

Can Excellence Be Managed?

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easily be aborted.

by Harold Brown

In thinking about questions of management and how management should function at Caltech—both on campus and at JPL—one is immediately drawn to the fact that we insist on excellence and strive for preeminence. That in turn raises the question of how management can function in an atmosphere of excellence and how it can encourage its development.

My frame of reference is that of having been a manager, at least in part, since a few years after I got my PhD and almost entirely for the past 15 years—in a development laboratory, in government, and now at a university.

Can excellence be managed? Let me point out some distinctions between the campus and JPL in this matter. The campus is a center of discovery of new ideas and of teaching—at the frontiers of science. Even in its very considerable and very important activities in engineering and applied science, the campus is centered on ideas and experiments, not on objects or development. But JPL is a center of excellence too—excellence in development, excellence in systems design, excellence in developing and applying advanced technology.

These differences between the specific aims of the campus activities and the specific functions of JPL lead to some differences in what constitutes the appropriate style of management. But similarities exist too, and, in my opinion, the similarities are greater than the differences.

The similarities make it possible to formulate some guidelines for discovery and development kinds of activity at Caltech—both on campus and at JPL. The first guideline I would suggest for the function of management is that it exists to help place the technological and educational activities of the Institute in a broader setting. On the

campus, the function of these educational and research activities is to develop new scientists, engineers, and educated and thinking men. The development of these ideas, and these people, is a very important value in itself. For that reason the activities on campus must have a core, a center, determined by the interests of the faculty and of the students.

Though some people outside of JPL may think its aim is simply the performance of very difficult technological feats, those are not in themselves the objective of the activities at JPL. Even more than on campus the purposes of the activities at JPL are inherently oriented toward the demands and needs of the larger society around us.

But even on campus we have to pay attention to society's *long-range* interests. We in the United States have always believed that education and fundamental science and technological research are important to society. In the last few years in particular that belief has been somewhat eroded. This erosion is a great danger to the university and to society. And it seems to me that this places upon management, top management particularly, the responsibility for closing the gap between the inner, encapsulated purpose of the Institute and the pressures and desires of the world outside.

This responsibility involves, first of all, explaining science and technology and development to the public. They don't really understand it, but many of them want to. Good science writing is rare, but in our own local area we get more than our share from some of the science writers of the *Los Angeles Times*. Two examples come immediately to mind of people in the Caltech family who have done a great deal on informing the public. One is Al Hibbs at JPL, and the other is Professor Kip Thorne on the campus, who last year won a national award for the year's best science writing in physics and astronomy.

A second example of how to connect the inside and the outside and to think of what society will want or will profit by 30 or 40 years later is quite different. This is the question of deciding in which field to work—such as the choice made in 1928 on the campus to go into biology.

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science and social sciences. Both the campus and JPL, in their own ways, are moving into environmental engineering and into some of the questions that deal with environmental pollution and transportation.

Another guideline for management is to take the responsibility for producing a form of governance that fosters acceptable relations among the various parts of the community of the institution: on campus, the relations between faculty and students and between both of them and nonacademic personnel; at JPL, relations among people in functional areas and between them and scientists.

As to further examples of what to do and what not to do, I suggest first, not competing with subordinates, but instead helping them grow—and second, remembering what your central goal is, which requires knowing what's going on around you.

At a university it is of central importance to have a critical and inquiring spirit. Good faculties have it; students have come to have it in even greater measure. I would suggest that JPL's greatest value to NASA in terms of its Caltech connections is the existence

of that spirit on the campus, and a primary management function at JPL is to preserve and expand it at JPL.

But to question society's, or NASA's, or even students' central beliefs these days is to risk (indeed sometimes to ensure) the displeasure of those bodies. Management has the function of explaining the need for the people at our kind of institution to ask questions—and to defend that need. It also has the responsibility to see that there is some sort of coherence to the activities of teaching, learning, doing research, or doing development, and to see that the right to question and to criticize is exercised in a way which does not infringe upon the freedoms of others.

A third function of management is to remember that there are limits to the role that management can play. Specifically, if administration becomes an end in itself, it will destroy excellence in the institution that is being administered. Caltech is dedicated to science and to technology, not to administration, or to buildings and physical plant, or to accounting. Those functions—like the president's office—are service organizations. In the tug-of-war between efficiency and responsiveness we need to try to maximize both, but there is even less excuse for lack of responsiveness of the administrative functions than there is for inefficiency.

Financial strictures on campus and at JPL, which are very real, strongly dictate prudence and efficiency. On the campus we are accountable to the donors of the money, and to the students who pay tuition; and at JPL we are accountable to the taxpayers for the tax dollars that support the operation. This accountability dictates prudence and efficiency. But the best accounting system and the most careful adherence to regulations in the world will not produce Nobel Prizes, brilliant students, or successful Mars probes; and without those things we have nothing to offer to justify our existence.

What I'm saying is that administrators, including university presidents, are overhead. The success of what we are trying to do depends upon the talents of our outstanding faculty and students on campus, and on the talents of the engineers and scientists at JPL. No matter how well the rest of us do our

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jobs, only they can keep Caltech and JPL excellent. This doesn't make us managers second-class citizens, but it should help us keep our priorities straight.

As managers and administrators, we often claim—and sometimes we have—a better long-range view of what actions and policies are best for the work of our professors and students, our engineers and scientists. We're supposed to have more wisdom as to how best to make their activities flourish. That is the justification for our function. But we must not let this lead us into thinking that the Caltech campus or the Jet Propulsion Laboratory are therefore to be run for *our* benefit. They are not. And whenever we take actions aimed otherwise than at enhancing *their* work—the work of our engineers and scientists, our faculty and our students—and *their* achievements, then we undermine the health of the Institute and the Laboratory. How well a manager performs his function determines whether he is helping to solve the problem or is a part of the problem.

So, my answer to the question: “Can excellence be managed?” is that it cannot be managed into existence. It can, however, easily be aborted. It is our job to nurture, encourage, and augment excellence. In that sense I think we can hope to manage excellence, and I know we shall all keep on striving to that end.