

W. Edwards Deming: The Story of a Truly Remarkable Person

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1. Introduction

The purpose of this paper is to provide a brief biography of Dr. W. Edwards Deming. Deming was born in 1900 and died in 1993. Almost up to his death he was unbelievably active in promoting quality. He never established an “institute” or school like other quality gurus but, for the most part, was in the private consulting business working out of Washington, D.C. He has probably had more influence on American business than any other person except, perhaps, Fredrick Taylor. Fortunately, much of what Deming taught overturned the “unthinking worker” approach of Taylor. What follows is a brief look at the life of this remarkable person followed by his main teachings and a profile of his personality.

This paper is organized as follows:

1. Introduction
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2. The Early Years (1900–1917)¹⁾

William Edwards Deming was born on October 14, 1900 in Sioux City, Iowa, approximately in the center of the continental U.S. He was named after both parents: William Albert Deming, his father, and Pluma Irene Edwards, his mother. He also inherited his father's penchant for learning and his mother's for music. His father was trained in the legal profession and did free-lance legal work such as writing contracts. His mother had studied music and gave lessons using their grand Kimball piano. When he was small, Deming recalled scribbling "with a pencil on paper, saying that I was writing music. My mother would put it on the piano and play something, and declare that I had written great music" (from Kilian, 1992, page 153). In fact, Deming went on to write several pieces of music, mostly religious. He also learned to play the piano, organ, piccolo, and flute.

Deming had two younger siblings, brother Robert born in May 1902 and a sister, Elizabeth, born in January 1909.

When Deming was about four, the family moved to a farm near Polk City, Iowa in the south-central part of the state. This was the "Edwards farm" owned by Deming's grandfather (mother's side) who, for some reason, had moved to Missouri. After living there for about two years, the Deming family again moved, this time to Cody, Wyoming. This was quite a long trip in those days, all the way across Nebraska and much of Wyoming. The trip was by rail since that was the main means of transport in those days. Cody was named for the famous buffalo hunter and scout, William Frederick Cody, who was better known as "Buffalo Bill." The Demings lived in a small house on the grounds of the Irma Hotel which was named for Buffalo Bill's daughter. Since Buffalo Bill was a frequent visitor to this hotel, the Deming boys had a first-hand acquaintance with him and

1) Unless otherwise stated, biographic data in this paper comes from one of these three sources: Gabor (1990), Kilian (1992), or Walton (1986).

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he even recognized them when they were at one of his famous Wild West shows while visiting an aunt in Los Angeles. While in Cody, Deming's father worked for the Simpson Law office as a legal clerk and his mother supplemented the family income with music lessons.

After about two years in Cody, Deming's father took advantage of a homestead program which gave out free land in 40 and 80 acre plots as part of a major irrigation reclamation project. This caused the family to move once more to Powell, Wyoming, about 22 miles north of Cody. Deming's father secured a 40 acre plot. That he was not really into farming can be judged by his distinction between an "agriculturalist" and a farmer: a farmer makes his money on the farm and spends it in the city whereas an agriculturalist does just the opposite; *he* was an agriculturalist! Although those early days in Powell were often touch and go, eventually his father was able to claim a moderate amount of success "selling insurance, making loans to farmers, drawing up wills, and selling land" (Gabor, 1990, p. 39). However, for their first four years in Powell, the Demings lived in a tarpaper shack about the size of a freight car and, in fact, this is where sister Elizabeth was born²⁾.

Even as a youngster Deming took on odd jobs and either saved the money he made or helped with family expenses. He recounts helping out at Mrs. Judson's Hotel in Powell for \$1.25 per week and being responsible for lighting the five gasoline street lamps in Powell every evening for \$10.00 per month (electricity did not come to Powell until around 1918).

The mostly frugal conditions under which Deming was raised no doubt influenced his belief about not wasting anything. Even when, in later life, he was commanding rather large sums of money for his services, he and his wife continued to live in their modest house in Washington, D.C. near the Maryland border.

2) Since Powell was only then becoming a town, Elizabeth could also claim the distinction of being the first baby born there (Walton, 1986).

The idea of not wasting anything fits in very well with the practice of good quality management and controlling the “cost of quality” since one important element of this cost is that for rework and nonconforming product that cannot be salvaged.

And so, Deming progressed through his high school days almost as an ideal son, studying and working hard yet also enjoying himself as camping and fishing were among his passions.

3. The College Years (1917–1928)

In 1917, Deming set out for Laramie in the southeastern part of Wyoming to attend the University of Wyoming. There he supported himself doing janitorial work, working as a soda jerk at a drug store, hustling suits to be cleaned for a dry cleaner, and various other odd jobs. Apparently these were happy years since a brief chapter in Kilian (1992) devoted to that time is called: *Those Good Years at Wyoming U*. Deming admits “I don’t remember much about classes except that mathematics went all right, and that I had a dreadful time with English” (from Kilian, 1992, page 170). Among other activities, he played in the band, starting off with drums and timpani and then switching the next year to the piccolo deciding that “it would be better to play a smaller instrument” after hauling the drums and timpani around to off-campus events. Deming also mentions having the nerve to ask a girl to barn dance and being “almost overwhelmed by her acceptance.” In 1921, Deming earned his bachelor’s degree in electrical engineering.

Deming’s mother passed away in 1920. She died at the Mayo Clinic in Rochester, Minnesota, a week after having had an operation there. Five years later, his father married Grace Peterson; Grace and Deming’s mother had been good friends. Deming’s father was to live only five more years, passing away in 1930.

After graduating from the University of Wyoming, Deming stayed on and taught engineering and continued his study of mathematics. He admits he was not a good teacher of engineering — “How could I do otherwise? I didn’t know very

Robert B. Austenfeld, Jr.: W. Edwards Deming: The Story of a Truly Remarkable Person much” (from Walton. 1986, p. 6).

Apparently Deming was not too shy around women because in June, 1922 he married Agnes Belle, a young school teacher. Although they had no children themselves, they did later adopt a daughter, Dorothy, when she was 14 months old. Deming marriage to Agnes was to be short-lived as she died in November 1930. Two years later, April, 1932, Deming married Lola Shupe, an assistant to Deming at the United States Department of Agriculture (USDA) Fixed Nitrogen Research Laboratory where he then worked. Besides Dorothy, Lola and Deming had two daughters of their own: Diana, born December 1934 and Linda, born June 1942.

At about this same time (1922) Deming had taken a job teaching physics at the Colorado School of Mines in Golden just outside Denver. This job was offered to him by a professor he had studied physics under at the University of Wyoming. He taught there two years and also took courses in mathematics by correspondence and summer school from the University of Colorado in Boulder, earning his master’s degree in 1925 in mathematics and physics. In 1924 he moved to Boulder to take a job with the University of Colorado Graduate School; again a job³⁾ offered by a former professor, the dean of the graduate school, Oliver Lester.

It was Dean Lester who also encouraged Deming to go to Yale (New Haven, Connecticut) to get his doctorate. Lester also secured for Deming an instructorship at Yale that paid \$1,000 per year. As Deming said, “We lived on it.” It was during this time that Deming had another experience that was to greatly influence his thinking about quality and how workers should be treated. During 1925 and 1926 he spent four months each summer working on transmitters at the famous Western Electric Hawthorne Plant in Chicago⁴⁾. He later recalled the inhumane

3) As an assistant professor of physics.

4) This plant was the site for the famous Elton Mayo (MIT) experiments in the 1920s on how changing working conditions affects worker productivity. It was found that ↗

conditions under which most of the workers had to work. He also recalled a discussion he had with a Dr. Hal Fruth who told him that after getting his degree from Yale, Western Electric might offer him a job at \$5,000 per year. This was more than Deming “had ever expected to earn.” However, Dr. Fruth went on to explain, that it was relatively easy to find a man worth \$5,000 per year, what they were really looking for was a man who would develop into someone worth \$50,000 per year, and *that* was hard to find. Apparently Fruth thought Deming was that sort of person.

It was during his time at Western Electric that Deming also began to learn about the importance of uniformity in telephone equipment and the name of a person who would soon become a part of his life: Walter A. Shewhart of Bell Laboratories. Shewhart was beginning to apply statistics to manufacturing processes in a way that would permit the worker to study and control variation in those processes. Deming was later to adopt this idea as a fundamental principle of his quality philosophy.

Although he finished his work at Yale for the doctorate in the summer of 1927, Deming was not formally awarded the degree (in mathematical physics) until June 1928. His dissertation was *A Possible Explanation of the Packing Effect of Helium*. Wasting no time, on August 1, 1927 Deming took a job with the United States Department of Agriculture (USDA) Fixed Nitrogen Research Laboratory (as already mentioned) in Washington, D.C. Despite several other offers, Deming, at that time, was particularly interested in studying nitrogen and its effect on crops.

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improving trust between workers and supervisors, reducing fear, and breaking monotony all helped to improve worker morale and productivity. It was also found that paying by piecework was self-defeating since workers would never exceed the target set by management for fear that the target would then be increased without a corresponding increase in pay (Gabor, 1990). Deming was not aware of the Mayo experiments at the time he was there.

4. His First Jobs (1927–1946)

Deming was with the USDA from 1927 until 1939 and then worked as a statistical advisor for the U.S. Census Bureau (Britannica home page, 2000). While at the USDA he published some 24 “principal” papers⁵). Most of these dealt with the physical properties of gasses. Once he began working for the Census Bureau, his papers were mostly about sampling, a technique Deming helped pioneer at the Bureau. It is interesting to note that more often than not these papers were jointly published with one or more others, in fact, twelve of the papers published while at the USDA were published with Lola Shupe who, as mentioned, became his wife in 1932 after Anges’ death in 1930.

It was Deming good luck to have as have as the Deputy Chief at the Fixed Nitrogen Laboratory a Dr. Charles Kunsman who was also a close friend of Dr. Walter Shewhart of Bell Laboratories in New York. In fact, Kunsman had shared an apartment with Shewhart in Brooklyn when he worked at Bell. Kunsman was quick to see the benefit of having Deming meet and, perhaps, learn from Shewhart. As Deming put it: “He [Dr. Kunsman] arranged for me many visits to Dr. Shewhart, the first one in the fall of 1927. In fact, I would claim that I had the privilege to work closer with Dr. Shewhart than any one had in the Bell Laboratories” (from Kilian, 1992, p. 175). Deming also studied in England under Sir Ronald A. Fisher, one of the “leading lights” of statistical theory at that time. But, as we shall see, it was Shewhart who most influenced Deming’s thinking.

Around 1935, Deming became responsible for courses in mathematics and statistics at the USDA’s graduate school. It is important to note here that these courses were set up to also accommodate working people and were made available in the evening and, as demand dictated, at various locations through Wash-

5) Dr. Deming’s principal papers are listed in Appendix A of Kilian (1992).

ington, D.C.⁶⁾ This meant the program drew students from all over the District including, for example, the Census Bureau. Because of this, its influence was quite great; especially for disseminating information about the new and rapidly growing field of the practical application of statistics. Much to his credit Deming saw the merit in inviting some of the best in the field to come and lecture such as Sir Ronald Fisher. However, it was Shewhart whom Deming probably wanted most as a lecturer. As he relates it in Kilian (1992): “The idea came into my head to invite Dr. Shewhart to give four afternoon lectures. He accepted, and spent a year in development of these lectures which he gave in March 1938” (p. 176). With Deming help in making them more understandable to the average person⁷⁾, these lecture were later published by the USDA’s graduate school in 1939 as *Statistical Method from the Viewpoint of Quality Control*. This book was later republished in 1986 by Dover Press with a Forward by Deming⁸⁾. This book was a follow-on to another book by Shewhart that was also praised by Deming: *Economic Control of Quality of Manufactured Product* (1931, D. Van Nostrand Co., Inc.). This book was also republished (in 1980 by the American Society for Quality Control) with a Deming dedication⁹⁾ highly praising Dr. Shewhart for his contribution to the practical application of statistics. One reason Shewhart was so involved in the use of statistics was his association with Bell Laboratories at a time when the U.S. phone system was rapidly expanding into a national system. Shewhart had the vision to realize that only by minimizing variation throughout

6) At the time none of the universities in Washington, D.C. offered such courses.

7) Although recognizing his genius, even Deming admits to having difficulty in understand some of the things Shewhart wrote.

8) See pages 98–101 of Kilian (1992). It is apparent from this forward that Deming considers this book in a class by itself because of the important principles it sets forth about the use of statistics; for example, how control charts can be used to understand and control variation in any process.

9) See pages 94–98 of Kilian (1992).

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the system would all the parts work smoothly together. He knew that the correct use of statistics could greatly help to minimize variation.

Having studied under some of the best statisticians, especially Shewhart, Deming was perhaps ready to begin putting what he had learned to use. In 1939 he joined the U.S. Census Bureau and played an important role in how the 1940¹⁰⁾ census was taken. Prior to this time sampling had not been used for the national census but users' demands for more and more information and improved accuracy¹¹⁾ were making it more attractive. However, according to Nancy Mann (from Voehl, 1995), "many of the users of census data were willing to accept sample results, but some of the old-timers at the Bureau of the Census were opposed to the idea of sampling" (p. 51). After hearing the pros and cons, the Secretary of Commerce decided in favor of sampling. Soon after that Deming received a call from the Bureau's assistant director, Dr. Philip Hauser, and accepted the job of advising on sampling for the 1940 census. Deming's papers dramatically changed to reflect his new field of interest, going from physics to sampling, especially as applied to census work (Myron Tribus, from Voehl, 1995).

Besides advising on the use of sampling for taking the 1940 census, Deming became much involved with improving the accuracy with which the data from the census questionnaires got keypunched onto the millions of punch cards. For example, before, there was 100% inspection of the cards. Although this would seem to ensure accuracy, in fact it did just the opposite¹²⁾. As Gabor (1990) notes:

...the pay of the inspectors was linked to the volume of punch cards they processed, which encouraged speedy but not careful inspection. And because some of the inspector were friendly with the keypunch operators, they

10) In America, the census is taken every 10 years.

11) In fact, a national unemployment survey taken in 1937 did use sampling and was able to narrow unemployment estimates down from between "three million to fifteen million" to eleven million (Gabor, 1990).

12) This amounted to a "piecework" approach to pay, one of Deming's pet peeves.

would often overlook errors for fear of getting their friends in trouble. (p. 45) Instead, Deming did 5% sampling and applied statistical process control (SPC) techniques to determine which operators were “out of control” and needed more training. As can be imagined, “The payoff was a substantial increase in clerical productivity and attendant dollar saving in addition to an earlier release of the population census results” (Homer M Sarashon, from Voehl, 1995, p. 72). Having a major impact, as he did on the efficiency of the census process, was to become typical for Deming as we shall see when we talk about his impact on the Japanese manufacturing industry.

Deming also became very involved with the U.S. war effort after getting a letter from a member of the Stanford University statistics faculty, W. Allan Wallis, in April 1942. Wallis was writing on behalf of himself and some of his statistician colleagues who were wondering if they couldn’t do something to help the war effort by offering training in statistics. Deming, in characteristic fashion, quickly responded with a suggestion that courses be set up as soon as possible to train “engineers, inspectors, and industrial people with or without mathematical and statistical training” (Gabor, 1990, p. 55). This resulted in a program of intensive eight-week courses that began in early 1943 and, within two years, had trained almost 2,000 men and women¹³⁾. Some of these then went on to train others resulting in the program training an estimated 31,000 (Nancy Mann, from Voehl, 1995). As Mann said: “The program had a strongly beneficial effect on the quality and volume of war production. Spectacular reductions in scrap and rework were made” (p. 52 in Voehl). Statistical process control charting and the Shewhart Cycle were core features of these courses. The Shewhart Cycle (see Figure 1), has also come to be known as the Deming Cycle — since Deming was most responsible for popularizing it — and the Plan, Do, Study, Act (PDSA)

13) Deming taught 23 of these courses himself.

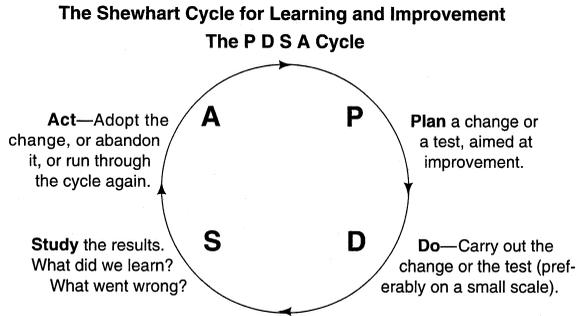


Figure 1. The PDSA Cycle (Deming, 1994, p. 132).

Cycle. Figure 1 shows how the cycle can be used to fairly quickly test a new idea for improving a product or process. Taken in a larger sense, the cycle can be considered a way to think about how to relate your product and processes to customer needs: the *Plan* step would be doing customer research to determine their needs, the *Do* step would be making a product that you believe meets those needs, the *Study* step would be to see how the customer liked the product, and the *Act* step would be making appropriate modifications, based on customer feedback, to make the product even better. As can be seen from the “cycle” idea, these four steps are to be repeated over and over to continuously improve the product (or a process).

This training program was probably the catalyst that caused America to finally begin abandoning some of the traditional ideas of scientific management with its emphasis on getting the most out of the least; that is, a purely financial orientation versus a customer orientation. However, it would take the fear of being overtaken by the Japanese some thirty years later before American business really accepted these new ideas. Nevertheless, at least a core of quality adherents schooled in these Shewhart/Deming ideas came into existence and began working together. Out of this movement came the establishment of the American Society of Quality Control (ASQC) in February 1946 (Nancy Mann, from Voehl,

1995). ASQC changed its name to ASQ (without the “control”) a few years ago to the counter the image of a group only interested in “sorting the bad product from the good” versus a more positive, proactive approach (in fact, Deming’s approach).

In 1946, Deming left his job at the Census Bureau to go into private consulting practice. He also took up a position as a professor of statistics at the Graduate School of Business Administration, New York University. He was to continue teaching at NYU even after “retiring” in 1975 and becoming emeritus. Had Deming died at this time (1946), he would still have held an important place in the world of science and statistics for his work at the USDA’s Fix Nitrogen Research Laboratory and the Census Bureau. He had already developed a reputation as an accomplished statistician and made important contributions to that field. However, at age 46, Deming, if he could see the future, could rightly say: “You ain’t seen nothin’ yet!”

5. His Early Work with the Japanese (1947–1956)

Deming’s Japan odyssey began in 1947 when he was engaged by General MacArthur’s Supreme Command of Allied Powers (SCAP) to advise on sampling techniques for a major census to take place in Japan in 1951. The purpose of this census was, among other things, to try to accurately assess the damage from the war so such things as the amount of new housing needed could be determined. It was at this time Deming first came to know and develop a respect for the Japanese. As he was to recall many years later: “The [Japanese] people were hopeful, happy, clean, they looked forward to another day, though they were hungry. Nothing impressed me so much as the striking contrast between the happiness of the Japanese and their devastation” (from Gabor, 1990, p. 76). As opposed to most of the people associated with the U.S. occupation, Deming spent most of his free time away from the American headquarters touring the country

Robert B. Austenfeld, Jr.: W. Edwards Deming: The Story of a Truly Remarkable Person and getting to know the people first hand. He also made friends with several Japanese statisticians and was even made the first Honorary Member of the Japanese Statistical Society. However, all this was but a prelude to what would happen three years later when Deming received an invitation from The Union of Japanese Scientists and Engineers (JUSE) in March of 1950 to return to Japan and teach the application of statistics to quality improvement. JUSE grew out of a group formed during WWII to help with the war effort and, after the war, to help with reconstruction. Until about the time of Deming's involvement with it, it was little more than a social group that "sat around, drank sake and ate rice, talked: [had an] aim without a method" (Deming quote, from Kilian, 1992, page 20).

Even before Deming returned in 1950, there had been considerable effort by General MacArthur's headquarters staff to improve the quality of Japanese production. In particular, the Civil Communications Section (CCS) of that staff had been charged with "restarting the communications equipment manufacturing industry quite literally from the ground up" (Homer M. Sarasohn, from Voehl, 1995, p. 73). As part of that effort, a seminar was established for senior industry executives who were, in turn, to give the same course to their subordinates. These CCS lectures included a 36 page lesson on quality by Homer Sarasohn, an American electrical engineer who had come to Japan in 1945 to work with SCAP on rebuilding the Japanese communications industry. This lesson set forth many of the ideas Deming believed in and, indeed, had its genesis in the work of Shewhart since most of those involved in delivering the quality control lectures were former employees of Bell Laboratories or Western Electric. For example, according to Gabor (1990), "The course emphasized the importance of controlling variation as well as the correlation between improving production processes and building high-quality products" (p. 78). Although the Japanese were ready to accept these relatively new ideas, especially at a time when "made in Japan" was becoming synonymous with junk, there were some misgivings that these lectures

were too technical and difficult to understand. In the meantime, JUSE was making some progress, beyond just talking, about how it could help with reconstruction and, in September, 1949, sponsored its first quality control seminar. Also, about this time JUSE learned that Deming would be revisiting Japan in 1950. Having studied whatever they could lay their hands on about quality control, especially from America, JUSE was becoming very familiar with people like Shewhart and Deming. Acting under the close regulation then existing during the occupation, JUSE obtained CSS's permission to invite Deming to give a lecture course "to the Japanese research workers, plant managers and engineers who had just started learning or taking an interest in quality control methods" (Kenichi Koyanagi, from Kilian (1992), p. 31). Again, in typical fashion, Deming quickly responded to the invitation and offered several suggestions for how such a lecture series could be best implemented.

The first of a dozen lectures began on June 16, 1950 with a standing room only crowd at Tokyo University. As described by Gabor (1990), "...Deming was overwhelmed by his reception and by the level of knowledge exhibited by those who came to hear him speak. More than five hundred people attended, including government officials, professors, and students" (p. 80). The lectures were given in several locations from Tokyo all the way down to Kyushu. However, Deming recalled well the way his ideas about such things as using control charts to understand and control variation had vanished from American management soon after the war ended ("there was nothing — not even smoke"). Therefore, he knew it would be important to talk with top management if what he had to say was to make a lasting difference.

The then president of JUSE, Ichiro Ishikawa, was also chairman of one of Japan's most powerful business groups: *Keidanren* (the Japanese Federation of Economic Organizations). With Ishikawa's help, Deming was able to meet with 21 of the top managers in Japan on July 13. This dinner meeting was a key turn-

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 ing point for Japanese industry. As Deming put it: “I think they were impressed, because before the evening was over they asked me to meet with them again...” (from Walton, 1986, p. 13). At subsequent meetings Deming continued to tell these and other managers that they *could* make good quality products if they would follow some of the common sense things he was advocating.

I said ‘You don’t need to receive the junk that comes in. You can never produce quality with that stuff. But with process controls that your engineers are learning about — consumer research, redesign of products — you can. Don’t just make it and try to sell it. But redesign it and then again bring the process under control...with ever-increasing quality.’ (from Walton, p. 15). It was during one of these meeting with managers that Deming began using his now famous system diagram shown in Figure 2. This diagram shows the

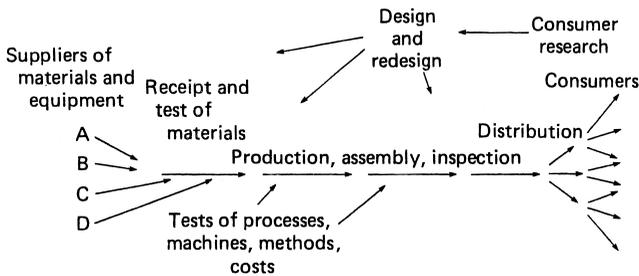


Figure 2. Production viewed as a system (Deming, 1986, p. 4).

importance of thinking of production in terms of a system and how good quality starts with the consumer and requires a close relationship with your suppliers.

Deming told the Japanese managers that if they followed his recommendations “they would capture markets the world over within five years.” In fact, it began happening within four years!

One might ask why the Japanese managers even listened to Deming, a foreigner and, at that time, probably someone they had never heard of. It was prob-

ably the confluence of several factors such as: (1) the real need for Japan to find a way to improve its exports and dispel the bad “made-in-Japan” image, (2) the connection Deming had made through his association with JUSE and, in particular, its then president, Ishikawa, (3) the respect Deming showed the Japanese at a time when their self-esteem was probably very low, and (4) the interest Deming took in the Japanese culture¹⁴⁾.

Following this significant event (Deming getting through to the top managers in Japan), Deming returned to Japan in 1951, 1952, 1955 and 1956 as a consultant and teacher to aid JUSE’s efforts at continuing the work he started in 1950 (Kilian, 1992 & Aguayo, 1990). Another significant event was the establishment of the Deming Prize in 1950 by JUSE to be awarded annually to persons and companies for excellence in the research, dissemination, and application of statistical quality control methods. Winners are awarded the Deming Medal, a silver medal with (a young) Deming in profile. The following is written under Deming’s likeness: “The right quality & uniformity are foundations of commerce, prosperity & peace”; words that would seem to epitomize Deming’s vision for a better world through continuous improvement. Winning the prize has turned out to be considered a very high honor indeed and, as Gabor (1990) tells it, the list of recipients “reads like a *Who’s Who* of Japanese companies that have dealt serious blows to U.S. industry.... Winners include Toyota, construction equipment maker Komatsu, copier manufacturer Ricoh, the diversified Toshiba Corporation, tire manufacturer Bridgestone, and Matsushita Electric Industries Company” (p. 93). It was not until 1987 that the U.S. established its equivalent to the Deming Prize, the Malcolm Baldrige National Quality Award.

Deming himself was awarded the American Society for Quality Control’s

14) As Walton, 1986 writes: “He delighted in invitations from Japanese hosts, and he sought to familiarize himself with the culture, frequently attending Kabuki theater and Noh plays, exploring markets and shops, visiting temples and shrines” (p. 11).

Robert B. Austenfeld, Jr.: W. Edwards Deming: The Story of a Truly Remarkable Person (now the American Society for Quality) Shewhart Medal in 1955. This award, given almost since the founding of ASQC, is awarded for having “demonstrated the most outstanding technical leadership in the field of modern quality control, especially through the development to its theory, principles, and techniques...” (ASQ home, 2001)¹⁵). It must have made Deming feel especially proud to receive an award dedicated to his old friend and mentor, Dr. Shewhart.

There is not much written about Deming during this time after his landmark visit in 1950. Kilian’s (1992) Appendix A (under International Activities) shows him doing consultant work in Germany and Mexico during the early to mid-1950s. He is also shown as being an “exchange scholar to Germany, 1952 and 1953.” Also during this period he continued to publish, producing several scholarly papers on statistical methods and sampling.

6. The Interim Years (1956–1980)

This time in Deming’s life might even be called his “hidden years” since there is not much written about his life. However, according to the list of his Principal Papers (Kilian, 1992, Appendix A, pp. 346–356), he wrote and published a lot: 58 papers. Figure 3 shows a very general breakdown of the topics of these papers. The fact that almost half of these papers dealt with specific applications of statistics shows that Deming was very much involved with the real world; certainly an indication of some of the very practical work he did in those days for improvement of existing practices. He often collaborated on these papers; 16 of the 58 were co-authored. The range of topics also shows how diversified were his interests.

One of the more noteworthy of these papers is the article “What happened in

15) ASQ has also awarded a “Deming Medal” since 1996 “to those who, like Dr. Deming, have successfully combined the application of statistical thinking and management so that each supports and enhances the other, thus leading to quality in products and services” (ASQ home page, 2001, under ASQ Awards and Scholarships).

Topic	Number	per-cent	Example
Use of theory	1	2%	On the use of theory (1956) #94*
Some specific application of statistics	27	46%	On some statistical aids towards economic production (1975) #149
Sampling (in general)	6	10%	On some new methods of concepts in sampling (1959) #105
Principles of professional practice	5	9%	Principles of professional statistical practice (1965) #104
The general application of statistics	12	20%	On the use of judgement-samples (1975) #153
Statistical quality control in Japan	5	9%	Recent advances in the statistical control of quality in Japan (1964) #121
The general application of probability	1	2%	On probability as a basis for action (1975) #145
Evaluation	1	2%	The logic of evaluation (1975) #148
Total	58	100%	

Figure 3. A general breakdown of papers published by Deming during the period 1956–1980 (source: Kilian, 1992). *Number assigned to the paper in Appendix A.

Japan?” published in *Industrial Quality Control* in August 1967. Here is the article’s purpose as stated by Deming:

The purpose of this article is to offer some observations on the causes of success in Japan, from the viewpoint of statistical control of quality, with the thought that energetic application of statistical techniques in other parts of the world, including the United States, might have healthy impact. (Kilian, 1992, p. 74)¹⁶⁾

The article provides the outline of what has come to be known as the Deming philosophy of management based on his now famous Fourteen Points and system

16) This quote is from a reprint of the article which appears in Kilian as Chapter 7. According to Kilian, a form of the article appeared in *Industrial Quality Control*.

Robert B. Austenfeld, Jr.: W. Edwards Deming: The Story of a Truly Remarkable Person of profound knowledge. In the article he discusses nine features of quality in Japan, defines statistical control of quality, describes an early version of the PDSA Cycle (see Figure 1 above), and discusses the difference between special and common causes of variation. For the serious student of Deming, the article provides a valuable historical insight into his ever evolving thinking.

It is also interesting to note that Deming, in that same article, specifically singles out the United States as a country that might benefit from his ideas; something that would not happen for another 13 years. Indeed, until the American broadcasting company, NBC, aired a special on quality in 1980, Deming remained in relative obscurity in the U.S. However, as the above described list of papers testifies to, Deming remained busy. According to Walton (1986) “he developed a large clientele in the trucking industry for whom he designed most of the rate structures now [1986] in existence” (p. 16). Walton goes on to give us a some inkling of what his family life was like:

His varied assignments kept him on the road a great deal. The family seldom took vacations¹⁷⁾, but on weekends they would go for bike rides or day trips. On Saturday morning, his youngest daughter, Linda, would wake to the sound of her mother at the calculator. Not only did Lola Deming perform the calculations for much of her husband’s work, she edited his manuscripts as well and traveled with him several times to Japan. Meanwhile, she continued to work for the federal government until her retirement in 1967. (pp. 16–17)

Perhaps the single most important event in this period of Deming’s life was being awarded the Second Order Medal of the Sacred Treasure by the Emperor of Japan in May 1960. This is the highest award Japan can bestow on a foreigner.

17) Although he knew how to have fun, Deming was definitely not a “vacation” person. He seemed to take delight in getting up each day and doing something new and interesting and learning from it.

In Deming's own words:

I can say nothing ever pleased me so much as this recognition. The citation stated that the Japanese people attribute the rebirth of Japanese industry, and their success in marketing their radios and parts, transistors, cameras, binoculars, and sewing machines all over the world to my work there. (from Kilian, 1992, p. 58, and, in turn, from Deming's journal, *Sixth Trip to Japan*)

Besides this trip in 1960 to receive the medal, Deming made a three-week visit to Japan in 1965. I think this was especially important to Deming because, by this time, Japanese industry had begun to definitely change due to the implementation of his ideas. To sort of commemorate this visit, Deming wrote a 65 page account of it which is a delightful look at many facets of the Japanese culture as it existed at that point in time. Here is Deming's preface to *My Seventh Trip to Japan*¹⁸⁾:

Unexpurgated, unmeditated, unimaginative. Being a candid day-by-day account of the incredible experiences of a weary statistician, working in Japan, in continued admiration and amazement of the ability of the Japanese people to be so charming along with their dazzling attainments. Typed from original notes written on the spot. Illustrated with the author's own snapshots.

As the new decade of the 1980s dawned, Deming's days of relative obscurity were about to end. Let us now fast-forward to June 1980.

7. The "If Japan Can, Why Can't We?" Era (1980–1987)

On June 24th, 1980 NBC aired a documentary called "If Japan Can, Why Can't We?" What prompted this program? Well, I often quote humorist Dave Barry (1992) who, discussing the American automobile industry's reaction to the loss of market to Japanese small cars in the 1970s, says:

At first the American auto manufacturers resisted making small cars for aes-

18) The account is reproduced as Chapter 15 in Kilian (1992).

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thetic reasons: Smaller cars sell for less money. But finally, feeling the pinch from foreign competition, the U.S. auto makers decided that, OK, they would make small cars. But not just *any* small cars: No, they would make *really bad* small cars. The shrewd marketing strategy here was that people would buy these cars, realize how crappy they were, and go back to aircraft carriers. This strategy resulted in cars such as the Ford Pinto, the Chevrolet Vega, and the American Motors Gremlin — cars that were apparently designed during office Christmas parties by drunken mail-room employees drawing on napkins; cars that frequently disintegrated *while they were still on the assembly line*. (pp. 12–13)

In other words, America, for the most part, had abandoned its brief enthusiasm with improving the quality of its products which had been crucial for success in WWII. Instead, operating in a seller's market following the war, the American "business model" was simply "sell, sell, sell." As Gabor (1990) puts it, "the marketer's job is to convince the customer to buy no matter what his needs, no matter what the suitability of the product" (p. 56). And, it might be added, no matter what the quality. As demonstrated by the above quote from Barry, by the 1970s it was "made in America" that was becoming a joke; indeed, the tables had turned with the Japanese taking away ever more of the market share from America. Not only were the Japanese making better cars, but better televisions, better motorcycles, better stereos, better you name it! It was this situation that, in the late 1970s prompted NBC to consider producing a documentary that would attempt to answer the question: If Japan can, why can't we (America)?"

Clare Crawford-Mason, the producer of the NBC documentary, was looking for a good story that would have program audience appeal but there didn't seem to be any story to tell. "She found herself conducting interviews with economists that were about as exciting as 'watching paint dry' ..." (Walton, 1986, p. 18). Then, one day, talking with the Dean of American University's Business

School (Washington, D.C.), Herbert Striner, she was put on to “an elderly man who lived up the street... ..who had helped the Japanese repair their economy” (Crawford-Mason, 1992). She had no trouble getting an appointment and met with him in his two-room office in the basement of his home. As she later recalled:

We talked for almost two hours, and I didn’t understand much of anything he said. I caught the phrase that he had “taught the Japanese to work smarter, not harder” and that sounded good. But I couldn’t seem to find out what he had taught them. It was to take me 10 years. (Crawford-Mason, 1992)

Indeed, she couldn’t believe anyone who had done what Deming had and lived only six miles from the White House could be so unknown. Checking with her Tokyo office, she confirmed that Deming was on a par with Douglas MacArthur in Japan. “So I returned and talked to Dr. Deming some more. He was... pleasant, charming but oddly vehement. A question that seemed reasonable to me would upset him. ‘No, no, no!’ he would almost roar.”

Fortunately, Deming had recently been working with the Nashua Corporation, in Nashua, New Hampshire, a maker of, among other things, carbonless paper.¹⁹⁾ By the time the documentary was produced, Nashua had had enough time to begin seeing some successes from the use of Deming ideas. The famous documentary aired on the evening of June 24, 1980. The last 15 minutes were about Deming and his work with Nashua. After the CEO of Nashua told how much their productivity had improved and how they were saving millions of dollars, Deming said: “If you get gains in productivity it is only because people work smarter, not harder, that is total profit, and it multiplies several times” (from Walton, 1986, p. 19). When asked if the methods that were working in Japan could work in the United States, Deming said “Why of course, we could” but concluded we didn’t because “There’s no determination to do it. We have no idea what, what’s the

19) Nashua had found out about Deming through a Japanese company it was partnering with at that time, Ricoh, a maker of copiers.

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right thing to do, have no goal.”

I mentioned earlier that Deming’s meeting with 21 of Japan’s top managers on July 13, 1950 was a key turning point for Japan. The broadcast of “If Japan Can, Why Can’t We?” was a key turning point for America. As Walton (1986) described it:

The next day, the telephone rang relentlessly in Dr. Deming’s basement office. “We were bombarded with calls,” recalled Cecelia Kilian²⁰. “It was a nightmare.” Many of the callers sounded desperate. “They have to see him tomorrow, or yesterday, or their whole company will collapse. (pp. 19–20)

Deming was soon in demand by some of the biggest companies in America. For example, he eventually became a regular consultant to the Ford Motor Company. It is fair to say Deming helped Ford do a complete turn around from the days when Whiz Kids like Robert McNamara held sway and, as Gabor (1990) puts it, “Cutting costs, not improving automobiles, was the mission of the day” (p. 131). Perhaps the best example of this turn around was the Ford Taurus program. “The car marked the first time market research was conducted before product development began. The project pioneered a new approach to team work and planted the seeds for Ford’s benchmarking²¹) system” (Gabor, p. 146). Indeed, Ford’s attempt to find out what the customer wanted (one of Deming’s basic tenets) resulted 1,401 “wants” for the new Taurus of which more than 700 were incorporated. For example the oil dipstick was painted a bright yellow to make it easier to read and a net was placed in the trunk to hold grocery bags upright (Austenfeld, 1995). These may be little things but they mean a lot to customers and showed that Ford really does care about them. This “Demingism” of Ford

20) Deming’s secretary.

21) Benchmarking is when a company seeks out other, highly rated, companies that have similar processes to learn how to improve their own processes. See Austenfeld, 1996 for a complete explanation of benchmarking.

paid off. In 1992 the Taurus became the best selling car in America, an honor that had been held for some time by the Honda Accord. And Ford moved into second place for U.S. and world automobile sales (Austenfeld, 1995).

Deming was not always easy to work with. Gabor (1990) describes one of his first meetings with some Ford executives:

Instead of delivering a slick presentation on how the automaker could solve its quality problems — the sort of thing that became the stock in trade of U.S. quality “experts” during the 1980s, Deming questioned, rambled, and seemed to take pleasure in making a laughingstock of his listeners. (p. 126)

Deming’s approach was to ask an executive what his job was, but he didn’t mean the obvious answer of, for example, “director of product assurance”; he was trying to get the executive to think in terms of facilitating quality. Unfortunately, his abrasive, and somewhat obscure, approach didn’t set well with the managers. Perhaps it was Deming’s eventual friendship with Ford’s then chairman, Donald E. Petersen that allowed the relationship to continue and Ford to benefit therefrom.

In any event, Deming, *then 80* years old, undertook an even more active schedule. Walton (1986) gives us some idea of the whirlwind life he led:

He was on the road constantly, not only in the United States but abroad. He made trips regularly to London, South Africa, and New Zealand, where he had clients. Mrs. Kilian bought shuttle ticket to New York twenty at a time. She saw less of him, but her work did not diminish. One day she heard from him in four states. He called as many as three or four times a day, sometimes dictating portions of his book from an airport telephone booth. (p. 20)

Deming also began giving his famous four-day seminars at about this time and continued to teach at NYU. When his daughter, Linda, tried to get him to slow down, he said “Thank you for caring, but this is what I need to be doing. I went so many years without people really knowing what I had to say” (from Walton, p. 21).

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In June of 1986 Deming's wife, Lola, died from heart failure; she had been in considerable pain over the last few months. She had also suffered from memory loss in those latter years. In Chapter 18 of Kilian (1992), Deming recalls many of his fond memories of Lola and her last days. They had been married for 54 years. Chapter 18 ends with a beautiful poem by Deming called simply "To Lola."

In 1986, Deming's classic work, *Out of the Crisis*, is published. It presents all his ideas for quality improvement as they had evolved up to that point in time. Another major book, *The New Economics*, would be first published in 1988. As a fitting close to this portion of Deming's life, in 1987 he was finally officially recognized for his work in America by being given the National Medal of Technology award by President Reagan.

8. The Final Years (1988–1993)

These last years of Deming's life were marked by a continuing whirlwind of activity. Deming truly seemed to thrive on work and, even up to his last days, was busy as ever with his four-day seminars²²⁾, teaching, consulting, and revising his latest book, *The New Economics*. In fact, the latter was republished about the time of his death, incorporating all the revisions he had made; primarily in Chapter 4, "A System of Profound Knowledge" (for more on this system, see that chapter in Deming, Austenfeld, 2001, and section 9 of this paper). According Appendix A in Kilian (1992) he was still holding professorial positions at both NYU and Columbia University in 1992. She also notes that his four-day seminars were continuing with an annual attendance of about 20,000.

Deming also was working closely with several people who were writing books

22) Deming's four day seminars are still presented. According to the W. Edwards Deming Institute home page (2001) the seminar "blends footage of Dr. Deming presenting his theories with active participant exercises, discussions, working groups, and presentations by experts in Deming's theory of management." One of Deming's last seminars, in July 1992, was videotaped and is available from the Deming Institute.

about him. For example, Mary Walton, who had already published *The Deming Management Method* in 1986, went on to write about the success of several companies that were using Deming's principles (*Deming Management at Work*). This book was published in 1990. Talking about the support she received:

Dr. Deming made good on his pledge of support. I attended additional seminars and traveled with him to several clients, including Ford. He loaned me a mimeographed copy of his diaries from Japan and provided introductions to people he thought would be helpful. He also granted me his scarcest resource: time. (Mary Walton, from Voehl, 1995, p. 11).

Deming also took the time to go over every part of Walton's first book which dealt in detail with each of his famous Fourteen Points (see Appendix A). Deming also gave unstintingly of himself during the writing of Walton's second book, helping her find and describe those companies that by then had begun to use his ideas to their advantage.

Andrea Gabor (*The Man Who Discovered Quality*, 1990) and Rafael Aguayo (*Dr. Deming: The American Who Taught the Japanese About Quality*, 1990) both acknowledge their debt to Deming for his time and patience in helping them write about him and his teachings.

Not long after his death, Frank Voehl put together a book called *Deming: The Way We Knew Him*. Structured around Deming's Fourteen Points, it is more a tribute to Deming than an exposition about the Points. Each chapter includes a section written by someone who was closely associated with Deming. Here are some excerpts from those writings to help us better understand the Deming of those final years:

Myron Tribus, a well-known quality consultant

In the early 1980s, Dr. Deming often said, "I lit many fires, but they all went out." Today he can say that no more, because there are people all around the globe who study his books, watch his video-tapes, and follow his

Robert B. Austenfeld, Jr.: W. Edwards Deming: The Story of a Truly Remarkable Person teaching in an almost religious way.²³⁾ (p. 32)

Nancy Mann, author of The Keys to Excellence: The Story of the Deming Philosophy (1987)

From the late 1980s until the end of 1993, Dr. Deming gave the world an example of never-ending improvement in his own thinking and his continuous learning. In *The New Economics*, a seminal work published a few months before his death, Dr. Deming summed up his vision of the world now guided by the ability of the human mind to understand the benefits of cooperation and the desirability of what he defined as optimization. (p. 57)

Hana Tomasek, consultant and, according to Voehl, "one of the leaders of the TQM revolution in Eastern Europe"

Even as he was dying, Dr. Deming was thinking of others. It was his request that any memorials be made in the form of blood donations to Sibley Hospital in Washington, D.C. While I was donating blood, I learned that Dr. Deming had told his nurse, "Life is so fragile. Let's not be afraid to say 'I love you.'" (p. 90)

Lisa McNary, one of Deming's last graduate students (began working with her in March 1992)

I learned a lot working with Dr. Deming, but I also remember laughing a lot. That combination of continuing to learn and laughing must have been one of Dr. Deming's secrets to a long life. If I had a dollar for every time I was asked, "how did you manage to get Dr. Deming on your dissertation committee?" — all my graduate work would have been fully financed. No one ever believed my pedestrian answer, "I just asked him." (p. 124)

Louis Schultz, consultant and "Deming disciple since the early 1980s"

Dr. Deming conducted his famous four-day seminars well into his nineties,

23) The Deming Electronic Network's home page (2000) lists the many international and U. S. Deming associations.

beginning them with, “Why are we here? To learn and have fun.” Much of his teaching... ..concerns understanding psychology, variation, systems, and theory of knowledge²⁴). These headings, however, are only that — the tips of icebergs which must be viewed beneath the surface to be truly comprehended. “If you have not produced the data, you cannot understand (or use) it,” Dr. Deming told his audiences. “You need to understand the production of the data.” (p. 152).

I could probably go on and on with fond remembrances and tributes to Deming but these give you some idea of the high esteem in which he was and still is held. After an unbelievably active and productive life, Deming was finally struck down by prostrate cancer that had spread to his lungs and bones. Even to the end he “got up out of his hospital bed each week to fly, in a hospital plane and with attending nurses, to his conferences at Ford or seminars around the country” (May Lum Gould, from Voehl, 1995, p. 41). He died on 20 December 1993; a loss felt round the world. In fact, the headline of the Japan Times’ (1993) report shows how much he is still revered in Japan: “‘God of quality control’ W. Edwards Deming dies.”

The last chapter in Voehl contains the homily delivered by the Reverend Father August Peters at Deming’s funeral requiem mass. The homily uses Deming’s life as a model for the rest of us. As Voehl says in the same chapter: “His religion was a very strong part of the fabric of his life. He composed hymns, sang in the choir, said his prayers, and followed the Golden Rule as best a man could” (p. 157). Near the end of his homily, Reverend Peters notes that Edwards Deming never forgot *who he was* and *Whose he is*:

W. EDWARDS DEMING

child of God,

friend to man,

24) Indeed, these four things together comprise Deming’s system of profound knowledge.

9. Deming's Basic Teachings

These are Deming's basic teachings:

- The chain reaction: quality, productivity, lower costs, capture the market
- Productivity viewed as a system
- The Fourteen Points for transformation of management
- The Seven Deadly Diseases
- The Plan, Do, Study, Act (PDSA) Cycle
- The Red Bead experiment
- The Funnel experiment
- The system of profound knowledge

The chain reaction: quality, productivity, lower costs, capture the market. This teaching is illustrated by Figure 4. With improved quality, productivity increases and costs go down. Therefore, you are able to sell a better product for less and capture more of the market. This means that you will stay in business, grow, and be able to provide “job and more jobs.”

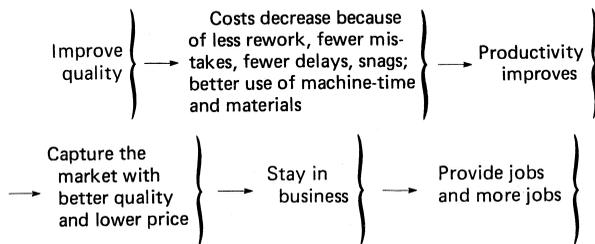


Figure 4. The chain reaction: quality, productivity, lower costs, capture the market (from Deming, 1986, p. 3).

Productivity viewed as a system. Figure 2, repeated here, shows this early teaching by Deming used when he first talked with Japanese managers in 1950.

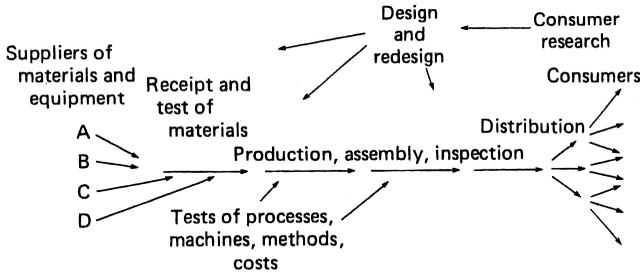


Figure 2 (repeated). Production viewed as a system (Deming, 1986, p. 4).

This idea of considering the supplier and customer as part of your production system was quite revolutionary at the time and, even, today, is not practiced as much as it should be. Too often the supplier and customer are thought of as separate and even “competing” entities from whom maximum advantage is to be obtained by hook or by crook. Despite all the efforts to inculcate systems thinking into management practices over the last thirty to forty years, too many managers still don’t think this way.

The Fourteen Points for transformation of management. Even as early as 1950, in Deming’s lectures to the Japanese, we can see elements of these points with his down playing of inspectors and emphasis on process improvement on the factory floor. Those lectures also stressed the ultimate responsibility of management for quality and for determining customer needs. They also said that it was important to view “quality concepts as part of a holistic new management philosophy in which *every member* of the organization must play a part [emphasis added]” (Gabor, 1990, p. 81). When Deming began working to improve the quality of American companies in 1979, we can see his Fourteen Points further evolving. For example, in the seminars he gave to Nashua of “If Japan Can, Why Can’t We?” fame, some of the things Deming told them to do were: “work closely with just a few suppliers, foster interdepartmental cooperation, work toward eliminating inspections, and build a relationship of trust with workers”

Robert B. Austenfeld, Jr.: W. Edwards Deming: The Story of a Truly Remarkable Person (Gabor, p. 114). See Appendix A for Deming’s Fourteen Points along with brief commentary on each..

The Seven Deadly Diseases. See Appendix B for Deming’s Seven Deadly Diseases (taken from Walton, 1990). For a fuller discussion of these “diseases” see the epilogue of Voehl (1995).

The Plan, Do, Study, Act Cycle. The Plan, Do, Study, Act (or PDSA) Cycle has already been discussed in section 4 of this paper. See Figure 1.

The Red Bead experiment. This experiment became an important part of Deming’s four-day seminars and he used it to illustrate several points about bad management practice. For a full description of the experiment, see Chapter 7 in Deming’s *The New Economics* (1994). Briefly, however, here is the experiment: Deming gets six “Willing Workers” from the audience along with two “Inspectors,” one “Inspector General,” and a “Recorder” — all volunteers. He then assumes the role of the foreman and carefully explains the job. The job is to produce only white beads from a supply that contains both white and red beads; in fact, 20 percent of the beads are red. The foreman goes on to tell the Willing Workers *exactly* how they are to “produce” the white beads using a paddle that is dipped (in a precise manner) into the incoming supply of beads. (Note that the foreman doesn’t care if the workers have a better idea for the production process.) The paddle holds 50 beads, one day’s workload. After the names of the workers are recorded by the Recorder, they are put to work with each one following the foreman’s procedures (exactly, or they are reprimanded or even fired!). The two Inspectors independently confirm the count of defects (red beads) with a final confirmation by the Inspector General. The count is duly recorded after that person’s name.

As the workers inevitably produce some red beads, they are berated by the foreman and urged to do better. When one of the workers does better than the rest, he or she is given a merit increase in pay. This goes on for “three days” and,

finally getting desperate, the foreman declares the fourth day “Zero Defects Day” with posters and much fanfare. He also gives the Willing Workers notice that unless things improve on the fourth day, the plant will be closed down. Of course nothing changes but the foreman announces the “good news” that a member of management has come up with this great idea of keeping the “best” workers. So the three workers who have produced the least white beads are fired and the three “best” workers go to work on the fifth day. Again, the results are disappointing so the plant is closed after all with much frustration and bitterness among all.

The main point of all this elaborate staging of the experiment is to drive home one of Deming’s most basic ideas: most performance problems are due to the system and only management can change the system. The workers, as their “Willing Worker” name implies, were not only willing but *wanted* to do a good job; the system simply would not let them. This is what Deming means by removing barriers that rob the worker of pride of workmanship (see Appendix A, Point 12b). This experiment also demonstrates Deming Point 11b: *Eliminate management by the numbers, numerical goals. Substitute leadership.* Appendix C, taken from a recent article in *Quality Progress*, the American Society for Quality’s (ASQ) monthly magazine, is a dramatic example of just how destructive managing purely “by the numbers” can be.

The Funnel experiment. For a full description of this experiment, see Chapter 9 in Deming’s *The New Economics*. The purpose of this experiment is to show the danger of tampering; that is, making changes to a process without first making a careful study of the possible causes of the variation in that process. The experiment requires an ordinary funnel, a marble that will drop through the funnel, and a table a short distance below the funnel onto which the marble will drop. Preferably the table is covered with a cloth so the marble won’t roll too far and a target from which the marble’s final resting place can be measured.

The funnel is aimed at the target and the marble is dropped through the fun-

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nel 50 times. Each final resting position of the marble is marked. This technique is called “Rule 1.” This results in a scatter diagram about the target. Of course we don’t want a “scatter” but rather for every drop to be right on or very close to the target. So we begin tampering with the system by trying some different “rules.” Rule 2: Move the funnel after each drop an equal and opposite distance *from its last position* as the resting place of the last drop; that is if the marble’s resting place was 30 cm northwest of the funnel’s last position, move the funnel 30 cm southwest of this position and make the next drop. This results in even greater scattering.

Rule 3: Do the same thing as you did for Rule 2 except use the target as the reference point. That is, if the marble comes to rest 30 cm northwest of the target, move the funnel 30 cm southwest *of the target*. The results are even more disappointing.

Rule 4: After each drop, set the funnel over the spot where the marble came to rest and make the next drop. Again, the situation becomes even worse and, as Deming puts it, “the marble will eventually move off to the Milky Way.”

The moral of the experiment is that before making changes to a process to reduce variation, you need to study the process and, usually, make substantial changes (not just a simple movement of the funnel in this case). For example, you might move the funnel closer to the table or use a coarser tablecloth to reduce the amount of scattering. Too often changes are made to a process based on some one-time event, such as a machine out of adjustment. However, since the cause of the problem was not accurately determined, the problem will continue and, because of the unwarranted change, may become even worse.

The system of profound knowledge. Chapter 4 in *The New Economics* (1994) explains Deming’s system of profound knowledge. See also Austenfeld (2001). The explication of this system seemed to be Deming’s swan song — something that tied together all of his former teachings into a neat package that consisted of

four elements: (1) *appreciation for a system*, (2) *knowledge about variation*, (3) *theory of knowledge*, and (4) *psychology*. It is important to note that these four elements must be used together to truly affect the transformation of management they are meant to affect. Let's briefly consider each of the elements.

(1) *Appreciation for a system*. According to Deming, "A system is a network of interdependent components that work together to try to accomplish the aim of the system" (Deming, 1994, p. 50). Figure 2 (already mentioned) is an example of a generic production system but a system could be anything from a simple process to a whole country. Here are the most important points for appreciating a system²⁵):

- *It must have an aim.*
- *The performance of each component must be judged on the basis of its contribution to the aim.*
- *The system must be actively managed.*
- *Recognizing the importance of the system to individual performance.* Recall the main point of the Red Bead experiment.

(2) *Knowledge about variation*. When we talk about variation, we are usually talking about variation in a process or system; for example, a process for making steel rods with a certain diameter and length. Another example would be a system for transporting people by air (airplanes, airports, airline employees who manage and operate the system, etc.). Here one variable might be arrival times. Airlines that pride themselves on having good "on-time" arrival performance will seek to reduce variation in that system. Here are the important points for this element.

- *Variation is normal.* What we usually wish to do is minimize it. For example, one of the keys to MacDonald's success is its almost religious adherence to

25) I will comment on these points only when it seems a fuller explanation is needed.

strict standards of quality for its materials, production, and service. No matter where you go in the world, your Big Mac will be essentially the same.

- *There are two kinds of causes of variation.* This principle came out of the work of Walter Shewhart and is another basic tenet of statistical quality control. For example, suppose you wish to control the variation of the diameter of the steel rod just mentioned. The first step is to let the production process run undisturbed for a while and take random samples of the output. In this case you would randomly sample the rod diameter and record this data. Using certain formulae you can then determine upper and lower control limits for your process. As you take further samples, any falling within the control limits are OK; any falling outside these limits indicate some special problem such as a machine getting out of adjustment. This type of cause is called a *special* cause of variation and can usually be fairly easily detected and corrected, even by trained workers. The other type of cause is called a *common* cause and is a cause that is inherent in the process itself; for example, poor quality materials as we saw in the Red Bead experiment. Of course only management can make the decisions necessary to reduce the common causes. Reducing the common causes will bring the upper and lower control limits closer together.
- *The importance of a stable system.* This relates to what has just been said: before the common causes of a system can be tackled, the system must be allowed to run undisturbed (no tampering!) for a while. Then management can consider whether it is worth the cost of eliminating any of the common causes.²⁶⁾
- *Why managers should not blame their workers for poor performance.* See

26) The variation in any process due to common causes can be reduced. The question is, is it worth it? Buying a super-expensive precision production machine may be doing much more than necessary to meet customer requirements.

the discussion of the Red Bead experiment above. In that case the variation in the red beads was due to the common cause of poor incoming materials.

- *Don't tamper with the system when trying to reduce variation.* See the discussion on the Funnel experiment above. Plotting the performance of the system/process is the first step in not only detecting causes of variation but in coming up with possible solutions and testing those solutions in a systematic way.

(3) *Theory of knowledge.* For this element, Deming stresses the need for managers to both understand how knowledge is advanced and to lead such efforts within their organizations. The important points are:

- *Theories need to be developed and tested to advance knowledge.* The theory could be as simple as which of two methods is best for training certain skills.
- *The plan-do-study-act (PDSA) cycle should be used to systematically develop theories (predictions) and test them.* See Figure 1 in section 4 of this paper.
- *Learning should be continuous and organization-wide.* Deming is big on learning: Point 6: *Institute training on the job* and Point 13: *Institute a vigorous program of education and self-improvement.*

(4) *Psychology.* The final, and perhaps in a way most important, element in the system of profound knowledge is about people; that is psychology. In fact, it is only through people that things are accomplished. We can have the best system, know all about variation and knowledge, and still not have a successful organization if we don't understand people; particularly what motivates them to want to do a good job. These are the important points about this element:

- *People are different.* As Deming (1994) says, "A manager of people must be aware of these differences, and use them for optimization of everybody's abilities and inclinations" (p. 108).
- *Rely more on intrinsic motivation rather than extrinsic motivation.* Of course we still need extrinsic motivation. It would be unusual for someone to work

without pay. However, the goal of managers should be to take advantage of the people's innate desire to do a good job.

10. A Profile of the Deming Personality

Deming truly was a remarkable person. However, merely watching a video of him conducting one of his four-day seminars, one would not be impressed. He is not polished, moves rather slowly, and at times seems to be unsure of himself²⁷⁾. But as you continue to watch the seminar and Dr. Deming you sense something else: a person who is convinced he knows something that is very important and he wants to share it with as many others as possible. The stern look in his eyes tells you that he is serious when he says something like “What is a leader?” But what kind of a person was this Dr. Deming, really? Let's look at him from the various roles he held: as a student, as a family man, as a teacher and academician, as a consultant, as a friend, and simply as a person.

As a student. Deming was eager to learn. He quickly earned his bachelor's, master's and doctor's degrees. But beyond that, he was a life-long learner. He was always open to new ideas and would jot these down for later use — always with attribution — in his writings and presentations. “His happiest moments seem to have been when he learned something new or made some new connection between data or ideas” (Clare Crawford-Mason and Lloyd Dobyns, from SPC Press home page, 2000, under SPC Press tribute).

As a family man. Deming was a devoted family man. Chapter 17 in Kilian (1992) is a beautiful set of recollections by Deming about his first (and adopted) daughter, Dorothy. “I think that a father and daughter were never closer than we were” (p. 279). Chapter 18 (as mentioned) is a loving remembrance of, Lola, his wife of 54 years²⁸⁾. Lola was at first a close associate of Deming's and then the

27) However, it must be added that at the time of this video he was 92 years old.

28) Deming's first wife (Agnes), whom he married in 1922, died in 1930. He married Lola in 1932.

mother of Dorothy and their two children: Diana and Linda. Even after she retired from her government job, Lola would help Deming with his work. Perhaps this quote of Deming from Chapter 18 best shows how Lola and Deming felt about each other: “She often remarked during the past few years about the happy life that we had had together — never a word of complaint to one another; no ill feeling against each other; only love and approval, so she thought; so much to be thankful for...” (p. 298). Another quote from Walton (1986) also indicates what kind of family man he was: “He biked with his family well into his seventies. And he was, said his elder daughter, Diana Deming Cahill, an expert kitemaker...” (p. 17).

As a teacher. Deming believed in the Socratic method. Howard S. Gitlow, an acquaintance of Deming for many years, recalls:

...calling him in 1981 or 1982 with a question which would clarify six months of personal study. Instead of answering my question, he said, ‘You’re barking up the wrong tree.’ It took me six more months to figure out why I was barking up the wrong tree and which tree I should be barking up. Once I figured it out, I realized that I had learned more by his method than I could have by any other means. (from Voehl, 1995, pp. 80–81)

He also helped many a student even into his last years, for example Lisa McNary with whom he began working (on her dissertation) in 1992 (Voehl, p. 120). And Ernie Kurnow, a long-time colleague at NYU, had this to say about Deming, the teacher: “Somehow, he always found time to consult with students outside of class, no matter how tight his schedule” (from Voehl, p. 65). It is perhaps his famous four-day seminars that best epitomize him as a teacher.

As an academician. Deming had a distinguished career teaching at New York University and Columbia University. He wrote or co-authored more than 170 papers and received many honorary degrees from universities across America. He received many other honors during his life such as being elected the most distin-

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gished graduate from the University of Wyoming in 1972, being elected to the National Academy of Engineering in 1983, and receiving the Wilbur Lucius Cross Medal from Yale University (Kilian, 1992). He has also written several books, the two most famous being *Out of the Crisis* (1986) and *The New Economics* (1994).

As a consultant. After working for the Department of Agriculture for 12 years and the Census Bureau for another eight, Deming became a consultant in 1946 and remained such for the rest of his life. Although he was *really* in demand after the “If Japan Can, Why Can’t We?” event in June of 1980, it seems he never had trouble finding clients. Of course, after 1980 he was in constant demand. His clients included some of the biggest names among the Fortune 500: Ford Motor Company, General Motors, Dow Chemical Company, and Hughes. He also worked for many smaller companies and travelled internationally, making trips regularly to London, South Africa, and new Zealand to serve clients (Walton, p. 20).

As a consultant he was often too forthright, especially with management which he blamed for so many of the problems companies had. Howard Gitlow tells the story of Deming being at one of America’s largest companies where, of all things, a birthday party had been arranged for Deming’s eighty-first or eighty-second birthday by the company’s top management.

After cake and coffee, Dr. Deming addressed the top management. His opening lines almost knocked me out of my seat. He said, “Do you know what is wrong with your company?” The room was silent — you could hear a pin drop. Dr. Deming pointed to the president and chief executive officer and said, “Him. He is what’s wrong with your company.” (from Voehl, 1995, p. 80)

As a friend. Deming had many, many friends. The book by Voehl, *Deming: The Way We Knew Him*, is ample testimony to that. As a friend, Deming would often go out of his way to be of help. There are stories after stories of how he

helped others on the basis of friendship, not for any personal reward (other than the satisfaction that must have given him.). For example, he gave much time and effort helping Mary Walton publish her two books. Others who have written books and were helped by Deming include Andrea Gabor, Rafael Aguayo, and Nancy Mann.

Here's but a sampling of testimonies from Voehl book:

- “To us, Dr. Deming was, most importantly, a *model of a kind and loving friend* [their emphasis]” (Carole and Dave Schwinn, p. 21).
- “We cherish the memory of his friendship and will hold his memory dear” (May Lum and Jay Gould, p. 41).
- “Ed would come through the door and greet me with his beaming smile and a glint in his eyes. I would get his firm handshake and a warm, deep-throated ‘Hello, Ernie’ and my day was made” (Ernest Kurnow, p. 66).
- “Dr. Deming is friend, colleague, and mentor to me, as he has been to many” (Gerald Glasser, p. 88).
- “In Atlanta, during another dinner with his friends, we sat hidden in a corner, so that he would not be recognized. He wanted to concentrate on his friends” (Hana Tomasek, p.90).

As a person. Deming is often described with the word “curmudgeon” meaning he was, on occasion, quick to anger and rude. Gabor (1990) describes one such instance when Deming began working with the managers at Ford Motor Company: “‘Why can’t America compete?’ Deming would ask, sputtering with rage. ‘The answer is — MANAGEMENT!’” (p. 127). Despite this sometimes rough exterior, there beat a kind, generous, and loving heart within. I believe Deming’s crude outbursts merely reflected a passionate desire to get his message of continuous improvement across. He tended to become more incensed when talking about management because he had seen so many examples of poorly managed organizations and the consequences for the workers and the public at large.

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If I were to attempt to characterize Deming I would call him first and foremost a visionary. He was able to see beyond the immediate and realize the value of applying sound statistical techniques to solve many of management's problems. Even beyond statistical techniques, as his system of profound knowledge shows, he was able to conceive of a whole system of management that would seem to take into account everything important: understanding systems and variation, the theory of knowledge, and the application of sound psychology. And, he had a passion for sharing that vision as evidenced by his books and his four-day seminars.

Besides these more serious pursuits, Deming was forever curious. A reading of his booklet describing his November, 1965 trip to Japan (Chapter 15 in Kilian) shows a 65 year old person still fascinated by anything new and different. And he firmly believed in the old saw "All work and no play makes Jack a dull boy." Repeating how Lisa McNary so nicely puts it: "I learned a lot working with Dr. Deming, but I also remember laughing a lot" (from Voehl, p. 124). His love of dining on lobster, corn-on-the-cob, salad, baked potato and ice cream was well known among his close friends (Crawford-Mason, 1992).

Deming was also a "gentleman and scholar" of the old school. He always was dressed well (albeit the suit might have been a bit threadbare) and clean shaven. When dealing with others on an individual basis he always showed the utmost respect. I believe Deming was probably honest to a fault. He was also unpretentious; he never set up an "institute for this or that" as so many other consultants do²⁹). He saw no need to expand beyond the two room-office he had in his basement which, apparently, served him quite well.

Deming might also be called a "truth seeker." As one follows his ever-expand-

29) However, he did found the W. Edwards Deming Institute in 1993 (the year of his death) as a nonprofit organization with the aim to foster understanding of The Deming System of Profound Knowledge to advance commerce, prosperity and peace. See <http://www.deming.org> on the Web.

ing philosophy for quality management over the years we see that this is in itself a model of continuous improvement. Starting with a few basic ideas in the 1950 (which were enough to begin turning Japanese industry around), he finished his life with a fairly well elaborated system of profound knowledge. Had he lived longer, there is no doubt in my mind that he would have continued to refine that system further.

Finally, I believe Deming saw himself as truly a child of God and destined for eternal union with God. Once again as Voehl (1995) states it: “His religion was a very strong part of the fabric of his life. He composed hymns, sang in the choir, said his prayers, and followed the Golden Rule as best a man could” (p. 157). Perhaps it was this underlying belief and faith in God that accounts for all the other remarkable traits of this man: his honesty³⁰, respect for others, readiness to help others, love of family, and desire to change the world for the better. Deming’s lifetime goal was nothing less than the transformation of Western management. And, as Gabor (1990) expresses it, he held the belief “that business has a social responsibility to survive, to grow, and to ‘provide jobs and more jobs.’” (p. 68). Oh, what a noble goal and how much it is still needed throughout the world. Deming has done much to make this a better world and, God willing, his legacy will continue to do so.

11. Conclusion

The purpose of this paper has been to provide a brief biography of Dr. W. Edwards Deming. In doing so it has traced his activities through seven stages of his long and prodigious productive life, briefly reviewed his main teachings, and attempted to describe his personality by considering the roles he played as a student, teacher/academician, consultant, friend, and person. What more can I add

30) Some might accuse him of being *too honest* with some of his remarks about things like American management.

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at this point? Only that I have had an interest in Deming since I was first introduced to his Fourteen Points when I was given the Scholtes book (1988) to read in 1989. The occasion was my first day on the job as a “procedures analyst” at Douglas Aircraft Company³¹⁾ in Long Beach, California. As I have continued to study Deming and his ideas I become ever more convinced he was “on to something.” Although sometimes the explanations of his ideas are not all that clear, a continual revisiting of them always sheds new insights into what he was trying to say. And, most of what he says *is* clear and immediately applicable to the workplace (and, even, one’s personal life). The many companies and people who have benefitted from Deming are a testimony to the efficacy of what he taught. I look forward to continuing to learn more about this truly remarkable man and his philosophy! Truly, I feel I have only touched the tip of his iceberg of knowledge. As a friend of mine said recently, “There will never be another Ed Deming.”

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31) Douglas Aircraft Company was part of McDonnell Douglas Corporation which has now merged into the Boeing Company.

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DEMING'S FOURTEEN POINTS

(Deming, 1986, pp. 23–24)

Point 1: *Create constancy of purpose towards improvement of product and service, with the aim to become competitive and to stay in business, and to provide jobs.* Here Deming is stressing the need for management to make a real commitment to quality so that everyone else in the company has confidence *that there will be a future*. Specifically, management must innovate, put resources into research and education, and “constantly improve the design of product and service.” Management must be concerned with business far beyond the next quarter’s dividends!

Point 2: *Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.* According to Deming, for the transformation (of Western management) to occur: “We can no longer tolerate commonly accepted levels of mistakes, defects, material not suited for the job, people on the job that do not know what the job is and are afraid to ask...” (p. 26). Citing the precision with which the Japanese train system operates — as opposed to what we often find in America, for example — Deming relates this set of instructions for getting to a company in Japan: “0903 h Board the train. Pay no attention to trains at 0858, 0901. 0957 h Off.”

Point 3: *Cease reliance on mass inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.* The main idea here is that it is better to randomly sample the process’s output for purposes of maintaining statistical quality control rather than having 100% inspection. Deming mentions a printing company that had prided itself on proofreading everything eleven times yet still needed help due to constant customer complaints. The problem: each of the eleven inspectors relied on

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the other ten! In other words: you can't inspect quality into a product or service. Instead, you should work to constantly improve the process — improved quality will automatically result.

Point 4: *End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.*³²⁾ Deming quotes from an actual government advertisement for professional help: “For delivery and evaluation of a course on management for quality control for supervisors.... An order will be issued *on the basis of price.*” Worse yet, such a practice will drive those who would have delivered good products and services out of business. Common sense tells us that you can't make quality products out of poor quality material. The other idea contained in this point is that it is a good idea to establish long-term relationships with your suppliers. This way you can work together to improve the quality of the supplies and, accordingly, that of the product in which they are used. As the product's quality improves and it becomes more successful, the additional profit can be shared with the supplier thus encouraging further improvements!

Point 5: *Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.* Some of the things Deming mentions here are continual improvement through a better understand customer requirements, development of better relationships with suppliers, doing a better job of hiring, training, and supporting workers, and considering/experimenting with all ways that a process might be made better (maybe just by changing the temperature or humidity). Toyota takes this point seriously; for example, in 1995 Toyota Motors received 764,402 suggestions and *99% were adopted* (Toyota Motor Corporation, 1997).

32) Deming discusses this point extensively in *Out of the Crisis* (17 pages).

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Point 6: *Institute training on the job.* Deming cites an example, perhaps all too common, of a worker simply being told to “go to work” without having the job explained to him and, to make matters worse, a foreman who “knows nothing.” Managers need to be trained in all aspects of the company operation and given an appreciation of variation. Unfortunately, most American managers have not had experience at the “factory floor” level. Deming also brings up the importance of recognizing that people learn in different ways.

Point 7: *Institute leadership. The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul, as well as supervision of production workers.* Deming here is saying the job of management is not “supervision” but “leadership.” This means knowing enough about the worker’s job to be able to give him or her the help needed. It also means not managing by the numbers as in “zero defects” or just meeting or not meeting some specification. The goal of leadership should be to empower (with the training and equipment needed) and encourage the worker to continually improve the process, not meet some relatively arbitrary specification or make some quota number.

Point 8: *Drive out fear, so that everyone may work effectively for the company.* Workers and supervisors will often do what management wants out of fear, even if it has long-term adverse consequences. One example Deming cites is a foreman who knew the production line needed to be shut down for repairs but took a chance in an attempt to meet management’s quota for castings. When his worst fears were realized, not only wasn’t the quota met, but the line was down for four days for repairs! Fear will lead to such things as an inspector passing poor quality products and fudging figures. A secure environment must be created where the worker knows it is OK to report a problem and a spirit of working together

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to solve problems prevails over blaming.

Point 9: *Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.* Another common problem in companies is the left hand not knowing what the right hand is doing. Deming gives the example of a perennial design problem that the servicemen continued to correct because there was no system for feedback to manufacturing to eliminate the problem in the first place! Departments need to think in terms of who their *internal* customers are and develop a good working relationship with them.

Point 10: *Eliminate slogans, exhortations, and targets for the work force asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, since the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.* What good are slogans when nothing is changed to help the worker do a better job. Deming's famous Red Bead experiment dramatically demonstrates the futility of exhorting workers to do better when the system remains the same. As the experiment shows, the (stable) system will never allow the workers to do better until management changes it.

Point 11a: *Eliminate work standards (quotas) on the factory floor. Substitute leadership.* Point 11b: *Eliminate management by objectives. Eliminate management by the numbers, numerical goals. Substitute leadership.* As Deming so eloquently points out, work standards (quotas) are great demoralizers. Take the case of the woman required to handle 25 reservation/information calls an hour for some airline. Due to circumstances beyond her control, calls often took longer than the average of 1/25 of an hour (2.4 minutes) the standard called for. The

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results was a dilemma: either give courtesy and helpful service or rush the call often angering the customer. Instead, as already mentioned, the process must be studied and and systematically improved.

As for management by the numbers, the main problem is saying “we will increase productive (or anything) by, say, 10% next year” *without a plan or method for doing so*. It’s as if somehow that increase will occur without any change in the way the company has been doing business — impossible, with a lot of frustration being the only result.

Point 12a: *Remove barriers that rob the hourly workers of their right to pride of workmanship. The responsibility of supervisors must be changed from mere numbers to quality.* Point 12b: *Remove barriers that rob people in management and in engineering of their right to pride of workmanship. This means, inter alia, abolishment of the annual review or merit rating and of management by objectives.* Some of the barriers to pride of workmanship cited by Deming in *Out of the Crisis* are: foremen who are afraid to make decisions or don’t know their job well enough to give leadership, equipment not working right, inadequate training, and being required to use poor quality materials. Deming cites many real life examples.

Point 12b, about eliminating the annual review or merit rating, is perhaps the only point that is controversial. However, Deming’s basis for this point is similar to that for Point 3, Cease reliance on mass inspection. As Deming puts it:

Basically what is wrong is that the performance appraisal or merit rating focuses on the end product, at the end of the stream, not on leadership to help people. *This is the way to avoid the problem of people.*³³⁾ A manager

33) Probably most of us know from our experience in the workplace or even at home how difficult it is for us to deal directly with people, especially about what might be perceived as a deficiency on the part of someone. Simply put, we fear confrontation.

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becomes, in effect, manager of defects [emphasis added]. (p. 102)

Besides this, such rating systems tend to foster competition among workers rather than teamwork. They also tend to foster an attitude of “not rocking the boat” and focusing more on how to get a good rating (e.g., tell the boss what he/she wants to hear) rather than using the knowledge possessed to help the company.

Instead, Deming says the performance of all workers doing a similar job should be tracked and plotted on a control chart. Should anyone’s performance fall outside reasonable limits, an investigation should be conducted to determine the cause (inadequate training, bad equipment, etc.). It is usually the system, not the individual worker, that is at fault when something goes wrong or there is poor performance. In fact, according to Scholtes (1988), about 85% of the problems an organization encounters is due to the system. Given that you have been careful to select good people, given them appropriate training and the chance to gain experience, and provided motivation, they will almost invariably do a good job *if the system lets them*.³⁴⁾

Point 13: *Institute a vigorous program of education and self-improvement*. As opposed to Point 6, *Institute training on the job*, this one is talking about just making your people better through education and other means such as giving them additional responsibilities. To quote Deming from *Out of the Crisis*: “People require in their careers, more than money, ever-broadening opportunities to add something to society, materially and otherwise” (p. 86).

Point 14: *Put everybody in the company to work to accomplish the transformation. The transformation is everybody’s job*. This simply means moving beyond words to action. Management must study, understand, and agree on what

34) That the rating system is “alive and well” is testified to by a recent New York Times article (Companies Turn to, 2001)

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the other 13 points mean and then disseminate this information to all the others in the company and develop concrete plans for accomplishing the points.

APPENDIX B

DEMING'S SEVEN DEADLY DISEASES³⁵⁾

(Walton, 1990, p. 1986)

1. *Lack of constancy of purpose.* A company that is without constancy of purpose has no long-range plans for staying in business. Management is insecure, and so are employees.
2. *Emphasis on short-term profits.* Looking to increase the quarterly dividend undermines quality and productivity.
3. *Evaluation by performance, merit rating, or annual review of performance.* The effects of these are devastating — teamwork is destroyed, rivalry is nurtured. Performance ratings build fear, and leave people bitter, despondent, and beaten. They also encourage defection in the ranks of management.
4. *Mobility of management.* Job-hopping managers never understand the companies that they work for and are never there long enough to follow through on long-term changes that are necessary for quality and productivity.
5. *Running a company on visible figures alone.* The most important figures are unknown and unknowable — the “multiplier” effect of a happy customer, for example.
6. *Excessive medical costs* for employee health care, which increase the final costs of goods and services³⁶⁾
7. *Excessive costs of warranty, fueled by lawyers that work on the basis of contingency fees.*

35) For a fuller discussion of these “diseases” see Chapter 3 of Deming (1986) and the epilogue of Vohel (1995).

36) It is interesting that despite Deming’s concern for the worker, he still believed common sense had to prevail when it came to benefits.

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MANAGING BY OBJECTIVES/MANAGING BY RESULTS

(MBO/MBR): ONE STORY

(Castellano & Roehm, 2001, p. 42)

The following is the story of a student (we'll call "Caroline") who was in one of the authors' master's degree level Strategic Cost Management classes (University of Dayton in Ohio):

After I got my degree in accounting, I took a job at a Fortune 500 company. I was a financial analyst assigned to the collection of accounts receivable. About 35 of us in the department were divided into groups of five, each group with a manager. Each group was responsible for a different geographic area, and each group member was responsible for a portion of that area.

We were to call customers whose accounts receivable balances were past 30 days outstanding, find out why and then facilitate prompt payment. In most cases there was a problem with the installation of the equipment they had purchased. If this was the case, we had to call the field office that was responsible for the sale.

I had no control over when the customers decided to pay their bills. I could not fly out and install the system correctly. I could not fix problems they might be having with the system or our sales representatives.

Our sales representatives were on the bonus plan which gave them an annual trip if their sales were at an arbitrarily chosen target level. Sales reps in my area would book a sale and invoice customers for unordered products just so they could qualify for their trips. Meanwhile, that invoice would be again on my receivable report, and my manager would blame me for not collecting it.

We were evaluated on a monthly basis on the dollar amount of aged receivables we collected. Our target amount was based upon past performance. There were monthly meetings at which an outstanding group was named and a "collector of the month" plaque was given. One month I managed to collect more than

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200% of my targeted amount. I was praised by my manager and told that no collection agent had ever collected that much over his or her target. Everyone in the department was envious — asking me how I managed to do it.

The whole process miffed me because I was starting to realize I had almost no control over when customers decide to pay their bills, and yet I was being rewarded for a chance occurrence. I did win the coveted “collector of the month” plaque that month and received a bonus of \$250 accompanied by a letter from some manager three tiers up the ladder (whom I’d never seen) for doing so well.

As might be expected, my next month’s performance was far less than 200% — more like 87%. I was called into my manager’s office and reprimanded for poor performance. I was told I could do better and that I was obviously not trying hard enough.

I was so frustrated and anxious about my performance that I became sick. I was diagnosed two months later with a bleeding ulcer. I had to miss work to have the diagnostic work and endoscopic surgeries. I managed to rack up over \$5,000 in medical bills that were paid by my employer.

Missing so much work only hurt my monthly performance. It became a vicious cycle. The poor performance during this period was once again noted on my performance appraisal, and I was once again reprimanded for not trying hard enough. When a downsizing occurred, my company let 10 of the department’s worst performers go in the first round of layoffs and firings. I was one of them.