

## The Scientific Fallacy of the Human Biological Concept of Race

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The authors provide a detailed presentation of the arguments commonly advanced to support the claim that the term "race" does not represent a useful scientific category. Their argument is supported by an extensive bibliography of selected texts.

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### A Wrong Approach

Modern science try to understand the phenomena of nature through the formulation of hypotheses and their subsequent empirical control by comparing predictions and observations. If a scientific hypothesis receive the empirical validation then it become part of the construction of a paradigm; otherwise, the hypothesis must be simply rejected if falsified by experimental results (Popper 1934; Kragh 1987). That was not the case of the construction of the "anthropological dogma" of human biological concept of race. Physical anthropology originated as an independent scientific discipline during the eighteenth century, and has been affected by an epistemological error from the very beginning. In fact, the existence of races was considered the basic principle of physical anthropology instead of just being a hypothesis amenable to empirical investigation, and therefore for about two centuries physical anthropologists refused to be led by the only criterion of truth that natural sciences recognize, namely empirical validation. However, all scholars who

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dedicated themselves to that futile classificatory exercise unintentionally contributed to demonstrate that they were involved in a false paradigm, because of the problematic aspects in explaining human biological variability using the taxonomic sub-specific category of race. This difficulty in identifying human races was proved by the high number of subdivisions suggested, which included two to sixty-three races, and differences in the traditional definition of race: Race as synonymous of sub-species, ethnic group, population, and so on (Darwin 1871; Count 1950; Biasutti 1967; Gould 1981; Brace 1982).

Why did so many physical anthropologists refuse to test the hypothesis of whether human biological variability could be neatly subdivided according to the taxonomic sub-specific categories of race? Why did so many physical anthropologists accept the racial paradigm? Three main constraints, two external and one internal to the scientific process, contributed to this serious error in scientific logic. First, the history of the cultural context from which physical anthropology originated. Second, the history of the social context in which physical anthropologists formulated the concept of race. Third, the broad process of construction of theories within Biological Sciences.

### **The Cultural Context**

#### **which Conditioned Physical Anthropologists**

The first reason emerged from a western culture idea that biological and ethnic diversity is very ancient. This concept developed in Egypt during the second millennium B.C., and represented a deep change in perspective. In fact, before then not only humanity but the whole world was considered as a unit. The Egyptians subdivided humankind into four groups, one of which was made up by themselves. They in fact called themselves Remet which simply means "man". In their paintings of the fifteenth century B.C. they were portraided in red, while the Asiatics named Aamu in yellow, the populations of sub-Saharan Africa, the Nubians named Nehesyu, in black, and the Libyans, as well as some western populations named Tjemchu, with yellow hair and blue eyes (Bresciani et al. 1993; Gardiner 1947). Still in ancient times, the father of history Herodotus (490/480-430/420 B.C.) gave a physical description to a great number of people in his *Historie*, and Pliny the Elder (23-79) in his *Naturalis historia* explained physical differences between Africans and

Europeans as a direct consequence of climate. After Herodotus all long-distance travellers, up to the origin of physical anthropology, left descriptions of the peoples they met (Daumas 1957; Duchet 1971; Geymonat 1973). A classic subdivision of humankind was reported in the Bible, which dominated western culture during the Middle Ages and part of modern times. Chapters ten and eleven of the Genesis describe the origin of populations as descending from Noah's sons and their dispersion: Shem was the ancestor of Semites (Arabs and Hebrews), Ham of Hamites who populated southern-western regions of the world, i.e. Africa, and Japheth of Aryans or Indo-Europeans. However, the Bible not only subdivides humankind it also contains a curse against Ham, the son of Noah who is considered the ancestor of the African populations (Genesis, 9, 24-27). It is clear that the troubles for the African populations began very early.

During the Renaissance (fifteenth and sixteenth centuries) psychological types and their classification, besides physical (mainly anatomical) differences, became again popular<sup>3</sup> and assumed great importance. According to Burke (1993:192):

*Classical views of the physical constitution of man, and the distinction between four personality types (choleric, sanguine, phlegmatic and melancholy), were taken seriously by writers in this period, and they are not without relevance to the arts.*

In fact, as an example, on the theme of the four personality types Albrecht Dürer (1471-1528) dedicated in 1526 a painting entitled the Four Apostles (Alte Pinakothek, Munich). Each of the four panels portrays an Apostle and an Evangelist typifying the four humours: St John as the sanguine, St Mark as the choleric, St Paul as the melancholic, and St Peter as the phlegmatic (Murray and Murray 1993:201). This subject was used later by Linnaeus in his racial classification.

### **The Social Context which Conditioned Physical Anthropologists**

The second reason was related to social and ideological conditioning of physical anthropologists when western societies justified slavery, colonialism, and discrimination (Montagu 1952; Livingstone 1962; Mead et al. 1968). In that period it was

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<sup>3</sup> Views of the distinction between psychological types came first from a text attributed to Aristotle.

essential for a civil society to find a moral justification for immoral behaviours and nothing was more propitious than a "scientific" demonstration that the observable physical differences, i.e. racial differences, were associated to intellectual and moral differences. Many attempts were made to state biological determinism and the superiority of some races over others. So it was a natural right, and also a duty, for the so called "superior races" (of course Europeans and European-Americans) to dominate. Montague Francis Ashley Montagu (1952) and Kenneth Adrian Raine Kennedy (1976) quoted a long list of such European and European-American degenerated ideas although they did not come from physical anthropologists.

In Italy, during fascism and its policy in acquiring colonies, for the most part in Africa, physical anthropologists devoted many efforts to support racist positions. The most zealous was certainly Lidio Cipriani (1892-1962), who wrote the following nonsense just before the attack of fascist Italy against Ethiopia in 1935 (Cipriani 1935):

Within negroes races, mental inferiority of women is very close to mental deficiency; moreover, at least in Africa, some female behaviours are not human, and resemble animal behaviours (p. 181). [...] As far as brain of negroes is concerned, [...] its morphology is scarcely comparable to the less developed brain of some European women. On the contrary, [...] very clever Caucasian men show an increase in the brain volume and a different morphology, mainly in the temporal lobe, than other populations (p. 184).

It is interesting to note that in 1909 Franklin Paine Mall (1862-1917) had already demonstrated that there were no differences in human brains according to race (quoted in Mukhopadhyay and Moses 1997, note number 3). The ideological role that these statements were to play in terms of social control in fascist Italy on the eve of the Ethiopian War was made manifest by the definition of race that Benito Mussolini (1883-1945) gave only three years earlier to Emil Ludwig [pen-name (1881-1948) 1932:73]: "Race: this is a feeling, not reality". Therefore, before the attack to the Ethiopians was planned Mussolini denied any biological basis of the concept of race

(Ludwig 1932:73).<sup>4</sup> Besides, at the beginning of the 1960s Cipriani changed his thought on the subject and became rather cautious (Cipriani 1962:25,26).<sup>5</sup> Racist assertions like those stated by Cipriani were strongly rejected by physical anthropologists free from any social and political prejudices, but above all by those interested in scientifically strict reasoning. After World War II the scientific community of physical anthropologists rejected the causal linkage between biology and mental capacity, a fundamental premise for the hierarchical evaluation of races, and the social-political dominance of the so called "superior races". This anthropological view was not new because Darwin had already specified (1871) that there was much similarity in mental traits between races. Besides, more recently this position was clearly articulated for public consumption in several documents: The statements drew up at UNESCO's House in Paris of July 1950 (I. Statement on race), June 1951 (II. Statement on the nature of race and race differences), and September 1967 (IV. Statement on race and racial prejudice); The proposal drew up in Moscow of August 1964 (III. Proposals on the biological aspects of race); The UNESCO "Declaration on Race and Racial Prejudice" adopted by the General Conference at its twentieth session in Paris, 27 November 1978; The document proposed by the International Institute for the Study of Man (Chiarelli 1995a, 1995b, 1996);<sup>6</sup>

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<sup>4</sup> "Of course, pure races do not exist any longer, not even Jewish race. But, exactly, from right mixtures often derives strength and beauty to a state. Race: this is a feeling, not reality: 95% feeling. I do not think that it is possible to prove whether or not a race is biologically pure. [...] The national pride does not need at all the frenzy of race".

<sup>5</sup> Comment to Bielicki's article (1962): "I wish only to make the point that all types of research directed at establishing inter-population relationships, no matter how conducted inevitably result in deductions that are provisional until new light is available from general biology". And comment to Wiercinski's article (1962): "I consider aleatory most of the analysis concerning ethnogenesis".

<sup>6</sup> The document on race proposed by the International Institute for the Study of Man – The reappearance of a subversive and confused concept of race and the artificial ethnic differentiation promoted by cultural, religious and political circles is misleading and dangerous for the present state and hope for worldwide integration of humankind. The International Institute for the Study of Man with this declaration intends to clarify: a. that the physical differences among human beings, apart from the differences related to sex and age, are due to environmental adaptations developed during 3 or more million years of the evolution of our species; b. that the cultural and religious differences which are the basis for the ethnic barriers are related only to the life of the individual and to the cultures in which the individual has been imprinted and raised during his early years of life.

And the American Association of Physical Anthropologists position to update the 1964 proposal (AAPA 1996). On the subject a very popular book by Theodosius Grigorievich Dobzhansky (1900-1975) entitled *Genetic Diversity and Human Equality* was published in 1973 and, more recently, Luigi Luca Cavalli-Sforza, Paolo Menozzi, and Alberto Piazza (1994:19-20) stated:

There is no scientific basis to the belief of genetically determined "superiority" of one population over another. None of the genes that we consider has any accepted connection with behavioral traits, the genetic determination of which is extremely difficult to study and presently based on soft evidence. The claims of a genetic basis for a general superiority of one population over another are not supported by any of our findings.

Such efforts to dismantle racist ideologies demonstrate how deeply influenced was the popular and intellectual way of looking at human biological variation and how human behaviour was affected by the ideological construction elaborated by physical anthropology between the nineteenth and the first half of twentieth century. However, in our opinion, the concept of race must be rejected not for its misuse for political reasons, but because many decades of scientific research has demonstrated that it is scientifically misleading in evaluating human biological variability.

### **The Scientific Construction of the Concept of Human Biological Race**

The third reason was due to the peculiar situation of biological research in the eighteenth century. The discovery of the Americas, geographically far from the rest of the world, made seventeenth century Europeans aware of a great number of new species of plants and animals. This sudden increase of knowledge about biological variability contributed the importance of classification as a scientific tool. Classifications became the essential tool for ordering and then studying variability. Until then, classifications had not been utilized, and in naturalistic studies only the medical properties of the plants used in botanical pharmacology were reported. On the contrary, from that moment onward, taxonomy became the fundamental tool of biology and of other naturalistic sciences. It was also

believed that classifications would have been able to clarify the model of organization of the world. Therefore, it was stated that biological studies had to be devoted to naming plants and animals and finding out the relationships between them (Rossi 1997). Moreover, it became clear that biological diversity within each species was important and therefore taxonomists introduced sub-specific categories to better classify variability. Differently from what had happened during the Middle Ages, in such a scientific climate humankind started to be physically examined through the same technical and theoretical levels reached by biology in the Age of Enlightenment which were also applied to the study of all other living beings. Also human biological variability, including the variability of native American populations which were unknown until then, was erroneously classified into races. Therefore, human racial classifications were not only the result of social-cultural conditioning, but also of a scientific trend. However, it is important to note that the use of human racial classifications was not accepted by all scholars. Different scientific ideas were proposed by Johann Gottfried von Herder [(1744-1803) 1784-1791] and Samuel Stanhope Smith [(1750-1819) 1810; quoted in Greene 1959] who were against the use of racial classifications in anthropology, but unfortunately not followed by physical anthropologists.

A peculiar position was taken by Charles Bonnet [(1720-1793) 1781:130], who did not propose any racial classification although he accepted the concept of race, or variety. He gave great importance to the variability not only of our species but also of each population:

The trend of nature is uniform, and humankind has its gradation, as everything in the world. [...] If you consider all the nations of the world and look at the people of the same Reign, or Province, or City, or Quarter, or even of the same family you would recognise as many different types of people as many individuals you can see.

It was a mistake to use human racial classifications although during the Age of Enlightenment they contributed to enlightening "Man's Place in Nature":<sup>7</sup> An animal species within all other animal species. After many centuries rational thought

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<sup>7</sup> To use the title of the famous book by Thomas Henry Huxley (1825-1895), published in 1863.

started to prevail again over metaphysics, particularly the biblical tale. As in classical philosophy, humankind was studied as an animal species, and was not considered as an exception within living beings. Indeed, Aristotle in his *Historia animalium* placed humanity at the top of animal kingdom, and considered it as the most perfected species. This position is quite different from the position stated by Christianity: The man was created in the image of god. Also today the Catholic Church states the ontological leap.<sup>8</sup>

The debate on human racial classifications was reinforced by the discussion on human monogenism and polygenism. Biblical anthropology maintained monogenism or the unity of the origin of humankind, sanctioned by Augustine (354-430) in his *De civitate Dei*, for creationistic belief and not for empirical validation of the hypothesis. On the contrary, laic and positivist anthropology which was then becoming popular, supported polygenism, a different origin of human populations. Polygenism was the rational, yet erroneous answer to the discovery of native Americans. In fact, they thought that these populations, who had been living in a continent far from the Old World, could not have had the same origin as the rest of humankind. At that time, such an idea was rather common. In fact, there were not historical records on the existence of the American continent, moreover the earth was thought to be very young. The question to be answered was: How could so many physical "types" originate in so few millennia, given the short history of humankind? The debate became particularly bitter in the nineteenth century when Paul-Pierre Broca (1824-1888), strong supporter of polygenism, abandoned the *Société de Biologie* which was against this theory and in 1859 founded the *Société d'Anthropologie* of Paris. Between 1859 and 1893 this new association, positivist, materialistic and anticlerical was the model for other anthropological societies which rose both in Europe and in the United States.<sup>9</sup>

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<sup>8</sup> See the paragraph "Humankind in the biological classification".

<sup>9</sup> London 1863, Berlin 1869, Vienna 1870, Florence 1871, Stockholm 1873, Washington 1879, Rome 1893. In 1882 Physical Anthropology was included into the American Association for the Advancement of Science. In Florence the *Società italiana di Antropologia* (with its journal *Archivio per l'Antropologia e l'Etnologia*) was founded in 1870 by Paolo Mantegazza (1831-1910), who stated human monogenism. The second father of the Italian biological anthropology, Giuseppe Sergi (1841-1936) supporter of polygenism, left the Florentine institution and



The contrast between monogenism and polygenism has been overcome. Modern anthropology has demonstrated that humankind has had a common evolutionary history and that, at the basis of our origin, there is not a founding couple, the idea proposed by creationists, but a population belonging to a species different from ours, and whose evolutionary changes, typical of anatomically modern humans, have occurred in a short period of time.

### **Humankind in the Biological Classification**

The first modern attempts at classifying human biological variation were given in the seventeenth century by François Bernier [(1625-1688) 1684], who classified humankind into four groups and by Richard Bradley [(born at the end of the 17th century-1732) 1721], who subdivided our species into Whites (Europeans and Americans), Negroes (Abyssinians and Negroes), and Intermediate (Mulattoes), thus disregarding all Asiatic populations.

But it was only during the next century that the first scientific subdivision of modern humans into races was made by the father of biological taxonomy: Karl af Linné (Linnaeus 1707-1778), who extended the Latin binomial nomenclature to animals and minerals. This nomenclature had been introduced in the field of Biology by Kaspar Bauhin (1560-1624) in order to classify plants (Kennedy 1976). Following the medieval scholastic philosophy, Linnaeus was a convinced supporter of the monophyletic origin of humankind, and in 1735 he first called our unique species *Homo sapiens*, with four varieties: *Europaeus albesc.*, *Americanus rubesc.*, *Asiaticus fuscus* and *Africanus niger*. He was undoubtedly biased by the renaissance theory of temperaments which used to define Europeans as sanguine, Native Americans choleric, Asiatics melancholic, and Africans phlegmatic (Linnaeus 1789; Daumas 1957). As Panofsky (1943) suggested, the theory of the four temperaments implied a hierarchy, so when Linnaeus coupled what the renaissance culture considered the noblest humours to Europeans and Asiatics, he banished Americans and Africans to the lowest level of his racial hierarchy.

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founded in Rome in 1893 the *Società Romana di Antropologia*, named in 1937 *Istituto Italiano di Antropologia*, (with its journal *Atti della Società Romana di Antropologia*, named in 1911 *Rivista di Antropologia*).

Even though Linnaeus was a follower of creationism, he achieved an “evolutionary” purpose: he recognized biological variability which characterizes the species and created the sub-specific taxonomic category named “variety”. Moreover, he included the genus *Homo* in the order of Anthropomorpha. In such a way, the advent of modern Biology freed humankind from the biblical destiny of “special creature”. But the contrast between rationality of scientific thought and the biblical metaphysics on the nature of humankind is not yet over. In his recent message to the Pontifical Academy of Sciences,<sup>10</sup> dated 22 October 1996, Joannes Paulus II accepted the biological theory of evolution but on humankind he stated yet (point n. 6):

With man, then, we find ourselves in the presence of an ontological difference, an ontological leap, one could say. However, does not the posing of such ontological discontinuity run counter to that physical continuity which seems to be the main thread of research into evolution in the field of physics and chemistry? Consideration of the method used in the various branches of knowledge makes it possible to reconcile two points of view which would seem irreconcilable. The sciences of observation describe and measure the multiple manifestations of life with increasing precision and correlate them with the time line. The moment of transition to the spiritual cannot be the object of this kind of observation, which nevertheless can discover at the experimental level a series of very valuable signs indicating what is specific to the human being. But the experience of metaphysical knowledge, of self-awareness and self-reflection, of moral conscience, freedom, or again, of aesthetic and religious experience, falls within the competence of philosophical analysis and reflection, while theology brings out its ultimate meaning according to the Creator's plans.

The term race appeared in scientific literature only in 1749 thanks to Georges-Louis Leclerc comte de Buffon (1707-1788) who changed it from the Linnean term variety (Buffon 1749-1804). He stated that humankind is one species with six races, and hypothesized environmental influences on their mechanism of origin (Buffon 1749). However, it was Johann Friedrich

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<sup>10</sup> *L'Osservatore Romano*, Weekly edition in English, n. 44 (1464), 30 October 1996.

Blumenbach (1752-1840) who greatly influenced the future thought of physical anthropology with his doctor of medicine thesis *De generis humani varietate nativa* from the University of Göttingen in 1775. The book was very popular, mainly the third revised edition published in 1795, which is considered the promoter of the new science of physical anthropology. Blumenbach stated that humankind is made up by one species with five races. He took humanity off the Linnean order of *Anthropomorpha*, and created the order of *Bimanus*. Moreover, he coined the term *varietatis Caucasiae* (Caucasian or Caucasoid) for populations of European origin, from a cranium of his osteological collection which belonged to Georgian Caucasus. According to Blumenbach the shape of the cranium represented the European "type" of head. Similarly, he described other four crania to be the ideal shape to fit the various races of his classification.

It was thanks to Blumenbach that the shape of the cranium, and therefore the shape of the head, received great attention in human racial classifications, and the publication of catalogues of human crania, preserved in osteological collections, became common. The interest for head morphology also increased in relation to the success of the ideas of a new pseudo-science, phrenology. Its founder Franz Joseph Gall (1758-1828) thought that psychical functions of individuals were determined by the brain and cranium anatomy (Gall 1825). The idea that human behaviour was correlated to human physical characteristics influenced anthropology to the point of becoming the essence of the concept of race.

The last human racial classification dating back to the Age of Enlightenment was suggested by Immanuel Kant (1724-1804) who, in 1785 and 1798, listed four races.

### **The Chronology of Life**

The eighteenth century thought was characterized by the contradiction between the monogenism, the existence of human biological races, and the Christian chronology of the origin of the world which fixed its age at a few thousand years. The first "rational" calculation of the age of earth was made by the Irish clergyman James Usher (1581-1656), Archbishop of Armagh. Usher stated the date of the Creation to be October 23, 4004 B.C., and the date of the creation of man six days later: 28 October (Usher 1650:1). Moreover, the English clergyman John

Lightfoot (1602-1675), Vice-Dean of the University of Cambridge in 1654, calculated that Adam was created at 9 o'clock a.m. (Lightfoot 1642:4) and that the date of the Deluge was 2348 B.C., i.e. 1656 years after the Creation (Lightfoot 1647:7, 10). These calculations were made according to the reconstruction of the Old Testament, using the genealogies reported in the Bible.

The young age of the earth was not in accordance with the fifteenth century B.C. paintings on the Egyptian tombs, which already represented morphological differences of humankind. One is then bound to ask how could the diversification of human biological races have occurred in a couple of millennia? In such a scientific climate, polygenism, supported by several authors, seemed to be more consistent with the earth chronology of the time.

Only towards the end of the eighteenth century the idea that the earth was much older gained consistency. In 1778 Buffon shifted the origin back to about 75.000 years B.P., and James Hutton (1726-1797) in 1795 stated that an indefinite span of time was needed to produce the land which then appeared. Hutton's thesis was shared by Charles Lyell [(1797-1875) 1830] who contributed to the decline of Christian chronology. During the nineteenth century, it was stated that the age of the earth was to be set even further back: Not less than many million years. Now we know that the earth originated some thousand million years ago (Dalrymple 1991). As a consequence, the idea of a very ancient earth gave rise to the idea of antiquity of living beings, and after this back-shift in time, polygenism lost efficacy as a tool for investigating the biological evolution of humankind.

### **The Morphological Approach to the Concept of Human Biological Race**

Until the first decades of the twentieth century a classification involved morphological features such as measurement and description, or anthropometry, reaching a highly sophisticated level. The main interest was to evaluate the connection between brain size versus intelligence. Craniometry was not developed to examine whether there were differences among human races, for physical anthropologists were sure of it, but to examine the scientific basis of the differences thought to exist among human races. Broca was one of the most

distinguished scholars involved in that kind of studies, who stated the causal relationship between brain size and intelligence. Louis Pierre Gratiolet (1815-1865) instead, maintained that intelligence was related to the age of obliteration of cranial sutures (Quattrone 1998).

In the eighteenth century Peter Camper [(1722-1789); quoted in Greene 1959] defined the first parameter to qualitatively evaluate physical characteristics: the prognathism angle, a measurement of the degree of facial projection. During the following century, Broca introduced the statistical method. The impression of precision in generating classifications of races was reached when anatomist Andres Retzius (1796-1860) used head dimension to define the cephalic index, which was putatively considered stable and therefore a good racial indicator. But efforts to develop more elaborate anthropometric techniques to make human racial classifications objective persisted into the twentieth century as, for example, the spectrometric measure of skin colour.

The limitation of morphological characteristics is due to the impossibility to discriminate between the contribution of genes and environment in forming their phenotype. It follows that those traits are not suitable to clarify the relationships between the various groups. In fact, in order to have a naturalistic value, a classification must rely on a network of ancestor-descendant relationships, i.e. the more populations resemble each other, the closer the point in time when they diverged from a common ancestor; in other words, the evolutionary path covered together is longer. It is obvious that for such studies one needs characteristics with well known genetic bases and on which the environment does not act; otherwise, we would measure the similarities between the environments in which the human populations live instead of their phylogenetic relationships. Skin colour, colour and shape of eyes and colour of hair, shape and size of body and head are under strict and direct environmental influences and tend to adapt themselves to the specific environment in which they live. This is why they are the best features to trace our ecological history and to help us understand the geographical typologies of humankind that were once used to define human races. To put it in a simpler way, populations that live in a certain geographical environment are more similar morphologically, even though they do not share a

common phylogenetic history.

### **Doubts on the Concept of Human Biological Race**

Charles Robert Darwin (1809-1882) was aware of the weakness of the concept of human race. In his book on the origin of humankind published in 1871 he argued for complete interfertility of races, and their physical and mental similarity. Races “graduate into each other” he said.<sup>11</sup> He also stated that sexual selection was the main force involved in originating races and that humankind is one species originated in Africa. The darwinian revolution eradicated the typological or static concept of species, but its impact on the concept of human race was less significant for a long time.

At the beginning of the century Franz Boas (1858-1942) was among the first anthropologists to struggle against biological determinism, which dealt with the cause and effect relationship between biological and cultural traits, and against the degenerative effects of racial crossing. Besides, in his book and paper published in 1912 the magnitude of short-term environmental effects on the variability of morphologic traits was well documented. This empirical observation produced his opposition to the stability of anthropometric features and therefore the opposition to the idea of race as fixed group (Boas 1928:63):

We have seen that from a purely biological point of view the concept of race unity breaks down [...] similarities between neighbouring races [...] are so great that individuals cannot be assigned with certainty to one group or another.

More recent attempts were made to discredit the notion that human body proportions are primarily racial (M. Kapell and B. Bogin, personal communication).

Montagu who was the supporter of anthropology against nazi-fascist racism rejected the “anthropological” concept of race, while supporting the genetic subdivision of humankind (Montagu 1952). In our opinion, this was an incorrect approach, since genetics is a level of biological knowledge which can be compared with morphology or physiology but not with physical anthropology. Physical anthropology has failed by assuming the taxon of race to rank human biological variation

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<sup>11</sup> Darwin, 1871, chapter 7.

using both morphology and genetics, and more recently, it has also failed at the DNA level analysis. The cause of the evident failure was made clear by the Debate that took place in the field of Zoology during the 1950s in which the scientific inconsistency of race as a biological taxonomic concept (Wilson and Brown 1953; see also Futuyma 1979) and, consequently, its inconsistency when applied to humankind was argued. Nevertheless, Montagu was crucial in helping both physical and cultural anthropologists, as well as the non-anthropological community to understand the fallacy of the concept of race (Reynolds and Lieberman 1996).

The concept of race occupied a central position in physical anthropology up until the early 1960s when the last classification of races was published by Stanley Marion Garn (1961), and an active Debate took place between eminent specialists who defended or rejected race. In the Debate reported in collections of papers (Montagu 1964; Mead et al. 1968), and in scientific journals, mainly Current Anthropology, races were considered objective natural realities,<sup>12</sup> or absolutely unsuitable for describing human biological variation.<sup>13</sup> The failure of the concept of race as a useful tool in physical anthropology to understand biological variability was synthesised in a masterly manner by Frank Brown Livingstone (1962:279): "Variability does not conform to the discrete packages labelled races". However, it should be noted that the same notion of race evolved from typological to a populational and processual concept (Lieberman 1968; Count 1964).

In 1962 Carleton Stevenson Coon (1904-1981) related the concept of race to evolutionary synthesis. In his analysis culture was linked to biology so that each race was related to a different cultural level. Coon stated that races reached the evolutionary stage of *Homo sapiens* at different times, and considering that Europeans and Asians emerged before Africans, they were culturally more advanced being faced with civilisation for a longer period of time. His interpretation of the last phase of our biological evolution was generally criticised as a racist version of the multiregional hypothesis (see below).

Several scholars supporting the concept of race developed

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<sup>12</sup> Czekanowski 1962; Dobzhansky 1962a, see also 1962b; Lasker 1962; Wiercinski 1962; Gates 1963; Newman 1963; Coon 1964; Garn 1964; Huxley 1964.

<sup>13</sup> Hiernaux 1962, 1963; Livingstone 1962, 1963; Montagu 1963; Brace 1964.

research strategies which at last favoured scientific criticisms of the concept itself. Renato Biasutti (1878-1965)<sup>14</sup> in the four editions of his book (1941, 1953, 1959, and 1967; the last is reported in the bibliography) summarized morphologic and genetic trait variations in geographic distribution maps which showed lack of correlation between traits. This approach turned out to be so damaging for the concept of race because it contained the basis for a scientifically more valid appraisal of human biological variation, i.e. the use of the cline concept or the gradual transition (Livingstone 1962; Brace 1964; Cavalli-Sforza 1972; Beals 1982). Besides, during the 1960s many scientists were called to develop empirical studies on the role of selective and adaptive forces, and according to Charles Loring Brace (1964) these kind of studies would make possible abandoning the concept of race.

In 1972 Richard Charles Lewontin gave an empirical falsification of the concept of race (see next paragraph). Ten years later another Debate appeared in *Current Anthropology* (Littlefield et al. 1982) and in other journals (Nei and Roychoudhury 1982) between specialists defending or criticising race. The main opinions against race expressed during the 1970s were summarized by Eliene Sousa Azevêdo (1982:647): Human biological variability is continuously distributed; human biological classifications are arbitrary; and it is scientifically impossible to demonstrate the existence of races.

The racial paradigm lost consensus during the last decades of the century. Leonard Lieberman and Fatimah Linda Collier Jackson (1995) demonstrated that American anthropology textbooks which rejected the concept of race reached only twenty percent between the 1930s to the 1960s, and increased to seventy percent in the 1980s. But the controversy on race is not over yet. Indeed, the concept of race seems alive and prospering in the popular imagination, and among physical anthropologists (Goodman and Armelagos 1996). A survey carried out in the United States in 1985 clearly demonstrated that half of physical anthropologists agreed with the statement that races exist (Lieberman and Jackson 1995; see also Lieberman et al. 1992). And more recently, in 1993, the American Association of

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<sup>14</sup> Biasutti subdivided humankind in 4 cycles, 4 branches, 16 stocks, and 53 living races.



Physical Anthropologists rejected a statement against the scientific use of race (Armellos 1995; Lieberman and Jackson 1995, note number 7). A year later, George John Armellos (1995:104) reported:

In 1994, the executive board and the section assembly of the American Anthropological Association passed a resolution stating, in part, «that differentiating species into biologically defined “races” has proven meaningless and unscientific as a way of explaining variation (whether of intelligence or other traits)».

Strangely enough this scientifically plain statement, which represented the current state of the art, did not appear in the revision of the 1964 UNESCO proposal named AAPA Statement on Biological Aspects of Race (1996). On the contrary the AAPA document included old, obvious, and confusing ideas on the concept of race unfit for a revision. Indeed, American anthropologists adopted a position against the existence of pure races (point 3); against the superiority or inferiority of biological races (point 6); against the restriction of intermarriages between individuals of different races (point 9); and against the possibility of identifying a national, religious, linguistic, cultural or economic group with a particular race (point 10). But all of these statements simply re-proposed the Debate of the first half of the century, so why were they offered as revisions? Probably such an obsolete document was imposed by so many physical anthropologists who believed that human biological races exist. This idea is reinforced by point 5 where the statement “humanity cannot be classified into discrete geographic categories with absolute boundaries” is followed by “the complexities of human history make it difficult to determine the position of certain groups in classifications”. The second part is tautological but necessary to be able to mention human racial classifications. Indeed, it is absolutely impossible “to determine the position” of each population and not only “of certain groups”, and this is why classifications are meaningless. We also think that the position against racism (point 11) is culturally correct and always useful, but we would like to point out that the problem with the biological concept of race is scientific in nature and not social: That is race is “unscientific as a way of explaining variation”.

The concept of race seems to have found new vitality in recent literature. In fact it is deeply involved in one of the main models concerning the origin of anatomically modern humankind (Lieberman and Jackson 1995, and note number 7), the "multiregional model" which proposes a scenario where different populations of *Homo ergaster* are simultaneously transformed into modern humankind in different parts of the world. The model suggests a great antiquity in the differentiation and evolution of races from the local types of *Homo ergaster* into their anatomically modern descendants (Weidenreich 1947; Wolpoff et al. 1984; Thorne and Wolpoff 1992; Wolpoff 1993; Frayer et al. 1993). However, the racial palaeontology concept was rejected by other scholars:

The fallacy of tracing lines of descent for living populations backwards into the Pleistocene and evoking some grizzled fossil skull as an honoured ancestor is confined today to the claims of non-scientific champions of reburial politics [...] We must conclude that beyond the span of a few centuries all such lines become tenuous, and within a few millennia we literally lose the thread of morphometric associations thereby rendering affinities un-recognizable and untraceable" (Kennedy and Chiment 1992:122-123; see also Kennedy 1976).

Recently, one of the main supporters of the "multiregional model" and then of the racial concept, Alan Thorne, stated in his speech at the Dual Congress 1998 (Sun City, South Africa) that "races disappear, people continue in a new form". In our opinion there is an evident contradiction in Thorne's position, because his statement is obviously against the concept of race.

The concept of race is also currently used by forensic anthropologists. They claim that skeletal traits (cranial, post-cranial, and dental) would allow the identification of the race to which the bones of a corpse would belong, and to this purpose several anthropometric measurements and functions are used to yield a quantitative value from which "race is indicated by whether or not a specimen's score falls above or below a predetermined sectioning point value" (Sauer 1992:109). Also non-metric or anthroposcopic methods are used in race determination (Krogman and Iscan 1986:272<sup>15</sup>). According to

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<sup>15</sup> "The more typically Negroid has undulating supraorbital ridges, sharp upper orbital margins, a rounded glabella, a plain frontonasal junction, and a wide

forensic anthropologists race should be determinable from “white” and “black” skull morphology in eighty to ninety percent of cases; but only one out of seven for American Natives. The indefinite results should be “attributed to the incomplete nature of the remains or mixed ancestry” [Sauer 1992:109]. However, as forensic anthropologists know, Americans of African or European ancestry, for example, are blended populations from a variety of different areas in Europe and Western Africa. Besides, African-American communities are genetically mixed with American Natives and Europeans (Reed 1969; Crawford 1984; Biondi et al. 1988; Brues 1992; Hsieh and Sutton 1992; Bortolini et al. 1997; Bravi et al. 1997; Parra et al. 1998; Martinez-Labarga et al. 1999). The discrepancy of the concept of race in forensic anthropology was well proved by researchers involved in the discipline:

My position in this paper is that race identification by forensic anthropologists *has little to do with whether or not biological races exist* (emphasis ours). The race controversy in anthropology is a Debate about natural groupings of human biological diversity, a question of taxonomy [...] Whether these [geographic populations or ethnic groups] 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 1992:109-110).

To the physical anthropologist, race is simply a phenomenon to be explained [...] race is the fact that geographically separated populations differ in their gene frequencies and range of phenotypic variation, which therefore may be used to estimate the probability that an individual’s area of ancestry is more probably one place than another” (Brues 1992:125).

In our opinion, forensic anthropology seems a good example of inductive thinking: The generalization from the observed biological variability of humankind to the concept of race. But “generalizing from data to principles, is the

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interorbital distance [...] White skulls have mesa-like supraorbital ridges, blunt upper orbital margins, a depressed glabella, «beetling» of the frontonasal junction and a narrow interorbital distance”.

foundation of scholarship and most social science” (Harpending 1995:100) not of natural science. On the contrary, from the biological point of view the concept of race was falsified by comparing the prediction of the hypothesis to empirical observation. For anthropologists involved in forensic medicine the concept of race means everything and nothing: As a matter of fact, Sauer concluded his paper “let us not fall into the trap of accepting races as valid biologically discrete categories because we use them so often” [Sauer 1992:110].

A recent attempt in using the concept of race came from psychologists (Rushton 1995; see also Rushton and Bogaert 1989). They claimed a basic identity between the biological and social concept of race, and used a very high number of biological, psychological, and social traits to trace a model of racial differentiation in which Europeans appeared in an intermediate position between Africans and Asians (for a detailed discussion see Bogin 1993 and Armelagos 1995).

In the end, it could be said that if race is everything, it is able to explain nothing. It could seem that the concept of race is like the Phoenix or a chameleon, as Armelagos (1995) suggested, and scientific statements against race are needed over and over again. Recently Barry Bogin (1993) conclusively criticised race because of inter-fertility between groups. Cavalli-Sforza, Menozzi and Piazza (1994) also stated the scientific decline of the concept of race suggesting the importance of different lines of research, such as those involved in the reconstruction of micro-evolutionary history of human populations.

### **Dismantling the Concept of Human Biological Race**

The first half of the twentieth century was characterized by an imposing development of genetic knowledge. In 1865 the laws of heredity were provided by the monk Brother Gregor, known in the world as Johann Mendel (1822-1884), and published in 1866, although they remained mostly unnoticed until 1900. They were rediscovered independently by Carl Correns (1864-1933), Erich von Tschermak (1871-1962), and Hugo de Vries (1848-1935), and were responsible for a new scientific discipline to which William Bateson (1861-1926) gave the name of Genetics in 1906. The flourishing of studies in the new field produced two events of extraordinary importance for their impact on the concept of race. The first event was the discovery of a new class of biological traits called genetic

markers, which are strictly inherited and immune, in the short run, to changes induced by the environment. The AB0 blood group was the first genetic marker discovered by Karl Landsteiner (1868-1943) in 1900, but its heredity was demonstrated only in 1911. The second event was due to Ronald Aylmer Fisher (1890-1962), John Burdon Sanderson Haldane (1892-1964), and Sewal Wright (1889-1988) and consisted in the rise of population genetics from 1930 to 1950, providing mathematical models and statistical tests to approach micro-evolutionary processes. The new discipline, founded by Fisher (1930), considered genes not only as hereditary factors which produce a single individual, but as hereditary factors common to a group of individuals, i.e. a population, and able to distribute and recombine between them. Population genetics used genetic markers to produce theoretical and empirical researches on evolutionary forces affecting populations: genetic drift, migration, mutation, natural and sexual selection; thus populations became the new units of evolution.<sup>16</sup> The genetic approach to the study of human biological variation did not escape for several decades to the racial paradigm, as it had already happened to morphology. At last it became scientifically clear that a static concept of race was not able to explain the dynamic processes of evolution. However, it was reported (Mukhopadhyay and Moses 1997:519) that "yet the rise of population genetics was not sufficient to eradicate the old racial worldview" among physical anthropologists, who simply transformed race typological concept into race populational concept. Ironically, during the development of population genetics, which set the grounds for the scientific falsification of the concept of race, biological racism increased and many political crimes were carried out in the name of racial purity and racial superiority, "totally unconnected with science" (Cavalli-Sforza et al. 1994:19).

The first time genetic markers were used in evaluating racial differences was before the advent of population genetics. At the end of the second decade of our century a biochemical index based on AB0 blood group alleles, the ratio of A to B allele

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<sup>16</sup> Tabulations of allele frequencies from a number of populations with evolutionary purposes were given by Mourant (1954), Mourant et al. (1976), Steinberg and Cook (1981), Tills et al. (1983), Nei and Roychoudhury (1988), and Cavalli-Sforza et al. (1994).

frequencies in populations was proposed (Hirszfeld and Hirszfeld 1918-1919). The index allowed to subdivide humankind into three racial groups: At the polar ends there were Europeans and Asians-Africans, and in the middle Arabs-Turks-Russians-Jews. Later efforts in defining racial classifications with an increased number of genetic markers were achieved by William Clouser Boyd [(1903-1983) 1950], and Garn (1961). We think it is of some interest to note that in the title of his book Boyd introduced the adjective modern to better define his genetic approach to the problem of human racial classification, and Brace stated in 1996 "Garn and others were simply reiterating what Samuel George Morton (1799-1851) had done in 1839".<sup>17</sup>

The development of mathematical techniques, as genetic distances and principal components analysis, were used in evaluating biological relationships between populations or ethnic groups to verify if they clustered into larger racial groups in a multidimensional space. Biological relationships turned out to be deeply inconsistent when genetic markers and morphological traits were used. The reconstruction of phylogenetic trees of human evolution based on genes, showed a higher affinity between Europeans-Africans and Asians-Australians, while phylogenetic trees based on anthropometric traits showed that Africans clustered together with Australians and Europeans with Asians (Cavalli-Sforza and Edwards 1963; Edwards and Cavalli-Sforza 1964). Genetic traits were also used in calculating time and patterns of divergence between races: 30,000 years ago Occidentals separated from Amerasians; 15,000 years ago Occidentals splitted in Europeans and Africans; and in

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<sup>17</sup> Quoted in Mukhopadhyay and Moses 1997, note number 4. Bell (1974:540) reported: "In 1830 Morton began collecting human craniums and eventually owned over 1,000 specimens [...] He devised ingenious ways to measure and calculate the capacity of craniums and concluded that races are distinguished by their skulls as well as by color. His *Crania Americana* (1839), by its use of physical measurements, the classification and comparison of data, and its accurate drawings, was a landmark in anthropology. In an «Introductory Essay» of ninety-five pages Morton asserted that the American Indians are a separate race, not descendants of migrants from Asia. «We are left to the reasonable conclusion,» he continued, «that each Race was adapted from the beginning to its peculiar local destination. In other words, it is assumed, that the physical characteristics which distinguish the different Races, are independent of external causes». The work was hailed in the *American Journal of Science* as «the most extensive and valuable contribution to the natural history of man, which has yet appeared on the American continent»".

an intermediate point in time Amerasians splitted in Americans and Orientals (Edmonson 1965). Besides, in a seminal work Menozzi, Piazza and Cavalli-Sforza (1987) showed that allele frequencies were overlapping with continuous distribution patterns, called clines, among populations (see also Cavalli-Sforza et al. 1994). Genetic boundaries, if any, are always weak and only mean less local admixture which is mostly due to certain geographic and cultural barriers (Sokal et al. 1988; Barbujani and Sokal 1990).

In the early 1970s the world of physical anthropology got acquainted with the empirical falsification of the concept of race. Indeed, it is impossible to divide humankind into biological races because genetic variation within populations is higher, about 85 percent, when compared with that distributed between populations (Lewontin 1972, 1974; Nei and Roychoudhury 1974). The question of race was solved at last (Keita and Kittles 1997), and an indisputable support came from molecular biology. Rebecca Luisa Cann, Mark Stoneking, and Allan Charles Wilson (1987) postulated the recent dispersal from Africa to Europe and Asia of anatomically modern *Homo sapiens*, and the displacement of the earlier inhabitants without much inter-breeding. This reconstruction was based on mtDNA. Subsequent studies on mtDNA, autosomal DNA and Y-chromosome supported this hypothesis (Vigilant et al. 1991; Hammer 1995; Tishkoff et al. 1996; Jorde et al. 1997; Krings et al. 1997; Jin et al. 1999; Kaessmann et al. 1999; Pritchard et al. 1999; Thomson et al. 2000; Underhill et al. 2000). Recently, Roy D'Andrade and Phillip Andrew Morin (1996:367) stated:

Examination of the relation between lineages and the physically distinct geographic groups that are called «races» – Asians, Europeans, Melanesians, and various types of Africans – reveals an interesting phenomenon. Racial groups show little or no phylogenetic structure,

and Craig Venter, head of the Celera Genomics Corporation in Rockville, declared that the entire sequence of the human genome had proved that human races do not exist (Angier 2000).

In the last decades molecular anthropology has helped reject a seventeenth century concept of race that often organizes the sampling regime of many modern biologists, promoting a

wider appreciation of the global distribution of human biological diversity. Nevertheless, we still find, in renown scientific journals and books (Chiarelli 1995a; Foley 1995; von Haeseler et al. 1995), the term “human race” that we consider loose terminology (every scientist knows that we should rather use the term “human species”), whatever it could be the rationale behind its use.

If races were a taxonomic category, they should allow us to reconstruct the phylogeny of human populations, i.e. ancestor-descendant relationships. As a matter of fact, the human biological concept of race has only permitted to us reconstruct the ecological history of humankind. It is hard to understand why a racial concept persists in modern biological anthropology in spite of multiple evidences that invalidated its scheme. We are however confident to be witnessing the demise of such a logical error.

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