Part———I

Overview

Chapter——1

Development and Education

Toshio Toyoda

I. The Meaning of Education in Development

Socioeconomic development and education, considered in a somewhat broad sense, can be said to be primarily concerned at present with the developing countries. T. W. Schultz, an American economist, analyzed the concept of the human factor in economics in 1957,[1] which shed new light on the human factor in development. This idea of the correlation between development and education was spread worldwide.

Schultz had observed America's economic growth over a forty-five-year period and incorporated education in his examination of its growth. He viewed human capability as a form of human capital which required expenses for it to be increased and promoted and took the position that as long as human capital entailed cost, it should be included in economic analyses. This article was published in 1957, the year the Soviet Union launched *Sputnik*. In 1957, moreover, Nkrumah led the way in Africa and declared Ghana's independence. Schultz had made a theoretical start in 1957 regarding the correlation between economic growth and education.

In international politics, Unesco's General Assembly in 1960 revealed a new viewpoint that education induced development culturally and socially and was indispensable to economic developmet. Unesco, in the same year, stressed the correlation of education and culture to economics. The following year OECD (Organization for Economic Co-operation and Development) held a policy conference in Washington under the theme "Economic Growth and Investment in Education." This conference expressed the surprise and worry of Americans

and Europeans over the launching of *Sputnik*. How was it possible for the Soviet Union to achieve a scientific accomplishment of such a high standard? Why was the United States unable to do so likewise? The conference debates became quite heated. One participant questioned the validity of taking up issues relating to education because it was felt that OECD was an organization for economic cooperation and development. It appeared to be an anomaly to have economic agencies with so many staff members for matters related to educational plans. Subsequently, however, OECD continued to place emphasis on education and founded the Center for Educational Research and Innovation (CERI) to pursue the educational development of each of its member nations.

From the 1960s to the 1970s, such United Nations organizations as UNIDO (United Nations Industrial Development Organization) and ILO (International Labor Organization) began projects regarding human resources and manpower. Various developing countries also came to give foremost political priority to the spread of literacy. As a result of Unesco's exhortation in the early 1960s, such conferences as the Karachi Plan in Asia, the Santiago Plan in Latin America and the Addis Ababa Plan in Africa were held to set long-term goals for educational development in these regions.

In 1964 F. Harbison and C. A. Myers wrote a book entitled *Education, Manpower, and Economic Growth*[2] which has since become a classic in this field. Harbison and Myers accumulated data showing the educational and economic standards of 75 countries and calculated correlation coefficients between the two standards (see Table 1.1).

When the correlation coefficients are studied as one group, it is possible to find various correlating indicators, such as those with strong correlations and those with weak correlations. The composite index shows that educational prevalency is very highly correlated to both per capita GNP and the agricultural proportion of the population. It can be seen that the ratios of secondary and tertiary educational enrollment are correlated at a fairly high degree to per capita GNP and the proportion of the agricultural population. Furthermore, the data shows that economic growth is highly correlated to human capabilities indicated by the numbers of teachers, scientists, engineers, and doctors. Although this table contains some parts which do not show such a high degree of correlation, it deserves attention as a comprehensive study.

Another interesting characteristic of this study is that Harbison and Myers developed a complex index showing the level of educational development. The index they finally devised after repeated test cal-

culations was extremely simple. It was the arithmetic total of the secondary-level enrollment rate and the tertiary-level enrollment rate, multiplied by five. With the use of this index, seventy-five countries are categorized into Level I: Underdeveloped; Level II: Partially developed; Level III: Semiadvanced; and Level IV: Advanced.

In the 1970s, enthusiasm regarding the so-called Economics of Education tended to decline. (In Japan many of those who persevered in their study majored in the field of "educational sociology." Despite the criticism of educational sociologists for viewing education as a tool of economic development, they persevered in trying to grasp the social function of education.) Despite a waning enthusiasm, according to Mark Blaug of the University of London, over two thousand theses and books in English have been published since 1957 when Schultz wrote his article. Furthermore, there is presently an annual publication of about one hundred volumes in the field of economics of education.

Among the reasons for the waning enthusiasm for the economics of education in the 1970s, one reason seems to be a limitation in the methodology: the input and output of education could not be calculated exactly.

Diverse reconsiderations were also made regarding investment in education. One opinion was that development funds spent on primary education were wasteful and that these funds should be spent on secondary and higher education, which would have a more intensive and immediate effect. Educational development plans, such as the Karachi Plan, in various regions of the world undertook a reconsideration of the effectiveness of the allotment of educational investment.

When the attainment level of these plans is reviewed, the objectives concerning secondary and university education have been achieved more than satisfactorily. It should be stated, however, that this educational investment has been made more on the basis of class pressure in society than on economic efficiency. Primary education at the base has remained unchanged without showing any considerable growth. As a result, the levels of attainment objective form an inverted pyramid. There is sufficient growth in education at the higher levels whereas at the lower levels growth is inadequate. This is completely different from the approach adopted in Europe and Japan where there has been a gradual growth both at the higher levels and in primary education.

Education in Japan has grown at such a rapid pace from the Meiji period (1868–1912) onwards because prior to the Meiji period there had been considerable educational attainment among the common people of the Tokugawa period (1615–1867). As for Russia, it could

Table 1.1. Human Resource and Economic Development: Correlation Coefficients of Indicators

Indicators	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Composite index		.888	−.814	.770	.579	.491	.656	.810	.905	.620	.079	−.160	.098	−.522
GNP per capita U.S. dollars	.888		−.818	.755	.833	.700	.668	.732	.817	.735	.021	.017	.101	−.515
Percent active population in agriculture	−.814	−.818		−.797	−.806	−.826	−.775	−.846	−.835	−.675	−.043	−.073	−.204	.595
Teachers per 10,000 population	.770	.755	−.797		.373	.339	.739	.870	.671	.392	.069	−.074	.142	−.310
Engineers and scientists per 10,000 population	.579	.833	−.806	.373		.816	.103	.895	.791	.784	−.303	.043	.462	−.618
Physicians and dentists per 10,000 population	.492	.700	−.827	.339	.816		.265	.759	.656	.832	−.210	.098	.722	−.661
First-level enrollment ratio	.656	.668	−.775	.739	.103	.265		.966	.485	.155	.297	−.126	−.401	−.210

Table 1.1 (continued)

First- and second-level ratio	.810	.732	−.846	.870	.895	.759	.966		.804	.744	.196	−.196	.368	−.564
Second-level ratio	.905	.817	−.835	.671	.791	.636	.485	.804		.758	−.005	−.120	.376	−.700
Third-level ratio	.620	.735	−.675	.392	.784	.832	.155	.744	.758		−.246	−.131	.734	−.754
Percent in science and technical faculties	.079	.021	−.043	.069	−.303	−.210	.297	.196	.005	−.246		−.234	−.498	.129
Percent in humanities, arts, law	−.160	−.017	−.073	−.074	.043	.098	−.126	−.169	−.120	−.131	−.234		−.215	.180
Public expenditure on education (percent national income)	.098	.101	−.204	.142	.462	.722	−.401	.378	.376	.734	−.498	−.215		−.720
Percent in age group 5–14	−.522	−.515	.595	−.310	−.612	−.660	−.210	−.564	−.670	−.754	.129	.180	−.720	

Source: Frederick Harbison and Charles A. Myers, *Education, Manpower, and Economic Growth: Strategies of Human Resource Development* (New York: McGraw-Hill, 1964), p. 39.

not suddenly have became a country with a high scientific standard had there not been scientific attainment prior to 1917.

The United Nations' expression Three Decades of Development estimates that the rate of primary-level enrollment in the third world has risen from about 47% to more than 60% in the past thirty years. When health conditions are considered, life expectancy has extended fifteen years in countries with a low GNP. When education in developing countries is studied on the basis of Three Decades of Development, the semi-advanced countries such as ASEAN countries have reached a development level necessary for the next stage, secondary-level education, because the objectives regarding primary education have been nearly attained. The vast majority of developing countries, however, are at present at the stage of facilitating primary education.

Although it was stated earlier that the average primary school enrollment rate in developing countries reached more than 60% in 1981, there are many dropouts in these countries. By about the end of the fourth grade as many as 40% of those who entered the first grade will drop out. This is an aspect which distinctly reveals the standard and quality of contemporary primary education. The World Bank, an international organization with optimum interest in education, published enrollment rates in various regions of the world in its 1980 World Development Report shown in Figure 1.1. The lowest ratio is found in so-called Black Africa south of the Sahara Desert. The highest ratio is found in Latin America, followed by East Asia, South Asia, the Middle East, and North Africa. In the case of South Asia there is a great gap between boys and girls in primary school enrollment. There is also a considerable enrollment gap between boys and girls in the Middle East. This gap derives from the social and religious attitudes of these regions.

In addition to the lack of excitement previously mentioned regarding the economics of education, it appears that education itself has been treated as if it had capabilities beyond its actual power. There appears to be a tendency to expect too much of education. Many of the studies on the comparison between education and the economic standard were pursued by those who followed in the wake of Professor Schultz. Arnold Anderson, for example, caustically ventured that it was more accurate to judge primary school enrollment on the evidence of national income than to judge national income on the evidence of primary school enrollment. Although the educational standard contributes to development, it is in fact to the same degree a by-product of development. Moreover, it is even said that, although it is necessary,

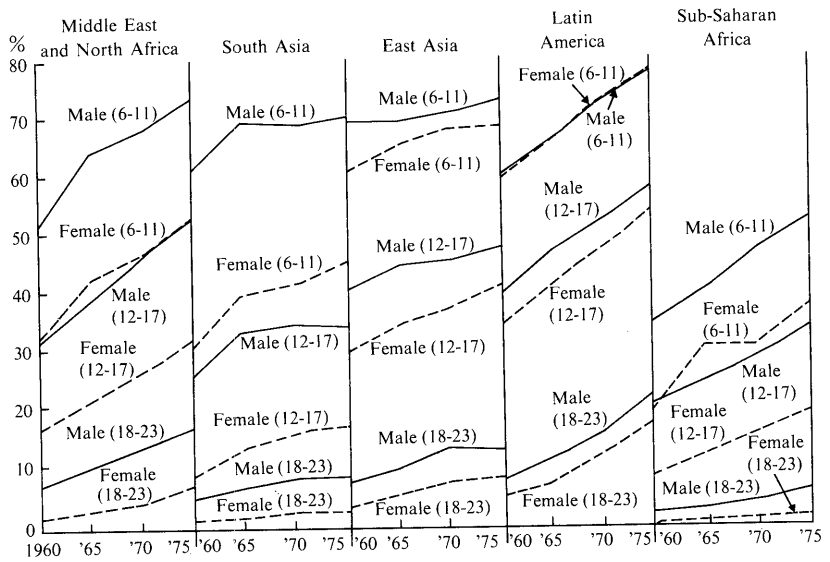

Fig. 1.1. International Comparison of School Enrollment, 1960–75(%)
Source: World Bank, *World Development Report, 1980* (Washington, D.C., 1980), p. 47.

education is never a sufficient condition for development. Apart from the above, the prevalency of education could lead to such a state as an increase in unemployment. According to one case in Africa, there is a joke that "if the elder sister goes to school, tonight's meal will consist of a fountain pen." According to another case in Africa, although a monthly salary of $1,000 had been offered to a university graduate, it was declined. Why didn't he accept $1,000? He preferred receiving the $500 that he had been getting thus far, because if his relatives heard that he had received $1,000, they would all come and his salary would soon be gone.

Educational planning does not necessarily go smoothly even in such a country as the Soviet Union. Due to a gap between the expectations of students seeking employment and the actual positions available, the reorganization of educational planning often becomes necessary. A comparison between the early Meiji period, when various educational programs were set forth, and a stage thirty years from then reveals that the degree of attainment in Japan also was not very satisfactory.

II. Vocational Education and Training in the Early Stage of Industrialization

1. Industrial Education and Training up to the Twentieth Century

Since skills and techniques that existed around the Meiji Restoration in 1868 were rooted in the traditional life of the Tokugawa period, those that could be used for the modernization of industry were extremely limited. When the Ministry of Industry was established, its first task was the founding of a training organ for engineers. Nearly all of the faculty members of the School of Engineering were government-hired foreign professors.

The school's program was extremely intensive (eleven and a half hours of classes a day). The school consisted of a two-year preparatory curriculum, a two-year specialized curriculum, and a two-year course of practical training. There were six courses: civil engineering, machinery, telecommunications, architecture, metallurgy, and mining. From 1870 to 1885, the school graduated 200 engineers who pioneered the spread of Western technology in their respective fields. Due to the insufficient development of modern industry, initially there was no place where these engineers could apply the education and training that they had received. This "anticipatory investment" in education, however, placed them at the apex of an industrial pyramid in the period of modern industry.

It was imperative to nurture skilled labor needed at the base or in the middle of the pyramid of the industrial structure. The first and the most effective training took place at a government arsenal and shipyard. Although this government factory was sold to a private concern in 1880, the training of skilled workers in metal and machinery was continued under government supervision as a national defense project.

The government had already established a training center annexed to the Yokosuka Shipyard in 1872, but in 1881 the government also opened the Tokyo Worker Training School (Tokyo Shokkō Gakkō, the present Tokyo Institute of Technology) placed under the jurisdiction of the Ministry of Industry. Recruiting students was not easy in a period when the objectives of modern industry were unclear. Therefore, the government endeavored to achieve full enrollment through the adoption of a special wage system for some kinds of skilled worker training as well as by exempting students from conscription. The principal, Tejima Seiichi, later called the father of industrial education in Japan, created at this school a prototypal system of "vocational

education." The Tokyo Worker Training School was soon divided into the Tokyo College of Technology (Tokyo Kōgyō Gakkō) and the Annexed Worker Apprentice School (Fuzoku Shokkō Totei Gakkō). The latter became the model of the apprentice schools founded nationwide in 1894.

2. Establishment of Apprentice Schools

Among the vocational schools in the early period were the apprentice schools and vocational continuation schools, as well as other vocational schools: industrial, agricultural, and commercial schools, and somewhat later fisheries and merchant marine schools.

The apprentice schools were established for the promotion of traditional local industries, whereas the vocational continuation schools were opened at night and on Sundays for part-time students to nurture agriculture, commerce and industry.

In the period when Japanese industry was about to enter the so-called takeoff stage in 1887, that which brought foreign currency to Japan was raw silk, ceramics, lacquerware, and products that had been manufactured since the Tokugawa period. The foreign currency obtained through the sale of these products together with the foreign currency acquired through the export of tea and copper was indispensable for the import of machinery and chemicals necessary for Japan's industrialization.

To maintain and modernize such industries as raw silk, ceramics, and lacquerware, as well as the traditional products made of wood and bamboo, apprentice schools (an early form of technical schools) were established.

From 1894 to 1901, 26 apprentice schools were founded throughout Japan. The curriculum offered at the respective schools included such courses as weaving and dyeing, china and porcelain, ceramics, woodwork, metalwork, lacquerware, bamboowork, paperwork, embroidery, artificial flower making, and shipbuilding. The schooling lasted from two to four years.

In accordance with Ministry of Education regulations, the apprentice school system was established in 1894 with the objective of providing new worker training. Modeled after the Tokyo Worker Training School—a training school for foremen, technicians, instructors, and industrialists—the apprentice schools were designed to train low-level technicians needed for rising industrialization. The Ministry of Agriculture and Commerce's "Views on the Promotion of Industries" stated in 1884 that, at the time, protection and nurturing of traditional industries were important national objectives.

Light industries such as cotton yarn, silk reeling, textiles and sugar refining were developed after the Sino-Japanese war (1894–95), and heavy industries such as shipbuilding and steel making were developed later. Upon reaching this industrial stage, mechanical skills became more important than manual skills. Since 1872, the Meiji government had been pursuing an educational policy emphasizing general education at its core, but now the government had to introduce industrial education. The Regulations for Apprentice Schools and the National Subsidy for Vocational Education Act passed the Diet in 1894 stressed industrial education and helped to finance industrial education for apprentice schools and technical schools. The Ministry of Education consulted the industrial union members in the suburban districts of Tokyo, but could not obtain their active support for the apprentice schools. Comments such as "students would not understand advanced science taught in a high-tone manner and would become neglectful of their work," "sending apprentices to school would interfere with work schedules," and "about two hours at night is enough for schooling" reveal the extent of people's understanding of technical education at that time.

Tejima Seiichi, the foremost promoter of vocational education, kept advocating the reform of conventional apprenticeships. He argued that "the wealth and power of the West derived from extensive industrial technology" and that "industry flourished due to the facilitation of vocational education as was seen in Britain." With Tejima at their center, the promoters of vocational education had a great deal of zeal. To catch up and pass Western civilization was a trend commonly found in each field and sector of Japan. It can be said that an even keener ardor prevailed when vocational education was introduced. *Kyōiku Zasshi* [The Educational Journal] published by the Ministry of Education had already put out 19 related articles in 1880. In 1884, the journal asked Kikuchi Dairoku (later president of the University of Tokyo and the University of Kyoto), who had just returned from England, to translate J. S. Russell's *The Theory of Vocational Education.* The journal also undertook a complete translation of the twenty-volume work by J. S. Russell entitled *Systematic Technical Education for the English People: Royal Commission on Technical Instruction.* Efforts made in the ensuing decade of this period culminated in the Regulations for Apprentice Schools and others.

Four apprentice schools were founded in 1894. In 1896 the number of schools increased to 17, then 34 in 1902, and finally 136 in the peak year of 1918. The training of middle- and low-level technicians was accelerated by the industrialization of Japan.

3. The Establishment of Vocational Continuation Schools

Vocational continuation schools provided the youth working at work and at home with supplementary primary education as well as simple vocational education. Since the Minister of Education, Inoue Kowashi, placed emphasis on vocational education as the Ministry's educational policy, promotion of vocational continuation education was advocated.

Regulations for Vocational Continuation Schools were established in 1893. Article 1 stipulated that the school be "a place where children either engaged in various vocations or, wishing to be engaged in a vocation, be given a supplementary primary education as well as knowledge and skills necessary for their vocation through a simple method."

It was decided that the educational entry level be more than ordinary elementary school graduation and the length of study was specified to last not longer than three years. The curricula were divided into two categories: one for regular subjects and the other pertaining to vocation. The vocational curriculum varied according to the region in which the school was located. Thus there existed curricula for industrial regions, commercial regions, and agricultural regions.

Classes were held for part-time students on Sundays, at night, or during certain seasons only. The vocational continuation schools were not established independently but were attached to ordinary elementary schools or upper elementary schools. These school buildings and their equipment were made available as long as the elementary classes were not hindered. Moreover, elementary school teachers taught at the vocational schools.

At the turn of the century, in what can be called the takeoff period, when Japanese industrialization progressed and the agricultural, commercial, and industrial sectors expanded, vocational continuation schools developed rapidly. Development for the period from 1896 to 1912 is as shown in Table 1.2. By 1912, the last year of the Meiji period, agricultural continuation schools accounted for nearly 80% of the vocational schools.

III. An Outline

This book consists of the following four parts: The first part describes historically the establishment and the developmental processes pertaining to the apprentice schools and the vocational continuation schools which are the themes of this book.

The second part deals with case studies and most of the pages are

Table 1.2. Public Vocational Schools, 1892–1912

Classification / Year	Industry	Agriculture	Fisheries	Commerce	Merchant Marine	Apprentice	Vocational Continuation School: Industry	Agriculture	Fisheries	Commerce	Merchant Marine	Others	Total	Grand Total
1892	1	8	—	11	—	—	—	—	—	—	—	—	—	20
1894	3	9	—	12	—	1	—	—	—	—	—	—	19	44
1896	5	28	—	15	—	11	13	52	—	25	—	—	90	149
1898	10	39	—	20	—	17	23	60	—	26	—	—	109	195
1900	15	51	—	31	4	19	25	70	15	31	1	—	142	262
1902	22	90	6	42	7	31	42	459	23	69	1	—	594	792
1904	30	110	7	47	7	39	72	1,374	41	106	1	—	1,594	1,834
1906	28	130	11	51	8	52	139	3,670	102	148	1	—	4,060	4,340
1908	31	167	14	55	11	76	231	4,045	91	189	2	—	4,558	4,912
1910	35	210	17	72	11	100	147	4,403	106	180	1	1,010	5,847	6,292
1912	34	236	9	80	11	104	177	5,336	123	176	1	1,293	7,106	7,580

Note: Formulated from annual reports published by the Ministry of Education. Excludes special training schools and branch schools.

Source: *Nippon kindai kyōiku 100 nen shi* [A Hundred-Year History of Modern Japanese Education], vol. 9. (Tokyo: National Education Institute, 1973), p. 716.

devoted to the examination of nine cases. Of the nine case studies, six pertain to apprentice schools (later promoted to technical schools), two to vocational continuation schools (later promoted to commercial schools), and one to an advanced level vocational school (agricultural school).

The third part follows the transformation processes which occurred in apprentice schools and vocational continuation schools, but most of this part deals with the education and training provided by companies.

The fourth part, which is entitled "Education and the Industrialization of Japan," examines Japanese education from Meiji to the present and describes industrial education and engineering education which corresponded to postwar industrial growth.

The following summarizes the first, second, and third parts.

Part I, Chapter 2. Vocational Education in the Takeoff Period

In 1894 the Meiji government established the Regulations for Apprentice Schools and began to deal with the full-scale training of low-level technicians through school education. The transformation of artisan training from a system based on traditional live-in apprenticeship for a long period to skilled worker training with modern technology was begun.

The intention of the Meiji government to train skilled laborers faced some problems. Depending upon the region, schools suffered from an insufficient enrollment of students. Furthermore, traditional indentured service was still so firmly rooted that the modernization of traditional industries through apprentice schools tended to be obstructed.

Nevertheless, the strong desire of the Meiji government to increase productivity and promote industry was gradually attained. Through the Vocational School Act in 1899 and the establishment of the Regulations for Technical Schools, apprentice schools were gradually transformed into technical schools. When the Vocational School Act was revised in 1920, apprentice schools were integrated into technical schools.

Even though apprentice schools in the initial stage opposed indentured apprentice service, they partially contained premodern elements in their educational content and methodology. These elements, however, were gradually outgrown and eliminated so that the schools could pursue modern skilled worker training. Thus, apprentice schools had a traditional character while artisan training on the basis of traditional apprenticeship was transformed to modern, skilled worker training.

Chapter 3. The Development of Vocational Continuation Schools

The vocational continuation schools had a history of forty-two years from 1893 to 1935. Vocational continuation schools in the early period (1893–1902) offered an education at the elementary level. Emphasis was placed on supplementing elementary school education. Vocational continuation schools in the middle period (1902–1920) were part of vocational schools that placed emphasis on vocational education for working youth. The vocational continuation schools in the late period (1920–1935) emphasized not only vocational education but also civic education. Ultimately, the schools were integrated in the Youth Training Center Act of 1926; they became youth schools which acted as character-building organs for youth associations and devoted an increasing amount of time to military education.

As seen above, although vocational continuation schools were upgraded from the elementary school level in the middle period, they clearly were not designated as secondary vocational education schools. Vocational continuation schools had an intermediate character between secondary vocational education institutions (advanced and ordinary vocational schools and apprentice schools) and primary education institutions. Together with an increased elementary enrollment, vocational continuation schools gradually decreased their function of supplementing elementary education. The schools also outgrew their intermediate character by being upgraded to ordinary vocational schools.

Corresponding to the development of the Japanese economy from the latter half of the Meiji period, vocational continuation schools were deeply related to the improvement of regular primary education and secondary vocational education. They supplemented such education but also filled the gap between primary and higher education and systematized the educational needs of working youth.

Part II. Case Studies of Vocational Schools

Chapter 4. Woodwork: The Sendai City Vocational Apprentice School

This apprentice school was established in Sendai, a city in northern Japan, in 1896. Sendai at the time planned to construct a new city office, but carpenters were not available within the prefecture so they had to be sought from other prefectures. The mayor proposed to the municipal assembly that a school be founded for the training of carpenters and joiners.

At first there was only a woodwork course for eighty students of carpentry with a subdivision for forty students of joinery. Entry qualification was an education beyond elementary school. During the four-

year period of study, the final year was spent on training at a job site where a student worked as an apprentice to an artisan.

In the initial years after its founding, the school intended but failed to break away from traditional indentured apprenticeship dependent upon traditional artisans for carpentry and joinery and to modernize worker training through school education.

In 1899 a metalwork course was added. Educational content was improved in 1911 when the woodwork course was split into two courses: the architecture course and the furniture course. In the latter half of the Meiji period, the school thus moved away from traditional artisan training.

The metalwork course was subdivided into metalwork and founding in 1913. From 1920 the school was upgraded to a technical school in accordance with the Regulations for Technical Schools. The school was reorganized with five years of schooling in 1922 as an advanced level technical school.

The school adapted to developing modern industries in the region through repeated changes in the school name and educational content. It was transformed from an apprentice school which had aimed at the training of low-level technicians into a technical school with modern skilled worker training.

For this type of advanced apprentice school both the National Subsidy for Vocational Education Act and the Regulations for Technical Teacher Training (1894) played particularly salient roles.

Chapter 5. Lacquerware: The Aizu Lacquerware Apprentice School

Aizu-Wakamatsu City in Fukushima Prefecture is renowned for Aizu lacquerware, a traditional industry with a history of over four hundred years. As a result of a feudal policy of promotion and protection, the industry prospered and Aizu lacquerware became well known throughout Japan. This lacquerware was also highly valued for export. During the period of seclusion (1635–1854), it is estimated that some 10,000 pieces, including Aizu products, were exported to Europe by the Dutch (between 1652 and 1781) through the trading port of Nagasaki.[3] The opening of Japan in 1854 gave further impetus to the export of lacquerware.

As was the case with other products such as silk fabrics, a great problem arose in the export boom of lacquerware. Due to massive exports, the quality declined and credibility was lost. Confronted by the crisis of the loss of international credibility, the people of Aizu-Wakamatsu, especially the wholesalers, established an apprentice school.

The Aizu Lacquerware Apprentice School run by Wakamatsu City was founded in 1898. Because the lacquerware industry was divided into plain wood, lacquer, and gold lacquer specialities, the school also had courses in plain wood manufacture, lacquer, and gold lacquer. The period of training was three years. However, because the initial number of applicants was so small, and because some who entered dropped out, the school did not reach full enrollment. Wakamatsu City, therefore, provided the students with a tuition-free subsidy to encourage enrollment.

The students were diligent and enthusiastic. They had the drive to become the standard-bearers of the future lacquerware industry, and they were so motivated that they visited their teachers at home after school and studied until late at night. More than half the classes were devoted to practical training. The teaching staff consisted of young, specialized teachers who had graduated from institutions such as the Tokyo Worker Training School and the Tokyo Art College. Practical training instructors were chosen based on their experience working with local mid-level or senior master lacquerware artisans. The monthly salary of ¥10 paid to them was equivalent to the monthly income earned by a top-grade artisan at that time.

Chapter 6. Ceramics: The Seto Ceramics School

Seto is endowed with high quality potter's clay and has a history of nearly one thousand years in the production of chinaware. The Japanese word *setomono* (Seto thing), referring to chinaware, also signifies its history.

The Seto school was established in 1895. At the time, the townspeople were strongly inclined to transform their pottery production from that based upon long experience and intuition to that based upon scientific technology. This inclination was the result of participating in exhibitions in the West where they were able to observe Western technology. The headman of the town, complying with the wishes of the townsmen, requested the prefectural governor to establish an apprentice school. The school was thus founded with an annual subsidy of ¥1,000.

The school was started almost on the same scale as a temple school, with a principal, three teachers, and eighteen students. The facilities and equipment were poor for the first ten years of its founding, but both the first principal and the second principal had studied under G. Wagner (a German who played a leading role in the development of industrial education in the early half of the Meiji period) at the Tokyo Worker Training School. They upheld as their educational policy a

unity of theory and practical training and were pioneers in the endeavor to develop and apply new technology.

The school met the expectations of the region as it made steady progress. A ceramic testing center was established as an annex; in addition, a coal-burning firing kiln was tested. Coupled with the modernization of electricity, transportation, and finance pursued by Nagoya City (in whose economic sphere Seto is located), the ceramic industry in Seto was transformed from a conventional cottage industry in a mountain village to an industry with urban factory production. Furthermore, the production of hard ceramics was made possible through the introduction of Western technology. The opening of Nagoya port gave an impetus to exports. When Seto developed into the leading production center of ceramicware in Japan both in name and reality, the number of applicants to the school as well as the demand for graduates of the school increased and the foundation of the school was further solidified. The development and production of novelties (porcelain dolls and animals) after World War I, in particular, was due to the education provided by this school. The school became an important educational organ which sent out many capable engineers and managers.

Chapter 7. Dyeing and Weaving: The Minami-Tsuru Dyeing and Weaving School

In conformity with the Regulations for Apprentice Schools, this school run by Minami-Tsuru County, Yamanashi Prefecture, was founded in 1896. The period of study was for three years and initially the school had the capacity for twenty students and a teaching staff of a principal and three teachers. As was the case with the Aizu Lacquerware Apprentice School, this school was established in response to the failure of the product overseas.

The silk fabric of this region was originally the product of an indigenous cottage industry and provided the farmers of the area with a cash income. The product called *kaiki* was a dyed-yarn fabric with a unique texture, which was treasured as a fabric for clothing and umbrellas. To achieve such high quality, the process of repeatedly dyeing the silk yarn as many as two hundred times had been adopted.

When new dyeing methods for such colors as mauve, invented in England, and magenta, invented in France, in the middle of the century were introduced to Japan, the dyeing industry in this region adopted these new methods and relied heavily upon them. As a result of an inadequate knowledge of Western dyeing technology, however, the dye of these products faded. Japan's reputation in dyeing was quickly

lost overseas. Consequently, on the basis of a proposal made by the prefectural governor, the administrative authorities decided to improve dyeing and weaving technology, which lead to the foundation of the Minami-Tsuru Dyeing and Weaving School. The achievements of Kawaguchi Takashi, the principal of the school and director of the testing center, were remarkable. During his thirty years as principal, he visited villages and gave lectures. Whenever he detected a problem, he gave on-the-spot instruction, listened to the problems of the villagers, and encouraged enrollment in the school. He thus encouraged the development of local industry. Although he was one of the most prominent men in the prefecture, whenever he went to Tokyo he made it a point to visit companies and factories to seek employment for his students. This school became the best known technical school for dyeing and weaving throughout Japan to a large extent due to the efforts of Principal Kawaguchi.

Machinery: The Hiroshima Prefectural Worker School

This school started as an apprentice school in 1897. This school was unusual as it was run by the prefecture from the outset. Although the courses initially offered were woodwork and metalwork, a course relating to the machine industry for metalworkers and an electrical course were later added. The school was thus characterized by courses which centered on heavy industry. It was upgraded in 1907 to an advanced level technical school.

The educational raison d'être of this school tended to be equated with national prosperity and defense because of its affiliation with the military. This school, however, was based on the amalgamation of liberal thoughts and the ideology of artisan service found in Japan from olden days and placed the foremost emphasis upon the improvement of technical capabilities.

The ability standard of this school was so high that the machinery, such as lathes, used for practical training in the school were produced internally. In 1910 this school was chosen by the Ministry of Education to send works to London as a representative school among nationwide technical schools and received an award.

The competition for admission to this school was particularly severe compared with other schools throughout Japan. The school did not accept students without a certain academic standing, even when there were vacancies, which explains why society had a high regard for the school and its alumni.

Some alumni became socially successful, thanks to their strong work ethic that had been nurtured by the school. Initially, the teaching staff

consisted of those who had graduated from higher technical schools and artisan teachers in charge of practical training. The school was characterized by close and cooperative relationships between those who received modern education and their mentors, the traditional artisans. (In the Taishō period (1912–26), as the number of artisan teachers decreased, teachers from higher technical schools predominated.)

As stated already, graduates of this school were fortunate to have good social conditions. Upon entering the Shōwa period (1926–present), however, their work became more specialized and centered on military productivity.

Chapter 8. Bamboo-Working: The Beppu Technical Apprentice School

This school was founded in 1902 by a joint school association of two towns (Beppu and Hamawaki) in Ōita Prefecture. Bamboo-working had existed in this region traditionally, and unrefined utility articles (such as bamboo strainers) had been made by the farmers as a side business. However, due to the development of the Beppu spa industry, which increased demand for souvenirs from the visitors to the hot-spring, a need arose for craftwork of improved quality. This was the background for the establishment of this school. On the other hand, there had already been a migration of bamboo artisans from areas with more advanced bamboo-working technology, and there had been signs of change in the ordinary sector of technology transmission from master to apprentice.

Nevertheless, at the time of its founding, the school was not able to attract many students. The school recruited twenty-four students from among those who had dropped out of elementary schools in Beppu and Hamawaki. Even so the school barely managed to attract these students. (The full capacity was for thirty-three students.) The period of study ranged from one to three years. The characteristic of this school was that articles produced by the students were sold. The production of salable articles enhanced the reputation of the school and thus the number of applicants increased. After deducting the actual cost for materials and other costs, the sales income was partly used for school financing and partly distributed to the students as prizes or saved up until graduation. Both town offices permitted the school authorities to conclude sales contracts with specific dealers (or wholesalers with a 20% commission). The school invited artisans from the Kyoto area and received instruction on designing and techniques.

The school enhanced the standard of traditional craftwork tech-

nology in the prefecture and exerted great influence upon its settlement. Technology transmission facilities were opened at various places under the guidance of the school graduates. The new technology acquired by this school through interaction with other regions spread throughout and beyond the prefecture.

Commerce: The Miyakonojō Commercial Continuation School

This school was opened in 1898 under the management of the town of Miyakonojō, Miyazaki Prefecture, located in southeastern Kyūshū. Miyakonojō is the center of economic activity and distribution for the surrounding agriculturally fertile region. The merchants of Miyakonojō supplied fertilizers and farm tools to the rice-growing farmers, thus the town was in a position to be involved with production, distribution, and consumption. The rise of commerce as a local industry was the basic condition which led to the establishment of the commercial school.

At the opening of the school, ¥300, more than half of the total expenses (¥550), was granted as a state subsidy. The period of study was three years. Initially there were courses in agriculture and commerce, but the school came to concentrate on the commercial course alone. (Business meeting halls and warehouses provided by supporters were used as classrooms.)

Because the educational curriculum offered by the continuation school was not sufficient for those seeking employment in business, which was not only expanding but also becoming complex, the school made its second start in 1904 when it was upgraded to an ordinary commercial school. Although financial resources presented the most difficult problem for the school management, a donation by influential merchants allowed the construction of a school building and the improvement of facilities and equipment.

In 1920, fifteen years after being upgraded to an ordinary commercial school, the school was upgraded further to an advanced commercial school to meet the diversified needs of the families and the region. The total number of students was increased to 500 due to a sudden rise in the number of applicants; from this point onward, the school maintained stability.

Up to the first half of the period in which the school was classified as an ordinary commercial school, the school fulfilled its function to train those who directly sought employment in business. The ratio of those seeking employment in business-related work decreased gradually, however, and the proportion of those employed in the modern sectors such as company employment, banking, civil service, and teach-

ing increased. This phenomenon was observed throughout the country. A few graduates took up employment abroad such as in China and Korea.

Chapter 9. Commerce: The Fukushima Commercial Continuation School

This school started in 1897 under town management. The school was annexed to an elementary school and offered three years of study to 100 students. Sendai was the location of the first school. Fukushima was the second commercial school to be established in the Tohoku region. Fukushima, being one of the major sericultural centers in Japan, contributed to the establishment of the school at such an early stage. Because of flourishing sericulture and raw silk transactions, it was imperative to train those engaged in this business.

Although initially the school did not recruit the maximum number of applicants, enrollments increased due to efforts of the principal and others. A decade after its founding in 1907, the school was converted to an ordinary commercial school and opened as the city-run Fukushima Commercial School. In the following year, the school finally came to realize its long-cherished desire of owning an independent school building. The seasonal night school was maintained as a continuation school.

The school was upgraded to an advanced commercial school in 1918. Three years later it was placed under prefectural management in accordance with an expansion policy of Fukushima Prefecture regarding prefectural middle schools. The period of study was changed to five years, and the number of students was increased to 500.

School spirit was sound and vigorous, as reflected in the school motto "faith, might, and tenacity."

As the school evolved from a continuation school to a prefectural school, curriculum emphasis on the number of subjects and periods shifted from that of a commercial course to that of a regular course.

In the initial period the students were the sons of town and city merchants. After graduation many of them found employment at their own family business and at raw silk wholesalers in the city. Subsequently, excellent students from throughout the prefecture came to be enrolled, and the sons of salaried workers increased. Employment also shifted to companies, banks, and other businesses. The school reflected the changing characteristic of Fukushima City from a distribution center of raw silk at one stage to a city with comprehensive functions as the center of the prefectural government.

Chapter 10. Agriculture: The Anjō Agricultural and Forestry School

This school was opened in the village of Anjō, Aichi Prefecture, as an advanced agricultural school in accordance with the Vocational School Act. Although the area of Anjōgahara was underdeveloped, it began to show signs of development as a center of the vast Hekkai county due to the Meiji Irrigation network beginning in 1880 and the construction of Anjō Station by the Japanese National Railways.

This school's agricultural and forestry course was originally divided into a one-year preparatory department and a three-year regular department. For about a decade after the founding of the Anjō Agricultural and Forestry School many children of medium and small production farmers, who had a superficial understanding of education, dropped out of the school. The exception were students from the landowning class.

The first principal, twenty-nine year old Yamazaki Nobuyoshi, had majored in agricultural chemistry at Tokyo Imperial University and was a great man who had an air of the samurai. His educational policy was based upon diligence and spirituality, and he aspired to extend education into the rural communities. He immediately introduced new knowledge and technology to the school and also acted for a long time as the director of an agricultural experiment station run by the prefecture. Yamazaki remained the principal for 19 years and greatly enhanced the reputation of the school. As a result of being exposed to the impoverishment and destitution of rural communities from the Meiji period onwards, he devoted himself to guiding farmer education as a relief measure which he called a "pilgrimage for the promotion of rural communities." It is said that he gave more than fifteen thousand lectures throughout Japan.

Upon entering the Taishō period, the educational legacy of this school bore fruit in the development of the local agriculture. Through diversified management and the agricultural cooperative project, this region came to be called the "Denmark of Japan." It was also referred to in school textbooks published by the government and became an agricultural belt widely known throughout Japan. This achievement was partly due to the outstanding leadership of Principal Yamazaki and partly to the alumni who introduced into local communities what they had learned at the school.

The school became a five-year school in 1925. Beginning in the Shōwa period, it became the model school for all agricultural schools in Japan.

Part III. The Growth of Enterprises and In-Company Training

Chapter 11. Japanese Industrialization and In-Company Training

From the latter half of the nineteenth century in-company training, mainly by large enterprises, was primarily conducted out of necessity. Although the demand for technical manpower by the industries had increased upon entering the 1920s due to industrial development, the education given by the apprentice schools and technical schools was not meeting such needs. Large plant organizations required educated skilled workers and foremen in great number. Because there were no educational institutions which systematically nurtured technicians and workers at the foreman level, enterprise managers, on their own initiative, came to establish "factory schools" in the company. In-company training by small and medium enterprises was minimal for a long time, as the management could not afford it.

Labor training at small and medium enterprises was unsystematic and backward. The training method employed was that of having a newly hired apprentice learn from watching the job done by senior artisans.

At the same time, a system of in-house operative training rapidly prevailed and took root among large enterprises centering on heavy industry, and slowly the in-company training system developed.

As stated earlier, the conditions extant in small and medium enterprises having the vast majority of workers were quite different, and it was very rare for these managers to employ apprentices or to provide their foremen with vocational training. As a result, the process of technology formation by small and medium enterprise workers depended upon the experience and enthusiasm of individual workers, and it was thus necessary for them to move frequently from one factory to another of the same kind in contrast to the stability of workers in large enterprises.

Due to low-level mechanization at small and medium enterprises, the manual and all-round skills acquired by workers meant they had to experience working at diversified production sites to acquire such skills secretly.

At small and medium enterprises, "itinerant workers" who had transferred from either large enterprises or other small and medium enterprises were instrumental in the transfer of skills. Manpower development policies pursued by the educational and labor administration exerted considerable influence on the in-company training provided by small and medium enterprises. Owing to the introduction of the 1916 Factory Act, enterprises were obligated to provide education and training to newly hired workers.

The industrial rationalization movement in the 1920s and the various

measures taken against skilled labor shortage by the government in the 1930s all promoted in-company training. Subsequently, systematic in-company training for small and medium enterprise workers came to be gradually expanded as the term apprentice was substituted for trainee workers and the ways of hiring and training them were studied.

Chapter 12. In-Company Training in Small and Medium Enterprises

From World War I to the 1920s the progress of Japanese industrialization was noteworthy in the history of vocational training for workers. The demand for the opportunity to receive vocational education at the secondary level increased because the workers' educational level had risen. In addition to those graduating from ordinary elementary schools, many now had diplomas from upper elementary schools. Some workers began to attend vocational continuation schools at night while others studied independently by correspondence.

Although the standard of technical continuation schools was low, it is noteworthy that there were some schools in Tokyo, Osaka, and Kobe which not only catered to the enrollment of young workers from small and medium enterprises with relatively good facilities for practical training but also established classes specifically requested by industrialists.

Technical continuation schools were the only ones that provided educational opportunities for those who wished to study while working for small and medium enterprises, since those companies did not make provisions for in-company training.

Notes

1. Theodore W. Schultz, "Investment in Man: An Economist's View," *Social Science Review* 33 (June 1957): 109–17.
2. Frederick Harbison and Charles A. Myers, *Education and Manpower, and Economic Growth* (New York: McGraw-Hill, 1964).
3. Yamawaki Teijirō, *Nagasaki no Oranda shōkan* (The Dutch Trading House in Nagasaki), Chūōkōron Shinsha, 1982, p. 4.