

as a result, there has been an approximate equilibrium between the introduction of new mutant genes into the population by mutation and the elimination of old genes by natural selection. But with our present high standards of living and health care, many mutants that in the past would have caused death or reduced fertility now persist. So the equilibrium is out of balance and new mutants are being added to the population faster than they are being eliminated. This, coupled with the near eradication of many infectious diseases, means that now and in the future our medical problems will be increasingly of genetic origin.

A mutation, once it has occurred, is transmitted from parents to succeeding generations. If the gene causes a lethal or sterilizing effect, it will persist for only one generation and affect only one person. On the other hand, if it causes only a slight impairment it may be transmitted on from generation to generation and thereby affect many people. There is, therefore, generally an inverse relation between the severity of the gene effect and the number of persons that will be exposed to this effect. If it were not for this, we could dismiss as relatively unimportant the effects of mild mutants. But in any overall consideration, we must consider many persons mildly affected as being of comparable importance to one individual severely affected. Experiments on fruit flies show that mildly deleterious mutations occur with much greater frequency than do more severe mutants—at least 10 times as frequently. All this makes it likely that, although an increased mutation rate would cause a corresponding increase in severe abnormalities and genetic diseases, the major statistical impact of a mutation increase on the human population would be to add to the burden of mild mutational effects. This would make the population weaker, more prone to disease, and more likely to succumb to an effect that otherwise would be resisted.

All these implications mean that it is not possible to predict in detail the kinds of effects that would occur following an increased mutation rate, nor their distribution in time. Nor can we be at all accurate in any quantitative assessment of the total harmful impact of mutation on the population in comparison with other hazards. So, in weighing benefits against risks of possibly mutagenic pesticides, we have only a vague idea of the nature and magnitude of the risk. We must remember, however, that genetic damage is irreversible by any process that we know of now. The risk to future generations, though difficult to assess in precise terms, is nevertheless very real. The prevention of any unnecessary mutational damage is one of our most important and immediate responsibilities.

Despite the extensive use of pesticides, our information on their possible mutagenicity is grossly inadequate. Several have been tested