

## EBB TIDE IN MEDICAL RESEARCH<sup>1</sup>

The academic physician has always struggled to find a balance between the pursuit of scientific research and his devotion to social needs. Today the pressures that drive him from the traditional disciplines of research to urgent medical problems in society seem overwhelming. This issue should be examined with as much perspective and reason as we can muster.

The practice of science in medicine has undergone its most extensive development during the past two decades. These changes, virtually revolutionary in their proportions, have not been in the nature of medical research but rather in the scale of its support. This distinction is the point on which I want to dwell.

Goals and attitudes in research in the physical or medical sciences have not changed in a fundamental way for hundreds of years. The essence of the scientific culture remains a stepwise extension of previous investigations. The process, seen with any perspective, always moves forward. Science is thus unique among human endeavors in the polarity of its overall movement which we call progress. The flow of science thus resembles the movement of rivers. Rivers have a fixed direction and continuity as they flow down to the sea. Like rivers, the pace and dimensions of scientific movement vary enormously. But shallow or deep, broad or narrow, sluggish or swift, the movement is inexorably forward.

There may be eddies in science as in rivers; and there may even be apparent reversals of direction. In recent memory, Lysenkoism stifled Soviet genetics and molecular biology for a whole generation, but eventually, even this death grip was released. Neither a tyrant nor an organized group can long withstand the determination of men to explore and to describe their observations to one another. The *facts of nature* emerge from our probings and cannot be denied. What is so startling, as Einstein once observed, is that man can fathom so much of the intricacies of nature.

In contrast to the forward movement of science, the support of science by society has no direction. Throughout history this support has risen and fallen. The attitude of society toward science does not resemble a river but rather the movement of tides. In our generation we have seen a strong high tide which now is beginning to ebb.

In the nineteen thirties, the practice of science in medical schools was barely tolerated. There were few

jobs and even fewer resources. In only a handful of schools was there a firm commitment to research. There were no research grants, no training programs. All of this changed in the fifties. Research became fashionable in medical institutions. Everyone was encouraged, even urged to do research. The federal support of medical science training and research eventually exceeded a billion dollars annually. The tide was rising.

What brought about this phenomenal post-war support of science? The influence of personalities and political and economic factors is difficult for me to evaluate. But of one thing I am sure. This expansion of science supported by tax dollars, industry, and private philanthropy was not due to the persuasive efforts of scientists. Far from it.

Some scientists objected to this new scale of support of science almost from the outset. They argued that men with talent and motivation would do research under any circumstances. A few petri plates, test tubes and home-built apparatus were all that one needed to make important discoveries. This rising tide of support would populate science with mediocre people and inundate the literature with trivial data.

On the contrary, the results of the massive support of science in the United States during the past twenty years have exceeded even the most optimistic predictions. Technology advanced far beyond our expectations. No one imagined that we would acquire so quickly the firm grasp we have today of the basic designs of cellular chemistry and its regulation. The nature of heredity, clouded in abstract language only twenty years ago, can now be described in the simplest chemical terms. In the next twenty years the chemistry of genes will become more precise, varied and extensive. Genetic therapy is no longer science fiction. Attempts are underway to cure children of a fatal inborn error of metabolism. The missing gene is being administered with a harmless virus as the vehicle. Difficult problems of viral and degenerative disease will soon be solved. I believe that we could, by enlarging the scale of our studies of the chemistry of man, begin to understand many aspects of human behavior as well.

Despite the spectacular success of this scientific effort, there is now an increasing retrenchment of support for research and training of scientists. I never expected this reversal of support. What I had failed to anticipate, too, was that public apathy or hostility to science would be evident so quickly among scientists themselves. It has become painfully clear to me that

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1. Based on remarks made at the Markle Scholars' meeting, September, 1970.

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the attitude of most scientists toward the support of science simply reflects that of the society around them.

Let me summarize. Science is extraordinary but scientists are not. Science enables ordinary men to express their creative talents in a global and purposeful way. Their humble probings, so picayune individually, combine to exert irresistible forces in exposing the grand designs of nature. Scientists for the most part have no deep dedication to the culture of science. They shift quickly to areas of science that have public approbation or away from science entirely when the pressure becomes too strong.

But science is very important to society. The esthetic value of understanding nature, including the basic fab-

ric of man, justifies an even greater support of science. Among the tangible benefits are improvements in the quality of human life by control of the old diseases and an ominous new one, overfertility.

The support of science is too important to be left to scientists. Few of them have the insight or the talent to interpret science for society. We need men who have this perception, and skill in persuading people. There must be a few among the large numbers of men who market cars, cigars and whiskey who can and would turn their talents to advertising a more wholesome product, the pursuit of science. This country supports many billion-dollar industries. Surely medical research deserves to be among them.

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