

# Point of View

## THE FUTURE IN GENETICS

*This issue's "Point of View" is adapted from remarks made at the University of Michigan's Future Worlds Conference Festival.*

These days one hears a great deal about genetics in the future world. Three developments—"genetic engineering," "cloning" and "artificial insemination"—are discussed most often, both for what some of the possibilities are and for the ethical issues raised by the possibilities. But in my view, it would be a "cop-out" on the real problem to see these developments, and kindred ones, as the wave of the future. It would typify the search for the quick technological fix that seems to characterize a great deal of human activity these days. I think there are much more important challenges to the geneticist—two seem almost overriding to me.

Biomedicine has had in recent years a kind of blind allegiance to the quantity of life, but relatively little to its quality. We have accepted the dictum that it's our job to save lives, without worrying sufficiently about what comes later. One of the consequences is a population crunch. Right now there are two very serious famines, and a great deal more human misery is not too far down the road.

This is a genetic problem in an important sense. I regard it as urgent that population growth be controlled. The moment you make a decision to control population, the question arises: who is going to have the children for the next generation? That gets the geneticist into the act. If he chooses not to get into the act, that is also a conscious decision—a policy, if you will.

I would like to suggest that we don't yet have the wisdom to say who should create the next generation, and that the most workable policy I can see is a simple replacement policy, in which each couple replaces itself with two children. It isn't going to work out quite that way, of course. There will be some persons who don't marry, or are married and childless. Others will stop at one. Most may stop at two, but some can go

on and have three and the average still works out to two.

To the geneticist, what this does is preserve for the present, just as far as possible, the gene pool—the genes that have brought us thus far in evolution, and are represented in humanity as a whole. The human species is broken up into ethnic groups; although there is a great deal of overlap in the gene pools of different groups, each is unique in some respects. Every time there is a major famine in particular countries, we lose part of mankind's collective gene pool.

Famines decimating large populations in India and Africa, for example, would have a tremendous effect. The impact of population loss would alter forever our collective gene pool, which is presumably what distinguishes us from other animals and which has enabled us to create the culture we now regard with such mixed feelings. If we control population expansion throughout the world with a simple replacement policy, however, we have a better chance to support the people already on the Earth—and to conserve the gene pool.

I see another important challenge for genetics. We still understand precious little about genetic man, but are pretty well persuaded that each of us comes into the world with his particular physical frailties (including those of the mind). Up until the present time, human culture has developed in a most haphazard way, without consideration of how to design the culture in which we might function best. I would suggest that the second great challenge is to learn what genetic man is; instead of trying to change our genes—with unknown consequences—we should get the most out of them by spotting our predispositions for disease and regulating our lives to some extent around these frailties.

In diabetes melitus, for example, there is general agreement that a genetic component exists, although precise genetics are unclear. When both parents are diabetic, abnormal glucose tolerance curves may appear in the children long before the advent of clinical diabetes; we know that if these children are overweight and not exercising adequately, their glucose curves can be

changed to normal by bringing down their weight and making sure they get enough exercise. Thus, by rather simple measures of intervention, the development of diabetes melitus can be forestalled in predisposed persons for some period of time.

There are other examples of genetic diseases which can be controlled. Some scientists believe that their tests will enable us to spot the person predisposed to hypertension well in advance of clinical disease; if this is the case, there may be measures one can introduce to prevent its onset. In families with gout—hyperuricemia—asymptomatic people often have high uric acid levels; one could thwart the development of gout by either dietary control or putting the individual on an agent that would reduce uric acid levels.

Screening children of parents affected by hypertension, gout and diabetes melitus would be a reasonable way to start public health programs in genetic disease. The return per unit effort would certainly be high in terms of improved public health. However, it might be desirable eventually to screen all children, whether they have a family predisposition or not.

It may sound naive and hopelessly optimistic to suggest that we will take the steps to bring population under control and then take additional steps to insure that we get more "mileage" out of the genes we have. But I'm afraid I don't see any real alternative as a geneticist. The helter-skelter growth which has occurred for the past century or so cannot continue, in my opinion. Sooner or later, we must take on the job of designing an environment in which the human animal functions best. That's the genetics of the future.

James V. Neel, M.D., Ph.D.  
Department of Human Genetics  
University of Michigan Medical School

---

*Readers are invited to contribute essays on any science-related subject that interests them. Contributions will be selected on the basis of content and will be edited for clarity of expression. You may first want to send a brief outline of your ideas to Point of View, The Sciences, 2 East 63rd Street, New York, New York 10021.*