

YOU DEN MEMORIAL ADDRESS

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PEDAL FASTER — THEY'RE GAINING ON US

1. Introductory Comments

Thank you, Galen [Britz, ASQC Statistics Division Chairperson]. And thanks also to the three sponsoring organizations of the Fall Technical Conference for inviting me to deliver this year's Youden Memorial Address.

A glance over the list of past speakers makes me feel that I am honored beyond deserving.

I don't intend to discuss the life of Jack Youden. John Cornell (1993) did an excellent job of that last year. Nor do I intend to discuss statistical tools - we're all good at those. Instead, I'd like us to step onto the growing edge and explore some of the harsh realities that face statisticians in this time of organizational downsizing and the uncertainties that it brings. Some aspects of Jack Youden's personality are applicable here.

2. Take Quality Management, Seriously

Twenty-five years ago, a group of us graduate students at Rutgers piled into station wagons and headed south to attend the Princeton Conference, now known as the Conference on Applied Statistics. We ran into a man who, I learned later, was W. Edwards Deming. To my naive ears, he seemed to be raising a fuss over managerial issues that had nothing to do with statistics. Moreover, he wasn't polite about it. I couldn't figure out why he was scolding us. We hadn't done anything. Now, I know that that is precisely why he was scolding us. We hadn't done anything!

Times have changed, and now people are listening to Deming. They are doing all the wrong things about his message, but they are listening to it. Almost every organization I know has dabbled in quality management. Many have plunged in without much effort to learn what it is all about before taking the plunge. The results have been disastrous.

Management wants everything they've always had ... and they want some of that quality stuff, too. Employee's time schedules are jammed, because they are trying to learn and practice new skills while continuing their regular jobs. Management has become aware of the fact that the waste in an organization is much bigger than they previously thought. The way to get rid of it, they know, is to put teams to work. No time for training the teams — be like Nike: just do it. Nonetheless, many teams with minimal training have performed well to identify and eliminate sources of waste.

Still, management holds team members at arm's length and reserves the right to override a team decision when "business reasons" dictate. Loosely interpreted, this means that recommendations for waste reduction are accepted as long as they don't gore the management ox.

Management-by-the-budget prevails. Even though Deming (1986) quotes Lloyd Nelson as saying that "the most important figures needed for management of any organization are unknown and unknowable," the message has not gotten through. It is still true that when one person has financial data and the other has no financial data but, for example, a plan to vastly improve customer service, the person with the financial data will win every time. Someone told me that there's only one knob upstairs. It's the financial knob, and it only goes one way — down.

Management claims that they want innovation. Yet anyone who attempts to organize for innovation is confronted with old system thinking: where are the financial data that support the potential for that new product or process? We are not structured to support that activity. There's no money in the budget for that idea. And so on.

With limited innovation and with management-by-the-budget comes a downward spiral that many organizations, including industries, colleges and universities, and government agencies, find themselves in today. They have gone from downsizing to what is euphemistically called "right-sizing" to sniper-sizing; picking off one employee at a time.

Short term, this looks like the right way out of the jam. The expenses appear lower on the balance sheet and the forecast income is the same. The new, leaner organization has the same amount of work to do, however, and the quality of work life goes down the drain. With it goes morale and productivity. Those who are able to do so, find work elsewhere, causing organizational brain drain and continual organizational deterioration.

Management gets back on the bicycle and pedals harder because competition continues to gain. Meanwhile, good people get hurt.

I believe that financial analysis should be used as the barometer of quality improvement. However, one cannot force financial success via the budget any more than one can change atmospheric pressure by bleeding the mercury out of the barometer.

Continued on page 5



Lynne Hare, Youden Address Presenter, with Galen Britz, Chair.

3. Synthesis and Statistical Thinking

How can this trend be reversed? There are no easy answers. There is only hard work. Deming said words to that effect. There are several people with partial answers.

Russell Ackoff (1991), author of *Ackoff's Fables*, talks about the distinction between analysis and synthesis. In analysis, we take things apart, we explain the behavior of the parts separately, and we collect the knowledge of the functionality of the parts into knowledge of the whole. In terms of use of the "whole brain" (Snee, 1993), analysis is a left brain activity. Its product is knowledge. That is important.

In synthesis the focus is on the whole. Parts of the whole are examined to learn how they work together to influence the functionality of the whole, or effort is undertaken to assemble parts to create a whole unit with given characteristics to meet a stated need. A proper balance among the parts is essential for the optimal functioning of the whole, and the effort of synthesis is directed toward that balance. Some call this "process thinking." It is a right brain activity. The product of synthesis, or process thinking, is understanding. That is important, too.

Apparently the ability to use synthesis and engage in right brain thinking was a strength for Jack Youden. John Cornell (1993) quoted Stu Hunter as saying:

When I worked with Jack Youden on partially replicated Latin Squares, he didn't care to get involved with the mathematics of the problem. He just looked at the block-treatment pattern and would say, "It's right," or "It's not right." He had an intuition about balance and symmetry of designs; he was amazing.

Bill Golomski, in his 1990 Youden Memorial Address, spoke about "Synthesis: The Forgotten Methodology," and he cited many applications areas, including physics, chemistry, sociology and anthropology. He asked about the role of statistical thinking in promoting synthesis.

By statistical thinking, I mean the understanding that all work is a series of interconnected processes, that all processes exhibit variability and that we benefit through the reduction of variability (Snee, 1990). Statisticians, for the most part, have focused their efforts on analysis. Yet statistical thinking is applicable to both, analysis and synthesis.

The greater challenges, I believe, are in synthesis because data are less readily available, and processes are less well defined. They must be developed, and this involves working with others to organize thinking. Statisticians make good generalists, and we are good "process thinkers." We have the proper mindset and the tools. We should lend our skills in this vital area to help our organizations out of the downward spiral.

4. Riding the waves.

Peter Senge (1992), in a paper called, "Building Learning Organizations," teaches that quality improvement efforts come in three waves. The first is directed toward frontline workers and focuses on continual improvement of work processes, removal of impediments, like unnecessary bureaucracy, that disempower local personnel, and fostering "new practices like quality training and competitive benchmarking that drive process improvement."

The second wave focuses on changing ways of thinking, interacting and learning. It is directed toward the managers, themselves, and it strives to simplify some of the complex webs woven since the foundation of the organization.

The third wave is a merger of the first two. It is here that "learning becomes institutionalized as an inescapable way of life for managers and workers alike."

Senge points out what many of us know already: America is in the first wave, at best, while Japan is in the second. He says that, "leverage ultimately lies in improving us, not just improving our work processes." Improving us is what it will take to reverse the downward spiral.

How is this accomplished? It happens with a combination of teamwork and process thinking (synthesis). Teamwork is enhanced by the seven new tools for management (Brassard, 1989) which, in my opinion, deserve more attention from statistically minded people. Process thinking, as mentioned earlier, follows statistical thinking, also deserving more attention.

THE SEVEN NEW TOOLS (Table 1)

1. AFFINITY DIAGRAM
2. INTERRELATIONSHIP DIGRAPH
3. TREE DIAGRAM
4. PRIORITIZATION MATRIX
5. MATRIX DIAGRAM
6. PROCESS DECISION PROGRAM CHART
7. ACTIVITY NETWORK DIAGRAM

The problem with the seven new tools is that someone has to learn them. Learning for most adults is difficult and most effective when the application is eminent. Statisticians, for the most part, seem to be an exception to this rule. We love tools and we love learning about them. For us, mentally, the application is always eminent.

As a profession, Ackoff says, statisticians tend to be input-oriented. That is, we are defined by the inputs we employ.

Continued on page 6

PEDAL FASTER continued

"Statisticians ... are continuously developing new sampling, estimating, and hypothesis-testing procedures and new applications for these and their earlier developed techniques. Such expansion and extension of uses can be dangerous if they tempt input-defined professionals to apply their instruments or techniques to inappropriate situations."

In short, statisticians fall prey to the "Law of the Hammer -- when you give a child a hammer, everything becomes a nail."

Falling in love with tools is an occupational hazard for us, and we should be aware of it. We can turn it to advantage by learning the seven new tools, keeping them in the backs of our minds and bringing them out when and only when the application is eminent for team facilitation.

This may not sound like much of a challenge. After all, statisticians are very good at solving highly complex, quantitative problems. However, there is relatively little money there. The money, and the future, are in what may, on the surface, appear to be less complex problems. These are problems in group dynamics, focusing group effort on changing the thinking and learning dynamics of the organization — Senge's second wave.

You will find, on tackling such problems, that they are much more complicated than you might have thought. If you are successful, you will find solution just as rewarding as the successful solution of a difficult quantitative problem.

Jack Youden, I think, would agree with this point. He devoted his professional life to helping people think differently about problem solving (Lasater, 1972).

As an aside, three years ago when the Statistics Division was working on strategic planning, following the vision and mission development, the leadership was struggling with understanding dependencies in a complex process. Beth Propst taught the rest of us how to draw an interrelationships digraph. We used it, and in a few hours all involved had a much better understanding of the process to which it was applied.

I tucked that lesson away for future use. Two months ago, I was asked to participate in a team whose objective was to simplify the label declaration procedure at Lipton. Another team had spent months trying to define the process and had eventually given up. In our new team, the issue of dependencies among functions arose, and I volunteered to guide the group through a process that would define those dependencies. No one had to know the name of the tool: the interrelationships digraph. In two hours of very hard work, we had the process defined, and we were well on the road to simplifying it.

5. The Crystal Ball

Taguchi (1980) and others have had successes recently in making the industrial world aware of the need for rugged products and processes and showing how to build in ruggedness. As statisticians, we've had quite a time discussing the details: who invented what; who has a better design; is the system of measurement appropriate; are statistical assumptions violated; is all of this an oversimplification that satisfies the desire for short term gains at the expense of true understanding and long term gains? I have participated in that foray, myself (Hare, 1990).

Insight into ruggedness on a much grander scale is provided by Peter Schwartz (1991) in his book titled, **The Art of the Long View**. He doesn't call it ruggedness, he calls it scenario planning. The applications are organizational survival, but the concepts are the same. In scenario planning, one writes down three or four scenarios, depending on the situation.

One scenario might describe a dramatic upturn in business due to vastly increased consumer demand. Another might describe long term maintenance of the status quo. A third might include a dramatic reduction in availability of raw materials or a marked increase in number of competitors entering the market. The choice of scenarios is based on learnings from the off-beat literature. For example, scenarios could have, as important elements, input from authors who are not in the mainstream of financial, scientific, or marketing thinking.

Once scenarios are listed, strategies for growth and development, or at least survival, under each of the scenarios are written down. Naturally, those strategies that appear under all of the scenarios are things that the organization should be doing regardless of what happens. Organizations that are best prepared for the future have strategies planned for all scenarios.

Because they had engaged in this process, Schwartz says, Royal Dutch Shell prospered during the oil crisis of the late '70's while their competitors suffered. This is ruggedness applied on a grand scale. Those who use statistical thinking were not involved, as far as I know, but I think they should have been.

In **Future Edge**, the author, Joel Barker (1992), talks about three keys to the future: innovation, anticipation and excellence. Scenario planning just discussed aids anticipation, and for years, this audience has heard about excellence. The lack of innovation, I believe, is what is killing many of our organizations.

Engaging in innovation requires a different mindset than we are used to, especially in the statistical community. Barker likens innovators to the pioneers who blazed the Oregon Trail. They didn't wait for data to support their hypotheses. They pressed ahead, playing hunches and trusting their intuition. After the pioneers found the way, the settlers followed. They called ahead, asking if it was safe to proceed. They moved ahead only when they got a yes answer.

Continued on page 7

PEDAL FASTER continued

Back when Europeans settled the American West, there was plenty of land for all. But now, resources are scarce, and the pioneers want to keep all they discover. How can they do this? By continually improving what they produce so that there is never any room left for the settlers in the market.

Barker uses Sony's introduction of the Walkman as an example. There were no data saying that it was safe to enter the market. No one had ever seen a Walkman. When competition, the settlers, copied the idea, Sony responded by making one that was smaller. When the settlers copied that, Sony responded by making one that was waterproof. When the settlers copied that, Sony made one that has no wire from the receiver to the headset. At each step of the way, Sony was prepared with the product of a never-ending continuous improvement effort to keep the settlers out.

Barker believes that this is the way of the future. Successful organizations will rely on intuition for fast entry into new markets, pulling through to latent customer needs. Then, using the tools and techniques of continuous improvement, they will leverage their products to exclude competition from the market place.

Sometimes I think statisticians are like the Native Americans, shooting at the pioneers instead of supporting them. Perhaps we believe our survival is threatened. But if Barker is right and this is the way of the future, statisticians must take a second look. This means knowing when to relax insistence on data, and it means continuing to foster continual improvement efforts.

6. If you can keep your head while all others about you...

A friend of mine told me that his company recently hired many corporate psychologists and sprinkled them throughout the organization. The intention was to make them available to the employees because Human Resources had noted a marked increase in heart attacks, divorce, separations, substance abuse and other indicators of stress. His company, and many like it, just never got the message about prevention. They are still trying to inspect quality into the system.

These are the same organizations that are pedaling faster, trying to get out of the downward spiral. They choose the subset of Deming's 14 Points that they like and ignore the rest. They shoot at innovators. They fail to plan for the future. And when times get tough they release the very people who could help them reverse the trend.

It's tough. And it's getting tougher. What can an individual do? There are some hints in the material I have already reviewed. Many of the principles apply to our personal lives as much as they do to organizational well-being.

For example, if scenario planning works for organizations, shouldn't it work for individuals? Regardless of

your chances of surviving the next downsizing of your organization, list 3 or 4 scenarios for your own future and that of your immediate family. List courses of action under each, and review the lists for things that you should be doing to continue progress toward your own personal goals. The purpose is to build a more rugged you.

If innovation, anticipation and excellence are keys to the future of organizations, aren't they also for individuals? Yet how much time do we, as individuals, devote to such items?

Covey (1989) provides good advice about developing one's own personal mission statement; sitting down and working to learn what you really want out of life and planning a strategy to get it. He takes us on the road from dependence through independence to interdependence via his "Seven Habits."

The private victory habits involve being proactive, having a sense of vision and understanding priorities. These lead to the public victory habits of thinking win-win, active listening (or "active understanding") and working toward synergy.

The seventh habit, which Covey calls "Sharpening the Saw," is keeping a healthy balance among the important things in life. This includes keeping yourself physically and mentally fit. Exercising, reading, discussing and learning new ideas, theories and concepts are all important parts of an individual's continuous improvement process.

The Center for Creative Leadership (CCL), a consulting organization that provides leadership development and team training, among other courses, uses a button to illustrate the need for this healthy balance. After all, a button, unless you join a nudist colony, is something you always have with you.

Geometrically, the face of a button has 4 circles in a 2-by-2 array within a larger circle. CCL uses the inside circles to represent your personal life, your career life, your family life, and your community life. The outer circle surrounding all the other circles represents your spiritual life.

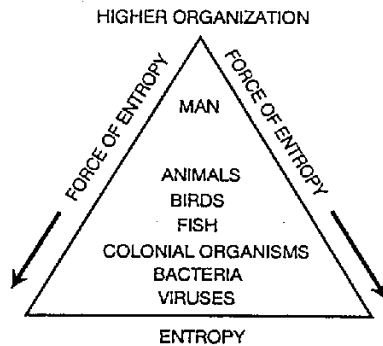
If any interior circle gets too big, it throws the button out of proportion and renders it dysfunctional. If a button has no outside circle, there is nothing to give it definition. There's no structure to keep the insides in balance.

The analogy to our own lives is a good one. Do we allow career pressures to force us to become workaholics? Does our attention to our careers encroach on our family lives? Our community lives? Where is the structure, in the form of spirituality, that keeps our lives in order?

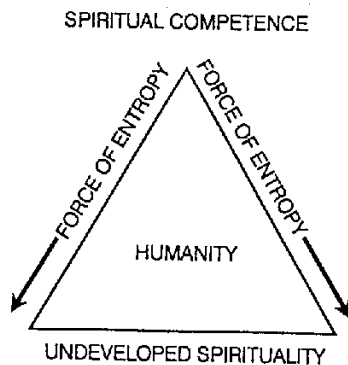
Scott Peck, in *The Road Less Traveled* (1978) addresses the issue of spirituality in his chapter on grace. "In the ordinary course of things ... [we] should not exist. ... evolution is an eddy in the second law of thermodynamics," he quotes an unknown source as saying. The following diagram illustrates his point. Forces of entropy work to drive higher organization levels down to a zero base. Yet evolution has persisted.

Continued on page 8

PEDAL FASTER continued



He says that the spiritual evolution of humanity can be diagramed similarly (as shown below). His point is that this growth takes place against overwhelming odds, but it does take place. Humanity must sometimes look many years into the past to see signs of spiritual development, but growth is there, nonetheless. His example is the way we treat our children now, by comparison to the way they were treated 100, 500 or 1000 years ago.



My point about spirituality is that, especially in hard times such as these, its importance is not readily visible. Yet it is a real force in human nature, and it is especially during hard times that spirituality is important to maintaining a healthy balance in life.

It is the ability to keep these things in balance that makes for a caring person and for what Covey (1990) calls the principle-centered person. Joel Barker (1992) agrees. He says that "without caring there can be no quality."

I can think of no better application of synthesis, process thinking, than this one of seeking and maintaining a balanced self.

In the closing pages of his second book, Covey quotes George Bernard Shaw:

This is my true joy in life, being used for a purpose recognized by yourself as a mighty one.

Being a force of nature instead of a feverish, selfish little clod of ailments and grievances complaining that the world will not devote itself to making you happy.

I am of the opinion that my life belongs to the whole community and as I live it is my privilege - my *privilege* to do for it whatever I can.

I want to be thoroughly used up when I die, for the harder I work the more I love. I rejoice in life for its own sake. Life is no brief candle to me; it is a sort of splendid torch which I've got a hold of for the moment and I want to make it burn as brightly as possible before handing it on to future generations.

Such a man, ladies and gentlemen, was Jack Youden - a model for us all.

Thank you for listening.

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