anomalies is in the vicinity of 1 or 2 percent, so by examination of a tiny fraction of all children born the specialist would have an excellent chance of selecting among these those with defects likely to be mutational in origin.

The success of such a system would not only depend on getting good observations at the source, but also on a system of prompt reporting and data analysis so that any trend could be detected promptly. If an increase is detected one could hope to identify the cause by such things as the geographical pattern.

The monitoring of gross abnormalities may be too crude to produce meaningful results. It may be advisable to use refined chemical procedures that can detect changes in the proteins that are the immediate gene products. At present such tests are very expensive, but with increased automation, these may be shortly feasible. The rough and ready and the refined methods are not mutually exclusive; both have their advantages. We think it is likely that as our chemical environment becomes increasingly more complicated that more and more elaborate systems of monitoring will be necessary.

The cost of genetic monitoring such as we have been discussing would be very great. It could probably be justified only if it were a part of a system of monitoring for other environmental factors. A natural one to couple with a mutation-detecting system would be a search for new teratogens in the environment. Our memory of the thalidomide disaster is a reminder of the need to have a system that will reveal as promptly as possible any agent that is causing physical abnormalities and disease, whether this be by increased mutation or any other cause.

Another possibility for monitoring is to study the human population, as before, but instead of looking at the next generation look at this generation for changes that might foreshadow such changes in the future. If mutations are induced in the germ cells, they are also induced, in all probability, in other body cells. Therefore, a sensitive system of monitoring mutation rates in the blood cells could give a much quicker indication of an environmental change. Such tests could be both chemical tests for altered gene functions and cytological observations for chromosome aberrations.

Conclusions

A number of procedures are presently available in mammals, the majority of recent origin, that can be used to determine the mutagenic activity of chemicals. Our ability to characterize mutagenic agents no longer depends exclusively on nonmammalian systems, such as *Drosophila*, bacteriophage, micro-organisms, and cell culture, although