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# Quality

For Better Product Assurance and Reliability

A man in a dark suit, white shirt, and red tie, wearing glasses, is looking towards the camera. In the background, a framed picture of a geisha in a patterned kimono and black hat holding a fan is visible. The background wall has a floral pattern.

Japan's turnaround—  
Top management  
understanding its duties.

Dr. W. Edwards Deming



# Dr. W. Edwards Deming — the statistical control of

Statistical quality control and the concept of zero defects are faces of the same quality coin.

After earning his bachelor of science degree from the University of Wyoming, W. Edwards Deming taught mathematics and physics at the Colorado School of Mines, the University of Colorado and Yale University.

In 1927 he joined the Department of Agriculture as a mathematical physicist, receiving his Phd from Yale in 1928.

Dr. Deming joined the Bureau of the Census in 1939 as an advisor. During the war he worked for both the Census Bureau and the War Department.

Following the war, he performed a variety of advisory services. These included observing the elections in Greece in 1946; acting as a consultant to the Government of India in 1947, 1951 and 1971; acting as advisor in sampling techniques to the Supreme Command of the Allied Powers in Tokyo in 1947 and 1950; and serving as a teacher and consultant to Japanese industry in 1950-52, 1955, 1960 and 1965.

A contemporary of Dr. Walter Shewhart, the designer of the statistical control chart, Dr. Deming has published more than 160 articles in mathematics, physics and psychiatry, and eight books or brochures.

In 1951, the Japanese Union of Scientists and Engineers announced that two prizes would be awarded—essentially on a yearly basis. These awards would honor the Japanese individual and firm which had most advanced the cause of Japanese industrial quality. The prizes were to be called the Deming Awards.

As a touchstone to his accomplishments, in 1950 Dr. Deming was awarded the Medal of the Sacred Treasure, 2nd Order. The Emperor of Japan presented this award to him for his efforts to improve Japanese economy and industrial quality.

Today, Dr. Deming is a consultant in statistics to research and industry and is a professor of statistics with the Graduate School of Business Administration, New York University.

■ In December, *Quality* visited Dr. W. Edwards Deming at his home in Washington, D.C. Here are some of the key points discussed in the interview.

**Q:** You had mentioned that you worked with Dr. Shewhart.

**Dr. Deming:** The man I worked for at the Department of Agriculture knew Dr. Shewhart and arranged for me to meet him during a trip to Bell Laboratories in New York. I had heard of Dr. Shewhart and knew something of his theories, but at the time they weren't well understood. This was in 1931 and his book<sup>(1)</sup> was just being published. We kept in contact over the next several years, discussing the theories he had presented.

In 1938, I persuaded him to come to Washington to give a series of lectures at the graduate school of the Department of Agriculture. At that time I was in charge of statistical courses at the department, although I could hardly call myself a statistician then. The lectures expanded and eventually turned into a book.<sup>(2)</sup>

In 1941 or '42, a committee was formed to generate standards for the statistical control of quality. It was formed by Dr. Shewhart who was working behind the scenes through contacts he had in the American Society of Mechanical Engineers. Dr. Shewhart was great for doing things without attaching his name to them.

Harold Dodge, also of Bell Telephone Laboratories, was the creative force of the committee, which included A.G. Ashcroft of Alexander Smith Carpet Co., Leslie Simon of the Ordnance Department, Ralph Wareham of General Electric, John Gaillard of the American Standards Association and myself.

The result of our work was three standards under two covers. I remember well that George Edwards—who was Dr. Shewhart's superior at Bell Labs—remarked that the standards would be in Japan within six months. I discovered later that they were.

**Q:** Was this prior to hostilities?

**Dr. Deming:** No. Hostilities had already begun. But they, like ourselves, had ways of getting things.

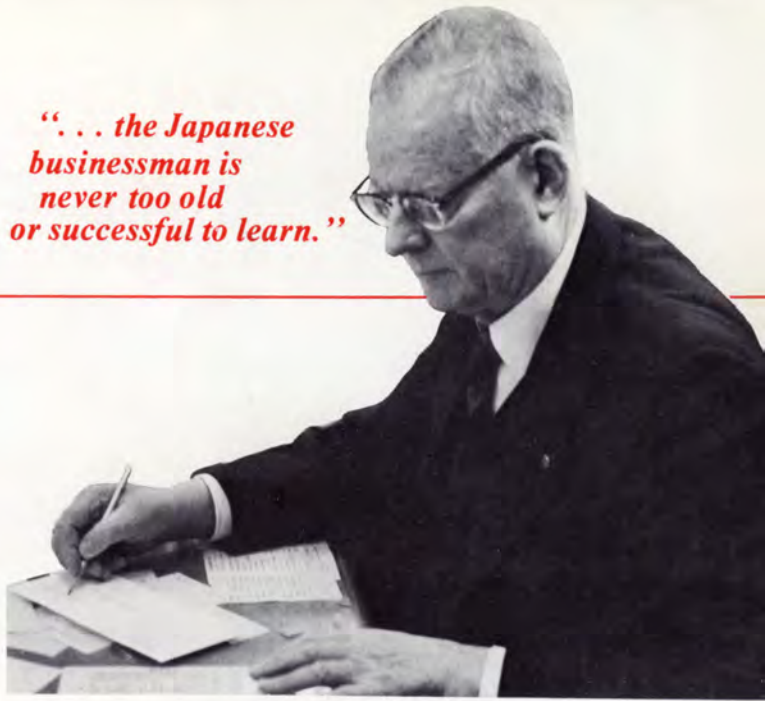
**Q:** So Japan had statistical quality concepts at about the same time that we did. Had the concepts of statistical quality control caught on in the US prior to 1942 or 1943?

**Dr. Deming:** If I said no, it would be wrong because there were some people who were using the methods. But I don't believe that there were many people either in Japan or the US who understood statistical techniques then.

**Q:** During World War II, many of the leaders of what was the fledgling field of quality control worked for the War Department, did they not?



*“... the Japanese  
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or successful to learn.”*



# quality

**Dr. Deming:** Yes. The War Department engaged Bell Laboratories—Mr. Edwards and some of his people—to go out to manufacturing plants and teach people simple methods of quality control.

**Q:** Were you working for the War Department too?

**Dr. Deming:** I put in two or three days a week working on statistical techniques.

**Q:** Were you working with Dr. Shewhart, Mr. Dodge and Mr. Romig?

**Dr. Deming:** We were in consultation with each other and with Captain (now General) Simon.

**Q:** Had you been in Japan prior to the war?

**Dr. Deming:** No.

**Q:** How did it come about, then, that you went to Japan after the war.

**Dr. Deming:** That is quite a story. You recall I mentioned the two pamphlets on statistics that we had drawn up. Well, a Dr. Kobayashi—who is now director of the Nippon Electric Company—had read a paper of Dr. Shewhart's that was published in 1929. But he did not have Dr. Shewhart's book and so he did not completely understand the principles. He, and a Dr. Nishibori, had tried to make it go—learning by doing—but did not have great success.

Near the end of the war, Kenichi Koyanagi had tried to get a group of scientists and engineers together, but not much came of it. At the conclusion of the war, the organization continued under the name “Japanese Union of Scientists and Engineers.” The Japanese meaning of the word union here is brotherhood or fraternity.

Drs. Kobayashi and Nishibori were members. They felt that someone of substantial prestige was necessary to lead the organization. They persuaded Ichiro Ishikawa—who was at that time president of the Kei Dan Ren, the organization of top people in industry and finance—to become president of the Union of Japanese Scientists and Engineers (JUSE).

After the war, JUSE decided that what Japanese industry needed more than anything for recovery—and in a different form than had existed previously—would be the statistical control of quality. They determined that they needed learning—the use of brains—something that could be applied immediately to whatever factories and equipment remained without waiting for the rebuilding of factories or replacement of equipment.

Although I knew nothing about it at the time, in 1948 the decision was made to invite W. Edwards Deming to teach them statistical methods.

**Q:** What was the Japanese attitude toward quality prior to the war?

**Dr. Deming:** Well, as you know the quality of Japanese consumer goods was the lowest level—both in Japan and outside. Today, of course, it's a different story. If you want

almost anything of top quality you look at Japanese products first.

**Q:** Did Japan have the capability of making top-grade product either during or prior to the war?

**Dr. Deming:** They had the capability and demonstrated it. What they didn't have was the means of doing it consistently. They believed that statistical methods were what they needed.

I had been to Japan in 1947 to work with Japanese statisticians on a census. We worked on population by area, labor force and unemployment. As a matter of fellowship, I invited them to come together regularly. I told them how important they were, and how they could rebuild Japan faster and more effectively with statistical techniques than by anything else that could happen. They didn't see how. It was hard for them to believe that there could be a recovery—some of them didn't have a place to live. But we met and talked.

So, in 1948, a letter came: Could I come and teach statistical methods to Japanese industry? It was June of 1950 before I could go. The War Department borrowed me for the excursion to Japan under the auspices of General MacArthur's general headquarters.

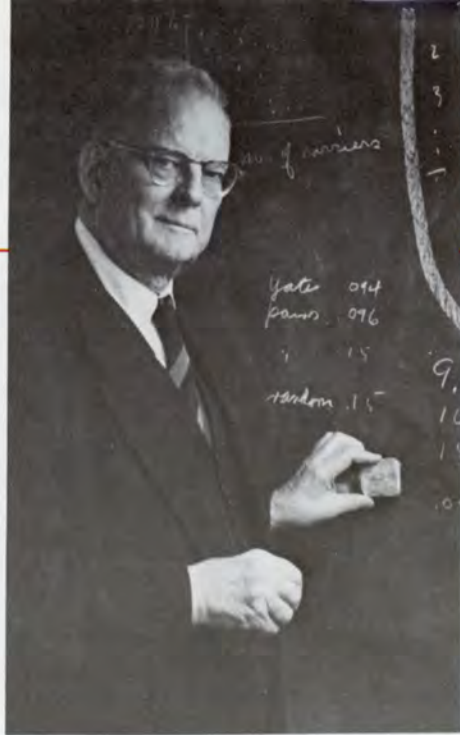
**Q:** Who were you working for at the time?

**Dr. Deming:** The Department of Census—although I'm not sure who paid me—it just didn't make any difference. Then Mr. Koyanagi wrote to me in March of 1950 and asked me for two favors: Would I come to Japan to teach statistical methods and would I contribute a message to the inaugural issue of the monthly “Statistical Quality Control” to be published by JUSE.

The arrangements were made with JUSE to set up a series of eight-day courses. Two hundred twenty engineers attended the first course, and they were magnificent students. The lectures began at 8:00 or 8:30 and by 9:30 I was dripping wet. There was no air conditioning and Tokyo in June is hot. But we stayed with it—I think that the Japanese perceived that I was in dead earnest and working hard for them.

But a horrible thought occurred to me—nothing will happen. It will be another chapter of what happened in America if I wasn't careful.





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I had perceived that statistical control of quality was received like a flash in America—but it didn't go very far. It would exist like a little fire then burn itself out. It succeeded well where people had tried it but it was not a nationwide continuing effort. The mistake was that management did not know what it was all about. They did not understand that they had to get behind it—that they had duties to perform. I saw no point in repeating that mistake in Japan.

So arrangements were made for me to speak to the members of the Industry Club—a group of some 45 of the top people in Japanese industry. I told them that Japanese industry could develop in a short time. I told them that they could invade the markets of the world and have manufacturers screaming for protection in five years. I was, in 1950, the only man in Japan who believed that.

But they said they would try to learn—try to do everything possible to make it happen. I explained to them some of the things they must do. I explained the various statistical methods that are helpful in the detection of special causes of variation.

Those techniques would show management what portion of the problem belonged to the system—things only management could change. I explained to them that these techniques would show them the results of changes that were made but that it would be their responsibility to implement changes when they were called for.

The management people wanted more sessions. So I went back six months later. And while we were there we attended a New Year's celebration at the Industry Club. A Mr. Nishimura of the Furukawa Electric Company came to the party late with a bundle of charts under his arm. He didn't want to eat or drink—he wanted a table and he wanted me. He was so intensely interested in those charts—in what he had done.

**Q:** When you say charts do you mean statistical control charts?

**Dr. Deming:** Yes. We might also call them quality assurance charts—a display of history in chart form.

He had decreased the rework of insulated wire to 10 percent of what it had been. He had done that in just those few months. Soon there were many reports; for example, Fuji Steel Company decreased their consumption of fuel to 71 percent of what it had been in less than a year. In other

words, they were saving 29 percent of their fuel per ton of steel produced. Top management went to work in the plants, learned what to do, and did it.

**Q:** Have you continued to lecture in Japan?

**Dr. Deming:** Yes. I have just completed my seventeenth trip.

**Q:** What has been happening to American quality control in the meantime? If we go back to 1948, as the Japanese began to see the glimmerings of what was necessary to improve the product and what could be done, what was happening in this country? Were we making any progress or just going along?

**Dr. Deming:** American product at the time was top quality. A Dr. Aochi who made a trip to America in 1953 said in a speech that he made sure that he bought an American fountain pen—Japanese pens of the time usually didn't work.

**Q:** Right after the war was there anyone—perhaps yourself—who attempted to educate American industry in the same way that you were attempting to educate the Japanese.

**Dr. Deming:** Yes. There were eight-day courses similar to those I was giving in Japan. In fact, I took part in the first 23 of them. The first two were held at Stanford University in 1942 at my suggestion.

The president of Stanford sent letters to a number of prominent people asking what Stanford could do to help the war effort. I was shown one of the letters by Dr. Stuart Rice. I said that one thing that could be done which would have an immediate effect was the statistical control of industrial quality. As a result, Stanford instituted a ten-day course in statistical quality control. Dr. Holbrook Working and Professor Eugene Grant did the legwork and I did the teaching. This course, and courses that would be held later, formed one of the foundations of the American Society for Quality Control.

**Q:** After the war were these courses received by American business with as much enthusiasm as they were received by the Japanese?

**Dr. Deming:** Oh no. Not at all. They were well received by engineers, but management paid no attention to them.

**Q:** Why did the Japanese—even though they may not have understood the techniques immediately—seem so eager to study and learn them when American management was not? Was it strictly a function of the destruction that existed in Japan and that there was none here?

**Dr. Deming:** I have thought about that question a great deal. I think—from firsthand observation, though I might be wrong—that it is because the Japanese businessman is never too old or successful to learn. While that is certainly true of some American people, the Japanese businessman seems to have a better chance because he has a deeper obligation, not only to the plant but to his people. He's there to do a job and he gets help from wherever he can get it.

**Q:** So you feel that there is at least some inherent difference between the Japanese and American worker and businessman?

**Dr. Deming:** I think that there is something fundamentally different. The best description I can think of is that the people have roots and the roots are the company.

For example, when I visited the Kawasaki Steel Company



in October of 1977, the steel industry was in a slump. But the company, of course, had not dismissed any employees. That would have been unthinkable.

They may have had to take a cut in pay, but if one took it they all took it. But while business was bad, the employees built the biggest blast furnace in the world. They spruced up the plant in every respect. They did repairs, tended the lawn, planted trees. There are no rules by which you can't go out and paint if that is the best thing for the company.

In a year things were better, but now they had this huge blast furnace in operation. Of the ten biggest blast furnaces in the world, nine are in Japan.

When I was there in October of 1978, I made the comment that Japanese workers seemed to work less and less and produce more and more of better quality.

I think that within the next two or three years the disparity between production records of Japanese and American factories is going to be greater than it is now. In other words, they're getting further and further ahead.

**Q:** That's very disturbing for this country.

**Dr. Deming:** Well, I should think that it ought to be disturbing, but apparently it isn't. Now while there isn't anything that can be said about any group of people that is 100 percent correct, it appears that American businessmen still are not interested in doing anything.

**Q:** We touched on it but I'd like to pursue the subject. Why does it seem that American business flatly refuses to take what appears to be the basic steps to achieve quality. Can you discuss some of your feelings in this area?

**Dr. Deming:** Well, I think partly it's a hope that the problems will go away. Maybe they're not as bad as reports indicate. Maybe the competition is having the same problem.



***"I told them that they could invade the markets of the world and have manufacturers screaming for protection in five years. I was, in 1950, the only man in Japan who believed that."***

**Q:** Do we attach too much glamour to the title of president, or chairman of the board?

**Dr. Deming:** I think so. And my conclusion is that often an American businessman feels that if he needs help he will be considered unqualified for the job—and he must not let that happen.

**Q:** Is that a good philosophy?

**Dr. Deming:** It is precisely the opposite in Japan. It's obvious which is better.

One of my students in her doctoral thesis studied how companies use the results of consumer research. The title of the project should have been not *how* but *whether*—because she found that companies make very little use of consumer research. They do it—they pay for it; but, the design department, for example, does not even look at the results. To do so would indicate that they do not know everything about design, and that would threaten their jobs.

**Q:** Would we begin to take steps in the right direction if key businessmen began to say, "I don't know all the answers. And I'm not going to make a decision until I've had a chance to talk to people—had a chance to investigate."?

**Dr. Deming:** Well I think it would be a good idea. In Japan there is no decision made by anyone until everyone has stopped talking and they have exhausted themselves. By that time the answer becomes obvious. There is no "I told you so" or "I thought so too." It's "We agreed, and that's the way we did it."

**Q:** Japanese leaders do not feel demeaned by this joint decision approach?

**Dr. Deming:** Oh heavens no! His job is to perform. And it's the same with the workers. They work together and help each other.

The Japanese foreman is not someone who has to spur people to do this or that. His job is not to push people but to help. He's a social worker. If Michiko doesn't show some morning, he's worried about her. If he doesn't hear from her by noon and if there's no phone at her house, he will go out to find out what the trouble is. If she is sick, the company physician is out there to help. The foreman wants her to be happy and unencumbered by any problems at home.

**Q:** In this country it would probably be considered an unacceptable invasion of privacy for a foreman to call.

**Dr. Deming:** Well that is discouraging. But the foreman in Japan is not a truant officer. They have work to do and anything that he can do to help helps the job. By the way, the Japanese worker doesn't talk about his pay as a weekly thing. He may receive on New Year's day two or three times his annual pay.

**Q:** Is this a bonus for the company's performance?

**Dr. Deming:** Yes. If the company had a good year, the worker will get a good bonus. It's in everybody's interest to help one another. ■

#### References

- (1) *Economic control of quality of manufactured product*, W.A. Shewhart, Van Nostrand & Co., 1931.
- (2) *Statistical methods from the viewpoint of quality control*, Walter Shewhart and W. Edwards Deming, Lancaster Press, 1939.

Next month in part two Dr. Deming discusses what may lie ahead in industrial quality control.



# Dr. W. Edwards Deming

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## — the statistical control of

Statistical quality control and the concept of zero defects are faces of the same quality coin.

■ In Part I (*Quality*, February, 1980) Dr. W. Edwards Deming discussed the early history of quality control in this country and his work in teaching statistical quality concepts to the Japanese.

In this concluding part, he discusses his views on the current status of quality control here and overseas and offers his thoughts about the future.

**Q:** Are statistical techniques—control charts, process capability studies, statistical sampling plans—as important to Japanese manufacturers today as they were ten or fifteen years ago?

**Dr. Deming:** More so. I recently visited the Tokai Rika Company and they are using 241 control charts. The charts are reviewed every two months to see if they are doing the job or if some characteristics should be added or deleted. They were never used more than now.

**Q:** How well are statistical techniques being applied in this country?

**Dr. Deming:** I have no way of coming to any figure, but I will say that there is little understanding in this country of what quality control really is.

Take the computer for example—it's both a curse and a blessing. It's a curse because it has led management to believe that, because they know from computer sheets that yesterday a particular production line made ten percent defectives, that they have quality control. Nothing could be further from the truth. I can tell you about one plant where each morning the plant manager had on his desk a report of the number of defective items that his plant made the day before. The report might have said the average measurement was thus and so, the standard deviation was 13.1, the fourth moment standardized was 7.8. This information was of no use whatsoever to the poor man.

The plant manager has the devil's own job—he has everything to look after. Besides production, there might be a man from the EPA who says that the plant put out too much smoke yesterday. Or there might be someone from OSHA waiting to see him because there was a complaint of an insanitary condition. He has everything in the world to look after and here's another one dumped into his lap.

Very properly, after a little while he disregards the computer printout. Now this same piece of electronic machinery and another \$50,000 or \$150,000 worth of brains—whatever it might take—could get him a short report that would tell him that at ten o'clock yesterday morning something went

wrong on the line. At the same time, a new supplier's material went into use; the reason for the problem is a characteristic of the new material.

Too many companies try to get along by using hardware instead of brains. I gave a lecture at a university recently. I told them of a vice president of an insurance company who said to me, "Ed, I'm getting another \$3 million machine." I said, "What you need around your place is \$300,000 worth of brains, not another machine." About 20 people stayed after the lecture in discussion. A man from a telephone company said, "People laughed at your joke—but it wasn't funny, it's true. If I wanted to buy a \$3 million machine there would be four people who would come and write the purchase order. They would explain how necessary it was that I have it and how I can't get along without it. But if I

***"The plant manager has the devil's own job—he has everything in the world to look after."***

wanted to buy \$300,000 worth of brains, or even \$50,000 worth, there's no one to help me." They won't spend money for brains.

**Q:** Why not?

**Dr. Deming:** I don't know. I don't have the answers to everything and that one I don't know. And while it pervades industry, it's not 100 percent true. There are some companies that understand the value of brains.

**Q:** One of the comments that is heard moderately often is that we need fewer statistical techniques and more common sense. Have you heard that comment?

**Dr. Deming:** One of the chapters in my new book is entitled, "The hazards of common sense." Common sense cannot be defined. You have to be able to define and measure what is significant. Without statistical methods you don't know what the numbers mean.

I have seen railroad vice presidents poring over records from, let's say, the Minneapolis agent. The record shows that last week the agent arranged for three carloads from a particular shipper. The same week a year ago the agent arranged for four carloads. What has gone wrong? Common sense might say that the agent is slipping. And so instead of knocking on doors, getting business, the agent is answering fool questions. Without statistical techniques, the difference between three and four carloads is meaningless.



# quality

**Q:** Can you give another example of how quality concepts are misunderstood?

**Dr. Deming:** One of the activities I performed for a large company was to work with their vendors. We sent out letters asking the vendors what QC records they could submit along with the product by which the purchaser could cut down on the amount of incoming inspection that was required. The answer is disturbing, and it is the answer to a number of your questions. Most of the answers read like this: "Quality is our policy."; "We believe in quality."; "Everything that we send out is inspected." I presume that they also believe in love of country. The replies said nothing. And when we investigated, by far the majority had not the faintest idea of what we were talking about.

**Q:** Would you discuss quality circles for a few moments.

**Dr. Deming:** The quality circle is a name given to the fact that the Japanese work in groups. They like to work in groups and always have worked in groups. The quality circles are groups of workers who study the local system and have the authority to change it.

The Japanese worker has much more freedom on the job than does the American worker. He can modify anything. If he was working here he could rearrange these books or add more shelves. The Japanese have a democracy on the job that we can't appreciate.

**Q:** There have been several attempts at implementing quality circles in this country and there are several organizations founded on the concept of quality circles. Do you see the circles providing a real benefit here?

**Dr. Deming:** They are a benefit, yes. But, if you ask me if they will do as much here as they have done in Japan, I'd say no. I don't like to see them so formalized. I believe that they reached their best efforts before they had a name—when they were spontaneous, natural functions.

Transplanting QC circles may be of some benefit but will not accomplish what has been accomplished in Japan because the group spirit does not exist here—not yet.

I'm afraid that the transplanting and the shortcuts—attempts to copy the Japanese—are just not going to work. You asked me to pinpoint some of the troubles—that's one of them. With the expectation of shortcuts people don't have to do anything—just copy.

**Q:** One of the comments that has been made is that people here are reluctant to join circles because of a fear of subjugating their individuality to the group. Is that a concern that we need to get away from?

**Dr. Deming:** I haven't heard of it expressed as a fear but that might be the explanation. It seems that in this country a person's cronies are people from other companies and there's really nothing wrong with that. But in Japan he would

spend the evening with people from the same company. They would talk about the company while they played cards or Mahjong.

**Q:** It would seem to be clear that there isn't the competition to move up the ladder that we find in this country.

**Dr. Deming:** In Japan you move up the ladder by birthdays. That's what moves you up.

**Q:** Not beating out your rival for a job?

**Dr. Deming:** No. You don't beat out a rival. There is no such thing. He's doing his best, you're doing yours, and you're working together. People here cannot understand that. The Japanese executive does not have to save face. His position is secure.

**Q:** Can we improve what's happening here without getting rid of the competition? Can we keep that tradition and still move ahead?

**Dr. Deming:** I don't think that you can get rid of the competition. That's the Western way of doing things. I wouldn't want to wait until the change.

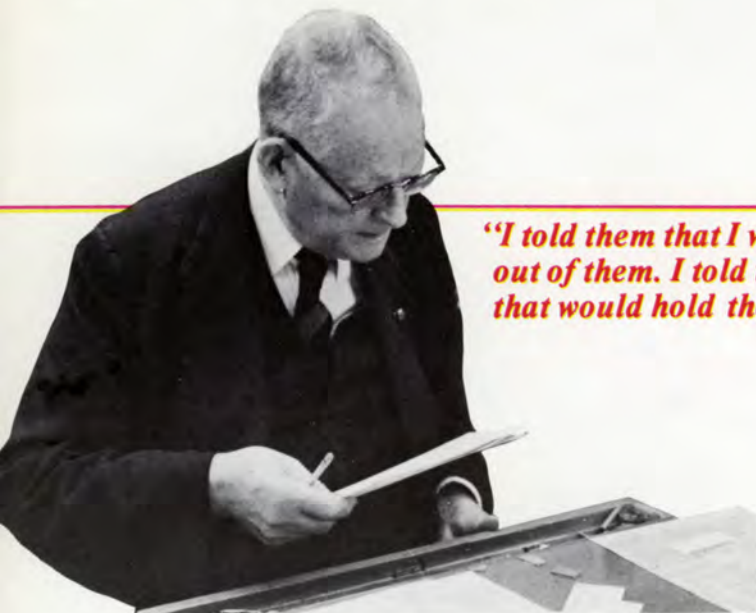
**Q:** How serious a problem is it?

**Dr. Deming:** I don't know if it's really serious. The Japanese learned what I taught them—they studied and learned it in the Japanese way. I gave some lectures to management in Mexico a few years ago. I told them that I wasn't trying to make Americans out of them. I told them that there were principles that would hold there or any other place, but that they should stay Mexicans and use them their way.

*"Too many companies  
try to get along  
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***“I told them that I wasn’t trying to make Americans out of them. I told them that there were principles that would hold there or any other place . . .”***

**Q:** What do you foresee over the next ten years?

**Dr. Deming:** There never was a time when exactness, precision and high quality were so important. The requirements of that tape recorder you’re using—you expect more than you did ten years ago. Take a memory disc that’s used in a computer. The bank and research laboratory will only use the best that can be obtained. They don’t want anything else no matter how much less it sells for.

**Q:** One of the concepts that has been brought up is that—at least in the United States—the next five or ten years will be called the “age of conformance.” That is, manufacturers will strive to produce no more goods of any kind which do not meet specifications. Does this sound like a reasonable prediction of things to come?

**Dr. Deming:** Well, I think that there’s going to have to be more attention paid to what specifications really are. For example, if you were to ask all the manufacturers of copy machines what constitutes quality in a copier, you’d find that few people had ever thought the matter through.

What are we talking about? The appearance of the copier? How important is that to the customer? Or do we mean speed of copying? Some people think that if you get a copy—

***“ . . . quality control does not mean achieving perfection. It means efficient production of the quality that the market expects.”***

no matter how poor it is—for a cost that’s next to nothing, that that constitutes quality.

I’ve made the statement that quality control does not mean achieving perfection. It means efficient production of the quality that the market expects.

**Q:** Do the Japanese do a better job of marketing their products than we do?

**Dr. Deming:** Much better. Look at what they’ve done to satisfy the consumer. They found out what people wanted in color television and they made it. That’s one of the obvious things. The consumer is the most important part of the production line—you can see how well they learned that lesson. Moreover, the Japanese operate through powerful trading companies.

**Q:** We have been talking about America and Japan, what do you see for the rest of the world?

**Dr. Deming:** No one will overtake the Japanese. Taiwan is a powerful industrial country and is not far behind Japan; but, I think they will remain behind. There are inherent differences—the workers and management do not have the same roots.

Korea is doing well, as everybody knows. But if I ask about quality control, nine times out of ten they talk about QC circles. In ten minutes at one place I showed them problems with the system that only management could correct.

**Q:** You said no one will overtake the Japanese—does that include the United States?

**Dr. Deming:** Oh, yes. In fact, I think the gap will get wider.

**Q:** Even with people such as yourself who are attempting to educate American business, won’t we be able to make any real progress?

**Dr. Deming:** Not until it hurts worse. That time is some years off. People are thinking, but they are not doing anything.

**Q:** One of the things our readers are going to want to know is what they can do individually to correct the statement that the Japanese can’t be overtaken.

**Dr. Deming:** There’s enough knowledge here, but, it needs understanding and application—it’s not being put to work. Americans depend too much on inspection and inspection is unsatisfactory.

Even 100 percent inspection using automatic testing machines doesn’t guarantee quality. It’s too late—the quality is already there.

**Q:** We’re going to have to do some changing aren’t we?

**Dr. Deming:** Well, I think so. You asked about American quality in 1948. It was terrific. America could sell anything just by the name. It doesn’t sell that way anymore.

**Q:** When did we begin to lose that?

**Dr. Deming:** It was apparent in the 1950s that we were slipping. I don’t think our quality has gone down, but other quality has gone up—overtaken us and left us behind.

We can lead—we have led in many respects. This calculator that I use, for example, is absolutely fabulous. The Japanese have never put out anything like it. Our quality can be good. But what we have to do is make a nationwide commitment to quality. There are no shortcuts. The Japanese made a commitment to quality nearly 30 years ago and they are still learning and moving ahead faster and faster. ■

**Editor’s note**

The control charts referred to in this article and in Part I, February, 1980, are statistical control charts invented and developed by Dr. Walter Shewhart.