

# INTERNATIONAL PEACE FOUNDATION

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## SPREADING PEACE THROUGH SCIENCE AND COMMERCE IN DEVELOPING COUNTRIES

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Science is an inherently peaceful activity, one in which disputes are solved, not by violence, but by the exercise of logic and reason. It is a universal discipline, being practiced in essentially the same form in every country of the world. There is no room for the fervent fundamentalism that characterizes many other social and religious activities. Disagreements are resolved by peaceful meetings of the antagonists, debate among them and the application of logical reasoning. The practice of science transcends the national boundaries of the political systems and the cultural bounds of religions. During the 1970's and 1980's, because of science, I was able to visit many Eastern European countries, then under totalitarian rule, and found that I always had common ground with the scientists who were my hosts. Furthermore, I was able to facilitate visits to the west for my scientific colleagues in Eastern Europe. Such visits, friendships and collegiality inevitably paved the way for better understanding of one another's political systems. When China first began to open its borders after the cultural revolution, I was again able to host several visiting Chinese scholars into my laboratory at Cold Spring Harbor. These contacts were incredibly beneficial on both sides.

One of the great rewards of science, particularly in the biological arena, has been the realization over the last 20-30 years, that aside from its intellectual fascination, many can commercial opportunities exist. With the discovery of recombinant DNA and the development of tools to study DNA, a whole new industry, biotechnology, has grown up. The applications flowing from biotechnology will impact all of our lives, not only because of developments in health care and diagnostics, but also through its impact on agriculture and the possibility that we may ultimately be able to tailor our environment into a fully sustainable ecological system based on our understanding of the natural processes that drive ecology. The commercial aspects of science have already had a huge impact in the West. However, there are equal possibilities for a similar impact in developing countries. For instance, the main crops that provide food in much of Africa and Asia are not the ones that sustain the Western world. By judicious application of biotechnology it should be possible for similar developments and advances to be made worldwide. Of course one will also need to consider carefully the whole question of intellectual property in these areas to be certain that the benefits of this technology do not outweigh its disadvantages. But it should not be forgotten that the genetic heritage of the developing world is every bit as important a natural resource as the minerals, timber or oil that we traditionally think of as the key to prosperity.

Because my own expertise is in the biological field, especially biotechnology, I will limit my remarks about commercial prospects to that arena. I will argue strongly that in general, commerce is a good thing. It tends to promote peace, not war, and almost everyone engaged in commerce will tell you that they prefer a peaceful environment in which to conduct their business. Thus, I would argue that commerce itself is an inherently peaceful activity. I have been especially fortunate in having the opportunity to combine science with commercial activities and by so doing, to promote peace. On a very modest scale, the company for which I work, New England Biolabs, has been trying to do just that. In the lecture I will recount some specific examples of the kinds of activities that New England Biolabs has been involved in which can serve as a small example of how science and commercial development in the West can help create a scientific and commercial base in developing countries.

New England Biolabs has been supporting laboratories in many developing countries including Cameroon, China, Vietnam, Uganda, Pakistan, Portugal and Nicaragua. Here, we have tried to enable scientists to make for themselves the basic tools that are needed for biotechnology research and development. We have trained scientists from these countries in our laboratories in Beverly and we have supported the development of their own laboratories in their home countries. In those laboratories they have been carrying out various discovery activities and in many cases have found reagents from local organisms that are sufficiently useful that we can sell them in the West. This has benefited our own company, but also the laboratory in the developing country to whom we give a royalty on all sales of products discovered by them.

Another way in which we have tried to be of assistance to developing countries has been through a program started more than 20 years ago through work on filariasis. When we began, this was one of the top 6 tropical diseases targeted for action by the World Health Organization. The disease is caused by parasitic worms and the condition known as elephantiasis is one of the major manifestations. The worm that we study is called *Brugia malayi* and some three years ago we, and others, made the interesting discovery that this parasitic worm contains an endosymbiotic bacterium that is essential for the growth of the worm. The bacterium, a *Wolbachia* species, is rather interesting from a scientific viewpoint, but more importantly, presents an attractive target for a drug that might one day be used to treat filariasis. We have recently sequenced its genome and have identified several promising targets against which drugs may be developed. Although it is unlikely that this would ever be a profitable endeavor, since drugs for third-world diseases rarely make money, we are very content with the results of our research plan because there have been many spin-off activities and products that have arisen solely because we chose to study this disease.

In summary, by practicing science and staying aware of commercial possibilities, I believe that the cause of peace can be promoted. Ultimately, if we are all citizens of a world in which the logic and reason of science prevails and there is sufficient commerce to insure prosperity, the chances of that world being peaceful are greatly increased.