

THE TRAINING OF BIOLOGISTS¹

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A FEW comments to introduce our topic may seem appropriate. Why this conference on the Training of Biologists? Well, simply because by shaping future biologists, we shape the future of biology. And there seem to be some grounds for concern. The question is: Can we profitably consider the many ramifications of a *training program* in biology without having a unified concept of *Biology* itself? There is our cardinal issue: What is biology, and what would we want it to be like? If we accord to biology the dignity of an integrated, consistent and coherent science, rather than view it merely—if you pardon the irreverent figure of speech—as a holding company embracing numerous separate and independent enterprises, then a clear understanding about the substance, aims and limits of this science would help to establish a sort of central beacon with regard to which we could orient ourselves, when dealing with subordinate issues. Then, anybody's problem becomes everybody's concern, and the common ground for this meeting of representatives of diverse interests is satisfactorily circumscribed.

Our meeting seems timely, or even overdue, in view of world events. In this world crisis, science finds itself confronted with mounting short-range demands and an altered long-range outlook. All around we hear it being predicted, that after this crisis has come to pass—in fact, if it is to be overcome for good—this world can never be the same again; and that, if the change is to be for the better, the critical, disciplined, fact- and relation-conscious mind of the scientist will have to be accorded a major share in the improvement. If experience and reason are to gain the ascendancy over emotion and superstition in the conduct of human affairs, man will have to know more about man, and then live up to his knowledge. Since for much of this knowledge he will have to call on biology, it becomes our responsibility to provide a generation of biologists fit to answer the call.

Only partly will their fitness depend on biological competence. Unless they are also made conscious of their obligation to society, they will, I am afraid, be at a loss to justify their subsidized existence to a

society asking uncomfortable questions. As the support of science will become incumbent on increasingly broader strata of society, for reasons of which you are aware, more and more such questions will be asked. And the biologist will have to be convincing in showing cause why what he is doing should not be discontinued as a publicly supported enterprise. The research man must prove that his work is more than a glorified hobby, the teacher that he is more than a slow-motion rendition of a text; the practicing biologist being the only one who will be taken for granted because of the plausibility of his utilitarian value.

Now, it is somewhat alarming to have to think of the possibility that in some future attempts might be made to set up an authoritarian agency to sit in judgment, and exert control, over what a scientist should or should not do or teach. Science would choke in such an atmosphere. But it is just as alarming to think of what would happen if the coming generation were left with the illusion that society will continue to stand for the random movements of unoriented and confused minds, privileged to receive public support for their playful exertions, good or no good, just because the story goes that a blind hen, too, occasionally finds a grain. Presumably, an economically minded society would withdraw its support from what it considers a bad investment, and science would be starved. It is up to us to avert both these dangers of either thus choking or starving our science.

We can do this, I submit, by waking up our students to the realization that their privilege of carrying on science as a public trust carries responsibilities. Heighten their sense of responsibility, and they will all by themselves check and recheck their conduct and activities by the standards of scientific and social ethics of which they will have been made conscious; and they will give a good account of themselves under any enlightened scrutiny. But keep on leaving them in the dark, and the whole structure of science will suffer.

This is not advocating indoctrination, but merely a better and more explicit exposition before the student of the philosophic, historical, methodological and cultural foundations of his science, than he is commonly offered. He ought to learn not only how to do things, but also how to rate the results of his doings, so that he may intelligently chart his course, ever on guard against the blind alleys of wasteful monomaniac pursuits. He should learn what his science is all about, how it has grown and how it might be made to grow

¹ Address by the Chairman of the Conference on the Training of Biologists, held in connection with the Fiftieth Anniversary Celebration of The University of Chicago on September 18-20. A full report of the proceedings of the conference will be published at a later date. Aid by the Carnegie Corporation of New York is gratefully acknowledged.