1
INTRODUCTION

It would be surprising if anyone reading this book had decided to embark upon a graduate degree in science with the objective of becoming a leader of scientists. My assumption is that you became gradually aware—probably during your postdoc experiences—that laboratories could be managed and people could be led effectively or ineffectively. Perhaps you reflected on the possible association between leadership and the qualities of the scientific outcomes (e.g., creative, productive, provocative). Or, you experienced or observed groups that were ineffectively led and wondered whether the outcomes might have been different under different (better) conditions.

If you set up your own laboratory in a university or research institute, you discovered that *managing* and *leading* were, inescapably, your responsibilities. If you chose to work in industry and became the leader of a group, that promotion was likely based on your scientific and technical successes. In either case, I presume that, by the time you realized your role had changed, you had little or no formal, systematic management or leadership training. Perhaps you were skeptical about such training. Did you ask: *Are the "soft" sciences just too soft to help me?*

HARD AND SOFT SCIENCES

In my early discussions with groups of scientists about leadership, almost invariably someone would tell me that he or she had witnessed or knew about a laboratory that was led ineffectively yet still produced good scientific re-

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sults. The question left hanging was: What does that mean in terms of management and leadership training?

Let me respond by disentangling the implied propositions. The first proposition is that *leadership of scientists does not matter.* As a professor of management, I am unlikely to agree. Given that you are reading this book, I assume you will concur if we do not entertain the first proposition.

The second proposition—*ineffective leadership does not negate good science*—is more interesting. Certainly, scientists have been productive and achieved good results under trying leadership conditions. When I was told about groups that had been productive although the leader was ineffective, I posed this question: Might effective leadership produce better results than ineffective leadership?

I am prone to believe the answer is "yes," but there are no science–leadership experiments that can satisfy the criteria of the scientific method.[1] After all, who would volunteer to be part of the "bad laboratory" in a study of inept versus effective leaders? (Who would agree to be the inept leader?) Even if we could find volunteers to work under these conditions, could we ever control the myriad human and other variables so as to determine with confidence that effective leaders *caused* good science?

The answers are "no one" and "no."

An effective leader of scientists is more likely to have an enthusiastic, energetic, passionately committed group working for him or her than an ineffective leader. In addition, I propose that the former group is more likely to produce better results. The simplest reason I can give is that more "brain power" can be employed in scientific endeavors under effective leadership conditions than under the opposite conditions. Consider how difficult it is for people to focus on the science if they are caught in unresolved conflicts, the crossfire of sniping and negative criticism, or the emotional wake of verbal abuse from their boss. Unfortunately, these situations are typical of some scientists' experiences of ineffective leaders, as described later in the chapter.

Despite the improbability of designing (to "hard" science standards) leadership experiments, I am confident of the relevance and utility of key lessons and concepts from the "soft" sciences that are presented in this book. However, I must state explicitly that the intrinsic limits of testing in the behavioral sciences require that answers to leadership questions be guidelines

rather than rules, heuristics rather than algorithms, and suggested tactics rather than normative protocols.

In the soft sciences, such as management, hypothesis testing is challenging but not impossible. If you are in a leadership position, I exhort you to use your scientific expertise to formulate and test behavioral and organizational hypotheses and, thus, to learn and to grow in wisdom and effectiveness. Hypothesis testing begins with making your assumptions about people and organizations as explicit as your assumptions about the variables in your bench experiments. It involves observing your own and others' behavior with a "beginner's mind," seeking out disconfirming evidence for your hypothesis, and being honest about the outcomes.[2] Reflect on root causes of behavioral problems, decide on an intervention, and determine what happens as a possible result. Ask for candid feedback. This methodology was part of your training as a scientist, and it is generalizable to your development as a wise and effective leader.

So, you might ask: *Is leading people qualitatively different from conducting experiments?* I suggest that they have more in common than you may expect, but only if you approach both with openness, humility, curiosity, and appropriate reverence. Will you be equally good at both responsibilities? Not necessarily, but understanding your shortcomings and taking steps to rectify them are as necessary to leading people well as to doing good science.

MANAGING VERSUS LEADING

A good *manager* (the more common term) must also be a good *leader* (the currently popular term). When I use the word *managing* throughout this book, I refer to two types of activities: (1) leading scientists as individuals and (2) administering the research organization (e.g., overseeing laboratory budgets, preparing annual plans). When I use the word *leading,* I refer to being an exemplar and inspiration to those who work with and for you as well as directing them in a course of action, in decision making, and in problem solving. My emphasis throughout the book is on your role as leader.

I define an effective leader as a person who is capable of developing *and maintaining* an enthusiastic, energetic, and creative group of scientists and

of administering the laboratory or research-and-development (R&D) organization successfully. I wrote this book, originally, because I believe that effective leadership of scientists requires surmounting several difficulties that are different from those found in "nonscience" situations. The first difficulty is that scientists are people whose primary activity occurs between their ears. Moreover, the purpose of their work is to generate new knowledge and ideas, an endeavor that, in comparison with other formally organized activities, is oblique, hard to predict, unwieldy to measure, and difficult to judge except in hindsight. Because of these characteristics, much of the conventional wisdom of administration, such as engineering-based planning and controlling, may not be directly applicable to planning, managing, and evaluating the work of scientists. This often puts the leader of science at odds with those trained to use more traditional standards and metrics.

A second difficulty is that scientific education and training result in groups of people who have conceptual frameworks, vocabularies, and discipline cultures that are very different from one another. A related difficulty, as you know, is that scientists are essentially trained to be solo contributors. (This does not rule out their directing a group of people engaged in their project or collaborating with scientists working on related projects.) Multidisciplinary teamwork, cross-functional communication, and collaboration are not easily realized.[3] Also, the matrix structure of formally organized R&D presents a special challenge because a matrix requires lateral communication and collaborative behaviors.

The final difficulty that I want to point out (although this is not an exhaustive list) is that scientists have moods, biases, quirks, and warts like the rest of humanity. When scientists come to work in the morning, they bring more than their cerebellum to the bench.

This combination of science, an oblique and unpredictable activity, and scientists, highly trained solo contributors who are also human beings, is notoriously hard to lead well. Striking the right balance between, first, the freedom, ambiguity, and challenge necessary to foster creativity and, second, the constraints necessary for producing results within time, cost, and perhaps commercial objectives is fraught with problems. Few are able to strike that balance without making painful mistakes. My hope is that this book will help you avoid as many painful mistakes as possible.

SCIENTISTS' OWN EXPERIENCES OF LEADERSHIP

I have tackled a second edition of this book because, in the years since the first edition, I observed so many negative repercussions of ineffective leadership. Now, when a scientist tells me that "X laboratory produced good science despite an inept leader," I know that the science may have been good for a time but the personal consequences were bad: Scientists gave up the bench entirely for another career, left that organization, or remained on the job but "exited" mentally from working to their capacity.

My beliefs that (1) poor leadership does not negate good science but (2) good leadership is more likely to produce better results were informed by my own experiences. They were also reinforced by an investigation conducted initially with a colleague (a senior scientist directing a research laboratory). We were interested in scientists' experiences of leadership—both being a leader and being led.[4] Between 1996 and 1999, we surveyed five expert panels that totaled 147 scientists, of whom two-thirds were PhDs, 14% were MDs, 5% were PhD–MDs, and the remainder MS technicians (and students). Most were working in the life sciences, although a number had doctorates in engineering, mathematics, and physics. A slight majority was working in academia, the rest in biotechnology and biomedical companies.

These panels were not meant to provide a representative sample of all scientists but rather a window into what it may feel like to lead and to be led in scientific endeavors. Possibly, life scientists are very different from other disciplines; or, academic leadership is completely distinct from industry leadership. (Because the panels were not representative, we did not analyze the responses by discipline, by degree, or by place of work.)

The survey consisted of three open-ended topics, based on our interests (questions were asked in reverse order):

1. Describe the worst example of scientific leadership you have encountered and explain why this person was ineffective (this generated 177 responses).
2. Describe the best example of scientific leadership you have encountered and explain why this person was effective (this generated 235 responses).

3. Of the typical problems that you encounter in your scientific position, describe the most difficult (this generated 214 responses).

Below, I discuss the panel scientists' experiences of ineffective and effective leaders. At the conclusion of this chapter, I describe their own most difficult leadership problems.

The Ineffective Leader

More than half of the responses to this question described the worst example of scientific leadership as involving a boss who:

- Publicly humiliated subordinates, was abusive, or provided only negative feedback (20% of responses)
- Could not deal with conflict (17% of responses)
- Was selfish, exploitive, dictatorial, or disrespectful (16% of responses)

Other descriptors included being disorganized, having unrealistic expectations, taking prolonged absences from the laboratory, and being dishonest.

The verbatim comments that people provided as to why the person was ineffective were sobering. Scientists had been yelled at publicly, berated, nagged continuously, and belittled. One scientist described "lab meetings [as] notorious for being forums for public denigration. [X] was abusive in meetings and often bluffed his way through things he knew little about." Numerous respondents cited leaders' inability to deal with conflict. People stated that ineffective leaders "avoided conflicts and let problems fester"; they "looked the other way"; they "hid from conflict." One scientist wrote that the director "used the technique of avoidance and, when problems were arising, simply never showed up in the lab." Another gave an example of a situation in which the principal investigator "delayed dealing with interpersonal problems until they grew out of hand—then asked a post-doc to handle the issues."

We were struck by the powerful negative climate created by an ineffective leader. The survey revealed numerous instances in which harsh criticism and

negative reinforcements were heaped on scientists; in which public humiliation—not only in their graduate and postgraduate training—was typical; and in which the level of interpersonal conflict in the laboratory was so high it had to affect the work. Not one respondent noted, in all the descriptions of ineffective leadership, that scientists were nevertheless productive. In fact, in their own words, the opposite was described:

> I often find not only in my experiences but observing others that negative motivation doesn't work. It makes me much less productive. . . .
>
> There is much waste of human and financial resources in science from ineffective leadership. . . .
>
> Management can have a significant impact on the morale and productivity of a group. . . .
>
> Having had both extremes—great and horrible—as leaders, I'm aware of the productivity associated with a good leader and the lack of productivity associated with a bad leader.

Fortunately for the state of science and the work life of scientists, a different picture emerged from their descriptions of effective leaders.

The Effective Leader

We expected that scientists would rank intelligence and skill as important in their characterization of the best example of scientific leadership, and they did. However, what I will call "being a nice person" was noted most often. This attribute was followed by skills in management, such as ability to resolve conflict and to communicate and listen; being a good role model and mentor; and, then, intellectual accomplishment.

Effective leaders were described as:

- Caring, compassionate, supportive, enthusiastic, motivating (31% of responses)

- Possessing managerial skills, such as communicating effectively and listening well, resolving conflict, being organized, holding informative meetings (26% of responses)
- Being a good role model, mentor, and coach (17% of responses)
- Being technically accomplished to lead a scientific effort (15% of responses).

Other attributes included diplomacy, consistency and fairness, and having a sense of humor.

The importance of leaders' care and compassion to scientists and technicians working in the laboratory was striking. The best leaders were characterized as "scientifically very competent, and compassionate and caring deeply for collaborators and subordinates." As one respondent noted, the best leader was "caring but assertive. Good working rapport as well as friendship in the lab. Overall feeling of appreciation for the work done." Similarly, in contrast to the use of negative reinforcement by ineffective leaders, the best leader "not only criticized but also *praised.* A lot of people tell you when you've done something wrong. Very few people tell you when you've done something right" (the scientist's own emphasis).

Capturing many of the respondents' descriptions was this warm recollection of a former boss, who was

> a great scientific leader and manager. He held regular group meetings, included everyone in the discussions, took risks scientifically and in management, and was not afraid to speak up. He kept everyone focused and was a real "cheerleader" when it came to motivating us, keeping us a very focused and excited research team. He gave us a certain amount of independence and expected us to plan our work thoroughly. He also spent a lot of time in the lab, talking with us individually about the work. Our team was VERY productive [respondent's capitalization]!

These and related comments provided insight into the climate produced by an effective leader. Unlike the harsh and punitive environment in which "no one wanted to cooperate," the effective leader generated a "fun and productive atmosphere in which each person could thrive in his/her own individual

way." Effective leaders, who were "highly enthusiastic and supported others' unorthodox ways of thinking," created an atmosphere in which professional growth and scientific innovation seemed to occur naturally.

One link between effective leadership and the quality of the outcomes can be found in these responses. Scientists reported that the effective leader "could get the best out of each person"; ensured that each person "felt a part of what was happening and wanted to do a good job"; and had "the ability to inspire and make everyone enthusiastic about the research." These leaders "created a stimulating environment," "encouraged ingenuity," and "appreciated innovative/novel/different ideas." Scientists and technicians working for an effective leader were enthusiastic, energetic, and committed. As I proposed earlier in the chapter, they were also far more likely to use their brain power in support of the science than those who were (in their own words) "verbally abused," "exploited," and "always criticized."

Exhibit 1 summarizes these scientists' experiences of "good " and "bad" laboratories.

MY MOST DIFFICULT PROBLEMS

There will always be scientific and technical problems and setbacks. Success in the end, however, depends not only on the solution of scientific and technical problems but also on the leadership and management skills of responsible scientists. Yet, as a number of articles in the scientific press have noted, scientists' "management skills [are learned] on the fly."[5] Even the National Academy of Arts and Sciences noted that scientists are not prepared to "work well in teams and demonstrate leadership ability."[6]

The scientists in our panels admitted that they were not ready for one of the most difficult and consequential aspects of their work—leading a group of people. In order of proportion of responses, their most difficult problems were:

- Becoming a leader, which included being authoritative, staying focused, balancing the scientific efforts with the management responsibilities, delegating (28% of responses)

- Dealing with conflict (24% of responses)
- Motivating people, generating enthusiasm (12% of responses)
- Communicating effectively, primarily providing feedback (10% of responses).

Other difficulties included "not being taken seriously as a leader," "lack of respect and support from people in authority," and "being undermined by colleagues, mentors, even secretaries." Because they have informed this edition of the book, I describe each of the four major problems in more detail, below.

Becoming a Leader

What scientists encounter in their new role is quite typical of the problems encountered by every first-time supervisor. Moving from a position as colleague and friend of other group members to being a leader with some authority over those group members is hard for anyone. The scientist-supervisor now has to "determine how to allocate work among team members and, occasionally, convince people they are going in the wrong direction without their resenting that as criticism." As leader, he or she is the person who inevitably hears and receives the complaints, who must handle "defiant and argumentative staff," and who has to confront those "lab members who leave a mess for others."

A number of respondents said that keeping a balance between moving the science forward and "complying with regulations," "obtaining space and technical support," or "raising money" was nearly impossible at first. Although they found joy in their scientific work, these scientists were sometimes overwhelmed by management responsibilities ("NON-SCIENCE activities," in the exact words and capitalization of one respondent). These ranged from "space conflicts and limited reagents" to dealing with "recalcitrant techs," "mediocre students," and "subversive colleagues." Their new role required them to "solve equipment and material problems," "deal with parking," and "chase after borrowed equipment that was not returned." Suddenly, there was "too much work, too little time, and too few hands," perhaps because (as one scientist stated) of the difficulty of "saying 'No.'" Still another admitted that he lacked the "confidence to delegate."

No matter how onerous the administrative duties, however, the thorniest issues involved dealing with people. One principal investigator stated that being a leader now required him to manage "difficult—arrogant and abrasive—people in other labs with which we must deal on a regular basis; I struggle with getting my point across, without causing a bigger dispute."

Dealing with Conflict

As the respondents pointed out, resolution of the inevitable conflicts that arise when people work together was one hallmark of the effective leader. In any organization, there will be interpersonal differences, personality clashes, and cliques. Scientists reported how difficult it was to resolve disagreements that ranged from "which music is played in the lab to which experiments have higher priority." They struggled to "keep people from sniping at each other," and they found themselves wondering how to handle jealousy, moodiness, and "one bad apple who poisons the atmosphere."

Conflict that is not resolved—especially when it is ignored and avoided—tends to draw in formerly disinterested parties. Whether they intend to or not, scientists and technicians take sides and further polarize the issues. And, inevitably, those who become even marginally involved in a conflict find that more and more of their energies go to the conflict situation rather than the science.

Dealing with conflict and motivating people (the next reported difficulties) are often surprising challenges to new leaders. Just because they are scientists does not mean that team members and colleagues are either "conflict proof" or highly motivated. Scientists have moods and quirks, and they bring more than their cerebellum to the bench every morning.

Motivating People

One of our respondents described the best boss as a "'cheerleader' when it came to motivating us." In their new role, these scientists realize how hard it can be to generate "enthusiasm equal (or at least closer) to my own." In some cases, they have laboratory members who "dream of being famous but lack

motivation." Others report that they have to deal with "people with low energy level—mind on the golf course and not at work." And, one scientist noted that she found herself "massaging egos of scientists who require attention."

Motivating people, as implied by the earlier descriptions of effective and ineffective leaders, entails praising, supporting, cajoling, and inspiring those around you. It involves spending "a lot of time in the lab, talking with [people] individually about their work." Thus, it is not surprising that *motivating people* and *communicating effectively* emerged as closely related leadership challenges.

Communicating Effectively

When the respondents described their difficulties in communication, they were not referring to clarity of verbal or written directions. The most common illustration of communication problems was giving feedback to others in ways that would not be felt as "personal attacks." As another scientist described it, the difficulty was "being able to convince people that they are going in a (likely) wrong direction in a way that would leave no resentment behind."

The ability to provide comments and suggestions while not "sounding confrontational" or "hurting [people's] feelings" was seen as vital both to motivation and to "keeping all team players focused on the critical path." When there is "too much work and too little time," staying focused is essential. Thus, communicating effectively—although ranked fourth in the respondents' list of difficulties—is a foundation skill for dealing with conflict and motivating people.

CONCLUSIONS

Larger Context

My purpose in presenting the above results is to illustrate the impact of leadership on scientists themselves. However, we must not overlook the impact

of leadership on the quality of the science—and, ultimately, the impact on society.

The U.S. National Science Foundation regularly publishes an overview of the status and role of science, engineering, and technology. Not surprisingly, global economies benefit and depend on crucial high-technology industries and services (such as health care) defined by "their high R&D spending and performance, and which produce innovations that spill over into other economic sectors."[7] Most of these industries, in turn, depend on academic research that enables advances in the private sector. Thus, the performance of crucial (to the nations) industries and services is linked to the performance of academic research.

When the output of research is high-quality innovation, those firms investing in R&D enjoy positive economic returns. At the same time, society benefits. In fact, "returns to society overall are estimated to be even higher. Society often gains more from successful scientific advancements than does the organization conducting the research."[8] It is not too much of an exaggeration, or simplification, to conclude that effectively led science contributes to social and economic welfare.

A possible impediment to that contribution, as the earlier discussions suggest, is scientists' lack of training for the interpersonal and organizational challenges they will face in becoming a leader. As one of the expert panel respondents said candidly, "Management of people is the most challenging, important, and time-consuming aspect of my job and exacts the greatest emotional toll on me. I often feel I am not getting the best from people in my group." The purpose of this book is to help meet these challenges.

FOCUS OF SECOND EDITION

The focus of this second edition of the book remains the same: to help you to improve the quality of the human interaction among scientists. Although scientists' principal activity is cognitive, the quality of the human interaction influences how creative the science and technology will be (and how much of a contribution to society the science and technology will make). Important links between cognitive and behavioral theories have inspired this book.

Let me be clear that this is not an academic text that provides an overview of relevant theories. I have chosen to discuss only a limited number of topics—those I have come to appreciate as most important for leaders to "get right." I have also been selective in drawing from "soft science" theories and constructs those that meet three criteria. First, they must be robust. There must be good empirical evidence over time that the particular theory is valid and reliable. Second, they must be parsimonious. Theories that are robust but may be cumbersome for leaders to put into practice are not considered. Third, they must have proved useful, in my direct experience, to leaders of science.

In the course of nearly 20 years, I have experimented with a number of robust and parsimonious theories while teaching scientists and consulting to R&D organizations, and I have learned what works well. Other theories or models you may come across can be useful, and I urge you to read more widely than this book. However, this book is intentionally focused and selective.

Finally, I have attempted to distill the knowledge I gained from my doctorate in organizational behavior, my general management experience, and my teaching and consulting so that my ideas can be simply put and readily applied (following the advice of a scientist who said to me: "Any fool can have a difficult idea!"). All chapters have been written for you to read, reflect upon, and read again. With each reading I hope you will bring different experiences to bear, drawing additional and deeper insights that you can apply directly to your own situation. If you approach the material with a willingness to learn in this way—that is, to read, reflect, and reread—I can state with confidence that:

- You will learn something about yourself: what motivates you and what is your preferred leadership (i.e., decision-making, problem-solving) style. I believe firmly that the beginning of wisdom and effectiveness in leadership comes from a better understanding of oneself and one's strengths and weaknesses. From this comes heightened sensitivity to and appreciation for what motivates others and, in turn, an understanding of what is important in recruiting and training people. Such insights will be helpful as you think about your career development and that of other scientists.
- You will learn techniques for communicating and confronting effec-

tively. Developing skills to deal with intragroup dynamics will help you develop collaboration when it is required, for example, in program and project teams. Simply putting qualified and capable scientists together on a task does not create a team. However, understanding motivation, leadership style, communication, and confrontation will help you to promote teamwork among individuals as well as collaboration among larger groups, such as between two laboratories or different organizational functions (e.g., R&D and marketing).

- You will learn how structure, size, and formal systems can be designed to improve the innovativeness of science. There is ample evidence that a leader who can develop an organic organization, characterized by (among other attributes) lateral relationships among scientists, can improve the creativity of science.
- You will learn how to analyze the culture of your organization, with a view to discerning how that culture encourages or discourages creativity. Any organization more than a few months old will have a distinctive culture. Aspects of that culture will either foster the type of organization you want to lead—with energetic, innovative, productive people—or discourage its development. You will learn what culture consists of, how it evolves, and how it can affect thinking and behaving. With this understanding you can assess the impact of culture on your organization's performance and begin to evaluate aspects of the culture that may be detrimental to creativity.
- Finally, because all organizations are imperfect, you will learn how to approach change efforts whose goal is to achieve an energetic, innovative, and productive organization. You will learn two fundamental change models, when and how to employ them, and what problems are likely to arise.

When you finish this book, my hope is that you will understand yourself and your colleagues better as people; that you will be able to analyze your laboratory or larger R&D organization in a more systematic and rigorous manner; and that you will be better prepared to address the problems you have identified. My hope is that you will be well on your way to becoming an effective leader.

NOTES

1. See, e.g., *The Limits of Science,* by P Medawar, Oxford: Oxford University Press, 1984. See also *Learning: Theories,* by M. H. Marx (Ed.), London: Collier-Macmillan, 1970.
2. Epstein, R. M., Mindful practice. *Journal of the American Medical Association 282,* i9,1999.
3. There was a symposium at the National Institutes of Health entitled Catalyzing team science and described by an attending postdoc (www.the-scientist.com/yr2003/sep/prof7_030908.html).
4. These management training workshops were led by Carl M. Cohen, PhD, and initially sponsored by the National Science Foundation.
5. Kreeger, K. Y., Researchers setting up labs must learn skills on the fly, *Scientist,* 1997 (www.the-scientist.com/yr1997/mar/prof_970303.html). See also Transforming scientists into managers, by P. Brickley, *Scientist,* 2001 (www.the-scientist.com/yr2001/nov/prof_0111236.html).
6. National Academy of Arts and Sciences, Reshaping the graduate education of scientists and engineers, Report from the Committee on Science, Engineering, and Public Policy, 1995.
7. National Science Foundation (NSF), *Science and Engineering Indicators,* NSF, Washington, DC, 2001, Chapter 7, p. 4.
8. Ibid.

Exhibit 1. Good Laboratories, Bad Laboratories

Good Laboratories and Effective Leaders

- Are full of energy, collaboration, curiosity, enthusiasm, FUN
- Encourage open and candid discussion among all scientists, value new ideas, balance individual scientific goals with institutional goals
- Provide freedom to explore while keeping efforts focused
- Employ first-rate scientists, demand hard work and rigor from scientists (but no harder than from the leader), clearly define expectations
- Inspire passion for the work, challenge and engage people, create an environment for learning and discovery by their compassion and support for individuals
- Always hire the most talented and avoid micromanagement
- Are organized and able to support many projects at one time
- Have a vision, communicate it to everyone, so everyone knows what is going on and how each effort at the bench fits the larger picture
- Are productive and creative

Effective leaders are compassionate and supportive, encourage interaction among staff, and " are not afraid to speak up." They are accessible and able to resolve conflicts successfully. They value each individual's contribution, praise as well as critique (but never degrade), treat people as equals, and value everyone's opinion. They have a "generous, open style" and are passionately enthusiastic and good role models (set personal example of standards, integrity, dedication, efforts). They are calm, relaxed, and informal. They have a first-rate intellect with wide interests and are able to "think outside the box."

Bad Laboratories and Ineffective Leaders

- Use negative reinforcement, blame and berate people for failure, destroy self-confidence of scientists
- Pit individuals against each other (foster internal competitiveness), encourage intragroup rivalry that inhibits flow of information

- Set unrealistic goals, deadlines, and expectations
- Are unable to resolve conflicts
- Are disorganized and inefficient
- Provide no freedom to learn on one's own or explore own ideas
- Are unable to define priorities ("everything is crucial"), change direction frequently for no apparent reason
- Put scientists on repetitive tasks with no challenge
- Stick with old techniques, make little attempt to learn new areas
- Are indifferent to the science
- Micromanage

Ineffective leaders allow conflict to fester, avoid confrontation, are poor communicators, and are unable to deal with conflict effectively. They berate people behind their backs, have personal favorites, and take sides when conflict arises. They jump to conclusions and are egocentric, manipulative, overbearing, and dominating. They have little concern for personal relationships, are unavailable, and rarely communicate directly. They are more interested in their own career than the work of the laboratory, exploit staff for their own career, and are unwilling to share credit and develop others. They are dogmatic, controlling, and unfocused and publicly criticize. They are disorganized and inefficient and unable to manage (often, they are "scientists without any management knowledge and skills"). They act like the resident "braintrust," so people "learn not to think on their own." They expect people to "read my mind" and are arrogant, emotional, and distant. They engage in sloppy thinking, are not intellectually demanding, are moody, and pay little attention to the laboratory. They appear blind to the efforts involved by their scientists and pay attention only to results.