

Diana Smay and George Armelagos

Galileo Wept: A Critical Assessment of the Use of Race in Forensic Anthropology

Anthropology has been haunted by the misuse of the race concept since its beginnings. Although modern genetics has shown time and again that race is not a biological reality and cannot adequately describe human variation, many anthropologists are unable or unwilling to put aside racial typology as an explanatory tool. Here, we consider the case of forensic anthropology as an example often held up by uncritical anthropologists as evidence that the race concept "works." The logic appears to be that if forensic anthropologists are able to identify races in skeletal remains, races must be biological phenomena. We consider four general viewpoints on the subject of the validity and utility of race in forensic anthropology and offer an argument for the elimination of race as part of the "biological profile" identified by forensic anthropologists.

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I am beginning to understand how astronomers feel. The relation between the scientific study of regional differences in man, and racism, is similar to the relation between astronomy and astrology. Astronomy is an attempt to understand a portion of the universe: astrology is an attempt to convert certain parts of this information into a kind of divination, to predict the characteristics, behavior, or fortunes of human beings. But so far I have not heard of anybody trying to tell astronomers that they cannot use the words 'star' or 'planet' because to do so might seem to endorse the validity of the horoscopes in the daily paper.

—Alice Brues (1993), "The Objective View of Race"

Diana B. Smay is a Ph.D. candidate at Emory University. Her research interests include bioarchaeology, paleoepidemiology, and medical anthropology, focusing on how diverse individuals react to environmental stress. Her interest in the race concept stems from a devotion to methodological rigor in biological sciences.

George J. Armelagos, professor of Anthropology at Emory University, has focused his research on diet and disease in human adaptation. He has been president of American Association of Physical Anthropologists, Northeast Anthropological Association, chair, Biological Anthropology unit of the American Anthropological Association, and chair, Anthropology Section of the American Association for the Advancement of Science.

INTRODUCTION

The level of acceptance of the biological validity of the race concept in physical anthropology has gone through radical shifts in the past fifty years. Perhaps more than any other concept, it has suffered the consequences of being torn between the teeth of "conventional wisdom" on one hand, and a lack of any cohesive scientific definition on the other (Brace 1982). The use of race in physical anthropology is particularly interesting, due to its historical conception as the "scientific" study of racial typologies of human crania. A review of the work of Samuel G. Morton (1839; 1844) is a common beginning to introductory level classes in physical anthropology, with more than a little flavor of learning history so as not to repeat it.

Although the vast majority of anthropologists now decry Morton's work and the whole of the early craniological classificatory schemes as racist, it is sobering to realize why this is so. Most reject this work because of the evidence that Morton's methodologies were flawed and that he may have unconsciously selected his data to support his preconceptions, not because they were based on the *a priori* and unscientific assumption of biological race as a natural category (Gould 1981).

Race has been a fundamental concept in anthropology and its misuse by racists, as suggested by Alice Brues, is not the only problem that we face. It is also the misuse by anthropologists that remains an issue. In a UNESCO pamphlet, Claude Levi-Strauss (1952) argues that the "original sin" of anthropology was the confusion that race (in a biological sense) was relevant to understanding what he called the "production of civilization." Anthropology as a discipline

has wrestled with the use of race to explain behavior. In fact, as physical anthropology emerged, it was this primary issue that characterized much of its early development. In this sense, physical anthropology, for its first six decades, supported the perception that the differential evolution of races could explain differences in behavior and thus culture.

This issue is evident in the work of Ales Hrdlicka (1918) who founded the American Journal of Physical Anthropology. He states in the first issue that the objective of physical anthropology was to understand the biology of the "normal white man." Hrdlicka summarizes the objectives of physical anthropology thusly:

The paramount scientific objective of physical anthropology is the gradual completion, in collaboration with the anatomist, the physiologist, and the chemist, of the study of the normal white man living under ordinary conditions (Hrdlicka 1918:18).

The implication of Hrdlicka's pronouncement is a sense that other racial groups are somehow "abnormal." Hrdlicka was directly concerned with the rudimentary state of racial studies (Blakey 1987). Eventually, he suggested that social differences between human groups were the result of racial characteristics that reflect the limits of their evolution (Blakey 1987:10). Hrdlicka (1927):208-209 argued,

The real problem of the American Negro lies in his brain, and it would seem, therefore, that this organ above all others would have received scientific attention.

Although anthropology has moved beyond the linking of race with cultural development, it has yet to recover from the impact of the emphasis historically placed on race to explain and understand human variation.

While solid objections to the scientific use of the race concept was sounded initially in the early 1900s by Boas (1911; 1925)¹ and by Hogben (1931)² in the 1930s, it was the work of Montagu (1941a; 1941b; 1942a; 1942b) that framed the debate in the modern era. In the 1960s, there was a major transformation in the way in which physical anthropologists looked at race as a means of understanding human variability (Brace 1964a; Brace 1964b; Livingstone 1962). It is only recently that the move to a non-racial approach has

gained significant acceptance. Currently, about half of the active physical anthropologists find the use of race as an explanatory tool problematic (Lieberman, Reynolds and Stevenson 1989).

If the data are in support of the dismantling of the race concept, why are so many physical anthropologists so reluctant to abandon it? One of the reasons cited for this reluctance is that forensic anthropologists routinely use morphological indicators to assign a racial category to the skeletal individuals they examine (Goodman 1997b; Goodman and Armelagos 1997). Following this is the assumption that these classifications are therefore "correct" and confirm the existence of races that may be determined scientifically—i.e., natural categories. If they can be identified, they must exist. And even among those who question the general validity of the race concept, there are still only a handful who reject its utility in a forensic context. If racial classification helps get the job done, what harm is there in using it?

The disconnect between validity and utility is at the crux of the problem. Some believe that for a category to be useful, it must first be valid, while others believe that a category's apparent utility proves its validity. The current literature on the use of the race concept in forensic anthropology is scant, most researchers having made up their minds one way or another. The number of works concerning this or that "race marker" in the skeleton, however, belies the fact that the vast majority of forensic anthropologists *use* racial indicators, whether or not they would admit to considering them valid. The thought pieces that do exist on the subject indicate that the opinions regarding the race concept among forensic anthropologists fall generally into four broad categories. These categories can be placed on a continuum ranging from complete and uncritical acceptance of race as biological reality to a wholesale rejection of the concept's validity and utility. The two positions falling between the extremes both question the use of race, but accept it with some qualification as a useful (or vital) component of the forensic anthropologist's toolkit. We will describe these positions in turn and then examine their merits and limitations for forensic anthropology and science in general.

RACE AS A NATURAL CATEGORY

The prevailing view of race as a natural category is unsurprisingly the least critical: races are clear-cut biological categories that are as obvious as the sun rising in the east and setting in the west. Indeed, it

might be even more accurate to say that this is less of a position in the debate, per se, as it is a default category. Most of the researchers who fall into it have never critically examined the race concept at all, but instead seemed to have inherited it along with other "conventional wisdom" (Reichs 1986; Sauer 1992; St. Hoyme and Iscan 1989). The scholarship that defines and quantifies racial characteristics and provides a kind of cookbook set of instructions for identifying them (and therefore identifying an individual's race) by definition accepts race as a valid and useful way to partition human groups. Most of these individuals cannot be said to be in the debate, if they are even aware that it exists. The evidence that continues to mount, which suggests that race does not explain human variation, pales in comparison to what appears to be obvious to the casual observer, and what is so important in the social partitioning of our society.

A notable example of this manner of thinking is found in *Skeletal Attribution of Race*, edited by George Gill and Stanley Rhine (1990). In his article on non-metric skull racing, Rhine (1990) designed a study to test the various methods that had until then been in use by members of the Mountain, Desert, and Coastal Group of forensic anthropologists. He gathered a list of morphological traits that members had found useful in the racial identification of skulls, these mostly stemming from the nasal bridge, mouth, and shape of the cranial vault. He then documented their occurrence in 87 skulls of "known race" from the University of New Mexico's Maxwell Museum's forensic skeletal collections.

Rhine never explains how the race of the individuals in the sample came to be known, although one is led to believe that it was either self-reported or attribution based on soft tissue appearance after death. Some information for individuals placed in the "Caucasoid" group included nationality, possibly from documented self-reporting. Although it is clear from this study design that the author never questioned the validity of the categories, it would seem upon further inspection that he does not even have a clear idea of their definition. He states (Rhine 1990:13):

While the bulk of the sample is Caucasoid, that group can be further subdivided into Anglo (those of predominantly European origin) and Hispanic, a "neo-race" (Dobzhansky 1955). Originally used as a vague "social race" term, Hispanic is now used in this context as a biological category

Rhine does not describe how the category Hispanic has become less vague since its inception as a biological category. Perhaps he assumes that by virtue of the idea that we can measure it, it has become clearly delineated.³

Rhine's sample also did not reflect the range of human variation that exists in the US, let alone in the world. Even using the categories of race that he sets out as natural, the sample is so skewed as to be inadequate for what he is attempting. The examined skulls were broken down into the following categories:

68 "Caucasoid" (including 53 "Anglo" and 15 "Hispanic" skulls)
12 "Mongoloid" (including 3 "Modern Amerind" and 9 "Prehistoric Amerind")
7 "Negroid" (including 5 "Black" and 2 "Black" casts)

Thus, the features that Rhine declares are good racial markers cannot even be representative of the groups they are supposed to represent since they were based on such a limited sample. Undoubtedly, since the skulls were said to have been "selected" (1990:9), they were chosen because they reflected at least some of the racial traits on the list. Even if we were to accept the assumptions upon which it is based, this study is a classic example of poor science. And yet it is widely cited as a reference for non-metric skull racing in forensic reports.

The objective of Rhine's paper was not the description of human variation in skeletal morphology, or even precisely the identification of individuals based on that variation. It was to determine which traits are best suited for assignment of a racial label to a skeleton. This assumes that races exist "out there" and it is our job to use their morphology to describe them. The slippage of the Hispanic category from social to biological race serves as an example of the uncritical nature of this undertaking. It should have provoked some discussion of the definition of biological race, but instead, it was not even noticed.

RACE AS NEWTONIAN PHYSICS

The second position is one of moderation. Among others, Alice Brues (1993) has suggested that, while race may not be the most precise way to describe human variation, it is accurate enough for applied work, such as forensic anthropology, and even for organizing broad theoretical paradigms. In this way, race is seen as a similar phenomenon to Newtonian physics. While

we know now that the simple laws Newton outlined are actually inaccurate, and that the theory of relativity allows us to achieve more precise measurements and make more accurate predictions, Newtonian physics is much simpler mathematically, and is therefore more practical for day to day affairs, where error is small.

The inaccuracy of Newton's laws only manifests on the grandest of scales, such as planetary orbits, but are perfectly sound for such small and mundane things as predicting the trajectories of billiard balls, for example. Similarly, even though we understand human variation to be an immensely complex phenomenon, and that we recognize the impossibility of assigning all individuals to discrete racial categories, it is still simpler to do this in most cases than to delve into the complexities of an analysis without racial classification. The assumption here is that the results between the two methods of describing human variation, racial and non-racial, will be very similar, the error being small. Race is conceived as a convenient shorthand, useful in its brevity and ability to accurately describe human variation in most endeavors.

Madeline Hinkes (1993:49) falls somewhere in between the first and second viewpoints. She acknowledges that the distribution of traits in human populations does not fall along discretely established racial lines, but still does not dismiss the race concept. Those physical features we have come to rely on as racial traits differ in frequency of occurrence of degree of development among races. There are no archetypes, no typological listings of tried-and-true rules. As no trait is entirely racial, so also is no trait entirely without some racial meaning.⁴

One is left to wonder how race is helpful in describing human variation when it does not account for the distribution of traits. The admission that human population genetics is more complicated than the typology of race dissolves to lip service when after the requisite paragraph is completed, the remainder of the article continues the racial analysis.

RACE AS A NECESSARY EVIL

Thirdly, both Norman J. Sauer (1992) and Kenneth Kennedy (1995) have argued that while race is not a valid biological category, the constraints that are put on the forensic anthropologist are such that it is necessary to put up with the faulty paradigm. They concede that race does not exist as a natural phenomenon, and Sauer goes so far as to say that the accuracy with which forensic anthropologists are able to "predict"

bureaucratic race (85-90 percent) does not, in fact, vindicate the race concept as natural (1992). In actuality, the 90 percent figure, which is usually held up to verify the reality and utility of race, is a fiction.

As Alan H. Goodman (1997b) notes, the 85 percent to 90 percent results are based on the accuracy of the method when standards are developed on a subset of a sample and then "tested" on the sample from which the subset was derived. For example, in the 1960s when Eugene Giles and Orville S. Elliot (1962) developed their formula to determine race from the crania, they used a sample that was a sub-set of modern adult Blacks, modern adult Whites and Native American skulls from an archeological site (Goodman 1997b). They applied a statistical procedure—discriminant function that separates crania into "races" using eight measurements. When they applied the formula to the rest of the crania in the *same sample*, they achieved the much touted 85 percent to 90 percent accuracy. When applied to other samples of Blacks, Whites and Native Americans, they achieved 18.2 percent and 14.3 percent accuracy, figures that hardly instill confidence (Goodman 1997b).⁵

Many forensic anthropologists understand race to be a folk taxonomy with little, if any, biological relevance. Given this, however, they point to the duty of forensic anthropologists to serve the medico-legal communities to which they have an obligation. These communities are not interested in the fact that race does not exist, and, according to Sauer and Kennedy, are not likely to be convinced of this in the near future. On the contrary, race is used as a key element in the search for missing persons, and forensic anthropologists are expected to provide this information in their reports. Even if races are not biologically "real", the accuracy with which forensic anthropological techniques are able to replicate the folk taxonomy from which they are derived should allow the anthropologist to make an educated guess as to how the person would have been identified in life.

Even in fiction anthropologists perpetuate the reality of race. Temperance Brennan, forensic anthropologist Kathy Reich's alter-ego in her best selling novel, *Death Du Jour* (1999), recovers the bones of Sister Elizabeth Nicolet, a candidate for sainthood who died a century earlier. Although Brennan is only asked to identify the bones as those of Sister Nicolet, she decides to do a complete forensic analysis. She measures the nasal region and discovers that Sister Nicolet is of mixed race, a fact that was not apparent

during her lifetime. She reveals the secret to the convent head with complete certainty: "The bones don't lie. And they are not judgmental."

Sauer is particularly adamant in his assertion that the skeletal identification of races has nothing to do with whether or not they actually exist. He states:

The forensic anthropologist's task is to predict which, if any, of these options will correspond to the set of bones they are evaluating. Whether these are cultural, sociological or biological categories is irrelevant. Forensic anthropologists may be very good at matching a set of remains to the race label ascribed to a missing person, but the practice has little if anything to do with the taxonomic questions about the natural existence of races. (Sauer 1992:110)

He continues to say that while identifying race on forensic reports may be necessary, forensic anthropologists have a duty to their students, colleagues, and to the lay public to educate them on the non-existence of biological races. Sauer points out that this is inconsistent, that the continued use of race identification in forensic reports in effect puts a "stamp of approval" on the traditional race concept (1992:110), but he is unclear what a long term solution should be. He hesitantly suggests the use of the term "ancestry" as a replacement for the more loaded and political term of "race" in order to avoid such an implied affirmation.

THE NON-EXISTENCE AND NON-UTILITY OF RACE

The last position is at the opposite extreme from the first and most prevalent view. Some anthropologists (Armélagos 1995; Armélagos, Carlson and Van Gerven 1982; Blakey 1987; Brace 1982; Brace, Nelson, Tracer, Yaroeh, et al. 1993; Goodman 1997a; Goodman 1997b; Goodman and Armélagos 1997; Hahn and Stroup 1994; Livingstone 1962; Lock 1993; Marks 1994; Marks 1995; Marks 1998; Montagu 1978; Mukhopadhyay and Moses 1997) have long argued that not only does race not have biological reality, but that it is irresponsible for forensic anthropologists to use scientific methods to place an individual in a category that does not, in fact, exist.

They argue that by doing so, forensic anthropologists are lending credence to the false, but common, assumption of the lay public that race is something which has biological reality, and thus

perpetuating racism (Armélagos and Goodman 1998). Especially damaging is the impression that students receive from such practice about the reality of race. When students learn to "race" skulls, they are learning to observe features, and then pigeonhole individuals according to a list of typical racial traits. They learn nothing about the evolutionary processes that led to variation in humans and the distribution of such traits on a populational level. Given the job market for forensic anthropologists currently, it is exceedingly unlikely that these students will go on to put their knowledge to use identifying skeletons. Instead, they will take what they have learned and apply it elsewhere, either in anthropology, some other part of academia, or in the business world, or medicine, perpetuating a false paradigm.

According to Alan H. Goodman and George Armélagos (1997), forensic anthropologists have a moral and professional responsibility as scientists, civil servants, and teachers to use models that reflect the impossibility of assigning individuals to races based on type specimens and typical features. They argue that nothing is to be gained by using a model that we not only know to be unsupported by data, but also to be potentially socially destructive. In this way, the choice to identify or not to identify races is not only a matter of good science, but also a matter of ethics and politics. They argue that science is never divorced from politics, and to be clear from the outset what one's political and ethical duties are is the only way to be a responsible member of the scientific community (Goodman and Armélagos 1998).

CONSIDERATION OF THE VIEWPOINTS

The first of the four positions is the easiest to dismiss. Given the fact that no researcher has yet been able to define a set of physical criteria that will satisfactorily subdivide the human species into discrete racial groups, it is sobering to realize how many scholars with biological training still uncritically subscribe to the race concept. It is based on the implicit assumption that certain physical characteristics (skin color, hair form, nose shape, etc.) do not assort independently on the genetic level, and furthermore that such traits can in turn be used to define the race to which they belong. Such a tautology, when revealed as such, is clearly absurd (Livingstone 1962). The fact that it is so ingrained in our thought processes as to be rarely even acknowledged as the subject of debate is a clear indication of the primacy of racial categorization

in our social understanding of other human beings. It is also a warning that such biases run deep, affect everything that we do and think, are notoriously difficult to detect, and even harder to root out.

It is interesting to note, however, that in a forthcoming revised edition of their volume *Skeletal Attribution of Race*, Gill and Rhine are considering replacing the word "race" with the less provocative term "ancestry" as Sauer has suggested (Alison Galloway, pers. com.). It is unlikely that any of the logic will have changed, but the proposed terminology switch indicates some awareness of the ongoing debate surrounding the race concept. The shift to the term "ancestry" implies an understanding that an individual may have combinations of traits which reflect a diverse heritage, but it is likely that the analysis of races as exclusive categories will continue, simply under a different name. Forensic anthropologists in the United States have always been aware of the existence of individuals of "mixed race," and this has never threatened the use of the paradigm. To suggest that all individuals are of mixed race is still to affirm the existence (at one point in time) of "pure" races which are biologically identifiable.

The other three viewpoints are more difficult to reject out of hand, since they involve some acknowledgment of the non-validity of the race concept as a means of understanding human variability. However, they each have distinct weaknesses. The "race-as-Newtonian-physics" model relies on the idea that all members of a given race will be more similar to each other than to any member of any other race. Thus a systematic analysis of human variability should show that variation exists in distinct packages that we can label as race.

One of the first serious attempts to measure the packaging of variability was undertaken by Marshall T. Newman. Newman (1963) used a number of genetic traits to systematically test the validity of Stanley C. Garn and colleagues' (1961;1960) classification of geographic and local races. He selected a number of traits that were used in racial classification and systematically determined if they clustered. Newman found that three of the geographic races (Asian, Amerindian and African) appeared to "stand up well", three (Melanesian, Polynesian and Micronesian) were placed in a "suspense account" and "may be valid but the critical data is lacking" and three (European, Indian and Australian) were "unwarranted abstraction."

Newman comments that Garn and coworkers list of

local races, ". . . harbor many conceptual left-overs from the days of typologist thought in racial anthropology (Newman 1963:192)." Newman was pleased with his results and said that with more study and the discovery of new genetic traits, racial classification would be refined. This is a theme that is repeated to this day: Once we find the "right genes," races will be revealed. Unfortunately, Newman missed the implication of his analysis and the theoretical and practical issues it raises for racial studies.

Newman unwittingly had discovered that racial traits are non-concordant. That is, there is no agreement between traits used in racial classification. If there is concordance, every trait will result in the same classification. For concordance to occur, each of the traits must be selected for at the same rate and in the same direction. In reality, genetic traits are evolving at different rates and in different directions, and consequently traits become non-concordant. In practice, racial classifiers have to select the genetic traits and morphological features that support his or her preconceived notion of the race.

Richard Lewontin (1972) published "The Apportionment of Human Diversity," the first serious attempt to determine the extent to which racial groups account for human genetic variation. Drawing upon existing studies of the distribution of various biochemical markers in populations around the world, Lewontin compiled data for nine blood groups (represented by differences in immunologic response to a specific challenge), as well as eight serum protein and red blood cell enzyme variants. In fact, what Lewontin demonstrated in his work on physical variation within and between self-identified racial groups, was that race only accounted for 6 percent of the observed variation (Lewontin 1972).

The reaction to Lewontin's publication was quite interesting. A number of researchers echoed Newman's point that with the right traits the reality of race will be evident. This criticism echoes earlier themes that still persist. B.D.H. Latter (1980), using a different set of genetic traits reached the same conclusion as Lewontin did. Others, however, have searched for the "Holy Grail" that would reveal the true reality of race, but without success (Nei 1982; Nei and Roychoudhury 1982). Even the use of PCR technology (Barbujani, Magagni, Minch, et al. 1997; Ryman, Chakraborty and Nei 1983) that uses markers that are close proxies for actual genotypes results in similar patterns of racial apportionment.

K. Owen and Mary Claire King (1999:453) explain why this is the case, "(M)ost human genetic variation antedates the migration of modern humans out of Africa. The possibility that human history has been characterized by genetically relatively homogeneous groups ('races'), distinguished by major biological differences, is not consistent with genetic evidence." Nearly 85 percent of human variability resides in the individual. And race can explain only about 6 percent to 12 percent of the variation.

The techniques used in forensic anthropology, of course, cannot provide the precision necessary to distinguish between the countless and ever-changing human breeding populations that exist in the world. Neither would this provide the information law enforcement officials are seeking on bureaucratic race.

Other questions begged by this position are: Is race an appropriate substitute for a more textured analysis? Does it reach the same conclusions in a much shorter length of time? If the answers to these questions are, as indicated by Lewontin's work, no and no respectively, then race cannot be a useful parameter for forensic identification—either it cannot be identified, or its identification means nothing.

The "race-as-necessary-evil" position is one to which many who are otherwise critical of the race concept find themselves attracted. The idea that one is simply providing a service analogous to that of an eyewitness who reports the observed race of a suspect is alluring: one is adding to the body of information that allows justice to be served. The appeal of this viewpoint is two-fold: it allows the forensic anthropologist to provide more information about the skeletal material he/she is called upon to analyze, something which is in itself rewarding, and secondly, it lets the anthropologist off the hook of racism. In this view, calling such an anthropologist a racist would be the same as calling the above-described eyewitness a racist.

The problem that still lurks within this paradigm is that the anthropologist and the eyewitness are not at all equivalent. One is counted as an expert, with all the machinery of "science" to back up his/her assertions. When the witness ascribes a racial category to an individual, we assume no guarantee that that person is "right" or has access to any privileged information. On the other hand, whenever a forensic anthropologist makes a racial "identification" on a set of skeletal remains, not only is that information presumed to be more accurate (even though there is substantially less data in this case than would be available to our eye-

witness!), but such an identification reifies the assumption of the lay public that race is something that can be scientifically identified. Each identification implicitly supports a biological foundation to the race concept and continues to feed the cycle of racism in our society.

While one could argue that the identification of race has allowed law enforcement personnel to make more identifications than they would have without such reference, it is impossible to know how many individuals went unidentified because the racial label attached to them by the forensic anthropologist did not match their bureaucratic race.⁶ Truly, the question of whether forensic racial assignment helps more than it hinders has not been answered fully.

In an interesting contrast to his stance on the issue outlined above, Sauer later provided one of the most vigorous defenses of the use of race as a natural category.⁷ Sauer (1993) states that

Nearly two-and-one-half centuries ago Carolus Linneaus presented to the scientific community in his famous *Sytemae Naturae* (Linneaus 1757) a classification of human varieties. He listed four groups: *Europeaus (albus)*, "white"; *Americanis (rufescens)*, "red"; *Asiaticus (fuscus)*, "dark"; and *Africanus (niger)*, "black." ". . . With later embellishment by Blumenbach, thus was born in a time of nascent exploration, in a time when scientists debated whether God created humankind more than once and in a time long before the birth of genetics or a theory of natural selection, a classification scheme that *endured rock solid* as a foundation for a study and understanding of human variation. With minor fluctuation, the idea that our societies can be partitioned reasonably into four major groupings has withstood the Industrial and American Revolutions, the institution and dissolution of American slavery, the world wars, the rise of civil-right consciousness, the 20th-century exploration of modern biology, and even the new physical anthropology (Sauer 1993:80, emphasis added)

He continues (1993:80): "Nonetheless, the question I raise here in 1993, can it be that so many of us in our research, writing and teaching virtually its original form the four-fold scheme invented over 200 years ago." Given the fact that Linnaeus did not understand the extent of biological variation, evolutionary theory, or genetics, he sarcastically

observes, "No, if Linneaus was correct in his characterization of varieties of our species, he must have been incredibly lucky."

It is important to put Sauer's analysis in historical perspective and fill in some of the gaps that he has conveniently left out in this description of Linneaus' contribution and the subsequent impact that it had on science. Linneaus' binomial classification, which is the basis for modern taxonomic nomenclature, also included a racial classification that reified folk taxonomy and included a feral and monstrous race of one-eyed populations whose women's pendulous breasts were often slung over their shoulders. His racial classification reflected and reinforced prevailing popular racist perspectives that use social and biological characteristics to classify races. In fact, Jonathan Marks (1995) argues that Linneaus' classification should be understood more in terms of a classification of behavioral, social, and cultural variation than as an analysis of geographic biological variability.

American Indians (*Homo americanus*), for example, are described as "reddish, choleric, painting himself with fine red lines and are regulated by custom." Asians (*Homo asiaticus*) are "sallow, melancholy, stiff, avaricious, having black hair, and dark eyes, covered with loose garments and ruled by opinion." Africans (*Homo afer*) are "black, phlegmatic, relaxed, indolent, negligent, have silky hair, flat noses, anointing himself with grease and governed by caprice." Europeans (*Homo europeus*) are "white, sanguine, muscular, gentle, acute, inventive, have long flowing hair, blue eyes, are covered by close vestments and governed by law." (Linneaus cited in Slotkin (1968:177-178). Linneaus was not lucky, he was simply reifying the "politically correct" folk taxonomy of the period.

Sauer's switch from a stance of underscoring the utility, but not the validity, of race to a wholesale acceptance of the race concept is startling. The lesson here should be one of the ease with which we can sometimes allow our assumptions to guide not only our views of history, but also the direction of our science. Extreme care is obviously required.

The acceptance of the last viewpoint is not simply based on the virtue of its being the only one left. On the contrary, the evidence outlined above clearly points to it being the most scientific and professionally responsible way of handling the difficult and potentially explosive race issue in forensic anthropology.

Although race has traditionally been one of the four criteria that make up the standard "biological profile" of the forensic report (along with age, sex, and stature) it is not required information for an identification of the individual. On the other hand, we as scientists have a responsibility to the community we serve to promote ideas that have evidential support instead of those that not only are not supported by evidence, but that are likely to promote systems of social inequality. As well we should return to sanctioning Social Darwinism if it were to become socially expedient again. It seems clear, as evidenced by Sauer's flexibility on the issue, that unless a conscious ethical and political stance is taken by scientists, slipping back into old, socially sanctioned ways of thinking is almost inevitable.

CONCLUSIONS

Returning to the Alice Brues' quote from "The Objective View of Race" (1993) that prefaces this essay, perhaps a better astronomical analogy for the debate over race would be the one of Galileo Galilei. History tells us that Galileo faced execution for his support of the Copernican theory of heliocentricity. Fifty years after the heliocentric theory had been proposed, Galileo used one of the first assembled telescopes to observe several of Jupiter's moons. He did not accept the prevailing interpretation of an Earth-centered cosmos but challenged the "politically correct" view. His executioners knew that he was wrong. The sun *obviously* rotated around the earth, this was common knowledge, a phenomenon they witnessed every day with their own eyes. Moreover, its movements orbiting the earth could be measured *scientifically*, and had been since the ancient Greeks. Not only was Galileo executed, but the Catholic Church only got around to officially admitting that he had been correct in 1992.

Those scientists who are convinced by the evidence that denies that races are natural categories are facing similar odds. Very few of the lay public will accept the scientific rejection of race when they "see" the "evidence" with their own eyes every day. Convincing them will not create a martyr, in the sense of Galileo, but it is as much a feat that requires great courage, forbearance, and tenacity. The difficult role has always been assigned to the individuals seeking to change the status quo. But if political and ethical reasons are not enough to encourage members of the physical anthropological community to "fight the good fight," then rigorous standards of scientific accuracy

and commitment to evidential support, should be.

NOTES

1. See also Baker 1994a; Baker 1994b; Baker and Patterson 1994.

2. The essay has been reprinted in a more accessible form (Hogben 1973).

3. There is a saying that describes Rhine's transformation of the social category to a biological reality: "I wouldn't have seen it if I hadn't believed it."

4. The notion that all traits are racial (or not entirely free of some social racial meaning) is a difficult position to defend. If all traits are racial, then any population that differs from another is by definition is a race. Defining every breeding population as a race is meaningless concept.

5. Even computer programs that "identify" race using a larger number of traits to place an unknown individual into a known race are problematic. Fordisc 2.0 uses discriminant analysis to compare the "unknown" individual to a large sample of individuals of known "race", and resulted in "inconsistent" results when tested with a sample that shows a great deal of intra-regional variation (Kosiba 2000).

6. Robert Hahn (1992) found that race changes as much as 40 percent in infants who died during their first year. The race at birth was determined by parents and at death by others such as the medical examiner.

7. Sauer's paper appears in a publication (Gordon 1993) by NAPA (National Association for the Practice of Anthropology) and the American Anthropological Association. This Association, which has been active in educating the public on problems with the biology of race, saw no inconsistency in the publication that does much to support the validity of race.

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