## PRACTICAL SOLUTIONS Scientists and Engineers as R&D Managers

by Thomas E. Clarke

Mr. Clarke is president of Stargate Consultants, Ltd., specializing in science and technology management, in Cold Lake, Alberta, Canada. He published the **1993 Science and Technology Management Bibliography** reference book.

W hen it comes to dealing with people—subordinates, superiors and colleagues, many R&D managers are insecure about their ability. Our ignorance of "how to manage" is not surprising. It seems that many of our professors labor under the misimpression that scientists and engineers are solitary, hermetic workers, shut up in their laboratories, interacting only with their equipment and data.

The reality is that, by necessity, scientists and engineers work in teams. They must also work closely with non-technical personnel to solve problems and develop applications for new technology. Effective management requires effective coordination and communication.

# Poor interpersonal skills are a major cause of managerial failure.

The education of scientists and engineers emphasizes technical skills to the virtual exclusion of interpersonal skills. There is even published evidence that professors *encourage* science students to consider R&D management as unimportant; and when the need is pointed out, they generally have a negative attitude towards management knowledge or training.

If the above applies to you, the question becomes this: What are you doing about it? There are thousands of articles, books, and conference proceedings about the art and science of managing R&D. Because of its importance, there are also many seminars and workshops on this subject.

Most researchers agree that a major cause of managerial failure among scientists and engineers is poor interpersonal skills. Many are more comfortable dealing with "logical" laboratory events than with people. They are used to doing things for themselves and find great difficulty in working with others. They commonly think that the success or failure of an individual scientist depends solely on personal actions and ability, totally independent of actions by the manager or organization. Frequently, these managers try to "wing-it" on their technical skills alone.

Ineffective R&D managers can cause organizational disruptions, complaints, grievances and employee turnover. Unfortunately, it is usually the better scientists and engineers who leave first, thus reducing an organization's ability to deal with a rapidly changing and highly competitive environment. Managers can improve their effectiveness by reading the literature on R&D management, observing successful managers, and by getting training in effective management.

#### **Topics for R&D Managers**

Based on a review of the R&D management literature, my experiences consulting for R&D organizations, and on conversations with hundreds of scientists and engineers, I've noticed that certain skills and knowledge deficiencies are frequently identified by R&D managers. I list these in three clusters to loosely reflect three managerial levels. Rate yourself on the topics below so that you can assess your problem areas.

First-Level Managers (the first level to which bench scientists and engineers report) should ask themselves how well they:

		Rate as poor, just OK, good, or excellent
	Provide effective leadership.	
	Communicate with management.	
	Communicate with your staff.	
	Sustain motivation.	
	Delegate.	
鑁	Manage conflict.	

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R&D INNOVATOR

#### **R&D** Managers

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题	Deal with problem employees.		
躑	Establish and nurture R&D teams.		101
	Appraise performance.		
	Handle hiring and firing.	-	11 844
题	Understand formal and informal		
	organizational structure.	Marcal and Provide States of	ļ
飂	Monitor and control projects.		
國	Evaluate and select projects and strategies.		
题	Interact with other managers at your level.		
靈	Market your group's technical capability		
	to clients.		

Second-Level Managers (the level to which first-level managers report). In addition to the above, second-level managers should ask themselves how well they:

	Monitor and mentor subordinate managers.	1.01.01.01.01.00.00.00.00.00.00
識	Evaluate and select programs.	
	Introduce change while minimizing negative	
	impact.	
	Plan projects.	
题	Prevent technological obsolescence.	
籭	Establish effective reward systems.	
钄	Hold effective meetings.	
	Make critical decisions.	
譾	Select first level supervisors.	
	Understand a new product development	
	process.	Name of the State State and State State
	Identify and access internal and external	
	funding sources.	
諁	Plan your staff's careers.	
题	Prepare budgets.	
	Manage stress.	Name and Party of Contractor
颤	Distribute information about technical	
	findings.	
镪	Acquire and disseminate technical	
	information.	
题	Manage intellectual property.	

Third-Level Managers (the level with considerable influence over the R&D organization's strategic directions). In addition to the above, third-level managers should ask themselves how well they:

No.	Identify and set strategic directions.	
	Understand the overall technological	
	innovation process.	
	Establish an effective organizational	
	structure.	
	Operate an effective promotional and	
	reward system.	
翻	Appreciate the impact of government	
	policies.	
	Deal with external public relations.	
1	Maintain a continuous learning or	
	improving environment.	
<u>89</u>	Make decisions taking corporate politics	
	into account.	-
	Communicate with diverse sectors in the	
	organization.	
龗	Monitor world technology trends.	

### What's Your Comfort Level?

How many topics do you feel comfortable with? How many trigger your interest to improve? Perhaps you should consider spending some time and effort examining the relevant literature (journals and books), looking into appropriate seminars and courses (sometimes given as adjuncts to national technical meetings, or at universities). Even discussing these topics with others in your organization, or with colleagues in other organizations, can be useful. The main thing is to be aware of your deficiencies and to act to improve them. As Myron Tribus of Xerox said, "Increasing the quality of performance of a research laboratory begins with an increase in the quality of the performance of its managers. It starts with you."

"The so-called Edison method, which had been shared by most of the independent inventors of the late nineteenth century, was more empirical, or hunt-and-try, than the approach of scientists working in industrial laboratories."

> Thomas P. Hughes, American Genesis (Penguin Books, 1989)