

W. Edwards Deming

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Born	October 14, 1900Sioux City, Iowa, USA
Died	December 20, 1993 (aged 93)Washington DC, USA
Fields	Statistician
Alma mater	University of Wyoming, University of Colorado, Yale University
Influences	Walter A. Shewhart

William Edwards Deming (October 14, 1900 – December 20, 1993) was an American statistician, professor, author, lecturer, and consultant. He is perhaps best known for his work in Japan. There, from 1950 onward, he taught top management how to improve design (and thus service), product quality, testing and sales (the last through global markets)^[1] through various methods, including the application of statistical methods.

Deming made a significant contribution to Japan's later reputation for innovative high-quality products and its economic power. He is regarded as having had more impact upon Japanese manufacturing and business than any other individual not of Japanese heritage. Despite being considered something of a hero in Japan, he was only just beginning to win widespread recognition in the U.S. at the time of his death.^[2]

Overview

Dr. Deming's teachings and philosophy can be seen through the results they produced when they were adopted by Japanese industry, as the following example shows: Ford Motor Company was simultaneously manufacturing a car model with transmissions made in Japan and the United States. Soon after the car model was on the market, Ford customers were requesting the model with Japanese transmission over the USA-made transmission, and they were willing to wait for the Japanese model. As both transmissions were made to the same specifications, Ford engineers could not understand the customer preference for the model with Japanese transmission. Finally, Ford engineers decided to take apart the two different transmissions. The American-made car parts were all within specified tolerance levels. On the other hand, the Japanese car parts were virtually identical to each other, and much closer to the nominal values for the parts - e.g., if a part were supposed to be one foot long, plus or minus 1/8 of an inch - then the Japanese parts were within 1/16 of an inch. This made the Japanese cars run more smoothly and customers experienced fewer problems. Engineers at Ford could not understand how this was done, until they met Deming.^[3]

Deming received a BSc in electrical engineering from the University of Wyoming at Laramie (1921), an M.S. from the University of Colorado (1925), and a Ph.D. from Yale University (1928). Both graduate degrees were in mathematics and physics. Deming had an internship at Bell Telephone Laboratories while studying at Yale. He later worked at the U.S. Department of Agriculture and the Census Department. While working under Gen. Douglas MacArthur as a census consultant to the Japanese government, he famously taught statistical process control

methods to Japanese business leaders, returning to Japan for many years to consult and to witness economic growth that he had predicted would come as a result of application of techniques learned from Walter Shewhart at Bell Laboratories. Later, he became a professor at New York University while engaged as an independent consultant in Washington, D.C.

Deming was the author of *Out of the Crisis* (1982–1986) and *The New Economics for Industry, Government, Education* (1993), which includes his System of Profound Knowledge and the 14 Points for Management (described below). Deming played flute & drums and composed music throughout his life, including sacred choral compositions and an arrangement of *The Star Spangled Banner*.^[4]

In 1993, Deming founded the W. Edwards Deming Institute in Washington, D.C., where the Deming Collection at the U.S. Library of Congress includes an extensive audiotape and videotape archive. The aim of the W. Edwards Deming Institute is to foster understanding of The Deming System of Profound Knowledge to advance commerce, prosperity, and peace.^[5]

Family

Born in Sioux City, Iowa, William Edwards Deming was raised in Polk City, Iowa on his grandfather Henry Coffin Edwards's chicken farm, then later on a 40-acre (m²) farm purchased by his father in Powell, Wyoming. He was the son of William Albert Deming and Pluma Irene Edwards,^[6] the daughter of Henry Coffin Edwards and Elizabeth Jane Grant. His father's name was also William, so Deming went by his middle name Edwards (the maiden name of his mother).

His parents were well educated and emphasized the importance of education to their children. Pluma had studied in San Francisco and was a musician. William Albert had studied mathematics and law.

He was a direct descendant of John Deming,^[7] (1615–1705) an early Puritan settler and original patentee of the Connecticut Colony and Honor Treat, the daughter of Richard Treat (1584–1669) an early New England settler, Deputy to the Connecticut Legislature and also a Patentee of the Royal Charter of Connecticut, 1662.

Deming married twice: first to Agnes Bell (died 1930) in 1922; second to Lola Shupe (died 1986) in 1932.

Deming married Agnes Bell in 1922, and together they survived the difficult college years. But in 1930, she died. Her death came a little more than a year after they had adopted a daughter, Dorothy. Deming made use of various private homes to help raise the infant and following his marriage to Lola Elizabeth Shupe (with whom he co-authored several papers) in 1932, brought her back home to stay. He and Lola had two more children, Diana and Linda. Diana and Linda survive along with seven grandchildren and three great-grandchildren. Dorothy died in 1984 and Lola in 1986. [8]

Early life and work

In 1917, he enrolled in the University of Wyoming at Laramie, graduating in 1921 with a BSc in electrical engineering. In 1925, he received an M.S. from the University of Colorado, and in 1928, a Ph.D. from Yale University. Both graduate degrees were in mathematics and mathematical physics. Deming worked as a mathematical physicist at the United States Department of Agriculture (1927–39), and was a statistical adviser for the United States Census Bureau (1939–45). He was a professor of statistics at New York University's graduate school of business administration (1946–1993), and he taught at Columbia University's graduate School of business (1988–1993). He also was a consultant for private business.

In 1927, Deming was introduced to Walter A. Shewhart of the Bell Telephone Laboratories by Dr. C.H. Kunsman of the United States Department of Agriculture (USDA). Deming found great inspiration in the work of Shewhart, the originator of the concepts of statistical control of processes and the related technical tool of the control chart, as Deming began to move toward the application of statistical methods to industrial production and management. Shewhart's idea of common and special causes of variation led directly to Deming's theory of management. Deming

saw that these ideas could be applied not only to manufacturing processes but also to the processes by which enterprises are led and managed. This key insight made possible his enormous influence on the economics of the industrialized world after 1950.^[9]

In 1936 he studied under Sir Ronald Aylmer Fisher and Jerzy Neyman at University College, London, England.

Deming edited a series of lectures delivered by Shewhart at USDA, *Statistical Method from the Viewpoint of Quality Control*, into a book published in 1939. One reason he learned so much from Shewhart, Deming remarked in a videotaped interview, was that, while brilliant, Shewhart had an "uncanny ability to make things difficult." Deming thus spent a great deal of time both copying Shewhart's ideas and devising ways to present them with his own twist.^[10]

Deming developed the sampling techniques that were used for the first time during the 1940 U.S. Census. During World War II, Deming was a member of the five-man Emergency Technical Committee. He worked with H.F. Dodge, A.G. Ashcroft, Leslie E. Simon, R.E. Wareham, and John Gaillard in the compilation of the American War Standards (American Standards Association Z1.1-3 published in 1942)^[11] and taught statistical process control (SPC) techniques to workers engaged in wartime production. Statistical methods were widely applied during World War II, but faded into disuse a few years later in the face of huge overseas demand for American mass-produced products.

Work in Japan

In 1947, Deming was involved in early planning for the 1951 Japanese Census. The Allied powers were occupying Japan, and he was asked by the United States Department of the Army to assist with the census. While in Japan, Deming's expertise in quality control techniques, combined with his involvement in Japanese society, led to his receiving an invitation from the Japanese Union of Scientists and Engineers (JUSE).^[6]

JUSE members had studied Shewhart's techniques, and as part of Japan's reconstruction efforts, they sought an expert to teach statistical control. During June–August 1950, Deming trained hundreds of engineers, managers, and scholars in statistical process control (SPC) and concepts of quality. He also conducted at least one session for top management. (The list includes top Japanese industrialists such as the likes of Akio Morita the co-founder of Sony Corp)^[12] Deming's message to Japan's chief executives: improving quality will reduce expenses while increasing productivity and market share.^[1] Perhaps the best known of these management lectures was delivered at the Mt. Hakone Conference Center in August 1950.

A number of Japanese manufacturers applied his techniques widely and experienced theretofore unheard-of levels of quality and productivity. The improved quality combined with the lowered cost created new international demand for Japanese products.

Deming declined to receive royalties from the transcripts of his 1950 lectures, so JUSE's board of directors established the Deming Prize (December 1950) to repay him for his friendship and kindness.^[12] Within Japan, the Deming Prize continues to exert considerable influence on the disciplines of quality control and quality management.^[13]

Honors

In 1960, the Prime Minister of Japan (Nobusuke Kishi), acting on behalf of Emperor Hirohito, awarded Dr. Deming Japan's Order of the Sacred Treasure, Second Class.^[14] The citation on the medal recognizes Deming's contributions to Japan's industrial rebirth and its worldwide success. The first section of the meritorious service record describes his work in Japan:^[12]

- 1947, Rice Statistics Mission member
- 1950, assistant to the Supreme Commander of the Allied Powers
- instructor in sample survey methods in government statistics

The second half of the record lists his service to private enterprise through the introduction of epochal ideas, such as quality control and market survey techniques.

Among his many honors, an exhibit memorializing Dr. Deming's contributions and his famous Red Bead Experiment is on display outside the board room of the American Society for Quality.^[15]

Later work in the U.S.

David Salsburg wrote:

"He was known for his kindness to and consideration for those he worked with, for his robust, if very subtle, humor, and for his interest in music. He sang in a choir, played drums and flute, and published several original pieces of sacred music."^[16] ^[17]

Later, from his home in Washington, D.C., Dr. Deming continued running his own consultancy business in the United States, largely unknown and unrecognized in his country of origin and work. In 1980, he was featured prominently in an NBC documentary titled *If Japan can... Why can't we?* about the increasing industrial competition the United States was facing from Japan. As a result of the broadcast, demand for his services increased dramatically, and Deming continued consulting for industry throughout the world until his death at the age of 93.

Ford Motor Company was one of the first American corporations to seek help from Deming. In 1981, Ford's sales were falling. Between 1979 and 1982, Ford had incurred \$3 billion in losses. Ford's newly appointed Division Quality Manager John A. Manoogian was charged with recruiting Dr. Deming to help jump-start a quality movement at Ford.^[18] Deming questioned the company's culture and the way its managers operated. To Ford's surprise, Deming talked not about quality but about management. He told Ford that management actions were responsible for 85% of all problems in developing better cars. In 1986 Ford came out with a profitable line of cars, the Taurus-Sable line. In a letter to *Autoweek Magazine*, Donald Petersen, then Ford Chairman, said, "We are moving toward building a quality culture at Ford and the many changes that have been taking place here have their roots directly in Dr. Deming's teachings."^[19] By 1986, Ford had become the most profitable American auto company. For the first time since the 1920s, its earnings had exceeded those of arch rival General Motors (GM). Ford had come to lead the American automobile industry in improvements. Ford's following years' earnings confirmed that its success was not a fluke, for its earnings continued to exceed GM and Chrysler's.

In 1990 Marshall Industries (NYSE:MI, 1984–1999) CEO, Robert Rodin, trained with the then 90 year old Deming and his colleague Nida Backaitus. Marshall Industries' dramatic transformation and growth from \$400 Million to \$1.8 Billion was chronicled in Deming's last book "The New Economics", a Harvard Case Study, and "Free Perfect and Now".

In 1982, Dr. Deming, as author, had his book published by the MIT Center for Advanced Engineering as *Quality, Productivity, and Competitive Position*, which was renamed *Out of the Crisis* in 1986. Deming offers a theory of management based on his famous 14 Points for Management. Management's failure to plan for the future brings about loss of market, which brings about loss of jobs. Management must be judged not only by the quarterly dividend, but by innovative plans to stay in business, protect investment, ensure future dividends, and provide more jobs through improved products and services. "Long-term commitment to new learning and new philosophy is

required of any management that seeks transformation. The timid and the fainthearted, and the people that expect quick results, are doomed to disappointment."

Over the course of his career, Deming received dozens of academic awards, including another, honorary, Ph.D. from Oregon State University. In 1987 he was awarded the National Medal of Technology: "For his forceful promotion of statistical methodology, for his contributions to sampling theory, and for his advocacy to corporations and nations of a general management philosophy that has resulted in improved product quality." In 1988, he received the *Distinguished Career in Science* award from the National Academy of Sciences.^[6]

In 1993, Dr. Deming published his final book, *The New Economics for Industry, Government, Education*, which included the System of Profound Knowledge and the 14 Points for Management. It also contained educational concepts involving group-based teaching without grades, as well as management without individual merit or performance reviews.

In December 1993, W. Edwards Deming died in his sleep at the age of 93 in his Washington home at about 3 a.m. due to "natural causes." His family was by his side when he died.^[20]

Deming philosophy synopsis

The philosophy of W. Edwards Deming has been summarized as follows:

"Dr. W. Edwards Deming taught that by adopting appropriate principles of management, organizations can increase quality and simultaneously reduce costs (by reducing waste, rework, staff attrition and litigation while increasing customer loyalty). The key is to practice continual improvement and think of manufacturing as a system, not as bits and pieces."^[21]

In the 1970s, Dr. Deming's philosophy was summarized by some of his Japanese proponents with the following 'a'-versus-'b' comparison:

(a) When people and organizations focus primarily on quality, defined by the following ratio,

$$\text{Quality} = \frac{\text{Results of work efforts}}{\text{Total costs}}$$

quality tends to increase and costs fall over time.

(b) However, when people and organizations focus primarily on *costs*, costs tend to rise and quality declines over time.

The Deming System of Profound Knowledge

"The prevailing style of management must undergo transformation. A system cannot understand itself. The transformation requires a view from outside. The aim of this chapter is to provide an outside view—a lens—that I call a system of profound knowledge. It provides a map of theory by which to understand the organizations that we work in.

"The first step is transformation of the individual. This transformation is discontinuous. It comes from understanding of the system of profound knowledge. The individual, transformed, will perceive new meaning to his life, to events, to numbers, to interactions between people.

"Once the individual understands the system of profound knowledge, he will apply its principles in every kind of relationship with other people. He will have a basis for judgment of his own decisions and for transformation of the organizations that he belongs to. The individual, once transformed, will:

- Set an example;
- Be a good listener, but will not compromise;
- Continually teach other people; and

- Help people to pull away from their current practices and beliefs and move into the new philosophy without a feeling of guilt about the past."

Deming advocated that all managers need to have what he called a System of Profound Knowledge, consisting of four parts:

1. **Appreciation of a system**: understanding the overall processes involving suppliers, producers, and customers (or recipients) of goods and services (*explained below*);
2. **Knowledge of variation**: the range and causes of variation in quality, and use of statistical sampling in measurements;
3. **Theory of knowledge**: the concepts explaining knowledge and the limits of what can be known (see also: epistemology);
4. **Knowledge of psychology**: concepts of human nature.

Deming explained, "One need not be eminent in any part nor in all four parts in order to understand it and to apply it. The 14 points for management in industry, education, and government follow naturally as application of this outside knowledge, for transformation from the present style of Western management to one of optimization."

"The various segments of the system of profound knowledge proposed here cannot be separated. They interact with each other. Thus, knowledge of psychology is incomplete without knowledge of variation.

"A manager of people needs to understand that all people are different. This is not ranking people. He needs to understand that the performance of anyone is governed largely by the system that he works in, the responsibility of management. A psychologist that possesses even a crude understanding of variation as will be learned in the experiment with the Red Beads (Ch. 7) could no longer participate in refinement of a plan for ranking people."^[22]

The *Appreciation of a system* involves understanding how interactions (i.e., feedback) between the elements of a system can result in internal restrictions that force the system to behave as a single organism that automatically seeks a steady state. It is this steady state that determines the output of the system rather than the individual elements. Thus it is the structure of the organization rather than the employees, alone, which holds the key to improving the quality of output.

The *Knowledge of variation* involves understanding that everything measured consists of both "normal" variation due to the flexibility of the system and of "special causes" that create defects. Quality involves recognizing the difference to eliminate "special causes" while controlling normal variation. Deming taught that making changes in response to "normal" variation would only make the system perform worse. Understanding variation includes the mathematical certainty that variation will normally occur within six standard deviations of the mean.

The System of Profound Knowledge is the basis for application of Deming's famous 14 Points for Management, described below.

Key principles

Deming offered fourteen key principles for management for transforming business effectiveness. The points were first presented in his book *Out of the Crisis*. (p. 23-24)^[23] Although Deming does not use the term in his book, it is credited with launching the Total Quality Management movement.^[24]

1. Create constancy of purpose toward improvement of product and service, with the aim to become competitive and stay in business, and to provide jobs.
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.
3. Cease dependence on inspection to achieve quality. Eliminate the need for massive inspection by building quality into the product in the first place.
4. End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move towards a single supplier for any one item, on a long-term relationship of loyalty and trust.

5. Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.
6. Institute training on the job.
7. Institute leadership (see Point 12 and Ch. 8 of "Out of the Crisis"). 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.
8. Drive out fear, so that everyone may work effectively for the company. (See Ch. 3 of "Out of the Crisis")
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.
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, as 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.
11.
 - a. Eliminate work standards (quotas) on the factory floor. Substitute leadership.
 - b. Eliminate management by objective. Eliminate management by numbers, numerical goals. Substitute leadership.
12.
 - a. Remove barriers that rob the hourly worker of his right to pride of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality.
 - b. 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 or merit rating and of management by objective (See Ch. 3 of "Out of the Crisis").
13. Institute a vigorous program of education and self-improvement.
14. Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job. "Massive training is required to instill the courage to break with tradition. Every activity and every job is a part of the process." [25]

Seven Deadly Diseases

The "Seven Deadly Diseases" include:

1. Lack of constancy of purpose
2. Emphasis on short-term profits
3. Evaluation by performance, merit rating, or annual review of performance
4. Mobility of management
5. Running a company on visible figures alone
6. Excessive medical costs
7. Excessive costs of warranty, fueled by lawyers who work for contingency fees

"A Lesser Category of Obstacles" includes

1. Neglecting long-range planning
2. Relying on technology to solve problems
3. Seeking examples to follow rather than developing solutions
4. Excuses, such as "our problems are different"
5. Obsolescence in school that management skill can be taught in classes^[26]
6. Reliance on quality control departments rather than management, supervisors, managers of purchasing, and production workers
7. Placing blame on workforces who are only responsible for 15% of mistakes where the system desired by management is responsible for 85% of the unintended consequences
8. Relying on quality inspection rather than improving product quality

Deming's advocacy of the Plan-Do-Check-Act cycle, his 14 Points, and Seven Deadly Diseases have had tremendous influence outside of manufacturing and have been applied in other arenas, such as in the relatively new field of sales process engineering.^[27]

Quotations and concepts

In his later years, Dr. Deming taught many concepts, which he emphasized by key sayings or quotations that he repeated. A number of these quotes have been recorded.^[28] Some of the concepts might seem to be oxymorons or contradictory to each other; however, the student is given each concept to ponder its meaning in the whole system, over time.

- *"There is no substitute for knowledge."* This statement emphasizes the need to know more, about everything in the system. It is considered as a contrast to the old statement, "There is no substitute for hard work" by Thomas Alva Edison (1847–1931). Instead, a small amount of knowledge could save many hours of hard work.
- *"In God we trust; all others must bring data."* W. Edwards Deming
- *"The most important things cannot be measured."* The issues that are most important, long term, cannot be measured in advance. However, they might be among the factors that an organization is measuring, just not understood as most important at the time.
- *"The most important things are unknown or unknowable."* The factors that have the greatest impact, long term, can be quite surprising. Analogous to an earthquake that disrupts service, other "earth-shattering" events that most affect an organization will be unknown or unknowable, in advance. Other examples of important things would be: a drastic change in technology, or new investment capital.
- *"Experience by itself teaches nothing."*^[28] This statement emphasizes the need to interpret and apply information against a theory or framework of concepts that is the basis for knowledge about a system. It is considered as a contrast to the old statement, "Experience is the best teacher" (Dr. Deming disagreed with that). To Dr. Deming, knowledge is best taught by a master who explains the overall system through which experience is judged; experience, without understanding the underlying system, is just raw data that can be misinterpreted against a flawed theory of reality. Deming's view of experience is related to Shewhart's concept, "Data has no meaning apart from its context" (see Walter A. Shewhart, *"Later Work"*).
- *"By what method?... Only the method counts."*^[28] When information is obtained, or data is measured, the method, or process used to gather information, greatly affects the results. For example, the "Hawthorne effect" showed that people just asking frequently for opinions seemed to affect the resulting outcome, since some people felt better just being asked for their opinion. Dr. Deming warned that basing judgments on customer complaints alone ignored the general population of other opinions, which should be judged together, such as in a statistical sample of the whole, not just isolated complaints: survey the entire group about their likes and dislikes (see Sampling (statistics)). The extreme complaints might not represent the attitudes of the whole group. Similarly, measuring or counting data depends on the instrument or method used. Changing the method changes the results. Aim and method are essential. An aim without a method is useless. A method without an aim is dangerous. It leads to action without direction and without constancy of purpose. Deming used an illustration of washing a table to teach a lesson about the relationship between purpose and method. If you tell someone to wash a table, but not the reason for washing it, they cannot do the job properly (will the table be used for chopping food or potting plants?). That does not mean just giving the explanation without an operational definition. The information about why the table needs to be washed, and what is to be done with it, makes it possible to do the job intelligently.
- *"You can expect what you inspect."* Dr. Deming emphasized the importance of measuring and testing to predict typical results. If a phase consists of inputs + process + outputs, all 3 are inspected to some extent. Problems with inputs are a major source of trouble, but the process using those inputs can also have problems. By inspecting the inputs and the process more, the outputs can be better predicted, and inspected less. Rather than use mass

inspection of every output product, the output can be statistically sampled in a cause-effect relationship through the process.

- *"Special Causes and Common Causes"*: Dr. Deming considered anomalies in quality to be variations outside the control limits of a process. Such variations could be attributed to one-time events called "special causes" or to repeated events called "common causes" that hinder quality.
- *Acceptable Defects*: Rather than waste efforts on zero-defect goals, Dr. Deming stressed the importance of establishing a level of variation, or anomalies, acceptable to the recipient (or customer) in the next phase of a process. Often, some defects are quite acceptable, and efforts to remove all defects would be an excessive waste of time and money.
- *The Deming Cycle (or Shewhart Cycle)*: As a repetitive process to determine the next action, the Deming Cycle describes a simple method to test information before making a major decision. The 4 steps in the Deming Cycle are: Plan-Do-Check-Act (PDCA), also known as Plan-Do-Study-Act or PDSA. Dr. Deming called the cycle the *Shewhart Cycle*, after Walter A. Shewhart. The cycle can be used in various ways, such as running an experiment: PLAN (design) the experiment; DO the experiment by performing the steps; CHECK the results by testing information; and ACT on the decisions based on those results.
- *Semi-Automated, not Fully Automated*: Dr. Deming lamented the problem of automation gone awry ("robots painting robots"): instead, he advocated human-assisted semi-automation, which allows people to change the semi-automated or computer-assisted processes, based on new knowledge. Compare to Japanese term 'jidoka' (which can be loosely translated as "automation with a human touch").
- *"The problem is at the top; management is the problem."* [22] Dr. Deming emphasized that the top-level management had to change to produce significant differences, in a long-term, continuous manner. As a consultant, Deming would offer advice to top-level managers, if asked repeatedly, in a continuous manner.
- *"What is a system? A system is a network of interdependent components that work together to try to accomplish the aim of the system. A system must have an aim. Without an aim, there is no system. The aim of the system must be clear to everyone in the system. The aim must include plans for the future. The aim is a value judgment. (We are of course talking here about a man-made system.)"* [22]
- *"A system must be managed. It will not manage itself. Left to themselves in the Western world, components become selfish, competitive. We can not afford the destructive effect of competition."* [22]
- *"To successfully respond to the myriad of changes that shake the world, transformation into a new style of management is required. The route to take is what I call profound knowledge—knowledge for leadership of transformation."* [22]
- *"The worker is not the problem. The problem is at the top! Management!"* [29] Management's job. It is management's job to direct the efforts of all components toward the aim of the system. The first step is clarification: everyone in the organization must understand the aim of the system, and how to direct his efforts toward it. Everyone must understand the damage and loss to the whole organization from a team that seeks to become a selfish, independent, profit centre." [22]
- *"They realized that the gains that you get by statistical methods are gains that you get without new machinery, without new people. Anybody can produce quality if he lowers his production rate. That is not what I am talking about. Statistical thinking and statistical methods are to Japanese production workers, foremen, and all the way through the company, a second language. In statistical control, you have a reproducible product hour after hour, day after day. And see how comforting that is to management, they now know what they can produce, they know what their costs are going to be."* [30]
- *"I think that people here expect miracles. American management thinks that they can just copy from Japan—but they don't know what to copy!"* [30]

- "What is the variation trying to tell us about a process, about the people in the process?"^[22] Dr. Shewhart created the basis for the control chart and the concept of a state of statistical control by carefully designed experiments. While Dr. Shewhart drew from pure mathematical statistical theories, he understood that data from physical processes never produce a "normal distribution curve" (a Gaussian distribution, also commonly referred to as a "bell curve"). He discovered that observed variation in manufacturing data did not always behave the same way as data in nature (Brownian motion of particles). Dr. Shewhart concluded that while every process displays variation, some processes display controlled variation that is natural to the process, while others display uncontrolled variation that is not present in the process causal system at all times.^[31] Dr. Deming renamed these distinctions "common cause" for chance causes and "special cause" for assignable causes. He did this so the focus would be placed on those responsible for doing something about the variation, rather than the source of the variation. It is top management's responsibility to address "common cause" variation, and therefore it is management's responsibility to make improvements to the whole system. Because "special cause" variation is assignable, workers, supervisors or middle managers that have direct knowledge of the assignable cause best address this type of specific intervention.^[9]
- (Deming on Quality Circles) *"That's all window dressing. That's not fundamental. That's not getting at change and the transformation that must take place. Sure we have to solve problems. Certainly stamp out the fire. Stamp out the fire and get nowhere. Stamp out the fires puts us back to where we were in the first place. Taking action on the basis of results without theory of knowledge, without theory of variation, without knowledge about a system. Anything goes wrong, do something about it, overreacting; acting without knowledge, the effect is to make things worse. With the best of intentions and best efforts, managing by results is, in effect, exactly the same, as Dr. Myron Tribus put it, while driving your automobile, keeping your eye on the rear view mirror, what would happen? And that's what management by results is, keeping your eye on results."*^[2]
- *"Knowledge is theory. We should be thankful if action of management is based on theory. Knowledge has temporal spread. Information is not knowledge. The world is drowning in information but is slow in acquisition of knowledge. There is no substitute for knowledge."*^[22] This statement emphasizes the need for theory of knowledge (see: epistemology, Shewhart cycle, C. I. Lewis).
- *"The most important figures that one needs for management are unknown or unknowable (Lloyd S. Nelson, director of statistical methods for the Nashua corporation), but successful management must nevertheless take account of them."*^[23] Deming realized that many important things that must be managed couldn't be measured. Both points are important. One, not everything of importance to management can be measured. And two, you must still manage those important things. Spend \$20,000 training 10 people in a special skill. What's the benefit? "You'll never know," answered Deming. "You'll never be able to measure it. Why did you do it? Because you believed it would pay off. Theory." Dr. Deming is often incorrectly quoted as saying, "You can't manage what you can't measure." In fact, he stated that one of the seven deadly diseases of management is running a company on visible figures alone.

Notes

- [1] Deming's 1950 Lecture to Japanese Management (http://deming-network.org/deming_1950.htm). Translation by Teruhide Haga. Accessed: 2006-06-16.
- [2] *Deming of America* (<http://priscillapetty.com/page7/page7.html>). [Documentary]. Cincinnati, OH: The Petty Consulting/Productions. 1991. .
- [3] Aguayo, Rafael (1991). *Dr. Deming: The American Who Taught the Japanese About Quality*. Fireside. pp. 40–41.
- [4] The Man: His Music (<http://deming.org/?content=64>). W. Edwards Deming Institute. Accessed: 2006-06-16.
- [5] Institute History (<http://deming.org/?content=41>). W. Edwards Deming Institute. Accessed: 2008-10-15.
- [6] The Man: Biography (<http://deming.org/?content=61>). W. Edwards Deming Institute. Accessed: 2006-06-17.
- [7] Deming, Judson Keith (1904). *John Deming and His Descendents*. Dubuque, Iowa: Press of Mathis-Mets Co.. p. 4. OCLC 2285125.
- [8] <http://deming.org/index.cfm?content=654>
- [9] *A Brief History of Dr. W. Edwards Deming* British Deming Association SPC Press, Inc. 1992
- [10] The Man: Articles: "The Three Careers of W. Edwards Deming." (<http://deming.org/?content=652>) W. Edwards Deming Institute. Accessed: 2008-10-15.
- [11] Editor's Preface *Elementary Principles of Statistical Control Quality* The Union of Japanese Scientists and Engineers (transcript of Deming's 1950 lectures in Japan)
- [12] Noguchi, Junji (October 1995). "The Legacy of W. Edwards Deming". *Quality Progress* **28** (12): 35–38.
- [13] "What is the Deming Prize?" (<http://deming.org/index.cfm?content=511>). The W. Edwards Deming Institute.. . Retrieved 2010-05-20.
- [14] Thiébaud, Jean-Marie (December 2007). "L'Ordre du Trésor sacré (The Order of the Sacred Treasure)" (<http://www.editions-harmattan.fr/index.asp?navig=catalogue&obj=article&no=8245>) (in French). L'Harmattan. .
- [15] "**Red beads on display at ASQ headquarters**". *Deming Interaction* **9** (1): 2. Spring 2005.
- [16] Salsburg (2002) page 254
- [17] Deming and his statistical methods are profiled by Salsburg(2002, Chapter 24)
- [18] Walton, Mary (1986). *The Deming Management Method*. Penguin Group. pp. 138–139.
- [19] Ford Embraces Six-Sigma Quality Goals. (<http://www.sme.org/cgi-bin/get-press.pl?&&20012513&ND&&SME&>) Accessed: 2006-07-31.
- [20] Quality Control Pioneer W. Edwards Deming Dead at 93 (<http://www.highbeam.com/doc/1G1-14738127.html>) Knight Ridder/Tribune Business News; 1993-12-20. Accessed 2010-05-20.
- [21] Dr. Deming's Management Training. (<http://www.dharma-haven.org/five-havens/deming.htm>) Accessed: 2006-06-18.
- [22] Deming, W. Edwards. 1993. *The New Economics for Industry, Government, Education*, second edition.
- [23] Deming, W. Edwards (1986). *Out of the Crisis*. MIT Press.
- [24] Phil Cohen. "Deming's 14 Points" (<http://www.hci.com.au/hcisite2/articles/deming.htm>). Hci. . Retrieved 14 November 2010.
- [25] Reilly, Norman B. (1994). *Quality: What Makes it Happen?*. Van Nostrand Reinhold. p. 31. ISBN 0-442-01635-2.
- [26] Walton, Mary (1986). *The Deming Management Method*. Penguin Group. p. 94.
- [27] Selden, Paul H. (1997). *Sales Process Engineering: A Personal Workshop*. Milwaukee, WI: ASQ Quality Press. pp. 60–74.
- [28] "The Man: Articles: Four Days with W. Edwards Deming" (<http://deming.org/index.cfm?content=653>). W. Edwards Deming Institute. . Retrieved 2008-10-15.
- [29] Cultural Transformation Discussion Guide. (<http://forecast.umkc.edu/ftppub/ba541/DEMINGLIBRARY/DLVol24-25.PDF>)
- The Deming Library. Accessed 2006-06-18.
- [30] *If Japan Can...Why Can't We* (white paper), broadcast by NBC in 1980.
- [31] "Why SPC?," British Deming Association SPC Press, Inc., 1992

Bibliography

- Aguayo, Rafael (1991). *Dr. Deming: The American Who Taught the Japanese About Quality*. Fireside edition. ISBN 0-671-74621-9. OCLC 229201675.
- Baker, Edward Martin (1999). *Scoring a Whole in One: People in Enterprise Playing in Concert*. Crisp Learning. ISBN 1-56052-549-5. OCLC 41259978.
- Delavigne Kenneth T. and J. Daniel Robertson, "Deming's Profound Changes: When Will the Sleeping Giant Awaken?" (PTR Prentice Hall, 1994), ISBN 0-13-292690-3
- Deming, W. Edwards (1986). *Out of the Crisis*. MIT Press. ISBN 0-911379-01-0. OCLC 13126265.
- Deming, W. Edwards (2000). *The New Economics for Industry, Government, Education* (2nd ed.). MIT Press. ISBN 0-262-54116-5. OCLC 44162616.
- Deming, W. Edwards (1966). *Some Theory of Sampling*. Dover Publications. ISBN 0-486-64684-X. OCLC 166526.

- Gabor, Andrea (1992). *The Man Who Discovered Quality: How W. Edwards Deming Brought the Quality Revolution to America*. Penguin. ISBN 0-14-016528-2. OCLC 154134300.
- Gitlow, Howard S., Shelly J. Gitlow, "The Deming Guide to Quality and Competitive Position" Prentice Hall Trade (January 1987) ISBN 0-13-198441-1
- Perry Gluckman, Diana Reynolds Roome, "Everyday Heroes: From Taylor to Deming: The Journey to Higher Productivity" SPC Press, Inc. (March 1990) ISBN 0-945320-07-8
- Haller, Harold S (1993). *Managing with profound knowledge: A management process based on the Deming management theory*. Harold S. Haller & Company. OCLC 40764811.
- Joiner, Brian L (1994). *Fourth Generation Management: The New Business Consciousness*. McGraw-Hill. ISBN 0-07-032715-7. OCLC 29219430.
- Kilian, Cecelia S (1992). *The World of W. Edwards Deming - 2nd Edition*. SPC Press, Inc. ISBN 0-945320-29-9. OCLC 28504460.
- Kohn, Alfie (1992). *No Contest: The Case Against Competition; Revised edition*. Mariner Books. ISBN 0-395-63125-4. OCLC 26255272.
- Kohn, Alfie (1999). *Punished By Rewards: The Trouble with Gold Stars, Incentive Plans, A's, Praise, and Other Bribes*. Mariner Books. ISBN 0-618-00181-6. OCLC 222755141.
- William J. Latzko, David M. Saunders, "Four Days with Dr. Deming: A Strategy for Modern Methods of Management" Prentice Hall PTR (January 26, 1995) ISBN 0-201-63366-3
- Langley, Gerald J., Kevin M. Nolan, Clifford L. Norman, Lloyd P. Provost, Thomas W. Nolan, "The Improvement Guide: A Practical Approach to Enhancing Organizational Performance" Jossey-Bass (July 26, 1996) ISBN 0-7879-0257-8
- Mann, Nancy (1989). *Keys to Excellence: The Story of the Deming Philosophy - 3rd Edition*. Prestwick Books. ISBN 1-85251-097-8. OCLC 59892273.
- Neave, Henry R (1990). *The Deming Dimension*. SPC Press, Inc. ISBN 0-945320-08-6. OCLC 22890202.
- Rodin, Robert (1999). *Free, Perfect, and Now: Connecting to the three insatiable customer demands*. Simon and Schuster, Inc. ISBN 0-684-85022-2.
- Salsburg, D. (2002) *The Lady Tasting Tea: How Statistics Revolutionized Science in the Twentieth Century*, W.H. Freeman / Owl Book. ISBN 0-8050-7134-2
- Scherkenbach, William W (1991). *Demings Road to Continual Improvement*. SPC Press, Inc. ISBN 0-945320-10-8. OCLC 24791076.
- Scholtes, Peter R (1997). *The Leader's Handbook: Making Things Happen, Getting Things Done*. McGraw-Hill. ISBN 0-07-058028-6. OCLC 38097010.
- Shewhart, Walter A (1939). *Statistical Method from the Viewpoint of Quality Control*. Dover Publications December 1, 1986. ISBN 0-486-65232-7. OCLC 13822053.
- Shewhart, Walter A (1930). *Economic Control of Quality of Manufactured Product/50th Anniversary Commemorative Issue*. American Society for Quality December 1980. ISBN 0-87389-076-0. OCLC 223422287.
- Tribus, Myron (1992). *Quality First: Selected Papers on Quality and Productivity Improvement -4th Edition*. National Society of Professional Engineers. ISBN 99938-53-23-2.
- Walton, Mary (1986). *The Deming Management Method*. The Putnam Publishing Group. ISBN 0-399-55000-3. OCLC 13333772.
- Wheeler, Donald J (1999). *Understanding Variation: The Key to Managing Chaos - 2nd Edition*. SPC Press, Inc. ISBN 0-945320-53-1. OCLC 43697523.

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- Deming.org (<http://deming.org/>) W. Edwards Deming Institute
 - statistical-process-control.org (<http://www.statistical-process-control.org/w-edwards-deming/>) W. Edwards Deming Founder of Statistical Process Control for Quality Management.
 - The Deming Forum home page (<http://www.deming.org.uk>) The Deming Forum
 - ManagementWisdom.com (<http://www.managementwisdom.com/>)
 - "Quality As Defined By Deming": Lecture by Newt Gingrich (<http://terrenceberres.com/ginren06.html>)
 - Obituary from Philadelphia Inquirer, Dec. 1993 (http://www.highbeam.com/doc/1G1:14738127/Quality+Control+Pioneer+W~R~+Edwards+Deming+Dead+at+.html?refid=ency_botnm)
 - W. EDWARDS DEMING: A Register of His Papers in the Library of Congress (<http://www.loc.gov/rr/mss/text/deming.html>)
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