

MAR 16 1966

THE AMERICAN NATURALIST
JOURNAL OF THE AMERICAN SOCIETY OF NATURALISTS

A journal devoted to the advancement and correlation of the Biological Sciences

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March 14, 1966

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Dear Josh:

I have now had the chance to read over your manuscript. I found it really stimulating and was particularly pleased by its emphasis on the determination of what is good and the insistence that this good be defined within the context of modern society. This, of course, is where most writers on eugenics have stumbled so badly.

In this connection, let me make a point that most eugenicists and other genetic architects seem to miss completely. They feel that an essential piece of information in social-genetic engineering is the heritability of a character, in the technical sense. After all, they say, if the character, say IQ, is 90% heritable, then it is eugenic measures rather than environmental ones that are important, while if it is only 10% heritable, we need to work with the environment. But, alas, as always, they miss the boat. Under our ~~present~~ educational system, the environmental variance may indeed be 50% of the total for IQ score, but, by putting into effect any educational reforms based upon that figure, we shall automatically make an immediate and perhaps drastic change in heritability. In fact, the ideal of the democratic-liberal education is to reduce the environmental component to zero (and to increase the genotype-environment correlation) by educating each child "to his innate capacity."

The~~se~~ other comments of substantive nature are:

Page 3, lines 5 and 6: Let me suggest a little reworking here. The issue is not so much that genes are maintained by nearly normal or supernormal heterozygotes. Rather, whether each of us is heterozygous at a couple of dozen (according to Joe Muller) or thousands (according to Th.D.) of loci, the multiple heterozygote is the pragmatic standard

of normality. It is simply absurd to say, as some do, that we will increase the proportions of "normal" individuals in the population by rejecting heterozygotes. This is, of course, only a part of the story since, as you point out, the most dangerous effect of eugenics might be to destroy desired heterogeneity along with the undesired.

Page 13, middle paragraph: While I thoroughly agree that developmental systems are complex, I think we would be agreeably surprised to find that there are main effects and a certain insensitivity to perturbations of the code in many instances. That is, it is obvious that while a single nucleotide slip can be disastrous, this kind of slip can be engineered away with a long program of testing in tissue culture. Then, what remains is the complex interactions that may result in a more subtle deleterious effect in real people when the desired change in nucleotide sequence is made at a given locus. But this, in turn, is a fault of all human engineering schemes, that we do not know the interactions. However, here we must assert to some extent the principle that main effects usually turn out to be large in comparison with gene interactions, with certain idiosyncratic exceptions. It is important to note that even for non-genetic human engineering, this problem exists. What effect on the totality of human society will there be of changing the proportions of phenotypes in an apparently adaptive fashion?

Some trivial editorial comments are put in with red pen on the MS.

We are looking forward to your final draft. It really is a fine piece, as might be expected.

Yours,

Dick

R. C. Lewontin
Co-editor

RCL:fl
Enc.