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Essays

Using Science to Help the Poor: Low-Budget Research Ideas. Part 1: From Biochemist to Advocate for the Underserved

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Halfway through my doctoral studies in biochemistry, I had an opportunity to travel to a developing country to visit some missionaries and the people they served. Thanks to that visit, I began my "mid-life" crisis in my mid-twenties.

My research at Indiana University was what one would call "basic research." Basic research is the word used when there is no immediate benefit anticipated to come from the research. It is contrasted to "applied research."

Basic research has an important place, and I recognize that often it leads to new opportunities for applied research. Some have speculated that the emphasis on basic research in the United States is partly responsible for the disproportionate number of Nobel Prizes awarded to Americans. But the more I learned about the desperate needs of the world, the less personally satisfying it became to me to work at projects like "elucidating the mechanism involved in the addition of cyanide ion to N-dodecyl-nicotinamide bromide." This was one of several reactions our lab was studying to try to better understand the forces responsible for the incredible catalytic ability of enzymes. For me, it remained interesting but was no longer a priority avenue in which to spend my professional life.

So began an odyssey that was to take more than a decade to reach resolution when I became the director of the Educational Concerns for Hunger Organization (ECHO). Along the way I learned a great deal about options for using science to help the poor.

Teaching at a Small College

I began my career as assistant professor of biochemistry at Geneva College in western Pennsylvania. The chemistry department required a senior research project for its majors. I found that I was not alone in longing to see my research make a difference. Though my research ideas were at that time limited, I found that science majors responded well to the opportunity to apply their scientific interests and skills to real-life problems.

Often a chemistry or biology major moves into medicine or ecology to find "relevance." Indeed, training in the hard sciences (especially chemistry and biology) is excellent preparation for these fields. But I was looking for research projects that could directly help the poor in developing countries. Medicine and ecology no doubt could offer such opportunities, but I chose to pursue opportunities in the field of agriculture, a field that could equally benefit from a thorough background in the hard sciences. It was also a "path less traveled by" (as Robert Frost would say) for majors in biology and chemistry. Less-traveled paths sometimes offer more opportunities.

Making that decision was one thing; knowing what to do next was quite another. One cannot just "do hunger-related research." The research cannot begin until the researcher has identified a specific question or technical opportunity that might be addressed through a research project. I had no idea what the questions were! In the last 19 years I have met many professors and students who have come to the same point. It is the purpose of the following articles (Part 2 and Part 3) to point my younger colleagues in what will hopefully be some helpful directions.

It is not my intent to cover the subject at all exhaustively. Scientists in other disciplines who wish to help the poor will need to chart their own course. I will later briefly address opportunities that one might pursue at better-funded laboratories at universities or international research centers. However, my primary emphasis is on low-budget projects that could be undertaken at smaller colleges, or in laboratories in economically underdeveloped countries.

My research budget was just a few hundred dollars at Geneva College, but we had a well-equipped laboratory, a chemical storeroom and some expensive instruments. It was difficult compared to the well-funded research I had done at Indiana University. On the other hand, I did not need to apply for grants, cover a portion of my salary and add a big overhead percentage. "All" I needed was a research opportunity that could be addressed with the instruments, equipment and chemicals on hand plus some modest purchases.

As I have spoken with many faculty members over the last 25 years, I have learned that finding time to do the work has proven more difficult than finding ideas that could fit into the resources of the college. I have met many eager scientists at small colleges who have had to give up because of their exceptionally heavy teaching loads. Realistically, I think very little will get done during the academic year, but a lot can be done in the summers. Many faculty members are free to do whatever they wish during the summer. If family finances do not require them to seek a summer job, the door is wide open to three or four months of full-time research. Better yet, there just might be a grant that would cover summer research and a stipend to allow a student to devote a summer to the project.

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