

In 1959, Mr. Chairman, an attempt was made to measure the contributions of industrial laboratories to the growth of fundamental knowledge. A study of the basic research articles printed in scientific journals during the course of 1 year was published in the weekly magazine, *Science*. Merck stood fifth on the list, right behind General Electric, Bell Telephone, Du Pont, and American Cyanamid. They averaged a third more papers than did we, but they also averaged over 30 times our financial resources.

But if my colleagues have reason for pride, they also have reason for discouragement. I am not referring only to disparagement of our work, though this is sometimes heartbreaking. I am referring to the painful slowness with which we and our counterparts in other pharmaceutical laboratories and our collaborators in the great research organizations of government, universities, and medical schools around the world are able to push back the frontiers of ignorance.

For most illness, such as the degenerative diseases, we have not yet found either the cause or the cure. While we can discover drugs like indomethacin which improve the health and well-being of patients, we are still fighting our way through the dark, and we are often terribly discouraged.

Biomedical knowledge is almost half a century behind that of the physical sciences in the accumulation of knowledge of the kind and depth that leads to major discoveries. The situation stems from the complexity of life. In the human body research is dealing with something like 100,000 or more biochemical processes. When you add to this the tremendous genetic complexities of the human being, the most complicated hybrid on this planet, you can see how difficult it is to make a statistical analysis of his chemical and emotional reactions. The number of unknown variables with which we have to cope is well beyond our present comprehension. We still can and do make significant progress, but it is clear that if research is really to conquer disease, we must never lose sight of our central task: the accumulation of more and more basic knowledge. This will require patience on the part of all, including the Congress, which has been so generous in recent years with appropriations for basic research in medicine.

Turning again to rheumatoid arthritis: in few other fields of medicine is our basic knowledge more deficient than it is in rheumatoid arthritis. Though indomethacin has given relief to many patients who suffer from this disease, there is still a deep dissatisfaction connected with this achievement. It is a dissatisfaction, too, for the medical profession and for the millions of victims of rheumatoid arthritis and related diseases. Neither we nor anybody else has found either the cure, or for that matter, the cause or causes of these diseases. All we have discovered are better ways to relieve painful suffering and return invalids to productive lives. This is important. But we still have before us the challenge to finish the job—namely, to cure and prevent the diseases themselves.

We now want to concentrate on the specific stage of our long research effort in this field—that of indomethacin—that now interests you and your committee. To tell you about this program, I would like to call on Dr. Karl Beyer, Jr., senior vice president for research of our laboratories. He is a distinguished scientist with an international reputation. He has both an M.D. degree, and a Ph. D. degree in physiology. He is a past president of the American Society for Pharmacology and