THE THREE SYSTEMS OF QUALITY

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INTRODUCTION

We begin with the redefinition of management, inspired by Dr. W. Edwards Deming:

The people work in a system.
The job of the manager is to work on the system,
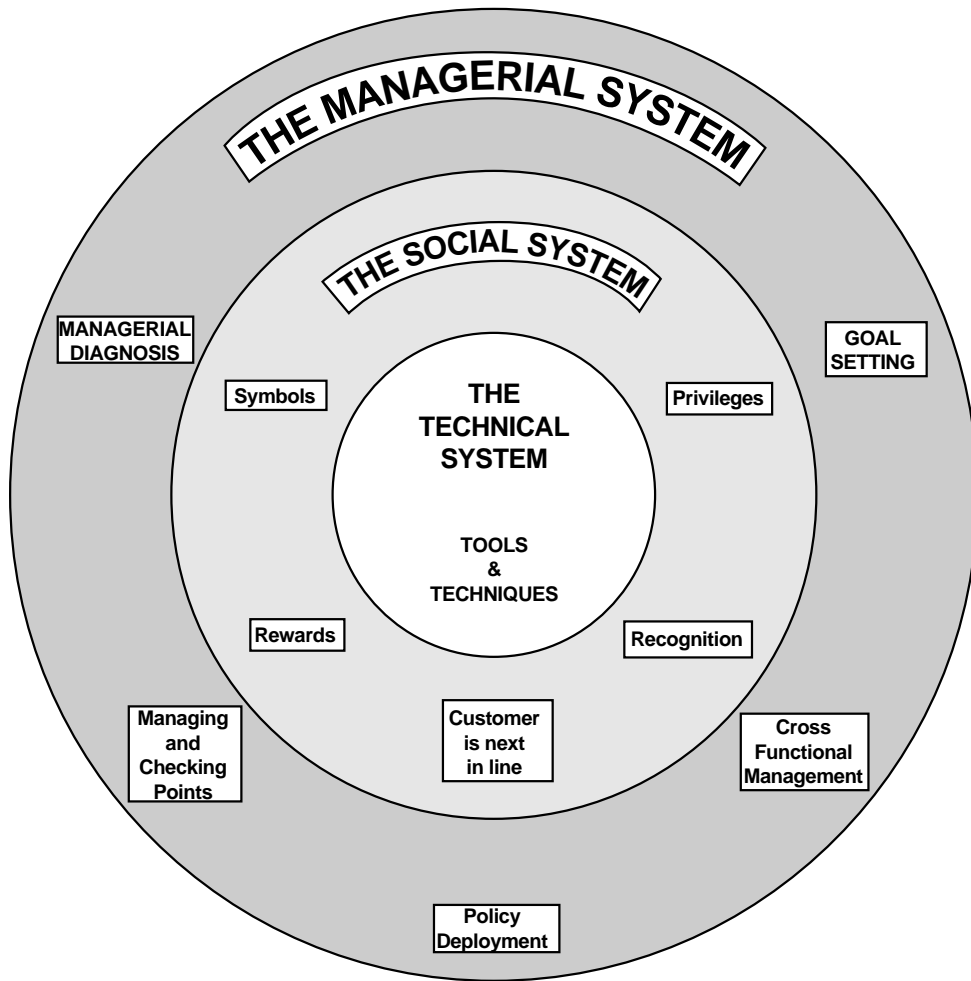**To improve it continuously,**
With their help.

Unfortunately, too many managers are unable to carry out their responsibilities because they have not been trained in how to improve a system. They do not have a well defined process to do these things:

1.   Recognize a system.
2.   Define it so others can recognize it, too.
3.   Analyze its behavior.
4.   Work with subordinates in improving the system
5.   Measure the quality of the system.
6.   Develop improvements in the quality of the system.
7.   Measure the gains in quality, if any, and link these to customer delight.
8.   Take steps to guarantee holding the gains.

For the past ten years, ever since I met Dr. Deming, I have been learning how to do these things and how to teach managers to do them, too. A short while ago I had the good fortune to hear a lecture by Lawrence M. Miller, who helped me to understand that the manager must deal with three systems, not just one. The three systems are pictured as concentric rings, as in the figure on the next page.

The innermost system is the technical one. The technical system includes all the machinery, the technical tools of quality science (as it is now being called) and the quantitative aspects of quality. If you can measure it, you can probably describe and perhaps improve it using the technical tools.

The middle ring is the social system. It includes, as Larry Miller has said, the reward structure, the symbols of power, the relationships between people and among groups, the privileges, the politics, in short, the power structure.

THE MANAGERIAL SYSTEM

THE SOCIAL SYSTEM

MANAGERIAL
DIAGNOSIS

GOAL
SETTING

Symbols

Privileges

THE
TECHNICAL
SYSTEM

TOOLS
&
TECHNIQUES

Rewards

Recognition

Managing
and
Checking
Points

Customer
is next
in line

Cross
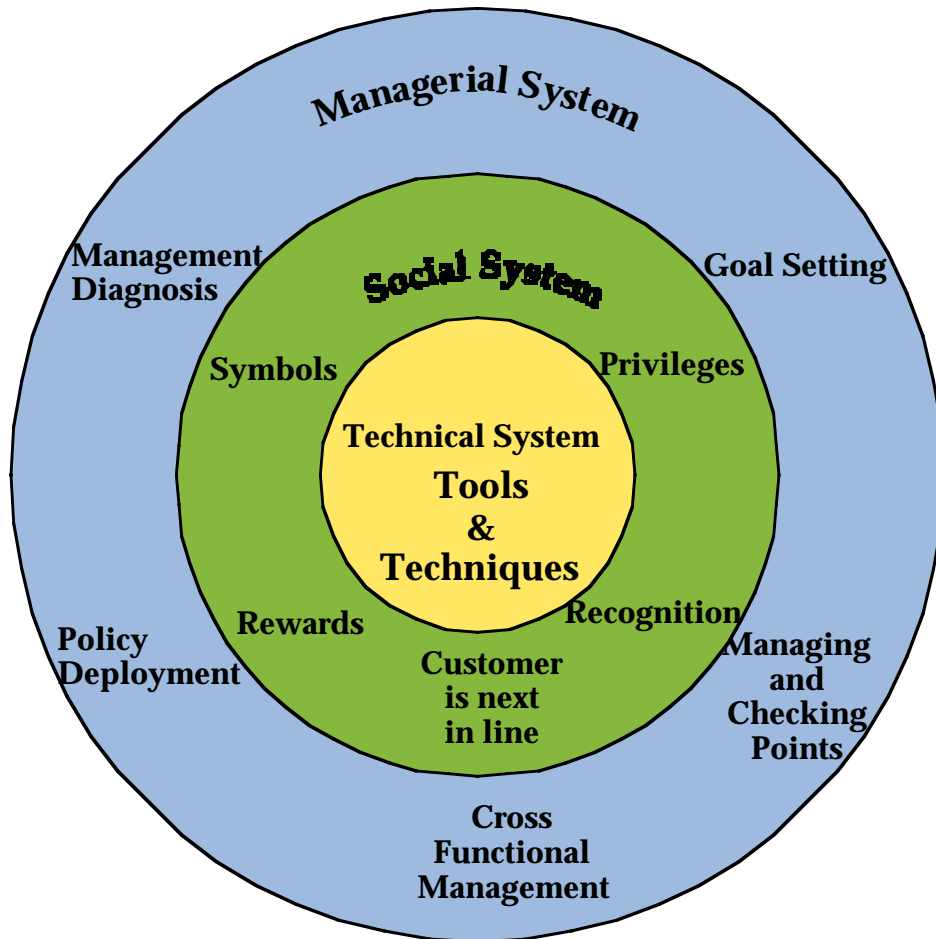Functional
Management

Policy
Deployment

Figure 1. The three systems for which managers are responsible.

The outermost ring is the managerial system. It is the system by which the other two rings are influenced for it is the way practices, procedures and protocols are established and maintained.

It is unfortunate that TQM is thought of mostly in terms of the small, central, circle. It is true that the tools which belong to this circle are indispensable. However, taken alone they are not enough.

It is well known in the field of sociology, that the introduction of a new technology always calls for a shift in the social system. When the "buck saw" was introduced into lumber camps, the cutting of trees was no longer the province of one man with an axe. Now it required two men, working cooperatively, each on the end of the saw. A change in social structure was required.

The lesson for us in all this is simply that when new technology is introduced, the social system must be changed, or the technology cannot be properly deployed.

Once we understand this linkage, then it becomes clear why top management has to be involved in the quality movement. While it is possible for the lower levels of management to introduce the tools and techniques of quality management, they cannot succeed unless the social system is also changed to accommodate these tools and techniques.

I saw this illustrated once when I was an executive in the Xerox Corporation. We had sent a number of our people to study Decision Analysis with an excellent consulting company on the West Coast. One day one of my colleagues came to my office to present the result of his analysis of a product introduction. He drew a number of decision trees on the board and explained to me how he had worked through the intricacies of making the decision. I asked him if he intended to present these results to the board meeting. "Hell no!", he exclaimed. "When I am at the board level I am not ever going to use the word 'probability'. They only want to talk to people who are dead certain and have no doubt about anything!" Even though the CEO had told me, privately, that he found decision analysis an important tool, which made it easier for him to see how a decision might be made, the social system had not changed enough for my engineer to dare to use this important tool.

Larry Miller spoke of the two systems, one inside the other. To my mind, there is a third system, the managerial system, which encompasses the other two. That system has its own tools and techniques, which differ from the tools and techniques of the innermost system.

THE MANAGER'S RESPONSIBILITY FOR THE THREE SYSTEMS

As we have defined the job of the management, constant improvement is the primary focus. This statement confuses many people, and they ask, "If everyone is busy improving things, who does the work?" This is a reasonable question and it deserves a clear answer. The following diagram indicates how the responsibility for improvement and for getting the work done rests with the different levels in the enterprise.

However, the time spent in improvement should not all be spent on just one of the systems for quality. As might be expected, the top management should spend much more time improving the social and managerial systems while at the lower level we should expect to find more attention devoted to tools and techniques, as indicated in figure 3
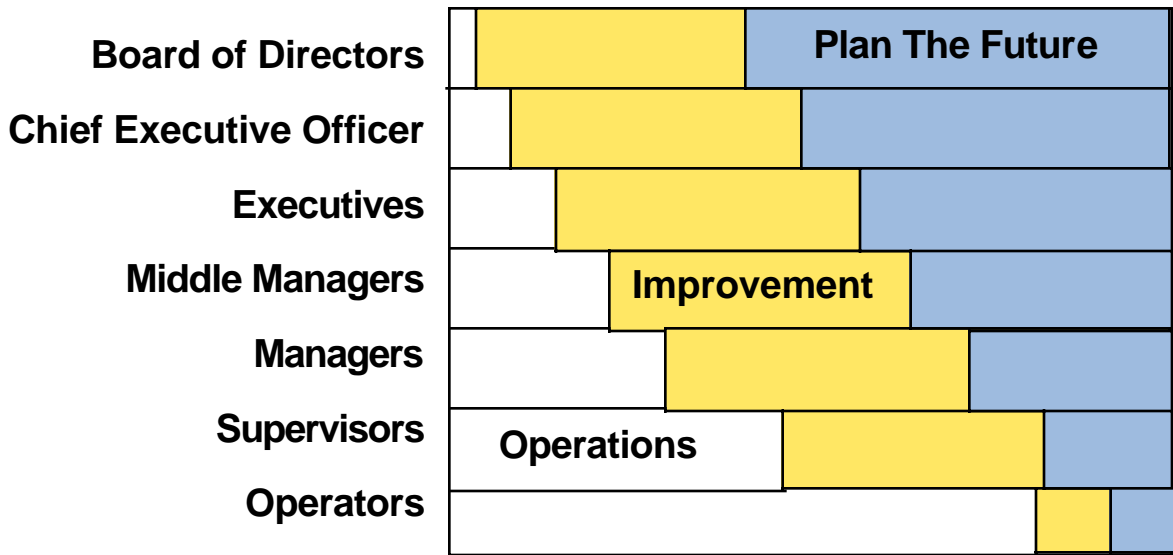
Figure 2. Distribution of time and responsibility for improvement, operations and the future of the enterprise, at various levels.
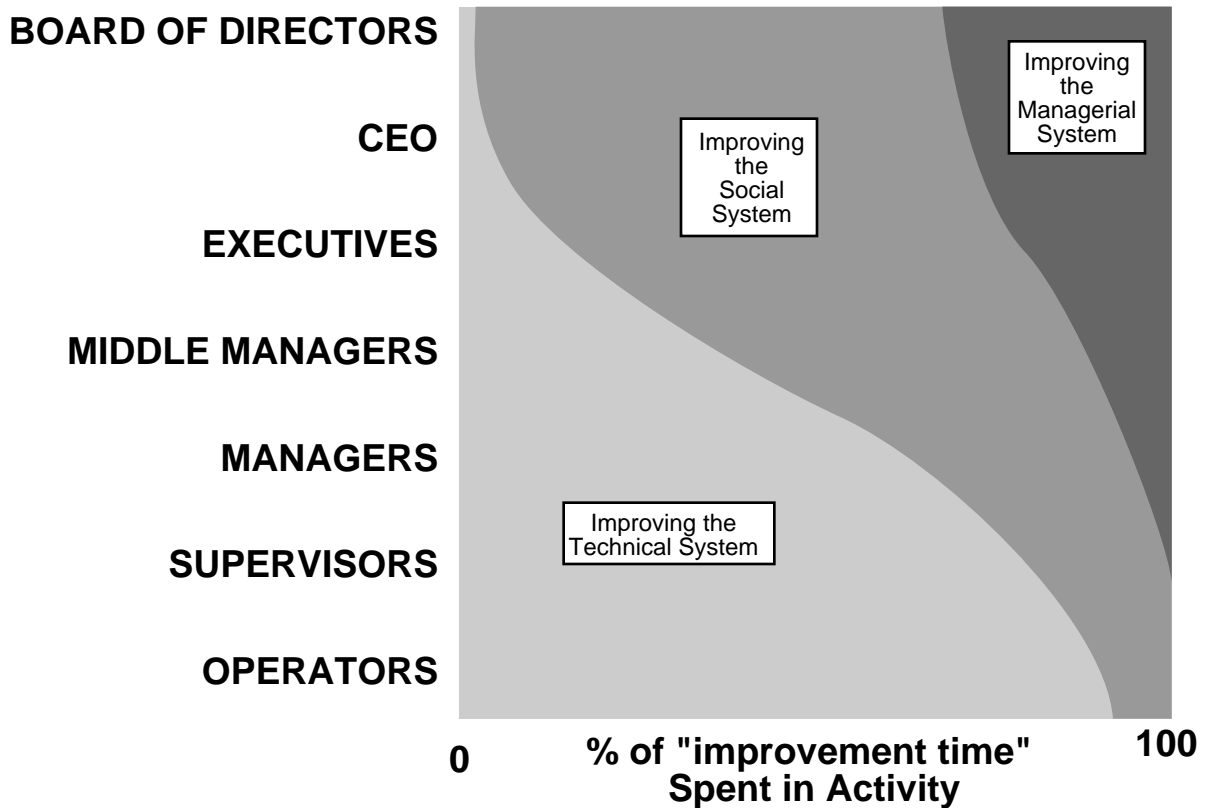

Figure 3. Division of responsibilities for the three systems as a function of level of responsibility in the enterprise.

I find this reconsideration of managerial responsibility quite useful and I am grateful for Larry Miller for making it all so easy to see.

IF YOU ARE NOT THE CEO, WHAT TO DO?

It is easy for people to look at figure 1 and say

"Ye shall know the big wheels,
For they run around in big circles"

Alas, the lesser fry are caught up in their own circles. I ran across a very interesting way to see this in a training manual for Nurses working in the Public Health Service in Great Britain. An enterprise called MacMillan Intek has undertaken to bring quality to that huge organization, the largest employer in the UK. Those of you who feel sorry for yourselves at the difficulty of the tasks you face in bringing quality to your company, should think for a moment of the problems people face in bringing TQM to that size bureaucracy.

The idea I gleaned from reading their manuals for nurses is shown in the next figure.
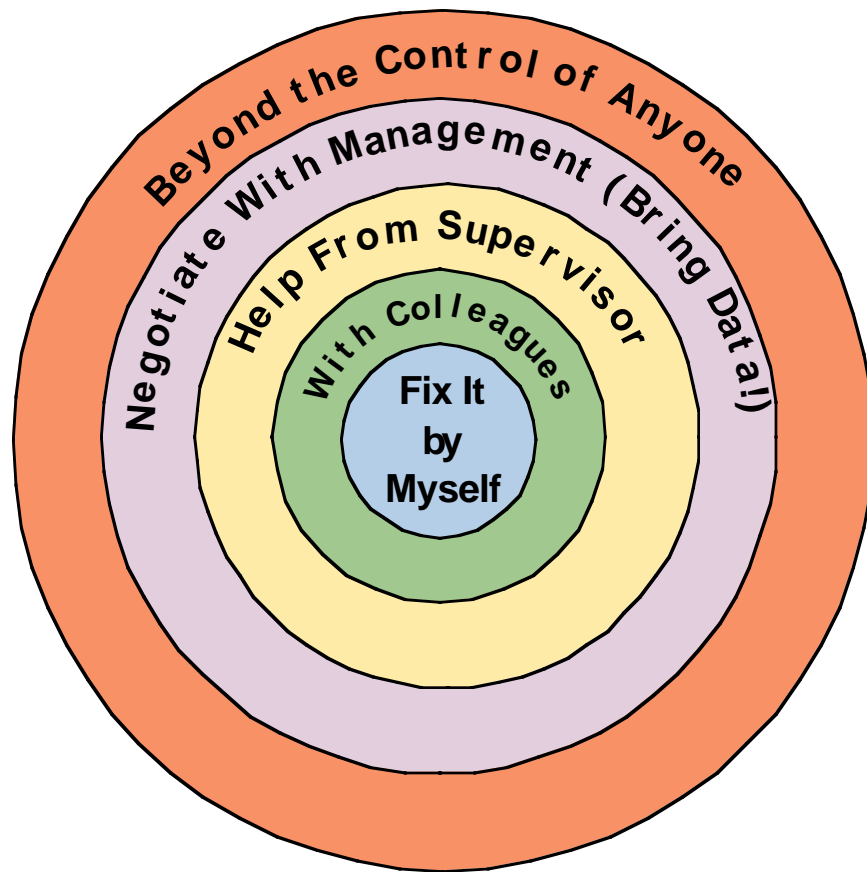

Figure 4. Domains of control.

It is the responsibility of management to change the social, technical and managerial systems so that the circles become larger--this is the definition of empowerment. When we speak of the improvement of the social system, we mean just that: The enlargement of the inner circles, the increase in autonomy, the increase in people's ability to improve their own situations.

Managements have worried about this for a long time, but with a different perspective. The unspoken assumption is that if people are given greater latitude, they will use it to the disadvantage of the enterprise. This premise was formalized a number of years ago in the writings of Frederick Winslow Taylor. Here are some of his more famous quotations. It must be said in his behalf that later in life he changed his views and came to regret what was being done to working men and women in the name of scientific management.

HARDLY A COMPETENT WORKMAN CAN BE

FOUND WHO DOES NOT DEVOTE CONSIDERABLE

TIME TO SEEING JUST HOW SLOWLY HE CAN

GO AND STILL CONVINCE HIS EMPLOYER HE

IS GOING AT A GOOD PACE.

                              FREDRICK WINSLOW TAYLOR

UNDER OUR SYSTEM A WORKER IS TOLD JUST

WHAT HE IS TO DO AND HOW HE IS TO DO IT.

ANY IMPROVEMENT HE MAKES UPON THE

ORDERS GIVEN IS FATAL TO HIS SUCCESS.

                              FREDERICK WINSLOW TAYLOR

The way that people behave depends on how they have been treated. Under the old style of management, Taylor's hypothesis was self fulfilling. If Taylor's hypotheses about the behavior of working men and women is not to be proven true, the system of management must consider how to change the social system to create the environment in which the statement will be false. By now every educated adult understands that people behave in a way which is related to the way they are treated and have been treated in the past. If Taylor is not to be proven correct, certain things need to be changed. Deming's 14 points all arise from these considerations. As Deming sees it, management has certain "obligations". Among these is the requirement to so structure the work situation that workers can have pride of accomplishment in what they do.

The problem for most managers is that there is a transition period in which the management style is changing but not everyone has gotten the word. When I first started observing these transitions, I expected the difficulties to lie with the people at the lowest levels. Now I understand this is not where the difficulties lie. The people at the lowest levels are the quickest to change. The difficulties are, first of all, with the very top managements, who simply do not understand their responsibilities for the three systems. After they learn, and are ready to lead the change, the biggest resistance then most often comes from the ranks of the middle management. These people are often referred to as the "frozen layer" or perhaps the "reflecting layer" because the orders from above are not acted upon but reflected back to the top management while the proposals from below are likewise reflected.
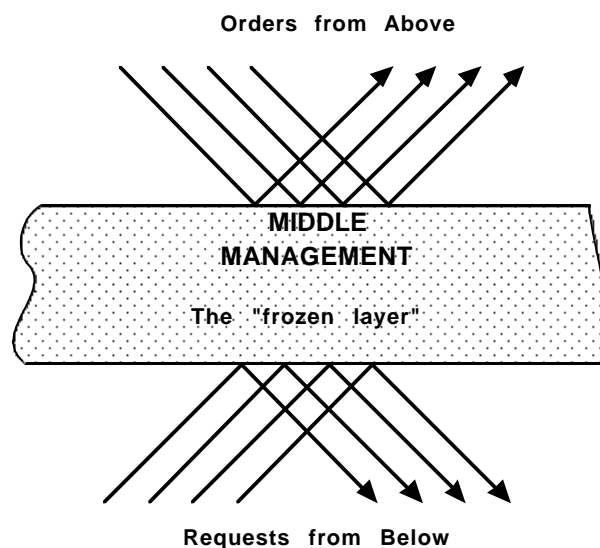

Figure 5.   In the process of transforming a culture, middle management appears to be the frozen layer .

When managers think only about the outer system--how they manage and the innermost system, the technical system, and they overlook the third system, the social system, the enterprise is bound to have a rocky experience.

In many ways, those who are in middle management have the toughest task of all.

On the one hand, they have to keep things going and are responsible to those above them for results. On the other hand they find that the relationships which they have developed over the years with those they supervise are undergoing swift changes. Aided by inspiring words from above, going directly to the work force, about empowerment and the need for improvement proposals and at the same time being held accountable, they appear to everyone to be the frozen layer.

The problem for a middle level manager is that while the boss may issue the right words and phrases, the boss may not actually understand them. There is a danger in many companies that the chief executive will say to a committee, "I am looking to you for guidance and assistance. I need your advice." As a result, the chairman of the committee writes speeches for the CEO and otherwise tries to control and guide the transformation. THIS WILL NOT WORK. There is no substitute for leadership by the CEO, with full backing and understanding from the Board of Directors. If the Board of Directors is left out of the process, if it should happen that a new CEO is to be appointed, the Board may appoint someone who will have to start all over again and will, therefore, destroy much of what has been built by the predecessor.

Because the middle level managers should be partners in changing the social system, and yet they are an essential part of that system, they will need considerable help from the top management.

THE TECHNICAL SYSTEM

I shall not dwell much on the technical system. It is covered very well in the literature. Because the technical system is easiest to grasp and to apply, there is a tendency for people to assume that the technical system is all there is to quality management. This is an unfortunate error.

Everyone in the enterprise should be familiar with the simplest technical tools. This is especially important for the leader. By the simplest technical tools I mean the following list:[1]

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[1] When this material was written, all of the technical tools and techniques had not yet been accepted in the USA.

1. Run Charts
2. Control Charts (all types)
3. Scatter diagrams
4. Histograms
5. Proper data sheets
6. Pareto Diagrams
7. Fishbone (cause and effect) diagrams
8. Deployment flow charts (integrated flow charts)
9. Nominal Group Technique

In many enterprises it is customary to appoint a steering committee to develop the strategy and plans for changing the culture of the enterprise. The steering committee should not be allowed to promulgate any of its ideas until every member of the steering committee has actually used the above 9 tools in the solution of one or more improvement tasks. The output of the steering committee will be acted upon by the rest of the organization. The steering committee, therefore, has enormous leverage with respect to the enterprise. If the steering committee doesn't actually understand what it is talking about, it is almost certain that they will send many false signals throughout the company.

Because so many of the tools of quality management are deceptively simple, there is a tendency, especially among the brighter members of the management team, to assume that because they think that they understand these tools, they know how to use them. There is an important distinction between knowledge and know-how. By "knowledge" we mean the ability to understand. By "know-how" we mean the ability to do something with the knowledge. When people have knowledge without know-how, we say their knowledge is "academic."

While the top managers may not be proficient in some of the more complicated technical tools (though in time, we would expect them to be very proficient…the transition period is a difficult one) they should understand and appreciate the power of these tools.

1. Quality function deployment
2. Design of Experiment

They should also be proficient in these managerial techniques

1. Quality Characteristics Evolution Diagrams
2. Policy Deployment.

Although the diagram of figure 1 suggests a neat division among technical, managerial and social systems, in reality the division is not so clean. There are tools and techniques which belong to all three systems. In particular, there are special tools for managers, which will be discussed in the next section.

SOME PERNICIOUS TOOLS AND TECHNIQUES IN SOCIAL SYSTEMS

Over the years, some managers have developed tools and techniques for dealing with the problems they encounter in the social system. Indeed, of all the things 'old style' managers have to deal with, which give them the most trouble, the methods and approaches used in altering the social system are the most difficult. The hard-boiled manager, habituated to giving direct orders and expecting silent obedience looks upon the 'new way' as too effete--too "laid back"--as though an abdication of a manager's responsibilities. This evaluation is far from the truth. Those who have worked under quality management have learned that, in fact, it is a more demanding system.

Two of the more pernicious approaches which have had some popularity, and which are especially contrary to the teachings of quality management are: 1) Management by Objectives and 2) Performance Management. Peter Scholtes has written about MBO, so I shall not spend time on it here. Performance Management, however, is a relatively newcomer to the scene. My quarrel with it is that it is not a means to increase empowerment or to improve the system. Instead, Performance Management attempts to manipulate the behavior of subordinates, rather like training rats in a maze, with a well defined system or rewards and discouragements. In general, the intelligence in subordinates is equal to or better than that in managers and it takes very little time for employees subjected to "performance management" to catch on.

SOME TOOLS IN THE MANAGEMENT SYSTEM

The following flow chart depicts how the top management can apply the PDCA cycle to its activities.

CEO	DIVISION MANAGER	SECTION MANAGER	SUPERVISOR

PLAN

GOAL SETTING PROCESS

PLANNING PROCESS

PLANNING PROCESS

PLANNING PROCESS

DO

ALL DEPARTMENTS CARRY OUT PLANS

WEEKLY

MONTHLY

CHECK

SEMI ANNUAL

ANNUAL

ACT

ALL DEPARTMENTS ANALYZE AND ACT
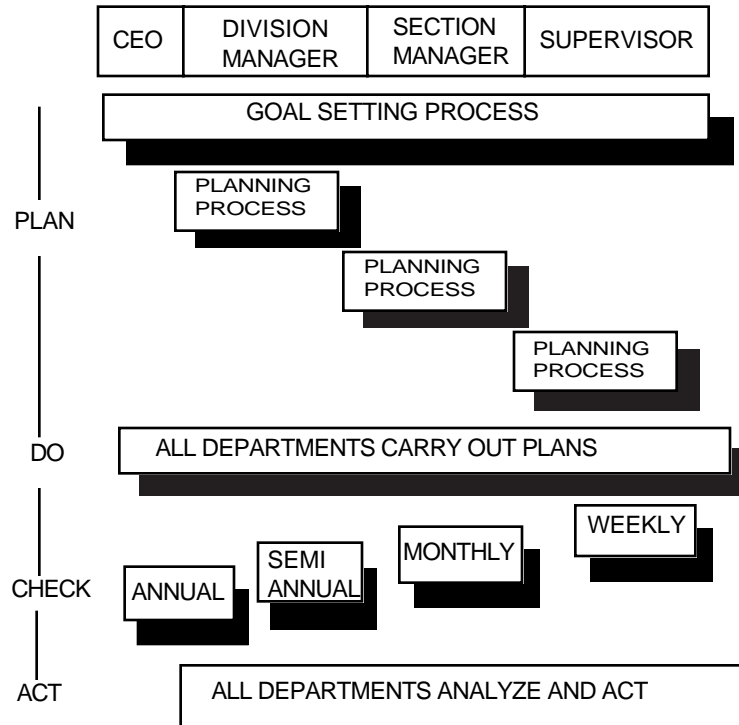
Figure 6.   The PDCA cycle for top management

The goal setting process in the above figure is marked by a "drop shadow", which according to the conventions of deployment flow charting means that there is additional detail on another diagram.   Some of these details are shown in the figure following.

It is not enough for the top management to announce goals.   These goals should be based on serious study of both the external and internal environments.   Furthermore, the studies should be carried out with quality.

The activities depicted in these two flow charts pose a difficult problem for the managements because they are truly "cross functional".   These activities cannot be assigned to the staff, though the staff has plenty of work to do in assisting the process.   They cannot be assigned to one department, either.   The P-D-C-A activities of management belong to the system as a whole.

CEO	EXECUTIVES	DIVISION MANAGERS	MIDDLE MANAGERS	MANAGERS	SUPERVISORS

Goals LRP SRP

Study trends in society, technology, government, resources, environment and the competition. Predict impacts on the enterprise and analyze steps required to respond.

Study internal operations, especially the quality of all operations to see if they will be adequate to the new demands and to identify those areas most in need of improvement. Benchmark the enterprise's capabilities against the best in class.

General meeting to develop consensus on Goals, LRP and SRP in the light of the findings of the staff relative to the external forces and the readiness of the enterprise to respond to them and to take advantage of new opportunities.

Goals SRP LRP QIP's Budgets	Goals SRP LRP QIP's Budgets	Goals SRP LRP QIP's Budgets	Goals SRP LRP QIP's Budgets	Goals SRP LRP QIP's Budgets

Meeting to identify quality improvement opportunities which span several departments. Cross Functional analysis of QIP's to dientify areas requiring coordination. Identification of task forces required.

Figure 7.   The goal setting process.

Another cross functional process is "Policy Deployment". In this process the objective is to be certain that everyone approaches quality improvement with the same set of priorities. To make this possible, it is important that the CEO select a few, not more than three or four--less is better--topics for attention to improvement. This set of priorities should be presented in a brief, well written, document. The document should then be interpreted by each manager down the management chain, also in a brief, well written document. The following diagram shows the process which should be followed by the various levels of management to insure the quality of the process. As indicated, each manager should read what is written two levels below, and compare what is said with what is wanted. There are two distinct possibilities:

a) There is a difference because the original statement is not clear to those who read it

b) They know something the higher level manager didn't know.

In either case, following the process in figure 8 will help. If the leader tells people his or her set of priorities but the people either know better or don't understand, the entire system fails. The integrity of this part of the process is essential to success.

PRESIDENT	EXECUTIVE	MIDDLE MANAGER	MANAGER	SUPERVISOR

Priority Goals

Priority Goals

Priority Goals

Priority Goals

Priority Goals

Meet to discuss interpretations

Meet to discuss interpretations

Meet to discuss interpretations

Meet to discuss interpretations
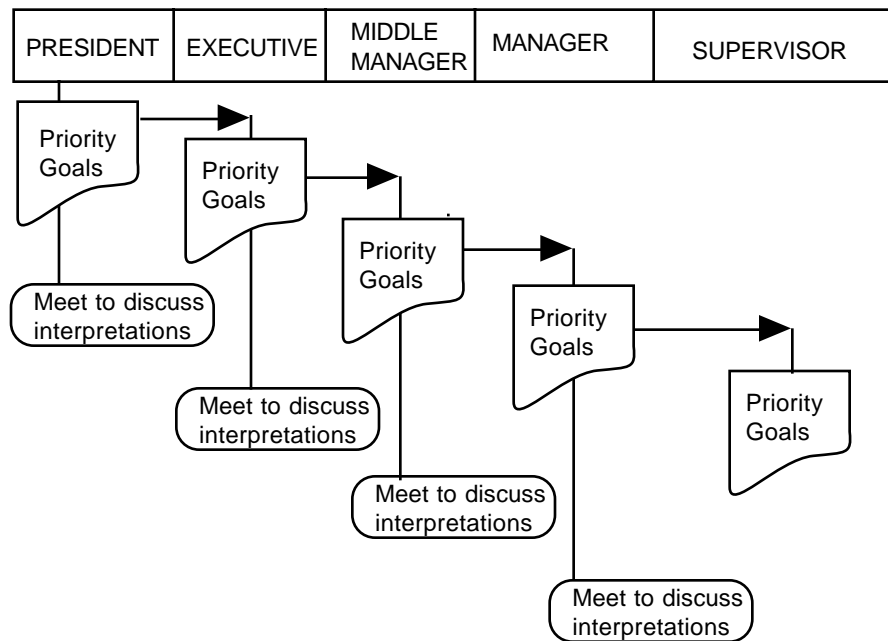
Figure 8.   Process to guarantee quality in the promulgation of priorities.

WHAT DOES CONSTANT IMPROVEMENT MEAN FOR MANAGERS?

All managers will need to consider not only the improvement of the systems for which they are responsible, but also the improvement of themselves as managers. They need to become leaders in learning. As Sarasohn told the Japanese, in the first course in management ever taught in Japan, on 1948:

**THE LEADER MUST, HIMSELF,
BE AN EXAMPLE OF THE QUALITIES
HE WOULD SEEK TO FIND
IN HIS FOLLOWERS.**

Homer Sarasohn, Japan, 1948

The management should strive to create the "learning society" to replace the "knowing society" so prevalent today. In a "knowing society", everyone pretends to know because to be ignorant is to confess to an inadequacy. But today, when things are changing so rapidly, most people are ignorant about

most of the important issues of the day. The leader should, by example, be an ardent learner. The leader should demonstrate joy in learning, and urge his or her followers to do likewise.

This point is significant, but often too subtle for many managers to understand. I learned a nifty way to illustrate this point by listening to a lecture by Frank Voehle of Qualtech, a consulting company in quality.

Frank told the members of the audience to each raise his or her right hand and to make a circle with the thumb and forefinger. Then he said, "Now, press the circle against your right cheek", but instead of doing what he said, he pressed his circle against his chin. Most of the audience did likewise, pressing their circled fingers against their chins. A few then thought about what he had said and shifted their circles to their cheeks. Some were obviously confused about what to do. Some were even visibly annoyed--even angry.

The lesson from this simple demonstration is this: People not only listen to the leader--they also watch what the leader does. If the leader's actions do not match the words, the majority of the people will follow the actions. The most thoughtful will see the discrepancy and will become angry. Their anger will, for the most part, be silent. This silent rage is costly; very costly, indeed.

The leader cannot say:

"FOLLOW ME, I'M BEHIND YOU ALL THE WAY"

The following, final, diagram, shows suggested steps in the process of personal development for managers. Each step is supported on pillars of learning. There is no other way.

Managerial development is a steady climb up the stairway of Total Quality Management, based on a foundation of continuous learning and a passionate obsession with TQM

Learn to improve the guidance process.

Learn to apply quality management methods to the guidance process, itself. Develop flow charts of how guidance is given. Understand the needs and desires of your customers, i.e., the people to whom you give guidance. Measure the quality of the guidance and apply constant improvement.

Learn to Guide the Improvement Process

Learn Policy Deployment. Learn to guarantee the integrity of priority assignments. Learn the managerial PDCA cycle. Learn to develop challenging and feasible goals for an enterprise. Learn to investigate if quality is the driving force within the enterprise.

Learn to Hold the Gains from an Improvement process

Learn SDCA cycle to improve standardization. Learn to develop managing and checking points to see that standards are observed and if not, why not, and what to do about it. Learn to intervene at the level of standards.

Learn to Improve the Improvement Process

Develop benchmarks inside and outside the enterprise. Learn to diagnose the social system to identify barriers and remove them.

Learn To DO the Improvement Process

Learn the 7 basic methods and work as part of a team in at least one project

Learn About TQM

Seminars
Books
Video Tapes
Magazines

THE FOUNDATION IS MANAGEMENT'S WILL TO SUCCEED, A PASSION AND OBSESSION WITH QUALITY.
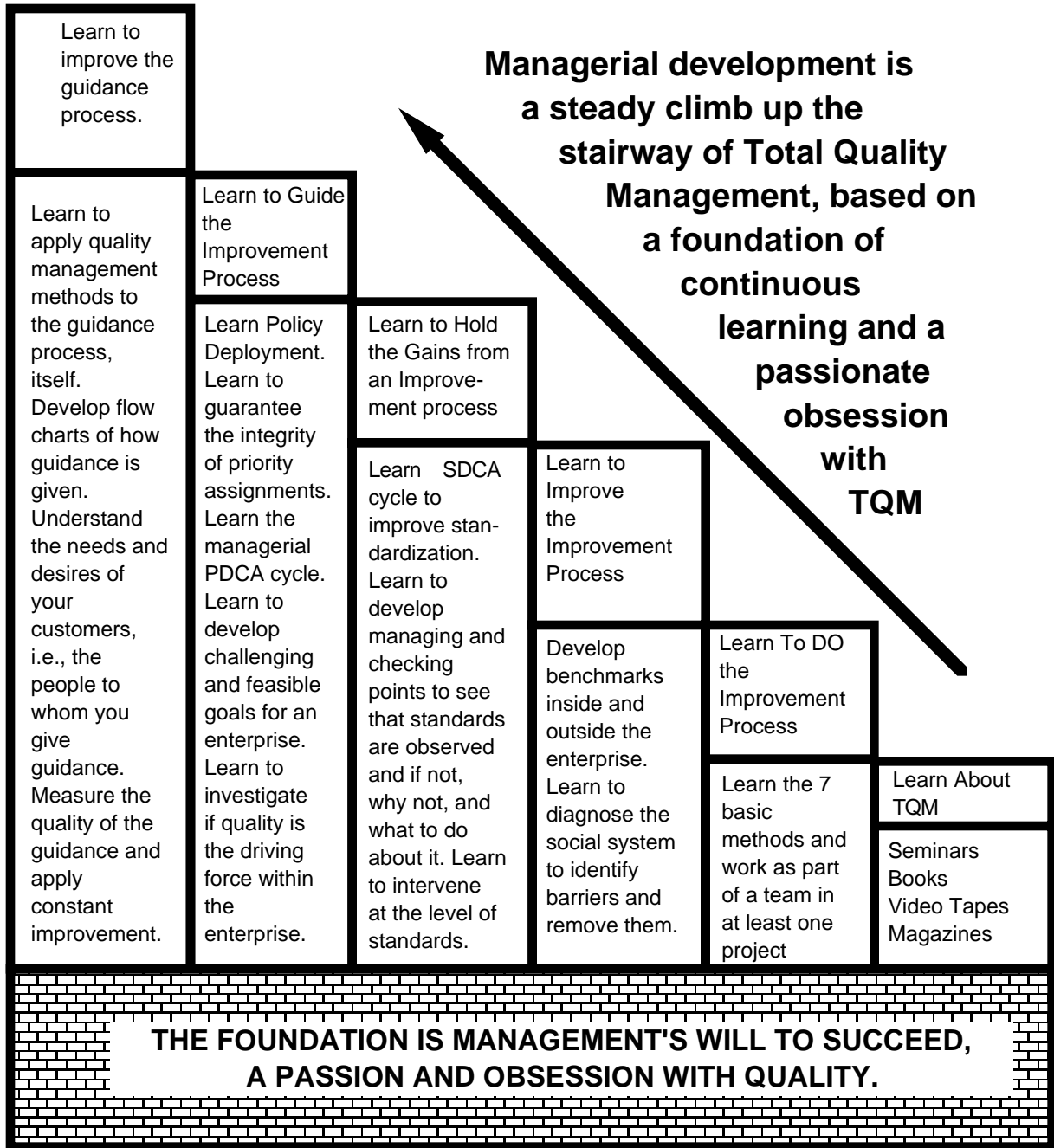
Figure 9.   Managerial Development is Based in Learning, Learning, Learning.