

Sir John Eccles, *The Understanding of the Brain*, just published by McGraw-Hill in paperback at less than half the price of Rose's book.

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Genetic Diversity and Human Equality. By THEODOSIUS DOBZHANSKY. New York: Basic Books, 1973. Pp. xii+128. \$5.95.

A great deal of scientific information and humane wisdom are packed into this deceptively small volume. Indeed, its scope and the importance of its message are anything but small. Moreover, it is well written and a pleasure to read. It presupposes no specialized background in genetics or psychology, and can be equally recommended to specialist and layman. Its author's voice in the so-called IQ controversy deserves everyone's attention. Long respected in the scientific community as one of the world's foremost geneticists and evolutionists, Professor Theodosius Dobzhansky, at age 73, is looked up to as a vigorous and sage father figure whose views shape the opinions of many students in biology and genetics and in the behavioral sciences as well. He is known not only for his prolific scientific accomplishments but also for his broad social conscience and continuing efforts to educate the public concerning the relevance of biological thought to some of the most important problems facing mankind.

The book is actually a collection of three essays, of which the first two are the most closely interrelated. The first essay, which was Dobzhansky's invited lecture before the John Dewey Society, entitled "Diversity of Individuals, Equality of Persons," is the basis for the book's title and the dust jacket's subtitle, *The Facts and Fallacies of the Explosive Genetics and Education Controversy*. The second essay, "Evolutionary Genetics of Race," is perhaps the most informative and essential; its factual content overlaps the least with the many other writings now considered a part of the "nature-nurture" controversy. This chapter especially should be required reading for students in the behavioral sciences. The final essay, "Epilogue: Man's Image," is a brief philosophic discourse from the standpoint of evolution on man's place in nature and his relation to the cosmos.

The central and recurrent theme that predominates throughout involves the distinctions between identity versus equality and diversity versus inequality. Individuals (except for monozygotic twins) are genetically unique, and human equality is not predicated on genetic identity of individuals or groups: ". . . a human being is a unique and nonrecurrent person, not a statistic; he deserves to be judged on his own merits, not according to the merits or demerits of his relatives." By the same token, genetic diversity is not a ground for human inequality. "To be equal," says Dobzhansky, "people need not be genetically alike." To Dobzhansky, equality is not a biological phenomenon, but a policy adopted by societies. Equality pertains to the human dignity of all persons, regardless of their genetic diversity; it is equality of opportunity and equal access to all available paths in the society: "People can be made equal or unequal by the societies in which they live; they cannot be made genetically or biologically identical, even if this were desirable."

And Dobzhansky maintains that such genetic uniformity would not be desirable

even if it were possible. Modern, complex societies need a diversity of persons adapted and trained for a diversity of functions, and this can best be attained by a combination of genetic and environmental conditioning. Thus, Dobzhansky seems to favor a meritocracy with equal access for all but with a system of rewards that does not result in gross inequalities of income and status. Yet he would prefer the pain of personal defeat to the denial of opportunity. "Dashed hopes are painful to the person concerned, but denial of the right even to aspire to admission to some opportunities in a rigid class society is far more devastating." The indispensable conditions for a good society are "the ability freely to choose the goals of one's life and the direction of one's efforts, and the provision of a variety of environments, and of kinds of upbringing and training, suited for diverse endowments of different persons." On the other hand, Dobzhansky believes that the fact that individuals differ in their genetic endowment of various abilities and proclivities argues for a diversity of educational paths and goals: ". . . when everybody is put through the same educational machine, the abilities of many people will be grievously misjudged." "Ideally, every child should receive the environment most conducive to the development of his own particular abilities." These statements could have come directly from the writings of the late Sir Cyril Burt, who long ago fully recognized the true implications of genetic diversity in abilities for education in a democratic society.

Dobzhansky reviews the extensive evidence for the heritability of intelligence as measured by IQ and other mental tests and arrives at essentially the same conclusion as that arrived at by Burt, Herrnstein, Eysenck, Jensen, and many other investigators, that some 70–80 percent of the population variance in IQ is genetically conditioned, with some 20–30 percent attributable to nongenetic or environmental influences. He believes this conclusion is now securely established and says, "IQ is about as strongly heritable as human stature."

But Dobzhansky also emphasizes the important concept of the reaction range of the phenotype, in this case IQ. This refers to the range of IQs through which identical genotypes will vary given the amount of environmental variation presently found in the population. It is best expressed in terms of the standard deviation of IQs for a single genotype, which, if the heritability of IQ is as high as 80 percent, amounts to six or seven IQ points. That is to say, two-thirds of all individuals with the same genotype will, in general, obtain IQs in the range of \pm six or seven points of the mean of all such individuals. The reaction range over which the IQs of 99 percent or more of identical genotypes may vary is thus more than 30 IQ points. (The relative frequencies of the deviations are assumed to be normally distributed, so that small deviations are common and the largest deviations are very rare.) This is a very considerable range of variation attributable to nongenetic factors.

But not all of these nongenetic factors are definitely known or manipulable aspects of the environment. Probably less than half are associated with such environmental variables as income, parental education, and socioeconomic status, though at present this is highly speculative. Prenatal and early postnatal biological and nutritional factors and subtle aspects of early child-rearing practices and the parent-child interaction seem the most likely places to seek an understanding of most of the nongenetic influences on IQ. If, with our present stage of knowledge, we were hypothetically assigned the task of raising the average IQ of the popula-

tion by, say, 20 points, and could use any means available, we could do it more surely and permanently by genetic selection than by any known environmental manipulation. The same can be said for reducing the incidence of mental retardation, defined as IQ below 70. This is not to advocate genetic selection, but to indicate that our knowledge of how the environment conditions IQ is much less complete or definite than most persons realize. Essentially, what we definitely know is that genetic factors are important but are by no means the whole story. Further research in behavioral genetics, it is hoped, will be able to delineate the specific genetic "architecture" underlying various human abilities as well as elucidate the specific environmental influences involved in individual differences.

The most contentious aspect of the so-called IQ controversy has concerned the question of genetic factors in group differences, particularly social class and race. Dobzhansky deals with these topics in a highly general fashion without any detailed or critical consideration of specific relevant research. Essentially, Dobzhansky echoes the gist of R. J. Herrnstein's thesis that the high degree of social mobility allowed in an increasingly meritocratic society will result more and more in occupational and socioeconomic stratification involving differences in genetically conditioned abilities. Notes Dobzhansky: "It may chagrin some people to learn that increasing equality of opportunity enhances, not reduces, genetic differences between socioeconomic classes." But Dobzhansky then adds an important new hypothesis of his own, namely, that the meritocratic society that develops under conditions of complete equality of opportunity will produce a condition in which social classes as we now know them will no longer exist. It is not made clear just how such a society would differ from the present one; presumably there would be some kind of genetically but not necessarily socioeconomically differentiated occupational groups. "As the class structure becomes more open, impediments to social mobility decrease, and the principle of meritocracy becomes dominant. One's status and role in a society are acquired and not inherited from the parents. What may seem surprising at first is that when social inheritance of role and status becomes less influential, the importance of biological inheritance increases. This is a consequence of the genetic conditioning of those human characteristics which determine social mobility in open-class societies." Herrnstein has elaborated upon this theme (*IQ in the Meritocracy* [1973]), and if his position differs in any essential way from Dobzhansky's, it is not apparent in Dobzhansky's book, unless one points to the slight reference Dobzhansky makes to *epistasis* (interactions or nonadditive effects among genes at different loci), which in each new generation would make for some genetic diversity even within highly selected parental lines. Epistasis is a part of the total genetic variance which does not "breed true," that is, it makes for differences rather than similarities between parents and offspring. With respect to the IQ per se, there is as yet no evidence that epistasis contributes an appreciable part of the variance. It most probably does not. Whether nonadditive gene effects play an important part in special talents and personality traits that may affect the individual's utilization of his intellectual abilities for socially recognized achievement remains to be explored.

Dobzhansky's treatment of race as biological and evolutionary phenomenon, in part 2, is excellent, but his discussion of racial differences in mental ability, while sound in general, is, in detail, probably the weakest part of the book. He simply does not come to grips with specific issues in this controversy but, rather, seems to slight them by quite superficial "outs." For example: "Racists have seized upon this

figure [80 percent heritability of IQ] as evidence of racial superiorities and inferiorities, arguing that since the heritability of the IQ variations is so high, differences in the IQ averages between races are fixed and irremediable. This is certainly unproven and unconvincing." But just who, one may ask, does believe this? I do not know of any reputable scientists today who believe that "IQ differences between races are fixed and irremediable" or who hold that high within-race heritability of IQ proves the heritability of the IQ differences between racial groups. The repeated references to "racists" throughout the book seem entirely gratuitous and out of place in a serious book. It is much as if one repeatedly made swipes at members of the Flat Earth Society in a book on geophysics, or denigrating asides about astrology sprinkled throughout a textbook on astronomy. This tendency to mention unnamed "racists" whenever bringing up the race-IQ issue unfortunately mars the otherwise objective and scholarly tone of Dobzhansky's essay. "Racism" is really a political-ideological matter, not a scientific one.

Dobzhansky explains that "interpopulational racial differences are compounded of the same genetic variants which are responsible for genetic differences among individuals within a population, and even among siblings and parents and children." The genetic aspect of behavioral differences among racial populations thus is quantitative rather than qualitative: "... gene variants which control some traits, from blood groups to intelligence, may be species-wide in distributions, and yet be found more frequently in some subpopulations than in others. This is not a biological technicality but a fact of cardinal ethnical and political importance. Every person must be rated according to his individual qualities, regardless of the subpopulation from which his genes come."

As to the more specific question of a genetic component in the difference of the IQ distributions of whites and blacks, Dobzhansky points out that it is an open question, as yet scientifically unresolved. An often neglected factor that may greatly complicate research on this question, Dobzhansky notes, is that Negro Americans are not only a hybrid race with generally low socioeconomic status, but also have caste status. This factor could conceivably be a source of between-population differences in particular abilities, while not contributing to individual differences within each population. But it is highly speculative that caste status per se has any causal relationship to average IQ differences. Elsewhere in this book, in fact, Dobzhansky expresses doubt that the rigid caste system of India has resulted in differences in intelligence between "higher" and "lower" castes. But Dobzhansky emphasizes that even if the question were resolved scientifically, and white and black populations were found to differ, on average, in genetic endowment for the development of the constellation of abilities involved in IQ, it would be no justification for any form of racial discrimination. If races are found to differ genetically in certain mental traits, these average differences, in terms of amount of overlap of the distributions, are undoubtedly much smaller than many of the observable racial differences in physical characteristics. There are no known average phenotypic mental differences between racial groups of a magnitude at all comparable to differences in skin color or differences in stature between groups such as the Pygmies and Watusis.

Too much of Dobzhansky's discussion of race and IQ has a generality and vagueness that are apt to make it much like a Rorschach inkblot onto which readers can readily project any notions they already hold, all the while imagining they are being informed. Although experts fully recognize the technical limita-

tions of quantitative statements regarding genetic differences, this is an area in which totally nonquantitative statements can be more misleading than some attempt at quantitative precision, even while realizing we cannot be precise. Completely nonquantitative generalizations encourage “either-or” thinking rather than thinking in terms of probabilistic continua, which is what is really called for. Take such a statement as that on page 10: “. . . genetic conditioning, no matter how strong, does not preclude improvement by manipulation of the environment.” Does this mean a child with an IQ of 60 can, with the best of training, be brought up to performance level typical of IQ 70, or does it mean we can make him into a Gauss or a Mozart?

Dobzhansky tends also to shy away from some troublesome but important points—for example, the fact that some population groups may contribute some five to 10 times the percentage of individuals below IQ 70 (the borderline of mental retardation) as some other groups, and that when large numbers of such low-IQ individuals are concentrated in certain neighborhoods, serious social problems are engendered and become all too visible to the larger community. For the solution to such problems, Dobzhansky hints that we might look to eugenics. “Eugenics will eventually come into its own, but eugenic amelioration can only be successful given antecedent environmental and sociological improvements.” The direction of causality and the interconnectedness of eugenic and environmental means are probably much more complex and problematic than Dobzhansky seems to suggest.

To say that “human differences can be accepted as differences and not as deficits” (Dobzhansky quoting Dr. Scarr-Salapatek) is to say too little. It makes it sound as though *all* kinds of differences are equally good, both for the individuals concerned and for society. But are they? The real importance of IQ, which is probably clearly perceived by the man in the street, is not the fact that IQ has some quite moderate correlation with educational and occupational status when considered throughout the full range of persons who actually have an education and an occupation, but the fact that IQ has something of a threshold character. That is to say, below some point on the IQ scale, a person does not function well in any walk of life, nor can any of his other possible latent talents ever be manifested. There seems to be no other human defect (or “difference” to Dobzhansky) as severely limiting as a very low intelligence. Deafness, blindness, physical deformity, paralysis—all are not incompatible with achievement, aesthetic enjoyment, and self-realization. Very low intelligence, on the other hand, seems a different order of misfortune, and it is hard to imagine how persons of any race or culture can be expected to accept it as a “difference” on a par with other human differences. If genetic factors are involved, as they surely seem to be, regardless of the individual’s racial and socioeconomic background, will not genetics have to play some part in the amelioration of the problem? The “defects = differences” approach, I fear, hints too much of belittling troublesome matters or sweeping them under the carpet, an approach which seems essentially out of tune with the humanity and wisdom that are evinced throughout the rest of Dobzhansky’s book.

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