

## 研究ノート

## Why did the U.S. Conduct QC in the Field of Public Health in Occupied Japan?

SATO Akiko\*

The purpose of paper is to answer the research question why the United States, which played the center role in occupied Japan, conducted the quality control (QC) in the field of public health in Occupied Japan. In particular, this paper argues that the statistical quality control (SQC) advocated by W. Edwards Deming who was an Advisor in Sampling, Bureau of the Budget, Executive Office of the President Truman contributed to producing larger amount and better quality of pharmaceutical products centering anti-TB drugs at lower cost in occupied Japan. The results of the SQC were in line with what the GHQ/PHW intended to develop Japanese pharmaceutical industry. Because Chief Sams aimed at self-sustaining development of Japanese pharmaceutical industry, which was forced to be independent from the protection of the United States since Dodge Line was conducted in 1949.

本稿の目的は、占領期に中心的役割を果たしたアメリカがなぜ公衆衛生の分野で品質管理を実施したのかの理由を探ることである。具体的には、当時大統領府の統計顧問を務めた W.エドワーズ・デミングによって 1950 年に紹介された統計的品質管理 (SQC) が抗結核薬を中心とする医薬品の品質向上、生産量増大、コスト削減に役立ったことを分析する。SQC の成果は、准将クラフォード・F・サムスが局長を務める GHQ 公衆衛生局の意図したことと合致した。サムスは 1949 年のドッジ・ラインによって米国の保護から自立を強いられた日本の製薬業界が、自立的に発展することを目指していたからである。

Keywords : Occupied Japan (占領期), SQC(統計的品質管理), Deming (デミング), anti-TB drug (抗結核薬)

## 1. Introduction

The purpose of paper is to answer the research question why the United States, which played the center role in occupied Japan, conducted the quality control (QC) in the field of public health in Occupied Japan. This paper humbly proposes the following hypothesis: To produce larger volume of higher quality products at lower price was the most indispensable task for the Japanese government. Especially, in order to reduce the high tuberculosis (TB) mortality rate, Ministry of Health and Welfare (MHW), healthcare experts including hospital doctors and academic scholars and pharmaceutical industry had to provide a larger volume of higher quality anti-TB products at a lower cost. Then, for GHQ/Public Health Welfare Section (PHW) led by Chief Crawford F. Sams, MHW and pharmaceutical industry in Japan, the Statistical Quality Control (SQC) advocated by William Edwards Deming was the best method to find the solution. Additionally, the SQC was the critical technique to lead Japan back to international society by exporting a larger volume of higher quality products at lower cost.

GHQ/Economic and Science Section (ESS) was in charge of evaluating the necessity of quality control in Japan. ESS considered Japanese industries strongly needed to improve quality of manufactured products to enhance their export. Then, ESS appointed Deming to instruct SQC to Japanese industries.

In particular, this paper will describe the statistical quality control (SQC) advocated by Deming contributed to producing larger volume and better quality of healthcare products at lower cost in Occupied Japan. Deming was an Advisor in Sampling, Bureau of the Budget, Executive Office of the President Truman and a professor of statistics in New York University at that time. He came to Tokyo appointed by Economic and Science Section (ESS), General Head Quarter (GHQ)/Supreme Commander Allied Power (SCAP) and invited by Kenichi Koyanagagi, General Secretary of Japan Union of Scientists and Engineers (JUSE) in 1950.<sup>1</sup>

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Akiko Sato\*Cross-Cultural Studies, Osaka University of Tourism  
Area of Expertise: Japan-US History after World War II

To assess the Japanese economy after World War II, which was said to have been triggered by changing the US's policy toward Japan, anyhow, examining the occupation period is indispensable.

Japan had to return to the international community by rebuilding her science and technology, which were the driving force for her economic reconstruction after World War II. In 1949, the Economic and Scientific Section (ESS), led by Chief William Frederick Marquat, launched a program to rebuild science and technology in Japan following the US government's policy of transforming Japan from a defeated country into an economic power and supply base in the Far Eastern region.<sup>2</sup>

Dodge Line was conducted in 1949 with the aim of rebuilding the Japanese economy that can rejoin the global system and form a liberal economic system.<sup>3</sup> Several inefficient, small-sized companies became bankrupt because of their super tight money policy.<sup>4</sup>

## 2. Previous Studies

### (1) Occupation Policy

There have been many interpretations and studies on the US occupation policy of Japan. Some scholars for example, T. A. Bisson, Theodore Cohen, and Eleanor Hadley interpret the occupation led Japan to implement successful social reform.<sup>5</sup>

Makoto Iokibe, however, understands that the innovation of the occupation policy had some limitations, and the effect of cold war was small; therefore, there was continuity in US-Japan relationship after World War II.<sup>6</sup>

On the contrary, Yoneyuki Sugita recognizes that after Dodge Line, the occupation policy shifted following the US policy.<sup>7</sup> Further Hiroo Nakajima views that the occupation policy was merely a period during the serial policy by the US toward Japan.<sup>8</sup>

From another point of view, Thomas J. McCormick et al. study that the policy of the US in Occupied Japan was consistently uniform and had the support of the global system.<sup>9</sup> John W. Dower, Rinjiro Sodei and Eiji Takemae state that, owing to the crisis in global capitalism and escalation of cold war, the occupation policy followed the "reverse course" toward economic reconstruction and rearmament of Japan.<sup>10</sup>

### (2) Quality Guru Deming

In numerous previous works on Deming, a number of New Left scholars cited Deming as a kind of trigger for economic reconstruction in Japan after World War II. Dower says, unless Korean War occurred, the SQC strategy by Deming might have had little impact, because there would not have been foreign demand for Japanese products or substantial mass production.

Moreover, Dower points out that the special demand for Korean War, even if indirectly, "enabled Deming's Japanese admirers to integrate his ideas about quality into the inaugural stages of new productive cycles and new entrepreneurial ventures in ways that would have lasting consequences over the ensuing decades."<sup>11</sup>

Indeed, Laura E. Hein, Chalmers A. Johnson, Toshihiko Yano and Aaron Forsberg mention that the SQC method advocated by Deming provided the concrete strategy of cooperation between business community and political community not only in Japan and but also in the United States.<sup>12</sup> However, their positive remarks on Deming are only based on the success in political and business world, and not on the contribution to public health in Occupied Japan.

According to successors to Deming, such as scholars of JUSE led by President Ichiro Ishikawa who was also President of Keidanren (Federation of Economic Organizations), Masuyama Motosaburo, the first individual scholar who received Deming Award, Shigeichi Moriguchi, Cecelia S. Kilian who had been a secretary for Deming for long years, Mary Walton, Suzaburo Takeda, Makoto Fujino, and Eitan Zemel, Deming had already attracted attention since the first and second visit to Japan in 1946 and 1947 as a sampling advisor to the General Headquarters, Supreme Commander for the Allied Powers, led by General Douglas MacArthur because of his remarkable statistical methods.<sup>13</sup>

Then, Deming was invited by Japanese scholars in 1950 as a statistical expert who was able to familiarize statistical quality control in Japan to improve Japanese products. From their notes and comments, Japanese scholars had already made efforts to develop some methods of quality control using statistic measures popular among Japanese people at that time.

To diffuse SQC strategy in Japan in Occupied Japan, Deming was definitely invited by Japanese scholars who had eagerly wanted to have higher quality of products made in Japan at that time.<sup>14</sup> Consequently, according to Deming

Prize Committee, as a part of participants, scholars and engineers of Tanabe Pharma attended the lecture given by Deming held in Osaka in 1950.<sup>1 5</sup>

ESS recommended Deming to be an adviser of statistical quality control to Japan. Simultaneously, Deming, who earlier visited Japan in 1946 and 1947 as a sampling advisor to the Bureau of Budget was invited to Japan in 1950 by the Union of Japanese Scientists and Engineers (JUSE) led by President Ichiro Ishikawa, who was also the Chairman of Japan Business Federation (Keidanren).

Finally Deming came to Japan in 1950 again as a consultant to the secretary of war and secretary of defense appointed by the US military, to give a series of lectures on statistical quality control, namely, SQC.<sup>1 6</sup> His SQC, taught through his seminars conducted when Korean War started, evolved later into the "Total Quality Control (TQC)" that was applied by many Japanese companies. Products made in Japan with improved consumers' satisfaction became famous for their high-quality shift away from "shoddy and cheap" products as Deming and Kilian stated.<sup>1 7</sup>

### 3. Signification of This Paper

Originally in the United States during the World War II, SQC was a guideline for less skilled labors who were engaged in manufacturing precision weapons.<sup>1 8</sup> In Japan before the World War II, although a laboratory for mathematical statistics was established supported by the military who was a main part of governments, unfortunately it was not developed.<sup>1 9</sup>

History is "an unending dialogue *between the past and present*" as Edward Hallett Carr stated.<sup>2 0</sup> The significance of this paper is to pursue the reason why the United States introduced SQC, which was originally formulated for less skilled labors to manufacture precision weapons, and expanded it to the field of public health in Japan which was entirely different field from that of the United States supported by governments, industries and universities.

### 4. Approach of Science, Technology and Society (STS)

This paper does not consider the "science" separated from "technology" when understanding science and technology in Occupied Japan. GHQ recognized that they had to reorganize the "science" at a nation level in Occupied Japan. GHQ defined the science as "influential social power," and understood that

the "science and technology" were defined as follows<sup>2 1</sup>:

- i) Strong science and technology are required to reconstruct Japanese economy.
- ii) Science and technology are the foundation for the healthy and modern society.
- iii) Since the science and technology become important resources in case of war, to develop and strengthen the well-balanced regime of science and technology are essentially required for Japanese people with sense of pride.
- iv) The appropriate regime of science and technology is enforced by Japanese people through Japanese government system. On the other hand, that regime should be accomplished through the science organization being democratically operated by scientists.

Therefore, other ministries than the Ministry of Education came to be responsible for the science and technology which directly related to the societies of agriculture, public health, industries, mining and others.<sup>2 2</sup> This paper follows the approach of Science, Technology and Society based on the view that science and technology are not theory but social system.

In this social system, four kinds of actors, namely, industries, universities and governments, which have been conventionally called "technocracy," and civilians, which has been conventionally called "democracy," have been played critical roles respectively. Two social categories have been considered being conflicting with each other. However, this paper will take a general view of reception of the United States' science and technology by Japanese people from the points of "industries, universities, governments and civilians."<sup>2 3</sup>

### 5. What Are the Concept of SQC?

#### (1) Definition

Before examining the achievement and contribution of Deming, it is essential to understand Deming's definitions of "quality" and "quality control" method.<sup>2 4</sup> Deming defined "quality" as "the intent, fixed by management, which should be aimed at the needs of the consumer." He considered that this kind of intent can be understood as plans, specifications, or tests, which can be delivered to the customer under

management's responsibility.

Accordingly, it is necessary to supervise 'quality' and to implement 'quality control' in applying statistical methods. Deming called this quality control method "statistical quality control (SQC)."<sup>2 5</sup>

## (2) Lecture of Deming in 1950

The SQC introduced by Deming was a method, aimed not at finding defective products but at controlling the products' quality in the inspection process. It is carried out by accepting a range of quality variations in the production process after statistically analyzing acceptable defective products to avoid more abnormalities.<sup>2 6</sup>

Deming explained the above production process for continuous generation of good quality products by following a spiral process called the "continue around the cycle."<sup>2 7</sup> To maintain quality in production process, Deming recommended, through his lectures in 1950 and afterwards, 14 points as "condensation of the 14 points for management" and warned management to avoid seven points in his "enumeration of the deadly disease."<sup>2 8</sup> At first, in Japan, 12 positive points were proposed. In the US, after 1980s, Deming added two additional points in tune with the then prevailing business environment in the US.<sup>2 9</sup>

Deming taught SQC to members of four actors, namely public servants of Ministry of International Trade and Industry, executives of big businesses, scholars of universities and engineers of the manufacturing companies. His lectures have been compiled by Kenichi Koyanagi who was Senior Chief of Union of Japanese Scientists and Engineers (JUSE).<sup>3 0</sup>

## 6. Fundamental Policy in Occupied Japan

### (1) Public Health in Occupied Japan

According to Sams, 600-kilogram streptomycin was imported in 1949 using GARIOA funds and distributed to hospitals with qualified personnel and suitable facilities. Later this medicine was additionally supplied because domestic production was permitted by the Ministry of Health and Welfare (MHW) and PHW.<sup>3 1</sup> However, MHW had to purchase streptomycin by paying high royalty to Dr. Selman Abraham Waksman of Rutgers University in the United States.

Therefore, Sams expected Japanese pharmaceutical industry, who had been engaged in producing medicine,

especially for TB, to produce them in Japan by themselves.<sup>3 2</sup> In May 1950, Tanabe Pharma was allowed to produce another anti-TB drug (para-aminosalicylic acid: PAS, later called "NIPPAS") in Japan.<sup>3 3</sup> PAS has also contributed to decreasing TB mortality rate.<sup>3 4</sup>

Second, the existence of public health centers built in each prefecture by its local government satisfied with the necessity of residents there. The improvement in public health in Occupied Japan was partly owing to the organized efforts of public health centers established by local governments. The severe budget constraint by Dodge Line in 1949 induced the innovative public health system including TB prevention program, i.e. BCG vaccination, hospitalization of TB patients and TB preventive education for residents. However, BCG was not the final solution to decrease TB mortality rate. TB infected people desperately needed the anti-TB drugs to stop their death.<sup>3 5</sup>

The difference of policy decisions between the United States and Japan can be attributed to "Presidential System" in the United States. The president of the United States is equivalent to the official states combining Japanese emperor with prime minister.<sup>3 6</sup> The president commands and controls the administrative division. He establishes policy challenges, state his vision and attach high value to the publication working on public and the Congress.<sup>3 7</sup>

The Truman administration proposed the public medical insurance in the United States in 1945, however, his proposal was strongly rejected by the American Medical Association (AMA) who was very good at media strategy.<sup>3 8</sup> The Truman administration failed the rhetoric strategy to match that of AMA.<sup>3 9</sup> However, he conducted health care reforms for people who participated in the War. This is the example which the war strengthened the public nature of medical care and gave the legitimacy to the federal government's interference.<sup>4 0</sup>

The constitution of the United States doesn't have a clause or provision which provides that social welfare is the right as stipulated in the Article 25 Right to Live of the Japanese Constitution.<sup>4 1</sup>

### (2) Intention of ESS and PHW

Crawford F. Sams, PHW Chief, expected to rise the pharmaceutical industry in Japan considering that only appropriate medical experts, good-quality pharmaceutical

products made by the pharmaceutical industry or modern measures of medical equipment and products can progress health and disease prevention in Occupied Japan which was underdeveloped then. <sup>4 2</sup>

Sams has noted that pre-war Japanese pharmaceutical industry had been developed enough to widely export her pharmaceutical products to South-East Asia. But at the beginning of occupation, he discovered drug stock in poor quality. Therefore, Sams strongly thought that Japan desperately needed appropriate quality control since Japanese industry seemed to emphasize rather quantity of pharmaceutical products than the quality at that time. <sup>4 3</sup>

In August 1946, ESS established the Economic Stabilization Agency, MHW Pharmaceuticals and Chemicals Safety Division and supplied raw materials or healthcare products under the supervision of PHW. Even before the end of occupation all controls on pharmaceutical products were removed and commercial trades worked out. <sup>4 4</sup> Namely, even in Occupied Japan, commercial development of pharmaceutical industry in private sector already started.

PHW usually maintained contact with ESS since they had received GHQ General Order No.7. <sup>4 5</sup> From this fact, Sams, who was keenly aware of necessity of quality control, would have well known that Japanese pharmaceutical companies took lectures and trainings of SQC by Deming.

PHW expected the rise of the private sector in Japan, especially, of pharmaceutical affairs. Actually, together with building national health insurance by the government, the pharmaceutical industry attained to produce high-quality and large volume of new products. This circumstance was exactly matched with Sams's expectation that PHW made Japanese pharmaceutical industry independent and produce high-quality products. <sup>4 6</sup>

To improve public health and then reduce the mortality rate of Japanese people, securing high-quality pharmaceutical products especially for tuberculosis, which was the first disease death cause, was essential. Sams, who lamented, "The pharmaceutical industry in Japan rather focused on producing products in the view of quantity than quality," was specifically aware of the importance of quality control. <sup>4 7</sup>

### **(3) Recommendation of the Science Advisory Mission from the United States**

Recommendation of the Science Advisory Mission

from the United States in 1948 was announced on December 18, 1948. <sup>4 8</sup> To sum up the recommendation, establishing national organization of instructors, financing Japanese students who want to study abroad, exchanging senior scholars between Japan and other countries, funding science and technology research facilities, founding the science education center for elite in small number, assembling power and knowledge of Japanese scientists to find solutions on industry, agriculture and public health. Especially, the last recommendation is the most important because it provided public health in Occupied Japan with the direction to cooperate with scientists.

### **4 Conclusion**

Sams expected the pharmaceutical industry in Japan to produce larger volume of higher quality products at more moderate price to reduce the mortality rate. Then, for PHW, MHW and pharmaceutical industry in Japan, the SQC, advocated by Deming, which was the method to produce a large volume of high-quality pharmaceutical products at low cost, was one of essential measures to reduce the mortality rate.

SQC was originally formulated for less skilled labors to manufacture precision weapons in the United States. ESS together with PHW intended MHW and the pharmaceutical industry in Japan to adopt the SQC method to the field of public health in Japan which was entirely different field from that of the United States.

For ESS, SQC was the critical technique to lead Japan back to international society by exporting a large volume of high-quality products at low cost. Further, for PHW, SQC was the indispensable measure to improve public health and reduce the TB mortality rate.

The above are the reasons why the United States having played the center role of Occupied Japan took precedence over the quality control when she led Japanese people to the reception of her science and technology in Occupied Japan.

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<sup>28</sup> "Out of Crisis," *Deming Papers*, Box. #124.; Akiko Sato, "Statistical Quality Control in Japan after World War II – The Deming Strategy and Improving Public Health-," *Conference Paper of New England Association for Asian Studies 2012 Conference*, pp.8-9. (Unpublished) In the above conference paper, I cited the following 14 points recommended by Deming: (1) Create constancy of purpose toward improvement of product and service with the aim to become competitive and to stay in business, and to provide jobs. (2) Adopt the new philosophy. (3) Cease dependence on inspection to achieve quality. (4) End the practice of awarding business on the basis of price tag. (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. (8) Drive out fear to work effectively for the company. (9) Break down barriers between departments. (10) Eliminate slogans for the work force. (11) Eliminate work standards. (12) Remove any barriers among workers and managements to keep pride. (13) Institute an efficient program of education and self-improvement. (14) Put everybody in the company to work to achieve the transformation (pp. 23-24). The following are the seven diseases pointed by Deming for elimination by the management: (1) Lack of purpose to plan product and service. (2) Emphasis on profits in a short term. (3) Performance evaluation, rating merit, or annual review. (4) Job hopping. (5) Management using only visible figures without consideration of figures. (6) Excessive medical cost. (7) Excessive costs of liability (pp.97-98).

<sup>29</sup> Ibid. p.181.

<sup>30</sup> Kenichi Koyanagi, comp., *Hinshitsu No Tokeiteki Kanri, Deming Hakushi Kogiroku (Lecture on Statistical Quality Control by Dr. Edwards Deming)* (Tokyo: Union of Japanese Scientists and Engineers, 1950), pp.1-147.

<sup>31</sup> Akira Amakawa and Eiji Takemae, eds., *Jieichikyū Nihon Senryoshi*. Koshueisei, trans. Akiko Sugiyama, vol. 22, 56.

<sup>32</sup> Crawford F. Sams and Eiji Takemae, *DDT Kakumei: Senryōki No Iryō Fukushi Seisaku O Kaisōsuru* (Tokyo: Iwanami Shoten, 1986), 286.

<sup>33</sup> Naoaki Oda and Kazuo Matsumoto, "NIPPAS Gojunen No Rekishi," *Yakushigaku Zasshi*, 2nd ser., 36 (2001): pp.161-166.

<sup>34</sup> Sams and Takemae, *DDT Kakumei: Senryōki No Iryō Fukushi Seisaku O Kaisōsuru*. 286.

<sup>35</sup> Akiko Sugiyama, *Senryōki No Iryō Kaikaku* (Tokyo: Keisō Shobō,

1995), 178-201.

<sup>36</sup> Chieko Otsuru (Kitagawa), "Rieki Dantaito Undo (Interest Group and Campaign)," *Amerika no Seiji (Politics in the United States)*, edited by Fumiaki Kubo (Kobundo, 2005), pp.159-182.

<sup>37</sup> Fumiaki Kubo, "Daitoryo (President)," *Amerika no Seiji (Politics in the United States)*, pp.43-66.

<sup>38</sup> Takakazu Yamagishi, *America Iryoseidono Seijishi: 20 seikino Keikento Obamakea (History of Health Insurance Policy in the United States: History of the 20<sup>th</sup> Century and Obama Care)*. Nagoya University Press, 2014, p.72-92. ; Harry S. Truman, *Truman Kaikoroku (Memoirs / Year of Decisions)*, trans. Yoshitaka Horie (New York: New American Library, 1992), pp.22-28.

<sup>39</sup> Hidekazu Nishikawa, *A Study of Cold War Rhetoric in the Formative Period: The Rhetorical Strategy of Harry S Truman as a Case in Point*. (Tokyo: Waseda University, 2008) p.231.

<sup>40</sup> Takakazu Yamagishi, *War and Health Insurance Policy in Japan and the United States: World War II to Postwar Reconstruction*. Baltimore: Johns Hopkins University Press, 2011, pp.109-114.

<sup>41</sup> Toshiyuki Nishiyama, *Americagata Fukushimaokkato Toshiseiji: Nyu Yook shiniokeru a-ban riberarizumu (American way of Welfare Nation and Citizen Politics: Development of Urban Liberalism New York City)*, (Tokyo University Press, 2008), p.89-90.

<sup>42</sup> *DDT Kakumei: Senryōki No Iryō Fukushi Seisaku O Kaisōsuru*, p.279.

<sup>43</sup> Ibid. pp.279-282.

<sup>44</sup> Ibid. p.281.

<sup>45</sup> Eiji Takemae, Takahide Nakamura Takahide, GHQ Nihon Senryoshi : Senryokanrino Taisei (History of GHQ Occupied Japan: Occupied Control System), (Nihontoshō Senta, 2000), p.163.

<sup>46</sup> Crawford F. Sams and Zabelle Zakarian, *Medic: The Mission of an American Military Doctor in Occupied Japan and Wartorn Korea* (Armonk, NY: M.E. Sharpe, 1998), p.139.

<sup>47</sup> *Medic: The Mission of an American Military Doctor in Occupied Japan and Wartorn Korea*. p.279.

<sup>48</sup> Shigeru Nakayama, "Saiensu Misshonno Rainichi (Visit of Science Mission to Japan)". In *Tsushi Nihonno Kagakugijutsu Senryōki 1945-1952 (A Social History of Science and Technology in Contemporary Japan: The Occupation Period, 1945-1952)*, 2-5. Vol. 1. Tokyo: Gakuyo Shobo, 1995. pp.122-131. ; Annex No.10: Memorandum to SCAP by the 2<sup>nd</sup> United States Science Mission to Japan, *GHQ Nihon Senryoshi (History of the Nonmilitary Activities of the Occupation of Japan)*, 1945-1951 p.123.