adequate food intake it is essential to have choline in the diet, as Mann found. The aortic lesion we described, which does not require a sustained high food intake and which is prevented by choline, has a completely different pathogenesis.

Mann challenges our right and wisdom in broadening the meaning of the term *lipotropic*. We are most anxious to preserve the clarity of the term which one of us introduced. If choline deficiency leads to abnormal changes in liver, kidney, heart, and vessels that are preventable by adequate supplements with lipotropic agents (as the evidence published from this laboratory and from others now clearly indicates), we fail to see why the term should continue to be limited to the effects of deficiency on only one of these organs. Had the need for lipotropic substances in maintaining kidneys, hearts, and vessels been discovered at the same time as their need for maintaining the liver, Mann would probably not have objected to the broad concept we now propose for the term *lipotropic*. His objection is obviously based on the fact that these various manifestations of choline deficiency were discovered at different times. The proper designations for tardy milkmen and aggressive cats we prefer to leave to Mann's imagination.

Whether similar sclerotic lesions are under consideration and whether sulfur or choline is more important will require further careful experimentation. Interchange of data between responsible investigators will eventually provide the true answers, which may be quite different from Mann's present ideas or from ours.

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7 October 1954.

Potential Application of Community Censuses and Genealogies

I have been thinking that anthropologists whose records contain answers to two questions could help make possible some theoretical estimates of rates of ongoing evolution. These questions are: (i) How many people are there in the endogamous group? (ii) What proportion of individuals enter the group from without?

As I have pointed out ["Mixture and genetic drift in ongoing human evolution," *Am. Anthrop.* **54**, 433 (1952)], evolution has been defined as a change in gene frequencies. Gene frequencies change in response to a small number of factors: natural selection, mutation, admixture, and chance variation from one generation to the next. If ethnographers will provide answers to the two questions for a number of groups with a variety of cultures, one could calculate rates of admixture and chance variation. Under assumptions about mutation and natural selection, one could then estimate possible rates of evolution without any reference to the fossil record.

The minimum information necessary to estimate rates of accidental variations in gene frequency is a count of the total population of the endogamous group (be it community, tribe, or caste). In addition one would like to know, if possible, the proportion who are of reproductive age and status and the variation in number of offspring; that is, how many children survive to adulthood for each individual who completes procreation.

The minimum information necessary for a crude measure of admixture is the proportion of persons in the group who were born outside of it. A more useful form of the information is the tabulation of birthplaces of parents of all persons born in the group.

Many anthropologists have made a census or recorded genealogies. These have been preludes to other studies and are frequently unpublished or inadequately presented for the present purpose. However, some readers may be able to add another case. We do not even know yet whether human evolution would have been more rapid before cultivation of the land began. Perhaps we can at least find out to what extent, if any, hunters live in smaller more isolated reproducing groups than, for instance, agriculturalists.

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I know nothing more deadening to original ideas than keeping a man's nose firmly fixed to the grindstone. Even directors need a change, and young men should have opportunities of meeting other young men working in other parts of the country. Ideas are more likely to come from such meetings with colleagues than by holding men down to some work in which there might be no progress at all. No laboratory today is self-sufficing.—Lord Rutherford.