

## LETTERS TO THE EDITOR

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### **On the Neglect of Scientists with Low Research Productivity**

Derek de Solla Price long ago presented impressive statistics on the vast imbalance in scientific research productivity. A tiny proportion of scientists are responsible for a large fraction of research output and an even larger proportion of the most significant research. It is not surprising that social studies of science have concentrated on the most productive scientists. As a rule, they are the most articulate and powerful, and there is more data about them. But, as a result, is there a lack of knowledge about the masses of less successful scientists, and therefore about the mass culture of scientific knowledge and practice?

I call the individuals toward the bottom end of the publication sweepstakes "scientists with low research productivity." Another name would be second-rate researchers. Many do routine technical work in laboratories. Others devote themselves to teaching. Still others do as little as possible in their jobs.

Low productivity scientists may lack profile and output, and yet be influential by their sheer presence in bulk. After all, they teach most scientists, and it is their understanding of scientific ideas and practices which is the practical cultural accomplishment of science and engineering in contemporary society.

Their behavior and influence remain to be examined in depth. It could be argued that most social studies of "science" are actually social studies of elite science, namely of the most famous, influential, productive, and outspoken scientists and their accomplishments. Much of the history, philosophy, and sociology of science may be distorted by neglect of the mass of ordinary scientists, just as the study of other occupational groups would be distorted by concentration on managers rather than workers.

Low productivity scientists are likely to be different from elite scientists in several ways, aside from low productivity itself. Here I present some preliminary observations based on my experiences in ordinary science departments.

First, their belief systems are likely to be less articulated. Nonelite scientists are not thrust into the public eye, and seldom have to justify themselves. Their views are developed from their own training and their day-to-day experiences and contacts. These may be firmly held, but they are not necessarily similar to those of prominent popularizers and scholars in their midst. Studying the analyses of scientists who write about science, such as Peter Medawar, Michael Polanyi, Karl Popper, and John Ziman, may give quite the wrong impression of what routine science is all about.

Most low productivity scientists do relatively little in the way of forging alliances with industry and government, building research empires, and establishing schools of thought. Significant features of their worlds include teaching schedules, tea rooms, and retirement packages. They are seldom involved in scientific controversies, neither having developed striking new ideas nor being impassioned or confident or prominent enough to enter the public arena in defense of the old.

Ian Mitroff demonstrated the intensely passionate commitments that top scientists have to their ideas. Does this also apply to second-raters?

Why have the low productivity scientists received so little attention? On a practical level, it is more trouble to study them. There are no articles about them, and they publish few articles themselves. There are hardly any citations to their work. They are more likely to be isolates or junior members of teams, and more likely to quit science. (Again, these obstacles also suggest the likelihood of different behaviors and belief systems.)

Low productivity scientists are less salient in everyone's lives (except their own) and therefore easy to ignore. We expect hagiographic science history to concentrate on Newtons and Darwins, just as Whiggish history in general concentrates on generals and kings. But should revisionist history of science be focusing so much on figures such as Pasteur and Boyle?

More deeply, the focus on elite research scientists may reflect an uncritical acceptance of elite science's own value structure. In most cases, research is much more prestigious than teaching, and similarly it seems that studying researchers has more prestige than studying teachers. There is also more status in being associated with famous individuals (past and present) than a bunch of unknowns. Who wants to be known as the expert on second-raters?

I thank Terry Stokes for useful comments.

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