

What were the Skilled Workers, and How were They Trained in Japan? : Apprenticeship, School Education and Corporate Apprenticeship

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報 告

What were the Skilled Workers, and How were They Trained in Japan ?

—Apprenticeship, School Education and
Corporate Apprenticeship—

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1. Introduction

In the late 1930s, hostilities with China had developed into a full-scale war. Expanding heavy industries badly needed additional workforce, while military conscription took many experienced operatives and engineers out of their factories. The shortage of skilled labor came to be a pressing issue in Japanese economy.

Bureaucrats, corporate managers, and vocational educators began to debate on skill training. Those engaged in the debate immediately noticed that some vagueness remained in the understanding of what kind of abilities and role should skilled workers possess. This ambiguity led to a debate in training of skilled workers [*jyukurenko-yosei mondai*].

In a speech at a conference in 1938, a leading industrial educator Tadashi Seike spoke that he had asked experts in industries and schools for a definition of skilled worker. No one could give him a clear answer. After this episode, Seike went on to define a skilled worker as a person with skills sufficient to provide him with enough income to support his family under piece rate system. He then described his views on how such workers should be trained¹. The next speaker was Enjiro Awaji, a pioneer of Japanese labor management research. Awaji concurred with Seike on the lack of a satisfactory definition of skilled worker. The definition he offered was completely different from Seike's. Instead of mentioning to the level of income, he char-

acterized three types of skilled workers: genius skilled workers [*Tensai Jukurenkou*], all-round skilled workers [*Bannokou*] and single-skilled workers [*Tokugi Jukurenkou*]².

The idiom “skilled workers (*gyukurenkou*)” was not first appeared in the 1930s. From the initial stages of Japan’s industrialization, the importance of training competent operatives had been recognized as an important topic. Many people in the field of skill training had discussed the defects adhering to their contemporary training methods. In their discourse, they had used the term *gyukurenkou*. It was in the debate in training of skilled workers in the late 1930s, however, the definition of the term had discussed seriously.

The direct reason behind training of skilled workers being discussed as a problem at this time was lively lecturing and publication activities by Kan’ichi Yamaguchi, an engineer with the Ministry of Railways, of training of skilled labor in the West. He toured Europe and North America around the summer of 1935 and then stayed in Germany from July 1936 through the start of March in the following year for observing worker training. While his opinions are summarized in his work *Jukurenkou mondai no kenkyu*³ (“Study of the skilled-worker issue”), the core of his argument is shown clearly in a piece he contributed to *Kogyo to keizai*, the house organ of the Japan Association of Industry, after his return to Japan.

In that piece, he first categorized skilled workers into “skilled workers in the intrinsic sense” and “makeshift semiskilled workers,” giving the journey-

1 Tadashi Seike, *Jukurenkou no Nouritsuteki Kunrenhou* [The Efficient Way of Training Skilled Workers], in *Osakafiritsu Sangyounouritsu Kenkyujo* [The Research Institute of Industrial Efficiency run by Osaka local government], *Jukurennkou Yousei Mondai Kouenroku* [The Record of Speeches about the Issue on the Training of Skilled Workers], 1938, pp 2–24.

2 Enjiro Awaji, *Syokkou no Yousei Houhou* [the Way of Training Operatives], *Ibid*, pp 25–26.

3 Kan’ichu Yamaguchi, *Jukurenkou mondai no kenkyu* [Study of the Silled-Worker issue], *Kyoritsusya*, 1941.

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man, craftsman, *Facharbeiter*, machinist, boilermaker, toolmaker, moulder, carman, painter, and *Schlosser* as examples of the former and the helper, learner, and *Angelernte* as examples of the latter. He then eliminated the latter, who can be trained in a short period of time since they need training in only a single task, from the subject of skilled workers issue and identified as the skilled workers subject to this issue the former, who require four to five years of training in various tasks and furthermore at least five years or so of practical experience. Then, emphasizing the fact that such skilled workers masters its crafts through systems such as those of apprenticeship and journeymen in Western countries, he argued that skilled workers should be developed within companies through an apprenticeship in Japan as well.

The concept of training skilled worker through an apprenticeship system may seem commonplace. However, his argument was a new one in that it correctly ascertained the fact that the apprenticeship in the West was strengthening its connections to school education. Focusing on corporative education, which had begun at British and American technical colleges, he described how in the United States apprentices received practical experience in factories equal in number of hours to the time they spent in school and in Great Britain they attended school only one day per week and worked in factories the other five days. Then he argued for the importance of incorporating into the apprenticeship scientific education provided at school, from the point of view that there was a need for scientific education in training of skilled workers for purposes of theorizing about and sorting out experiences in the factory⁴. Yamaguchi defined skilled labor trained in this way as “*tanouko*” (“multi-skilled worker”) having diverse skills and experience, explaining that this term was a translation of the English word “all-round” and the German word “*vielseitig*,” both used to modify the term “skilled worker”

4 Kan'ichi Yamaguchi, *Jukurenkou Yousei ni Taisuru Shiken* [My Personal Opinion About Training of Skilled Workers], in *Kogyou to Keizai* [Industry and Economy] No. 57, 1937, pp 22-24.

in the West⁵.

2. The appearance of “core skilled worker”

In response to Yamaguchi’s proposal of training of skilled workers through an apprenticeship incorporating scientific education through coordination with school education, the new concept of core skilled worker was created. This new concept regarding skilled worker was proposed in a pamphlet entitled “*Kikanteki jukurenkou no juyosei to sono yosei ni tsuite*” (“On the importance of training of core skilled worker”) published in 1938 by the *Kyochokai* (“Harmony Society”), a body established by business and government in 1919 to jointly tackle labor problems. This document was prepared by the apprenticeship committee formed within the *Kyochokai*, led by Tsuneo Ohuchi, who at the time was a secretary of the *Kyochokai*. Ohuchi said that he had created the term “*kikanteki jukurenkou*” to describe the “all-round” skilled worker that Yamaguchi had referred to, after studying in the *Kyochokai* the proposal for “training of all-round workers” that Yamaguchi had brought back with him from his tour of the West⁶. However, in a discourse announced prior to Yamaguchi’s return to Japan, Ohuchi developed an argument largely prefiguring Yamaguchi’s proposal. After first arguing that what was needed today was not simply practical skills but “modern skilled workers” with “the brainpower to apply them” and that such workers needed to have scientific knowledge, he discussed the need to reform Japan’s apprenticeship on the model of Western apprenticeships, particularly the U.S. corpo-

5 Kan’ichi Yamaguchi, *Jukurenkou Yousei no JuYousei* [The Importance of Training Skilled Workers, in *Kagakusyugi Kougyou* [Scientific Industry] 1939, May, p 135.

6 Round table, *Kikanteki Jukurenkou to Toteiseido* [Core Skilled Workers and apprenticeship], Tusneo Ohuchi, *Kikanteki Jukurenkou to Toteiseido no Saikentou* [Reconsideration on Core Skilled Workers and Apprenticeship], in *Sangyou to Kyouiku* [Industry and Education], 1938, Aug, 22, pp 41–42, p 50.

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native system⁷. It appears likely that at that time in Japan there was a certain number of people who shared knowledge of skilled-worker training systems in the West incorporating scientific education and the view that worker training in Japan should be reformed on that model, and these people received Yamaguchi's proposal actively and advanced discussion of the training of skilled workers.

The *Kyochokai* pamphlet argued that core skilled workers would be the key to expand the productive capacity of Japanese heavy industry, which was in the process of shifting to a system of mass production. The apprenticeship committee felt that such workers would play the key role in shops as leading operatives. To perform their role, the core skilled workers must possess sufficient skill and judgment to carry out various tasks they were assigned alone, without assistance of supervisors and engineers. The abilities of core skilled workers should comprise expertise in performing the work they would specialize in, all the skills needed to perform almost any task required for their job, and scientific knowledge of these tasks. To train employees into core skilled workers, the pamphlet argued, it was necessary to provide them with extended, systematic, and broad-ranging training in the use of all kind of machines relating to their jobs, as well as with scientific education to understand the production process. The committee recommended companies in heavy industries to establish a training course for core skilled workers in which boys between the ages of 14 and 16 would be hired as apprentices and given three to five years of training in shops and classes⁸.

According to the apprenticeship committee, the essential difference between the notion of ordinary skilled workers and core skilled workers was

7 Tusneo Ohuchi, *Jukurenkou Yousei to Sono Taisaku* [Training of Skilled Workers and Its Measures], in *Sangyou to kyouiku*, 1936, April, pp 25–29.

8 *Kyochokai Totei Mondai Kenkyukai* (The Research Group on the Apprenticeship Problem), *Kikanteki Jukurenkou no Juyousei to Sono Yousei ni Tsuite* [The Importance of Training of Core Skilled Workers], 1938, pp 1–5, pp 14–25.

that the latter would possess enough scientific knowledge [*gakuri*] to perform their work. Scientific knowledge would enable workers to repair machines and equipments, improve efficiency and quality, and perform new or unexpected tasks. Workers with the ability to perform such difficult tasks, the pamphlet goes, should be genuinely multi-skilled workers.

In contrast to this new proposal to train core skilled workers as multi-skilled workers, the divergent view was argued that importance should be placed on training of “*tannouko*” (“single-skilled worker”) who could be trained in a short period of time.

In this difference of opinions, known as multi-skilled workers/single-skilled workers controversy, it was Takenosuke Miyamoto, Okiie Yamashita, Masatoshi Ohkouchi, and others who argued from the latter position, that of focusing on single-skilled workers. The gist of their argument was that the mass production techniques needed to expand production capacity in the machine industry, needed in a wartime economy, required specialization of tasks and simplification of operations, and that in order to realize these progress should be made in development of special-purpose machine tools and training of single-skilled workers suited to their use. For example, Miyamoto argued that since the principles of mechanical production were specialization of tasks and simplification of operations, in order to expand production capacity and produce good products at lower prices and in mass volumes, it was necessary to specialize tasks and simplify operations as much as possible, and that special-purpose machine tools and single-skilled workers were suited to this need.

However, they still did not deny the necessity of multi-skilled workers and core skilled workers. Miyamoto pointed out at the same time that while machine parts in the machine industry were produced by single-skilled workers, multi-skilled workers were essential since only multi-skilled workers were capable of assembling these, and since it was multi-skilled workers that were responsible for exercising leadership and authority over single-skilled workers⁹. Despite the difference of opinions on the focus of worker training, both

sides shared the understanding that core skilled workers with multi-skills were important.

The decree on training of skilled factory workers enacted in April 1939 required large factories in the metal and machinery-tool industries to implement plans to train core skilled workers. This decree mainly covered factories in the metal and machinery-tool industries employing 200 or more male workers aged 16 or above and factories employing 50 or more such employees as designated by the Minister of Welfare. It ordered them to provide male graduates of upper elementary school or of the general courses of youth schools aged 14 through 16 with three years' training as apprentices to equip them with the knowledge and skills needed to serve as core workers. The standards for the content of such education were prescribed in the guidelines for training plan preparation as at least 220 hours of general education and 500 hours of technical education. While of course the skills training for which 5000 hours were prescribed was the central part of the training, the factories were required to provide scientific education too. The number actually trained through fiscal 1943 totaled 199,376 trainees¹⁰.

This concept of core skilled workers had a major impact on postwar training of workmen as well. A work published in 1944 by Toshio Hosoya, who led postwar industrial-education research, stated, "Skilled workers employed in modern industry must possess a high level of skills and, at the same time, a high level of scientific knowledge concerning technology," and then, calling a system of company in-house training of multi-skilled workers possessing

9 Takenosuke Miyamoto, Seisankakuju to Tannoukou [Expansion of Production and Single-Skilled Workers], in *Kagakusyugi Kougyou*, 1937, Sept, pp 71-72, pp 129-132.

10 Roudousyo [Labor Ministry] ed, *Roudou Gyouseishi* [The History of Labor Policy], vol. 1, 1961, pp 943-945, Syokugyoununren Daigakkou [Institute of Vocational Training], ed, *Syokugyoununren Karikyuramu no Rekishiteki Kenkyu* [A Historical Research on Curriculum of Vocational Training], 1933, pp 57-58, pp 61-62, p 74.

such comprehensive knowledge and skills a new apprenticeship, argued that such a system had appeared in Europe after the First World War, citing examples including the Astier Law in France¹¹. Even the pamphlet “*Ginosya yosei*” (“Operative training”) published by the Labor Standards Bureau of the Ministry of Labor in 1953 identifies as the training target of the postwar operative training system “core skilled worker with the abilities to understand scientific principles and put them to practical application, or put another way, with scientific grounding and grounding as multi-skilled worker.”¹² The concept of core skilled worker had come to serve as one important target in Japanese human-resources development.

While this concept of core skilled worker was formed with Western training of skilled worker serving as a direct model, it was not simply an import. We can find its source in Japan at the start of industrialization as well. The historical process by which this concept formed and was accepted widely points out some important characteristics of workman training in Japan. Below, we will examine this historical process in connection with the transformation and atrophy of the apprenticeship.

3. Changes in the apprenticeship and attempts to train operatives with “scientific” knowledge

During the initial period of industrialization in Japan, the people comprising the bulk of the industrial labor force had also been trained under the apprenticeship. In terms of the treatment and methods, this system followed on from the apprenticeship in the Edo Period among artisanal communities

11 Toshio Hosoya, *Gijutu Kyouiku* [Technical Education], Ikuei Syuppan, 1944, pp 281–288, p 198.

12 Terutaka Izumi, *Tanoukou Yousei no Rekisi to Houhou* [The History and Methods of Training Skilled Workers] in Employment Promotion Agency, ed, *Mekatoronikusu Jidai no Ginousya Yousei* [Training of Skilled Workers in Mecha-tronics Time], 1984, p 30.

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which is considered to be Japan's pre-industrial era, and became the method of training operatives for new jobs such as turners and fitters, which had emerged due to the introduction of new technology from the West. Under the traditional system, children between the ages of 11 and 13 were hired as apprentices. They lived in their masters' house and spent six or seven years undergoing skill training while also performing chores and various other duties. During servitude they were given a tiny allowances, not wages. After successfully serving apprenticeship, young craftsmen usually began his itinerancy to develop their skills on their own¹³.

Since the initial phase of industrialization, reliance on traditional apprenticeship to train a labor force for industry based on technology introduced from the West had been the subject of sharp criticism. In 1881, an application to the Government for permission to establish the Tokyo Workmen's School (discussed later) criticized contemporary apprenticeship for promoting the exploitation by elderly operatives of apprentices as slaves for performing chores, requiring too long to equip the apprentices with the skills they needed to do their jobs, and for not providing them with any scientific knowledge whatsoever¹⁴. In 1884, in a report compiled as part of a government inquiry into the apprenticeship system, the Tokyo Chamber of Commerce and Industry argued that the tutorial relationship between master operatives and apprentices had broken down, causing many apprentices to run away and abandon their apprenticeships. It also answered that many master operatives did not possess sufficient skills and knowledge to educate their apprentices, and instead just exploited them¹⁵. In 1896, a report of the Tokyo

13 Mikio Sumiya, ed, *Nihon Syokugyoyu Kunren Hattatsushi* [the History of the Vocational Training in Japan], vol. 1, 1970, pp 76–77.

14 Tokyo Kougyou Daigaku [Tokyo Institute of Technology], ed, *Tokyo Kougyou Daigaku Rokujunenshi* [the 60years' History of Tokyo Institute of Technology], 1940, pp 59–61.

15 Mikio Sumiya, ed op cit, p 84.

Industrial School (successor of the Tokyo Workmen's School) on industrial education facilities, also highlighted inefficient education and a lack of scientific education as weaknesses of the apprentice system¹⁶.

The view encompassed by these criticisms, that apprentices had basically been transformed into child laborers working for extremely low wages, and that the apprenticeship had deteriorated as a mechanism for imparting skills, was one that had probably been frequently heard in various other countries as issue was taken with the degradation of apprenticeship during the process of industrialization. The other key criticism, that the apprenticeship was failing to provide apprentices with a scientific education, was probably rooted in the fact that Japanese industry was developing based on technology from the West, which had little in common with the technology that had been developed independently in Japan. Corporate managers and technical educators expressed the view that to develop and manufacture products using new technology from Europe and North America, not only engineers but also operatives needed the ability to understand Western technology. This view reflected a belief that Western technology was based on scientific knowledge, and that the possession of such knowledge by operatives in the West was the reason that industry had developed in those countries¹⁷.

From the 1880s government officials began expressing the view that the

16 Tokyo Kougyou Gakkou [Tokyo Industrial School], *Kougyou Kyouiku Shisetsu Ippan* [The facilities for Industrial Education], 1896, pp 4-5.

17 Tei'ichi Sakuma, *Kougyojo Totei Kyoiku no Hitsuyousei wo Ronzu* [The Opinion on the Necessity of Apprentice Education for Industry], in *Sakuma Tei'ichi Zensyu* [The Collected Works of Tei'ichi Sakuma], 1998, pp 55-57 Bunji Mano, *Kougyou Kyouiku ni Tsuite* [On Industrial Education], in *Kyouiku Jiron* [The Educational Review]" No. 811, 1907, Kowashi Inoue, Documents of Nobuaki Makino, *Osaka Kougyou Gakkou Setsuritsu ni Kansuru Ikensyo* [A proposal of Establishing Osaka Industrial School], in Toshikane Ohkubo, ed, *Meiji Bunka Shiryo Sousyo* [The Series on the Material of Meiji Culture], vol. 8, 1975, p 218

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apprenticeship, which was acknowledged to be fraught with various flaws, needed to be legally regulated in order to restore its usefulness for equipping apprentices with skills¹⁸. However, the establishment of a law for this purpose proved difficult. The law relating to the Industry Act, which was passed in 1911 and took effect in 1916, contained clauses concerning apprenticeship, and factory owners employing one were obligated to obtain a license from their local government. In practice, however, very few factories complied with the law and obtained such a license. Almost all apprenticeship remained unlicensed and ignored¹⁹.

To tackle the inadequacies of the apprenticeship in terms of developing skills, an attempt was made to establish school education as an alternative. The goal of this policy was to train operatives who possessed not only practical skills but also scientific knowledge. The most important schools in terms of achieving this goal were Seisakugaku Kyoujo (Manufacturing studies school), affiliated with Kaisei Academy (*Kaisei Gakko*), an institute of tertiary education in Tokyo, which was founded in 1874 and closed in 1877, and the Tokyo Workmen's School, which was established in 1881. A key objective of both these schools was to train chief of operatives with an understanding of theory, which they could not acquire under the apprenticeship²⁰. The term "chief of operatives" as used here is often taken to mean the equivalent of a modern-day general foreman, but is actually closer in meaning to "engineer." The Tokyo Workmen's School developed into a polytechnic, the aim of which is obviously to train engineers.

What was devised as an alternative to the apprenticeship that would train operatives with scientific knowledge was the apprentice school. Regulations established in 1894 on apprentice schools positioned such schools as a form of

18 See, Masana Maeda, *Kougyou Iken* [The Opinion on Promoting Industries], 1884, reprinted, Kouseikan, 1981, p 218.

19 Roudousyo [Labor Ministry] ed, op. cit., pp 58-59

20 Tokyo Kogyo Daigaku [Tokyo Institute of Technology], op cit, p 66.

primary education for young people who had graduated from elementary schools offering three to four years of study. Classes included arithmetic, geometry, physics, chemistry, and drawing, along with courses and practical training relating to each occupation. Principals were given a great deal of leeway in the running of their schools. For example, they had the authority to choose which of these subjects they felt their students needed, and could offer classes in the evenings or on holidays if the circumstances of students required that. They could also offer a wide range of periods of study, from six months to four years. Most of the apprentice schools actually established aimed to train operatives for employment in industries based on local, traditional techniques. Few of them trained operatives who understood and could use technology introduced from the West²¹.

What played a bigger role in the training of personnel capable of using Western technology were industrial schools, which were positioned as providers of secondary education. In 1899, when regulation governing technical schools (*Kougyou Gakkou Kitei*) was established, there were 18 such schools nationwide. After that the numbers increased, and the number of departments teaching subjects relating to Western technology such as machining and metal processing gradually climbed²². One problem the industrial schools faced was that their graduates did not want to remain operatives forever. Many industrial schools failed to articulate clearly whether their goal was to train junior technical staffs or leading operatives, and many people in the field lamented the fact that when graduates had been hired as operatives, they demanded promotion to higher-status positions and would not set-

21 Mamoru Satou, ed, *Totiseido no Kenkyu* [A study on Apprenticeship] 1962, pp 44-45, p 111.

22 Tomoko Hashino, *Kindai Nihon Niokeru Sangyou Kouzou Henka to Kyouiku Shisutemu no Sougosayou* [Interaction between the Change of Industrial Structure and Educational System in Modern Japan], in Masahiko Aoki, et, al, *Dai-gaku Kaikaku* [The Reformation of Universities], 2001, pp 9-10, p 15.

tle at the factories where they worked²³.

This behavior by industrial school graduates indicates that the distinctive personnel management employed by Japanese companies, in which the educational background of an employee was the most important factor in determining their status within the company, was a hindrance to the use of school education to train operatives with scientific knowledge. In this system, which was termed the “educational-status system,” (*Gakureki Mibun-Seido*) employees were divided into three classes. Those who had completed a course of tertiary education at a university or polytechnic were appointed to be senior staffs, while those that had only graduated from secondary schools such as industrial schools were treated as junior staffs. Most operatives hired had only received a primary school education, if they had received any education at all. There were big differences between these three classes both in terms of their treatment inside the company and their social prestige. The social status of operatives was particularly poor. They were seen by people with higher-status jobs as having depraved lifestyles²⁴. This meant that even if they were treated as leading operatives with scientific knowledge within the company, people who had received a secondary school education could not be expected to be satisfied with their status as operatives and put their abilities to use for the benefit of the factory. The fact that graduates of industrial schools hoped to obtain jobs of higher status than that of operatives, and that they repeatedly moved from factory to factory drew criticism from corporate managers and educators. At the same time, the apprentice schools, the goal of which was to train operatives, failed to appeal to most young peo-

23 Kyochokai, *Toteiseido to Gijutsu Kyouiku* [Apprenticeship and Technical Education], 1936, pp 283–284, Toshikata Sano, *Kougyou Mondai ni Tsuite* [On the issue of Industrial Education], in *Kousei* [Industrial Policy], vol. 76, 1926, p 28.

24 See, Hiroshi Ichihara, *Jintekishigen no Keisei to Mibun Seido* [The Development of Human Resource and Status Syatem], in Naofumi Nakamura et al, ed, *Kouza Nihon Keieishi* [Business History in Japan], vol. 2, Mineruva Syobou, 2010.

ple and their parents, and many were seen as low-grade industrial schools for educating the children of factory owners and operatives from the local area²⁵.

When young people educated at such schools became operatives, factory owners were dismayed that they refused to behave like older operatives with artisanal tradition. When factory owners in Tokyo had been consulted on the issues with apprentice schools before the aforementioned regulation governing such schools had been established, they recognized the value of a scientific education in school. On the other hand, they were concerned that scientific education in school would interfere with the practical-training aspect of apprenticeships, and indicated no willingness to send their apprentices to school²⁶. Educational journals published in the 1920s carried numerous pieces from managers of small and medium-sized factories arguing that technical education in schools would hinder the training of operatives²⁷.

Because the attempt to make school education an alternative to apprenticeship failed to produce the results hoped for, a method called the trainee system (*Minarai kou Seido*) came to be the predominant means of training of operatives. Regulations governing trainee systems had been drawn up in 1890 at the Mitsubishi Nagasaki shipyard and Machinery Works and in 1896 at the Yokosuka naval arsenal, and similar systems were adopted at numerous other large factories at around this time²⁸. Under this method, young people were hired by factories as trainees, where they acquired skills through on-the-job training on the frontline under the supervision of a operative assigned to instruct them. Unlike apprentices, these trainees commuted from

25 Yasuharu Akiho, *Kougyou Kyouiku to Syokkou Yousei* [Industrial Education and Training of Operatives], 1917, pp 148–151.

26 Kyocho kai, op cit, p 251.

27 Shigeru Sakaguchi, *Kindai Nihon no Kigyounai Kyouiku Kunren* [In-house Training in Modern Japan], vol. 1, 1992, pp 3–4.

28 Mikio Sumiya, ed, op cit, pp 103–104, p 178.

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their parents' homes, and received small wages.

The drawback of this trainee system was that the young trainees could not actually receive any instruction in the workplace. Unosuke Nishiyama, who became a trainee at Osaka Steelworks in 1887, recalled that he had not been taught anything, that he had acquired his skills solely by watching and remembering²⁹. Karoku Miyaji, who became a trainee at the Sasebo naval arsenal in around 1897, wrote that the leading hand who had taken him on as a pupil took him for his wages and exploited him, leading him to flee the boss's house after only a short time³⁰. Because the operatives assigned to supervise the young trainees were given no incentive to take care of the minors, they neglected to teach them, while the less savory took them for their wages or exploited them. Because they were not supervised or looked after by anyone in the factory, trainees tended to breach their contracts and drifted one factory to another³¹. As a result, the custom of itinerating and the acquisition of skills through on-the-job training became the hallmarks of the training of operatives.

At the beginning of this paper, I presented that a clear notion of the skilled worker had not been formed as late as in the 1930's. The blurred definition of skilled workers in Japan was attributed to the disappearance of any connection between the training of operatives and the apprenticeship from this period.

4 . The Beginnings of the corporate apprenticeship

Beginning at the turn of the century, Japan also saw the full-fledged development of heavy industry. Shipbuilding was the driver for this heavy indus-

29 Uzou Nishiyama, *Ajikawa Monogatari* [The Story around Aji River], 1997, p 194.

30 Karoku Miyaji, *Syokkou Monogatari* [An Operative Story], 1949, pp 9–13.

31 Tsutomu Hyodo, *Nihon ni Okru Roushikankei no Tenkai* [The Development of Labor Relations in Japan], 1971, pp 104–105.

trial development, and after the Russo-Japanese War of 1904–05, Japanese shipbuilding companies are credited with acquiring the ability to manufacture ships of similar size and performance to those produced by Western firms. With the aim of developing a modern steel industry to supply the raw material for shipbuilding, reparations obtained from China for the First Sino-Japanese War were used to build a government-run steelworks, which went into operation in 1901.

The prevailing view that emerged was that the use of advanced Western technology was essential to develop such heavy industries, but that such use would require not only the training of high-caliber engineers but also the training of operatives who understood the theory behind the technology. This view became widespread for technical reasons, because design drawing had come to play a major role in shipbuilding at the time. Until the end of the 19th century only a basic design drawing was prepared when a ship was going to be built, but at the turn of the century detailed design drawings began to be produced. These drawings were often labeled in English, so operatives needed the ability to look at the drawing and visualize the structure of the ship and the engineering methods needed to build it, as well as the ability to read English, at least at a rudimentary level³².

Companies trained workmen with scientific knowledge, which had become increasingly necessary during this period, not by hiring as workmen graduates of schools offering technical education but by employing as corporate apprentices (*Youseikou*) young people who had graduated from primary school and providing them with scientific education and technical training. Two methods were used to provide corporate apprentices with theoretical education. The first was to send them to an in-house school established by the company, while the second was to have them study at an external technical education institution such as an apprentice school or an industrial-type special institution (*Kakusyu Gakkou*).

32 Hiroshi Ichihara, *op cit*, pp 231–232.

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One of the first factories to establish an in-house educational institution providing scientific education to workmen was the Mitsubishi Nagasaki shipyard and Machinery Works, Japan's biggest private-sector shipyard. The trainee system introduced there in 1890 was transformed into a corporate apprenticeship in 1899. The corporate apprentices were hired from among children who had completed elementary school and graduates of higher primary schools, which provided two years of advanced elementary education. They spent their five-year apprenticeship acquiring skills under the supervision of a foreman, and took lessons relating to their particular jobs in a classroom in the factory. In 1899 an in-house school called the Mitsubishi Junior Industrial School (*Mitsubishi Kougyou Yobigakkou*) was also established at the shipyard. This school admitted children who had graduated from elementary school, and provided them with five years of instruction in draftsmanship, as well as in standard secondary school subjects such as English, mathematics, physics, and chemistry. In 1904, when the school produced its first graduates, management decided that all corporate apprentices would be drawn from among the graduates of the Junior Industrial School. This meant that after receiving an all-round education equivalent to that offered at secondary schools, corporate apprentices would undertake practical training in the factory while simultaneously studying technical subjects relating to their jobs in the classroom. The classroom lessons amounted to a total of five hours per week³³.

At the Yokosuka naval arsenal, which drove the development of Japanese shipbuilding technology due to the promotion of warship construction, an in-house school to train chief of operatives with scientific knowledge was established immediately after the founding of the arsenal on the recommendation of a Francois Leonce Verny, a French naval engineer. Described as a workmen's school, it admitted farmers' children from the surrounding area with

33 Mikio Sumiya, op cit, pp 178-187, Ryouichi Iwauchi, *Nihon no Kougyouka to Jukuren Keise* [Industrialization and Skill Formation in Japan], 1989, pp 113-116.

the aim of training them to be chiefs of operatives possessing both practical experience and scientific knowledge. Soon afterwards, however, it transformed into a school that admitted high-caliber operatives and taught them the subjects they needed to be promoted to the status of junior technical staffs³⁴. In 1910 at this arsenal, corporate apprentices became obligated to study for two years at a further education school (*Hosyu Gakko*), where they were provided with supplementary vocational education for primary school graduates. In 1917 the period of study was extended to three years. Then, in 1921, eligibility to be hired as a corporate apprentice was tightened to include only graduates of higher primary schools. Three years later an institute of training for trainees was established at the arsenal on the grounds that the education provided by the further education school was not suitable for preparing people for jobs at a naval arsenal. As a result, corporate apprentices began receiving technical education that related to their jobs on site³⁵.

In 1910 an institute of training for boy operatives (*Younen Syokkou Youseijo*) was established at the government-run Yawata steelworks, and an institute of training for apprentices (*Totei Youseijo*) was founded by Hitachi, which would grow to become one of the most important companies in Japan's electrical machinery and appliance industry. Both institutes recruited promising young people from the local area who had graduated from higher primary schools. The young workmen enrolled studied science every morning and underwent practical training in the workplace they were assigned to

34 Mikio Sumiya, ed, op cit, pp 93–100.

35 Yokosuka Kaigun Kousyo [Yokosuka naval arsenal], ed, *Yokosuka Kaigun Kousyo Gijutsukan Oyobi Syokkou Kyouiku Enkakushi* [The History of Education of Engineers and operatives in Yokosuka Naval Arsenal], 1937, p 28, pp 118–119, Yokosuka Kaigun Kousyo, *Yokosuka Kaigun Kousyoshi* [The History of Yokosuka Naval Arsenal] vol 2, 1935 [reprint, 1983], p 443, vol. 3, 1935 [reprint, 1983], p 259.

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in the afternoons. At both institutes, the scientific education comprised standard subjects such as English, mathematics, physics, and chemistry, and specialized engineering subjects relating to their jobs. In 1928 Hitachi's institute of training for apprentices became a special institute (*Kakusyu Gakkou*) called the Hitachi Industrial Vocational School (*Hitachi Kougyo Sensyu Gakkou*), which still exists today as a distinctive educational institution³⁶.

The most famous system for having operatives attend schools providing technical education was an educational program described as *Tekizai Kyouiku* "education of men fit for their jobs" begun in 1905 by a workmen's school run by the Tokyo metropolitan government. Several large companies in Tokyo, such as Shibaura (now Toshiba), a leader in Japan's electrical equipment and appliance industry, and Ishikawajima Shipyard (now IHI Corp.), took advantage of this program to send operatives they hoped would become their core set of workmen to the school to study science. The companies sent them to the school during working hours and also covered the tuition fees. Although this system did not target company apprentices specifically, many other companies, such as Kawasaki Shipbuilding Corporation and Toyo Electric Machinery Corporation, also had their corporate apprentices attend schools outside the companies³⁷.

Corporate apprenticeship like these were adopted by numerous companies during the 1920s as they attempted to rationalize following World War I, during which an unprecedented boom for the Japanese economy had led to full-fledged labor union activity emerging for the first time. The proliferation

36 Ryouichi Iwauchi, *Yawata Seitetsusyo ni Okeru Kyouiku Kunren no Hensen* [The Transition of Education and Training in Yawata Steel Works], in Meiji University *Keiei Ronsyu* [Meiji Business Review], vol. 37 no 2, 1990, Nichikou Dousoukai [The Alumni Association of Hitachi Industrial Vocational School], *Warera Hitachi no Teiryu Taran* [We will be Undercurrent of Hitachi], 1987, pp 35-37, pp 64-65.

37 Mikio Sumiya, ed, op cit, vol 2, 1971, pp 21-28, pp 146-147.

of the corporate apprenticeship is generally seen as being one of the factors behind the early development of internal labor markets at large Japanese companies in the 1920s. The notion of establishing a core set of operatives comprising “operatives possessing both practical skills and scientific knowledge” became widely embraced, and became the prototype for the aforementioned notion of core skilled workers in the debate of the late 1930’s.

5. Corporate apprentices and junior technical staffs/foremen

One of the problems with the corporate apprenticeship was that corporate apprentice-turned operatives were a minority among operatives. They formed the core group of operatives, and were expected to become highly-capable foremen in the future, and indeed, many corporate apprentices succeeded in meeting these expectations. The majority of operatives, however, were former trainees who had acquired their skills through on-the-job training. In addition, most of the foremen that company apprentices encountered in the workplace were much older than them, and had not been equipped with scientific knowledge when they acquired their skills in their youth. There were also big differences in terms of modes of behavior and cultural values, so corporate apprentices often clashed with the foreman supervising them or the operatives who were their colleagues at the factory³⁸.

Company records show that most of the corporate apprentices at the aforementioned Mitsubishi Nagasaki Shipyard and Machinery Works did not want to be assigned to the production frontline, citing discord with foremen as the reason³⁹. Instead, they had a strong desire to work in design depart-

38 Yasuharu Akiho, *Syokkou Kyouiku ni Kanshi Koujounushi ni Nozomu* [The Hope to the Factory Owners about the Education of Operatives], in *Tokyo Keizai Zasshi* [Tokyo Economic Journal] no. 1474, 1901, p 15.

39 *Mitsubisi Kougyou* [Mitsubishi Mining Corporation], *Roudousya Toriatsukai-kata ni Kansuru Chousa Houkokusyo Mitsubisi Zousenjo* [The Investigative Report on the Treatment of Workmen at Mitsubishi Shipbuilding Corporation], 1914, p 62.

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ments. The explanation given was that corporate apprentices believed that being assigned to design departments would increase their chances of being promoted to junior technical positions, and personnel records show that most of them did indeed receive promotion to such positions. As mentioned earlier, the social status of operatives was extremely inferior, so they had a strong desire to escape operative status. Their primary method of achieving this was to obtain scientific knowledge and aim to be promoted to a junior technical position known as a *gite*. If corporate apprentices felt that the chance for technical position closed for them, most of them would leave the factory and try to enter a more advanced school to increase their chances of obtaining a higher-status position.

Under personnel management based on the aforementioned educational-status system, it was generally conceived that the *gite*, junior technical jobs were suitable for graduates of industrial schools and other secondary schools. In reality, many operatives were promoted to junior technical positions after graduating from primary school and then working at the factory for a lengthy period of time⁴⁰. It was widely acknowledged that there was a serious problem in Japan between these junior technical staffs and foremen. This problem was not seen in Europe and America. People with an interest in the training of foremen pointed out repeatedly that the status of foreman had become a means of rewarding workmen for long service, that their duties were unclear, and that most of the duties assigned to foremen in Western countries were performed by junior technical staffs in Japan⁴¹. These characteristics were rooted in the weak abilities of foremen in the pre-war Japan. Foremen had not received scientific education and lacked the ability to lead their men in solving technical questions in their shops. This problem

40 See, Hiroshi Ichihara, op cit.

41 Kyochoikai, *Syokuchou Oyobi Syokuchou Shidousya no Kyouiku* [The Education of Foremen and the Instructors of Foremen], 1932, Tuneo Ohuchi, *Syokuchou Yousei* [Training of Foreman], 1942, pp 76-86.

led, in the 1920s, to the launch of education for foremen and senior workmen who were expected to be promoted to foremen. The aforementioned Tekizai Kyouiku (education of men fit for their jobs) was one such initiative, while in 1920 Hitachi established a new in-house school with the re-education of foremen as its primary objective⁴². However, the demarcation between the duties of junior technical staffs and foremen was unclear, and in practice their duties overlapped, and this problem remained unsolved until the end of the 1950s.

The notion of establishing a core set of operatives comprising “operatives possessing both practical skills and scientific knowledge”, i.e. the corporate apprentice concept, developed, and this evolved into the notion of the core skilled worker in the 1930s. Even so, solutions were ultimately not reached for issues relating to the positioning inside the company of the operatives that would embody this notion, i.e. whether they should be skilled workers, foremen, or junior technical staffs, and what jobs were appropriate for them to perform.

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42 Mikiko Sumiya, op cit, vol. 2, pp 142–152, Nichikou Dousoukai, op cit, p 50.