

INTRODUCTION

Scientists often have an aversion to what nonscientists say about science. Scientific criticism by nonscientists is not practiced in the same way as literary criticism by those who are not novelists or poets. The closest one comes to scientific criticism is through journalists who have had an education in science, or through scientists who have written about their own personal experiences. Social studies of science and philosophy of science tend to be abstract or to deal with well-known historical events or remote examples that bear no relationship to what occurs daily at the laboratory bench or in the interactions between scientists in the pursuit of their goals. In addition, journalistic or sociological accounts seem sometimes to have the sole purpose of proving merely that scientists are also human.

A love-hate relationship exists toward scientists in some segments of society. This is evident in accounts that deal with facets ranging from tremendously high expectations of scientific studies to their cost and their dangers—all of which ignore the content and process of scientific work itself. In the name of “science policy,” studies of scientific activity by economists and sociologists are often concerned with numbers of publications and with duplication of effort. While such examinations are of some value, they leave much to be desired because, in part, the statistical tools are crude and these exercises are often aimed at controlling productivity and creativity. Most importantly, they are not concerned with the substance of scientific thought and scientific work. For these reasons, scientists are not drawn to read what outsiders have to say about science and much prefer the views of scientists about scientific endeavors.

However, the present book is somewhat different from accounts usually written by nonscientists about science. It's based on a two-

year study by a young French philosopher which was carried out at The Salk Institute for Biological Studies and which was subsequently written up in collaboration with an English sociologist. Although I was not responsible for the initial invitation, I welcomed the opportunity to see if the approach that was contemplated would remedy some of the shortcomings of previous social studies of science.

The approach chosen by Bruno Latour was to become part of a laboratory, to follow closely the daily and intimate processes of scientific work, while at the same time to remain an "inside" outside observer, a kind of anthropological probe to study a scientific "culture"—to follow in every detail what the scientists do and how and what they think. He has cast what he observed into his own concepts and terms, which are essentially foreign to scientists. He has translated the bits of information into his own program and into the code of this profession. He has tried to observe scientists with the same cold and unblinking eye with which cells, or hormones, or chemical reactions are studied—a process which may evoke an uneasy feeling on the part of scientists who are unaccustomed to having themselves analyzed from such a vantage point.

The book is free of the kind of gossip, innuendo, and embarrassing stories, and of the psychologizing often seen in other studies or commentaries. In this book the authors demonstrate what they call the "social construction" of science by the use of honest and valid examples of laboratory science. This in itself is an achievement for they are, in a sense, laymen to laboratory science and are not expected to grasp its fundamentals, but merely expected to comprehend only that which is easiest to understand, such as the superficial aspects of laboratory life.

In reading this book about my colleagues who have been observed under a sociologist's microscope, I realized how "scientific" a study of science could be when viewed by an outsider who felt impelled to imitate the scientific approach he observed. The authors' tools and concepts are crude and qualitative, but their will to understand scientific work is consistent with the scientific ethos. Their courage, and even brashness, in this undertaking reminds me of many scientific endeavors in which nothing stands in the way of the pursuit of an inquiry. This kind of objective observation by an outsider of scientists at work, as if they were a colony of ants or of rats in a maze, could be unbearable. However, this seems not to be so, and for me the most interesting part of the work and of its outcome, is that Bruno Latour, a philosopher-sociologist, began a sociological study of biology and

along the way came to see sociology *biologically*. His own style of thought was transformed by our concepts and ways of thinking about organisms, order, information, mutations, etc. Curiously, instead of sociologists studying biologists, who in turn are studying life processes—in a sort of infinite regression—here are sociologists coming to recognize that their work is only a subset of our own kind of scientific activity, which in turn is only a subset of life in the process of organization.

The final point, intended to suggest that this book is not unworthy of the attention of scientists, is in the bridge made between science or scientists and the rest of society. The word “bridge” is not quite right and I doubt that it would be acceptable to the authors because they claim to go much further. One of their main points is that the social world cannot exist on one side and the scientific world on the other because the scientific realm is merely the end result of many other operations that are in the social realm. “Human affairs” are not different from what the authors call “scientific production,” and the chief accomplishment they claim is to reveal the way in which “human aspects” are excluded from the final stages of “fact production.” I have doubts about this way of thinking and, in my own work, find many details which do not fit this picture, but I am always stimulated by attempts to show that the two “cultures” are, in fact, only one.

Whatever objection may be raised about the details and by the author’s arguments, I am now convinced that this kind of direct examination of scientists at work should be extended and should be encouraged by scientists themselves in our own best interest, and in the best interest of society. Science, in general, generates too much hope and too much fear, and the history of the relationship of scientists and nonscientists is fraught with passions, sudden bursts of enthusiasm, and equally sudden fits of panic. If the public could be helped to understand how scientific knowledge is generated and could understand that it is comprehensible and no more extraordinary than any other field of endeavor, they would not expect more of scientists than they are capable of delivering, nor would they fear scientists as much as they do. This would clarify not only the social position of scientists in society, but also the public understanding of the substance of science, of scientific pursuits and of the creation of scientific knowledge. It is sometimes discouraging that although we dedicate our lives to the extension of knowledge, to shedding light and exemplifying rationality in the world, the work of individual scientists, or the work of

scientists in general, is often understood only in a sort of magical or mystical way.

Even if we do not agree with the details of this book, or if we find it slightly uncomfortable or even painful in places, the present work seems to me to be a step in the right direction toward dissipating the mystery that is believed to surround our activity. I feel certain that in the future many institutes and laboratories may well include a kind of in-house philosopher or sociologist. For myself, it was interesting to have Bruno Latour in our institute, which allowed him to carry out the first investigation of this kind of which I am aware and, most interestingly, to have observed the way in which he, and his approach, was transformed by the experience. It would be very useful for this critique itself to be criticized. This would both help the authors (and other scholars with similar interests and background) to assist scientists to understand themselves through the mirror provided, and help a wider public understand the scientific pursuit from a new and different and rather refreshing point of view.

—Jonas Salk, M.D.

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