

Commentary
Genetic Diversity and Human Equality

Theodosius Dobzhansky
New York, Basic Books, 1973

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This book of a little more than 100 pages and just over 30 years old should be re-read by those who read it when first published. Moreover, it should be recommended to everyone involved in education from secondary school on up, and to those in the media; it should also be perused by all those responsible for Italian social policies. In dealing with its topic, this book is simple, almost to the point of being banal (starting from the title). Yet, usually the simplicity of authors so authoritative on such delicate questions conceals profound knowledge and thinking. In this article, I purposely deal with the book in some length, hoping not to bore the reader, because I have discovered with regret that it is no longer available in bookstores.

But why write about genetics and human equality in the USA in 1973, and why suggest the reading or re-reading of this book in Italy in 2009? There are, in my opinion, two responses to the first question. Firstly, even though well over 100 years had passed since the abolition of slavery, the USA had never truly adapted ideologically to its multi-ethnic nature. Although promoting itself worldwide as the leader in human rights, the USA has constantly lived with the internal contradiction of not having fully managed to accept its multi-ethnicity, despite appreciating, like few others in the world, the value of multi-ethnicity in all productive sectors of the country. It has always been pervaded by subtle, almost invisible signs of discrimination, which occasionally have emerged in episodes of individual violence not easily explainable in view of the nation's normal lawfulness. Secondly, in academia, the 1970s saw the increasing development and consolidation of the enormous possibilities of knowledge deriving from Watson and Crick's discovery in 1953 of the helical structure of DNA. This discovery was followed by the expansion of human and population genetics as the leading disciplines in the field of genetics, not only as instruments of knowledge and comprehension of human variability, but especially as the means of verification and confirmation of the fact that such variability could be related to a gradient of lesser or greater intellectual abilities. It was precisely this point that Dobzhansky believed must be clarified. Physical diversity should be considered a patrimony of humanity and not evidence of cultural diversity: it should have nothing to do with cultural and social discrimination.

Why recommend the reading or re-reading of this book in the Italy of 2009? The question is superfluous. In my opinion, Italian history presents two characteristic social and political aspects that mark the country's dynamics and whose comprehension is necessary to understand my conviction that reading this text is still useful, even necessary, today. In the last 100-150 years, Italy has changed from a country of heavy emigration to one of strong immigration, all the while finding itself unprepared culturally, socially and politically for such a metamorphosis. This problem, combined with the Italian political history, has never been resolved and is even becoming accentuated in the early twenty-first century, transforming an initial verbally-expressed impatience toward the increasing multi-ethnicity of the Italian society into dangerous episodes of intolerance, at times gratuitous and even physical. It is grievous

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that a country that has suffered so much humiliation due to its citizens being considered in a negative light because ethnically different (considered 'undesirable' and thus ghettoized in other countries) has not been able, and is still not able, to educate its citizens about tolerance, solidarity and the inclusion of 'strangers' in its social fabric. With this, it is not my intention to ignore the problems related to migration, but I believe it is necessary to emphasize the goal of forming a society able to break away from the 'socially diverse because physically diverse' concept. My hope is that this will not be left exclusively to the good sense of the individuals but will become the common sentiment of a mature society.

CONTENTS OF DOBZHANSKY'S BOOK

The book consists of three chapters which Dobzhansky, in his preface, says are essays presented previously and/or published elsewhere. The first, entitled 'Diversity of Individuals, Equality of Persons', introduces the reasons that prompted the author to write the book. The second introduces the biological and genetic concepts essential to the reader to orient himself in regards to the anthropological knowledge and to understand the classification of human diversity. The third, entitled 'Epilogue: Man's Image', is an overall reflection on the position of man in nature and in the universe, which inevitably leads to metaphysical considerations that also refer to the thinking of many great philosophers of the past. In this context, Dobzhansky states that, from this moment onward, any sociological analysis, deduction and reflection cannot and must not fail to take into account the scientific knowledge of its time.

What a simple epilogue, but what a topical epilogue!

CHAPTER ONE: DIVERSITY OF INDIVIDUALS, EQUALITY OF PERSONS

The author makes his thoughts clear from the first page when he states that equality is mistaken as identity and diversity as inequality, and a little later when he observes that the easiest way to discredit the idea of equality seems to be in demonstrating that individuals are, by birth, genetically and thus irremediably different; the problem, however, is that human equality involves the rights and the inviolability of each human being and not his or her physical and mental characteristics. In other words, diversity is an observable fact of nature, whereas equality is an ethical commandment.

These affirmations, absolutely revolutionary in their lucid simplicity, are followed by a clear and synthetic explanation of their genetic bases. Thus, we learn that it is more appropriate to speak of genetic 'conditioning' rather than 'determination' because in this way we automatically arrive at the principle that various somatic traits and very many individual characteristics, such as intelligence, personality, particular skills, etc., can be modified by both genetic and environmental factors. A person's genes have determined his intelligence (and his physical traits) within the particular sequence of environments to which he has been exposed. Moreover, the genetic conditioning of variations of intelligence does not necessarily mean that a person's intelligence is irremediably fixed by his genes, since it is possible to enhance or repress it with education, training, illnesses, etc.

Dobzhansky adds another very important concept for a correct understanding of 'genetic conditioning' and 'heredity' of physical and psychological characters. Heredity is an intrinsic property of a specific population: when the heredity of IQ is estimated at 81%, the value is deduced from middle-class samples of white populations and is valid only for the time at which the data was collected. In this way, the author introduces not only population genetics but also the complexity of its concepts and thus the necessity of critical interpretation by neophytes



and/or lay people of the knowledge from which they derive. It is evident, therefore, how complicated it is to assess in terms of heredity the differences in IQ between single members of a population and even more so between the mean scores of different populations. Moreover, educational and environmental opportunities *sensu lato* differ among the various socio-economic classes of a population and are reflected in different mean IQs. At this point, Dobzhansky illustrates a key concept for the USA of the early 1970s. The mean IQ scores of American black populations were around fifteen points lower than those of white populations. Nevertheless, the individual scores overlapped widely and many whites were below the black mean and many blacks were above the white mean. The natural conclusion of his thinking is that race and class differences in mean IQ scores can be attributed to inequalities of educational possibilities and living standards; hence, it is not the opposition between environment and heredity but the magnitude of the environmental conditioning with respect to the genetic conditioning.

The reader may think it sufficient to stop here since the concept has been clarified. However, this is not so because the development and social organization of *Homo sapiens* is so variegated and complex, with equally variegated and complex biological repercussions, that further inquiry is necessary. In fact, although there is no doubt that all the inhabitants of the world derive from and participate in the same gene pool, it is also true that not all individuals have the same opportunities to mate in any place and with each individual of the opposite sex. Geographical, cultural and other factors maintain the gene pools of these 'subordinate' reproductive populations partly separate. The consequences are almost always quantitative rather than qualitative, since they are reflected in different frequencies of the genetic variants that control certain characteristics, from blood groups to intelligence. Since the different subpopulations are only partly reproductively isolated, they will have gene frequencies that grade into one another, with the result that the gene frequencies of the two subpopulations at the extremes of the gradient will be very different while those of neighbouring groups, having greater opportunities to mate, will share a higher number of genes. All this, when applied to the social organization of a community, is translated into class distinctions within an organized society, partial reproductive isolation between different classes, higher genetic diversity between extreme classes, and more or less extensive overlapping between neighbouring classes. This is why Dobzhansky (and he is not alone) states that this is not a biological technicality but a reality of cardinal ethical and political importance; each person must be assessed on the basis of his individual qualities, independently of the subpopulation from which his genes derive.

Dobzhansky vehemently opposes those members of privileged classes who, in an erroneous interpretation and application of the principles of genetics, believe that they belong to the socio-economic class for which their genes qualify them. His criticism rests on two points. Firstly, he maintains that these people are self-excluded from the discussion, and secondly that they consider that the genetic basis of the human species is uniform everywhere. He reaffirms that all social groups and reproductive populations have different gene frequencies for each specific character, including IQ, just as they have different environmental opportunities, and he concludes that the potential of the individual depends on his genetic makeup and not on his class or racial origin.

There follows an interesting section on *Wisdom of Equality and Unwisdom of Inequality* in which Dobzhansky clarifies that human equality is an ethical precept, not a biological phenomenon. Moreover, he distinguishes between equality of opportunities and equality of status. The social stratification of power, privilege and prestige is determined by the former, which he defines as the procedure of assignment. In this regard, he gives as examples the Indian castes characterized by specialization of occupations and functions which for millennia



have been viewed as a genetic specialization of these groups, and the opposite case of the Russian revolution which, removing the ancient elites, did not lead to intellectual impoverishment but rather recruited new talents from the subordinate classes that had not previously had the opportunity to express themselves. It follows, according to Dobzhansky, that waste of intelligence is a fatal flaw of all systems based on rigid castes and classes. In a meritocracy, instead, one's socio-economic situation depends on one's ability and personal initiative, and educational institutions become channels of social mobility. All this raises other problems, including: the frequent custom of parents to convince their children to follow in their footsteps, thus frustrating the selective process; the complex genetics of these characters, which can be translated into mediocre offspring from parents with talent and vice versa, just as different genetic makeups can result in the same level of success; evaluation of abilities and success presupposes the validity of all educational systems established in society. In reality, since the impartiality of educational systems is certainly not proved, we must assume that the abilities of many individuals will be poorly judged. Last but not least, although it is true that high mental ability allows one to reach positions of prestige, power and economic success in meritocratic systems, it is equally true that many individuals reach excellence in jobs and activities not directly and closely correlated with high IQs. Artists, intellectuals, athletes, businessmen are some examples that underline the inherent limits of the use of IQ. Although it can be measured and used as a predictive index of scholastic success and professional results, other characteristics and abilities, unmeasurable but presumably inheritable, have an equally important role in professional success in a society that is meritocratic and considers such skills useful.

Hence, there are two aspects of equality of opportunities. The first is the right of each person to have access to (to struggle and compete for) all levels of social conditions regardless of that of his or her family. The second concerns society's awareness that different people, because they have different genetic makeups, require diversified environments to fulfil their potential. This is occurring in part in technologically advanced countries, even if it may involve a waste of effort and resources by the society. Dobzhansky, in forcefully affirming these two aspects of equality, emphasizes that human equality does not mean all people are the same; to the contrary, it is the recognition that each individual is different from all the others, and that everyone has the right to follow his own path, provided he does not harm others. Human genetic diversity is not a misfortune or a defect, it is precious resource, and equality is necessary for a society to maximize the benefits of the genetic diversity of its members.

In the concluding section, the author agrees with the opinion of Scarr-Salapatek (1971) that the differences between human beings can simply be accepted as diversity and not as deficiencies and he states that people do not need to belong to elites and guilds, that equality of opportunity in societies that encourage free competition is an ethically desirable prospect and that, in his opinion, history is moving ineluctably in that direction.

CHAPTER TWO: EVOLUTIONARY GENETICS OF RACE

In this chapter, Dobzhansky deals with two related and complex topics. On the one hand, the concept of evolutionary genetics with all its actuating mechanisms and, on the other hand, its outcomes for the human species, namely the diversification of human populations, namely the concept of 'race'. He also maintains from the start that human genetic diversity is more than just a theoretical or academic topic, it has a great number of socio-political implications. Moreover, the importance of the many questions surrounding race is too great to ignore the problem or to give free rein to fanatics; there is an urgent need to clarify the biological and



non-biological aspects of races. The author repeatedly uses the term 'race', while clearly specifying that the reason is that it is better to make people understand the nature of racial differences rather than pretend that they do not exist.

To introduce the topic of this second chapter, Dobzhansky refers to Immanuel Kant, to whom it was already clear that there was great variability among individuals and groups and that the different races were perpetuated in specific distribution areas. In regard to races, Dobzhansky's thinking is directed to those physical anthropologists that pursued the dream of describing human populations in terms of 'pure races' or 'types', mistaking the polymorphism of biological characters for the bases of such a description. An impossible dream, given the human species' exogamous sexual reproduction and the genetic uniqueness of individuals. Not only that, these physical anthropologists operate under the assumption that the identifying characters of these racial types, above all morphological traits (height, colour and shape of the eyes, head hair and body hair, cephalic, facial and nasal indexes, etc.), are inherited as alleles of a single gene, in open contradiction with what is known about their genetics.

This is followed by some clearly written sections on the mechanisms underlying the origin and maintenance of the genetic distinctions among the different Mendelian populations that make up the human species, a complex Mendelian population. They are defined as secondary Mendelian populations organized hierarchically along clines or genetic gradients as a consequence of the different levels of endogamy and gene exchange, the latter always present in a more or less extensive manner. They are the *races* within a species. The mechanisms of genetic differentiation also determine the lack of clear demarcation lines between secondary Mendelian populations in man, preventing a rigid racial classification. However, when the populations are separated by very large distances, the gene flow is extremely limited and thus they differ in many morphological and physiological characteristics: they are differentiated into distinct populations in the racial sense.

This concept of race is very different from the traditional typological one. Indeed, it reveals, according to Dobzhansky, the latter's absolute stupidity: the concepts of typological race must be replaced by concepts of population, since interpopulation racial differences consist of the same genetic variants responsible for the genetic differences between individuals of the same population, and also between brothers and sisters and between parents and offspring.

Dobzhansky does not deny the concept of race, but he wishes to clarify its significance. Firstly, it refers to genetic differences objectively observed between Mendelian populations. Secondly, it is a classificatory category that must have a pragmatic function in facilitating communication. Populations contain dissimilar sets of genotypes if they are different in the racial sense, or similar sets if they are identical. Considering Garn's (1965) classification of mankind into nine geographical races and 32 local ones, and Lundman's (1967) into four main races and 16 subraces, Dobzhansky observes that they correspond only in part, but this does not mean that one is inaccurate with respect to the other, rather one may be more appropriate than the other for a certain purpose. He refers to the constant action of gene flow and to the concept of genetic gradient, which only rarely permits one to draw on a map a border between the territories of different races. Finally, he calls attention to the contrast among natural selection, sexual selection and random genetic drift, which all contribute to the differentiation of races. The action of sexual selection and random genetic drift are very often expressed in a diversification of gene frequencies which, in contrast to the directional action of natural selection, determine important stochastic evolutionary processes. However, Dobzhansky believes that the formation of the races mentioned by Garn by means of genetic drift is very unlikely. His opinion is that the process of genetic divergence of races was gradual and that the distance and geographical isolation of developing races on different continents provided natural selection with ample opportunities to favour the genes that facilitated



adaptation of the populations to different living conditions. He views genetic drift as mainly a 'disturbance' in the adaptive processes of evolution, even if he believes that racial differentiation is the result of the interaction of these two evolutionary forces.

To conclude this second chapter, Dobzhansky returns to the main topic of his book: the possible racial differences in mental characteristics, in particular so-called 'intelligence'. He states that 'equality' and 'inequality' are not synonymous with 'biological identity' and 'genetic diversity', respectively, since human equality and inequality are not the result of observable biological conditions but rather policies adopted by societies, ethical principles and religious commandments. And he uses almost a play on words when he states that equality has meaning only because individuals are not identical.

Among the limitations Dobzhansky observes when mental characters and capacity for intellectual development are discussed is the idea that they refer inevitably to a single character, IQ, which is the result of various abilities, perhaps genetically independent at different levels. Moreover, IQ has been measured only in a few racial groups and by means of tests whose impartiality and cultural neutrality can be placed in doubt on account of the possible danger that they may unconsciously favour the race, social class, culture and subculture of their creators. The correction factors adopted in this regard have had little success. Moreover, considering the action of the environmental component, the observed racial differences in mean IQ scores cannot be attributed exclusively to discrepancies between environments because it is not possible to specify the exact environmental factors underlying them. Dobzhansky concludes that, given the current knowledge, the degree of genetic conditioning of the differences in IQ among the races remains an unsolved problem on account of the inadequacy of the available data. Nevertheless, there are two indisputable facts that disprove the racist theses: the wide overlapping of the variation curves for IQ scores and other human faculties, and the universal ability to learn and thus to improve oneself. Indeed, it is thanks to his culture, and not to his genes, that man, unlike other organisms, adapts to new environments, and this ability gives the human species an evolutionary uniqueness that should not be underestimated.

CHAPTER THREE: EPILOGUE: MAN'S IMAGE

This chapter dwells on man's place in the universe and on the human condition in the light of Dobzhansky's considerations in the previous two chapters and the scientific knowledge of the time. The author poses the question of extraterrestrial life as a possible occurrence in other parts of the universe. His reasoning on this question rests on two scientific bases. The first is that evolution is, above all, adaptation to the environment; however, even if somewhere there existed environments very similar to those on Earth, the probability of a repetition of Earth's evolutionary history is very close to zero. The second derives from the fundamental assumption that biological evolution is not predestined to arrive at any particular form of adaptation to the environment, rather it has a virtually unlimited range of possibilities. In this way, he introduces the element of chance inherent in the creative process of evolution, denying any final purpose of the succession of single events, which are related to each other by chance and are aperiodic. Thus, he believes that man is a species almost certainly alone in the universe and Earth a unique planet.

Referring to the major developments of scientific thought and its philosophical implications from Copernicus to Darwin, the author carefully considers several points that are still of topical interest. In the first place, the discovery of the laws governing celestial phenomena (not matched by a similar mastery and knowledge of biological and psychological laws) leads to



reflection on God the Creator and on his continuative action. In Dobzhansky's opinion, it is difficult to imagine a God Creator and Master who cannot intervene, or does not want to intervene, to change the random sequences to which events are linked. He is equally critical of determinism, according to which there is nothing new in the world since everything that happens was predestined from the beginning, including any human effort and/or passivity. In this sense, he credits Darwin with having shown that biological species did not appear ready-made, that organic diversity is a consequence of adaptation to different environments, and that the infinite variety of structures and functions and types of organisms allows exploitation of the diverse opportunities an environment offers to life.

Dobzhansky devotes two sections to 'Evolution and Man's Image' and the 'Evolutionary Uniqueness of Man' in which he slowly leads the reader to reason on several points. Thanks to evolutionary thinking (which applied the mechanistic approach to the physical world), biology, from Darwin onward, exorcized the ghost of vitalism. Yet, the theory of evolution, in revealing the world in its transformation and development, has raised new questions: *Is the universe going somewhere?* If yes, *Where?* In short, the theory of evolution places the accent not on the regularity of phenomena but rather on change and thus on the possibility of future transformations, even transcendent ones such as those of the past involving the emergence of the living from the non-living and of humanity from animality. It is an ongoing creative process that presumably will continue indefinitely. This gives rise to metaphysical questions on the existence of man and culturality and on the possibility that science can always discover a meaning in everything: man is continuously asking if his existence, and that of the universe, has some meaning; yet, science is neither a scoundrel that degrades human dignity nor the only source of human knowledge.

On the final page of his book, Dobzhansky does not give answers, he only poses questions impossible to answer in his time, which remain unanswered today and presumably will remain so for a long time. One of these questions is: *Where is evolution heading?* This question may apply separately for three types of evolution: cosmic, biological and human, which can be considered integral parts or stages of a single process. Perhaps evolution is simply drifting randomly; however, it is possible that the evolution of the universe is a grand adventure, and everything and everyone is a part of it. But what exactly is this adventure, what are its purpose and its objective? The four centuries of scientific development following Copernicus have not solved the mystery, but the century after Darwin has made the solution as urgent as ever. *What role must man play in evolution? Must he be a simple spectator or the director?* At the core of this question is nothing less than the meaning of his existence. Does man live merely to live, and is there no purpose or meaning other than this? Or is he called to participate in the construction of the best universe imaginable?

These are the thoughts to which Dobzhansky calls the reader's attention, thus putting in perspective, in my opinion, all the discussions on racial differences in mental abilities thoroughly dealt with in the preceding chapters. The position that emerges is that diversity of complex characters, such as IQ, is the result of the interaction of genetic diversity with the environment, and this, combined with the fact that man differs from the other animals by his intellectual faculties, implies that a society must assume as its ethical foundation the objective of offering the same opportunities to all its members in order to exploit their biological diversity.

