either small or very far in the future. Most slave traders, moreover, were monogenists.
5. As for explanations for the origin of the diversity, neither Darwin nor Wallace focused on the correlates between physical traits and environmental adaptations. Darwin in fact came to the conclusion that racial traits were not adaptive and explained them in terms of sexual selection (Stepan, 1982).
6. In fairness, the lack of consensus among early evolutionists on aspects of the theory (Darwin, Wallace, Huxley) coupled with an incomplete understanding of the genetics of inheritance (which would take until the middle of the following century) contributed to the failure to develop a new concept of race at this time.]

7. The facial angle is a line drawn through the lower part of the nose and the orifice of the ear. For Camper, this provided a standard for comparing forms and accordingly is regarded by many scholars, as the beginning of modern craniology. The smaller the angle, the more ape-like. Humans ranged from 70-100, from the African to the Greek of antiquity. As orang utans had a facial angle of 58, Camper placed the African as closer to the ape than to the European.

8. It is interesting and puzzling that the African-ape morphological link, found in common imagery as well as in science at this time, is not similarly applied to the analyses of hair. The hair of Africans was likened to that of another non-human, the sheep, "the hair of the white man will not felt, but the wool of the Negro will felt." (Browne, 1850, p.8) The fact that ape hair closely resembles that of non-African peoples is not deemed of consequence.

9. Looking at a conjunction of characteristics rather than at a single trait makes it easier to identify uniquely the geographic origin of many individuals, but the cost is that many individuals can not be identified at all. This is the approach of modern forensic anthropology. For example, among the standard "European" features are a narrow face, a sharp nasal sill, a narrow distance between eye orbits, little facial prognathism, and a prominent chin. An "African" cranium has a narrow face (in contrast to a wider "Asian" face) no nasal sill, a wide distance between the eye orbits, alveolar prognathism and a chin that only projects slightly Bass (1987). These combinations of features sort with a high degree of accuracy the skulls that fall in one category or another. But many skulls fall in neither category (or fall in both).

10. Mendel's work wasn't resurrected until 1902 and despite August Weismann's theory of germplasm back in 1869, Lamarck's ideas were still powerful in some circles into the 1900s.

11. There is some reason to believe that in the twentieth century DuBois became less of an essentialist under the influence of anthropologists like Franz Boas. See, for instance, his essay, *The First Universal Races Congress* (1911). On the other hand, as late as 1939, Melville Herskovitz was finding racial essentialism in *Black Folk: Then and Now*. For a discussion of this controversy, see Lewis (2000), pp. 455-56. Whatever DuBois believed later in his life, it is fairly clear that as the 19th century drew to a close, he was a strong race-essentialist.

References

- Augustine, *The City of God*. translated by Marcus Dods. New York: Modern Library.
- Baker, L.D. (1998). *From Savage to Negro. Anthropology and the Construction of Race*. Berkeley: University of California Press.
- Bass, W.M. (1987). *Human Osteology*. 3d edition. Columbia, MO: Missouri Archaeology Society
- Bernier, F. (1684). A new division of the earth. From *Journal des Scavans*, April 24, 1684. Translated by T. Bendyshe (1863-64) and reprinted in R. Bernasconi and T.L. Latt (eds.) (2000). *The Idea of Race*, pp. 1-4. Indianapolis: Hackett Publ.
- Blumenbach, J.F. (1779/1780). Order I: *Bimanus*. Order II: *Quadrumanus*, pp. 67-71. In T.D. McCown and K.A.R. Kennedy (eds.) (1972). *Climbing Man's Family Tree. A Collection of Major Writings on Human Phylogeny, 1699-1971*. New Jersey: Prentice Hall.
- (1776/1795). *On the Natural Variety of Mankind*: Section IV. Five principal varieties of mankind, one species. Translated from the German and reprinted in E.W. Count (ed.) (1950). *This is Race*, pp. 34-39. New York: Henry Schuman.
- Browne, P.A. (1850). *The Classification of Mankind, by the Hair and Wool of their Heads, with an Answer to Dr. Prichard's Assertion, that "The Covering of the Head of the Negro is Hair, Properly so Termed, and Not Wool"*. Paper read before the American Ethnological Society, November 3, 1849. Philadelphia: A. Hart.
- Buffon, G.L.L. Comte de (1749[1812]). Varieties of the human species, pp. 3-15. In *A Natural History, General and Particular*. Translated by William Smellie. London: T. Cadell and W. Davies.
- (1749-1804). *Histoire Naturelle, Generale et Particuliere*. Paris: Imprimerie Royal, later Plassan.
- Cuvier, G. (1817). The animal kingdom. Translated from the French and reprinted in E.W. Count (ed.) (1950). *This is Race*, pp. 44-47. New York: Henry Schuman.
- Darity, W. Jr. (1994). Many road to extinction: Early AEA economists and the Black disappearance hypothesis. *History of Economics Review* 21(Winter):47-64.
- Darwin, C. (1871/4). *The Descent of Man, and Selection in Relation to Sex*, 2nd edition. London: John Murray.
- (1859). *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Existence*. London: John Murray.
- Deniker, J. (1900). *The Races of Man*. London: Walter Scott.

Douglass, F. (1854). *The Claims of the Negro, Ethnologically Considered*. Address before the Literary Societies of Western Reserve College, at Commencement, July 12, 1854. Rochester, NY: Press of Lee, Mann and Co.

DuBois, W.E.B. (1911) The First Universal Races Congress, 1911, pp. 44-47. In David L. Lewis (ed.). *W.E.B. DuBois: A Reader*. New York: Henry Holt (1995). (Published originally in *The Independent* (70), August 24, 1911.)

----- (1897). The conservation of races. *American Negro Academy Occasional Papers*, 2. Reprinted in R. Bernasconi and T.L. Latt (eds.) (2000). *The Idea of Race*, pp. 108-117. Indianapolis: Hackett Publ.

Figlio, K.M. (1976). The metaphor of organization: An historiographical perspectives on the biomedical sciences of the early nineteenth century. *Hist. Sci.* 14:17-53.

Fogel, R., R.A. Gallantine, R.L. Manning and N.S. Cardell (1992). *Without Consent or Contact: The Rise and Fall of American Slavery: Evidence and Methods*. New York: Norton.

Gossett, T.F. (1965/97). *Race: The History of an American Idea*. New York: Oxford University Press.

Gould, S.J. (1996). *The Mismeasure of Man*, revised edition. New York: W.W. Norton.

----- (1994). The geometer of race. *Discover* 15,11(November):65-69.

----- (1981). *The Mismeasure of Man*. New York: W.W. Norton.

Haller, J.S. (1971). *Outcasts from Evolution. Scientific Attitudes of Racial Inferiority, 1859-1900*. Carbondale: Southern Illinois University Press.

----- (1970)a. Civil War anthropometry: The making of a racial ideology. *Civil War History* 16,4(December):309-324.

----- (1970)b. The physician versus the Negro: Medical and anthropological concepts of race in the late nineteenth century. *Bulletin of the History of Medicine* 40(March-April): 154-167.

Hannaford, I. (1996). *Race: The History of an Idea in the West*. Washington, D.C.: Woodrow Wilson Center Press. Johns Hopkins University Press.

Johnson, H. (1891). *The question of race: A reply to W. Cabell Bruce, Esq.* Baltimore: J.F. Weishampel.

Kant, I. (1775). On the different races of man. Translated from the German and reprinted in E.C. Eze (ed.) (1997). *Race and the Enlightenment. A Reader*, pp. 38-64. Cambridge, MA: Blackwell.

Keane, A.H. (1889). "Ethnology" in *Chambers' Encyclopedia*. Philadelphia vol 4. ppp. 44-441.

Knox, R. (1850). *The Races of Men: A Fragment*. London: Henry Renshaw.

- Lebnitz, G.W. von (1718). *Otium Hanoveranum sive Miscellanes ex ore...*. Leipzig: Johann Christiani Martini.
- Lewis, D.L. (2000). *W.E.B. DuBois: The Fight for Equality and the American Century, 1919-1963*. New York: Henry Holt.
- Linnaeus, C. (1758). *Systema Naturae*, 10th ed. Stockholm.
 ----- (1740). *Systema Naturae*, 2nd ed. Stockholm.
 ----- (1735). *Systema Naturae*. Stockholm.
- Lorimer, D.A.. (1997). Race, science and culture: Historical continuities and discontinuities, 1850-1914, pp. 12-33. In S. West (ed.), *The Victorians and Race*. Brookfield, VT: Scholar Press.
- Marks, J. (1995). *Human Biodiversity. Genes, Race, and History*. New York: Aldine de Gruyter.
- Michael, J.S. (1988) A new look at Morton's craniological research. *Current Anthropology* 29,2:349-354.
- Morton, S. (1839). *Crania Americana; or, A Comparative View of the Skulls of Various Aboriginal Nations of North and South America, to Which is Prefixed an Essay on the Varieties of the Human Species*. Philadelphia: J. Penington, London: J. Madden.
- Nott, J.C. and G.R. Gliddon (1854). *Types of Mankind: or, Ethnological Researches, Based upon the Ancient Monuments, Paintings, Sculptures, and Crania of Races, and upon Their Natural, Geographical, Philological and Biblical History, Illustrated by Selections from the Inedited Papers of Samuel George Morton and by Additional Contributions from L. Agassiz; W. Usher; and H.S. Patterson*. Philadelphia: J.B. Lippincott Grambo and Co.
- Ranke, J. (1894). In M. Hirschfeld (1938). *Racism*. trans and ed. by Eden and Cedar Paul London 1938.
- Ray, J. (1691). *The Wisdom of God Manifested in the Works of Creation*. London.
- Ripley, W. Z. (1899). *The Races of Europe. A Sociological Study*. New York: D. Appleton.
- Slotkin, J.S. (1965). *Readings in Early Anthropology*. London: Methuen and Co.
 ----- (1944). Racial classifications of the seventeenth and eighteenth centuries. *Transactions of the Wisconsin Academy of Sciences* 36:459-467.
- Stanton, W. (1960). *The Leopard's Spots. Scientific Attitudes Toward Race in America, 1815-1859*. Chicago: University of Chicago Press.

- Stepan, N. (1982). *The Idea of Race in Science: Great Britain 1800-1960*. London: Macmillan.
- Thomas, K. (1983). *Man and the Natural World*. New York: Pantheon Books.
- Tiedemann, F. (1836). On the brain of the Negro, compared with that of the European and the Orang-outang. *Phil. Trans. Roy. Soc.* 126:497-527.
- (1816). *Anatomie und Bildungsgeschichte de Gehrins im Foetus des Menschen*. Nurnberg: Steinischen.
- Topinard (1892). On "race" in anthropology, pp. 171-177. Translated and reprinted in E.W. Count (ed.). (1950). *This is Race*. New York: Henry Schuman.
- Virchow, R. (1896). Race formation and heredity, pp. 178-194. Translated from the German and reprinted in E.W. Count (ed.) (1950). *This is Race*, New York: Henry Schuman.
- Voegelin, E. (1998). Species and race in the eighteenth century, pp. 29-79. In *The History of the Race Idea: From Ray to Carus. Works Vol. 3*. Translation by Ruth Hein. Edited by Klaus Vondung. Baton Rouge: Louisiana State University Press.
- White, C. (1799). *An Account of the Regular Gradation in Man, and in Different Animals and Vegetables*. London: C. Dilly.
- Willcox, W.F. (1911) "The Negro." *Encyclopedia Britannica*.
- Wolpoff, M.H. and R. Caspari (1997). *Race and Human Evolution*. New York: Simon and Schuster.