

EDUCATION AS A BASIC FACTOR IN JAPAN'S ECONOMIC GROWTH

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Introduction

Japan's modern educational system was established in 1872, only four years after the Meiji Restoration, and the benefits it has bestowed on modern Japan may be considered from various angles. Educational experts in many countries of the world pay special attention to its contribution to the development of the Japanese economy. Their attention has been attracted by the spectacular economic recovery and its subsequent 'miraculous' growth of Japan in the period following the close of World War II. It has been said that Japan was able to achieve this, in spite of the loss of a quarter of her material wealth through war, only through the 'know-how' and technical skills of the Japanese people which had been gained from the prewar educational system.

Japan is one of the countries which has made swift economic progress in the Twentieth Century. The many factors, political, social and spiritual which have contributed toward a rapid economic growth in these countries have little in common, except that in all these cases the educational system has played an important role. In addition, it must not be overlooked that the system developed in these countries was "modern" in content, and designed to vigorously promote vocational and technological skills to meet social needs.

Japan's modern educational system was also devised along these lines and included courses on agriculture, engineering, commerce, medicine and education.

Education in Japan, too, helped to overcome unfavourable social and economic conditions during its 'Take-off' period. Japan soon outdistanced other Asian Countries and has approached the levels of advanced European and American countries. This is in spite of Japan's late arrival in the field, problems of overcrowding, and a poverty of natural resources. One important feature at this stage was the spread of elementary education among the farming communities, which then comprised a very great proportion of the gainfully employed population of the country.

Japanese education, in the early period of the Meiji Era (1872-1885), was more concerned with raising educational levels and modernizing the country's outlook and ways of thinking, rather than trying to attempt to contribute directly toward economic activities, which could be left to a later stage.

The evaluation of the role of education in the economic development of Japan should be attributed to the effort of the people who restricted

consumption and invested the money thus saved in education. That the ratio of educational expenditure to national income in Japan was among the highest in the world substantiates this statement.

1. QUANTITATIVE DEVELOPMENT OF EDUCATION AND ITS RELATION TO ECONOMIC GROWTH

In examining the spread of education and the aims and contents of education, it must be realized that the industrialization of Japan advanced at an extremely rapid pace, outstripping the social development of the community, which had only recently been released from feudal bondage. Consequently the quantitative development of education had to proceed at a much more rapid tempo than that of the more advanced European countries. This must be pointed out as a characteristic feature of modern education in Japan.

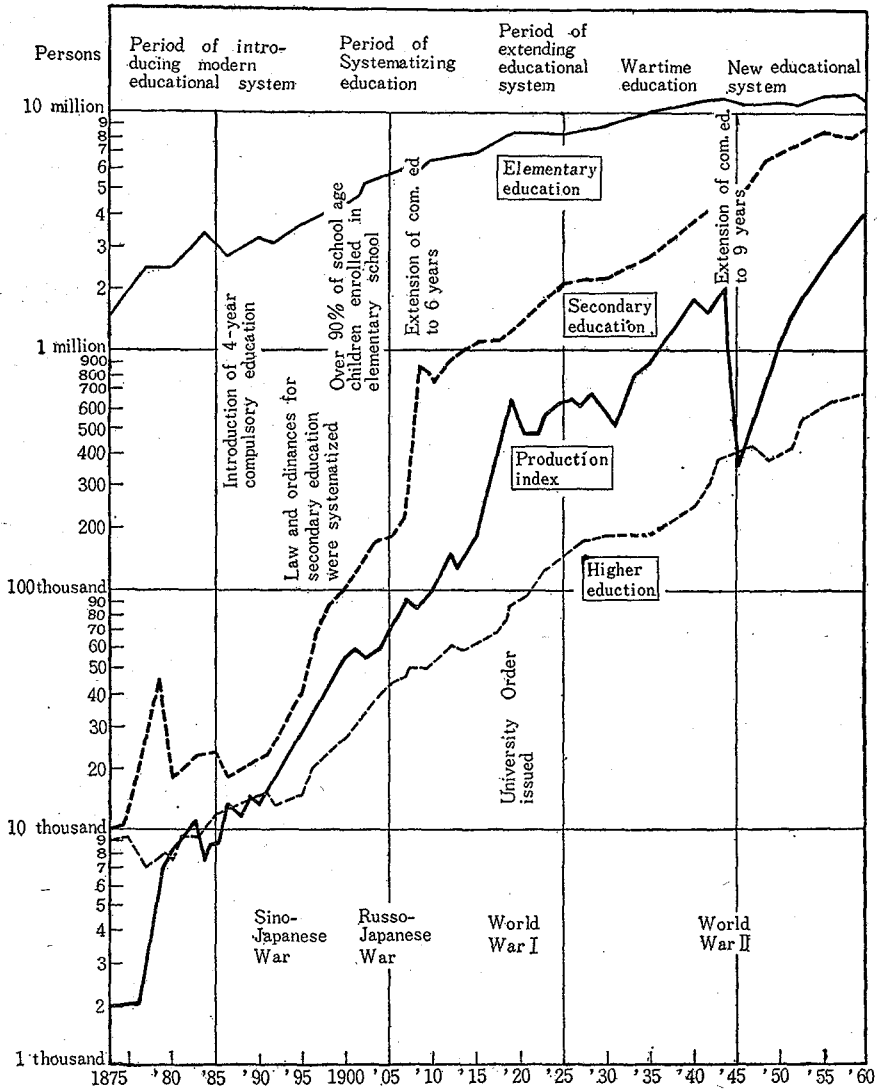
Japan's modern history dates from the 1870's, and the educational system of this period provided an elementary basic education for the nation, and a higher education for the training of its potential leaders.

As light industries were established, centreing on the textile industry, and heavy industry began to appear, the system was expanded to include secondary and vocational education, and the education of women made rapid progress. As heavy industry ushered in a period of economic maturity, the system for higher education was expanded by a spread of secondary education. The recent period following the Second World War marked a remarkable increase in the national income, a feature development in heavy and chemical industries, and growth of tertiary industries. In this period post-secondary education and higher education under a new educational system were introduced. The relationship between education and economic development is illustrated graphically in Figure 1, in which enrolments in schools of different types, and manufacturing and mining production indices are correlated.

As stated above, the first stage dealt with universal elementary education and the special training of leaders. This was in line with the following socio-economic policy.

The Meiji Government, intent on modernizing the country rapidly, and at a much later period than the more advanced European countries, had to preserve the independence of the country, yet at the same time introduce modern military, fiscal, and administrative systems, and modern methods of production. This was carried out under the slogans of 'Wealth and Military Strength', 'Promotion of Industry' and 'Development of Culture and Civilization'. Thus the educational system was a part of the measures taken by the Government. In 1872 the 'School System', patterned after the European and American school systems and incorporating the ideals of 'equality of educational opportunities for all' was promulgated. The 'School System' which made education compulsory for children of

Figure 1. TRENDS IN ENROLMENT IN INSTITUTIONS OF ELEMENTARY, SECONDARY AND HIGHER EDUCATION IN JAPAN



Sources: Ministry of Education, *Mombushō Nempō* (Annual Reports of the Ministry of Education), Tokyo, 1876-1960, *passim*; Nihon Tōkei Kenkyūjo, ed., *Nihon Keizai Tokeishū* (Collection of Japanese Economic Statistics), Tokyo, Nihon Hyōronsha, 1958, p. 27; and Economic Planning Agency, *Keizai Yōran* (Handbook of Economy), Tokyo, 1962, pp. 88-89.

- Notes:
1. "Secondary education" does not include quasi-secondary schools.
 2. By the Government Order of Education, 1879, some schools were excluded from number of regular secondary schools.
 3. Students receiving higher elementary education are included.
 4. 1935=100.

either sex irrespective of class, was of immense significance in Japan's later industrialization. In 1900, it was prescribed that tuition in public elementary schools would not be charged for in principle, while in 1907 the period of compulsory education was extended from four to six years. In spite of this extension of the period of compulsory education, the percentage of enrolments reached 98 per cent in 1907, which meant that practically all school age children were receiving elementary education. It is worthy of note that six-year compulsory education became a reality after only 30 years of enforcement of the 'School System.' This was a factor that contributed greatly toward the smooth development of light industries centreing on the textile industry and the establishment of heavy industry. The remarkable speed with which elementary education was consolidated in Japan may be explained by the fact that there were practically no religious, linguistic, national or other social and cultural traditions to hinder the modernization of the country. But more than anything else it was due to the fact that the Government was keenly aware of the part that education could play in developing the country, and made unflinching efforts to this end.

Nor should we lose sight of the fact that in the early stages of the modernization of this country, where the spread of education was not yet sufficient, leaders of the country played a significant role in thought and action. Higher education before the modernization of the country was aimed to produce a class of leaders from the upper strata of society. After the promulgation of the Government Order of Education, higher education was provided for all who had ability and talent as future leaders of the country, irrespective of social origin. Thus the country was able to draw for its talents from a wider range of its people.

Table 1 classifies according to social origins the students enrolled in the University of Tokyo, which enjoyed a privileged position as a higher educational institution. Figures cited in this table show that higher education

Table 1. DISTRIBUTION OF STUDENTS ENROLED IN THE UNIVERSITY OF TOKYO BY SOCIAL ORIGINS

Year	Peers	Descendants of "Samurai" Class	Commoners	Total
1878	0.6%	73.9%	25.5%	100%
1879	0.5	77.7	21.8	100
1880	0.9	73.6	25.5	100
1881	0.0	51.8	48.2	100
1882	0.1	49.1	50.8	100
1883	0.1	52.9	47.0	100
1884	0.2	50.2	49.6	100
1885	0.2	51.7	48.1	100

Source: Ministry of Education, *Mombushō Nempō*, 1872-1885, *passim*.

was open to various classes of society in the transitional period from feudalism to modern society.

Secondary Education

It was in the period from 1895 to 1905 that secondary education was firmly established as an integral part of the nation's education system. This period corresponds to the "growth period" of the Japanese economy. This period saw a gradual growth of industry, a change from cottage industry to factory production, replacement of the old apprenticeship system by new vocational education, and direct adaptation of socio-economic requirements into the public educational system. Thus, as secondary education advanced, Japan's economy entered a period of maturity after 1905.

Increased national income led to an advance in the rate of enrolment in the institutions of higher learning, whereas the spread of higher education was accompanied by an increase in production. Shown in Table 2 are per capita income figures of gainfully employed persons and the number of students enrolled in secondary schools, in 10-year steps.

Table 2. INCREASE IN ENROLMENT IN SECONDARY SCHOOLS AND INCREASE IN PRODUCTION AND INCOME

Year	Per capita national income for gainfully employed population (1) (in thousands of yen)	No. of Students enrolled in secondary schools (in thousands of persons)	Mining and manufacturing production index (1914=100)
1895	45	46	22.8
1905	47	191	52.1
1915	73	1,058	126.0
1925	111	2,069	478.3

Sources: Kazushi Ōkawa, ed., *Nihon Keizai no Seichōritsu* (The Growth Rate of the Japanese Economy), Tokyo, Iwanami, 1956, pp. 72-73 and 162; and Ministry of Education, *Mombushō Nempō*, 1895-1925, *passim*.

Note: Currency adjusted to 1960 values.

Thus, the national income, which followed a slow upward curve from 1895 to 1905, rose sharply between 1915 and 1925. The number of students enrolled in secondary schools made a corresponding advance.

Education of Women

Women's education in Japan lagged behind men's education. Women previously educated at home, gradually began to receive the same schooling as men, and then not only ordinary cultural education but also vocational and specialized education. This gradual spread of education among women contributed as much as the spread of education among men to the social and economic modernization of the country. It is true that many of the women graduating from schools were tied down to housework

instead of becoming career women and that the percentage of women employed in the labour force was much lower than that of men, but there is no denying the fact that women, who received higher education, helped develop the society and economy of the country through their family life and by encouraging their children to higher learning.

Higher Education

Higher education represents the third stage in the spread of education. The number of students receiving higher education did not begin to increase until about 25 years after the Meiji Restoration. Secondary education was not yet so popular while greater importance was attached to the institutions of higher learning, which though limited in number, were regarded as centres to produce a leading class for the nation. However, in or around 1900, the number of students receiving higher education began to rise. This is explained by an increase in and after 1903 of the number of colleges, which were established to meet the demand for specially trained people due to the industrial development of the country following the Sino-Japanese and Russo-Japanese wars.

A period from 1920 to 1925 saw a rapid increase in both the number of schools of higher learning and students enrolled in them. This indicates

Table 3. PERCENTAGES OF STUDENTS ENROLED IN HIGHER EDUCATIONAL INSTITUTIONS IN TOTAL NUMBER OF PERSONS IN CORRESPONDING AGES, COMPARED WITH ECONOMIC INDICES

Year	Percentages of Students enrolled in higher educational institutions*	Mining and manufacturing production index (1953=100)	Adjusted national income index (1953=100)
1895	0.3%	3.0	20.1
1905	0.9	6.8	23.1
1915	1.0	16.5	37.0
1925	2.5	62.8	60.7
1935	3.0	100	100
1950	6.2	96.8	93.3
1960	10.2	476.9	225.8
1961	10.2	577.1	266.9

Sources: Ministry of Education, *Mombushō Nempō*, 1876-1950, *passim*, and *Gakkō Kihon Chōsa Hōkokusho* (Report on the Basic Research on Schools), Tokyo, 1955 & 1960, *passim*; Ministry of Health and Welfare, Institute of Population Problems, *Meiji Shonen Ikō Taishō 9-nen ni itaru Danjo Nenreibetsu Jinkā Suikei ni tsuite* (On the Estimated Male and Female Population by Age Groups, from the Beginning of the Meiji Era to the Ninth Year of Taishō), Tokyo, 1962, pp. 35-36; Economic Planning Agency, *Keizai Yōran*, pp. 88-89; Tōkei Kenkyūjo ed., *op. cit.*, p. 27; and Prime Minister's Office, Statistics Bureau, *Kokusei Chōsa Hōkokusho* (Report on Population Census), Tokyo, 1925-1960, *passim*.

Note: * Includes post-graduate students. The scope of persons in corresponding ages differs according to years.

that the expansion of the industrial productivity following World War I increased the demand for specially trained people and that a rise in the income of ordinary people provided means for enrolment in schools of higher education. However, the number of students receiving higher education fell between 1927 and 1935, reflecting the worldwide crisis and the resultant depression of the Japanese economy. But with the year 1935 as the turning point, the numbers began to rise rapidly, manifesting Japan's national policies for expansion of production in preparation of military adventures. Then, after World War II the demand for university graduates again rose sharply as a result of a rapid expansion of secondary and tertiary industries, while the number of persons wishing to receive higher education and that of students enrolled in schools of higher education reached unprecedented heights with a remarkable improvement in the living standard of the people.

Shown in Table 3 are the interrelations between the quantitative development of higher education and the economic development of the country by comparing the percentages of students receiving higher educa-

Table 4. PERCENTAGE DISTRIBUTION OF PRODUCTIVE AGE POPULATION, BY LEVEL OF SCHOOL COMPLETED

Year	Productive age population	Receiving no education	Completed elementary education	Completed secondary education	Completed higher education
1895	100	84.1	15.6	0.2	0.1
1905	100	57.3	41.6	0.9	0.2
1925	100	20.0	74.3	4.9	0.8
1935	100	7.1	82.1	9.2	1.6
1950	100	2.3	78.5	15.8	3.4
1960	100	0.5	63.9	30.1	5.5

Sources: Ministry of Education, *Mombushō Nemphō*, 1876-1950, *passim*; Ministry of Health and Welfare, Institute of Population Problems, *op. cit.*, pp. 35-36; and Prime Minister's Office, Statistics Bureau, *op. cit.*, *passim*.

- Notes:
1. The productive age population for 1895-1925—are group between 15 and 54 years, that for 1935 and after—between 15 and 59 years. Figures up to 1900 are based on the population estimates by age, compiled by the Institute of Population Problems, and other figures on the National Census.
 2. As for the number of graduates of elementary and secondary schools, and institutions of higher learning, as reported in the Annual Report of the Ministry of Education, was taken as the basic data. The number of deaths, estimated on the basis of the life-span table compiled by the Institute of Population Problems, was deducted from the cumulative total to obtain the figures in the table.
 3. The number of persons who received "no education" represents the difference between the working population and the total of graduates from schools of various levels.
 4. Figures for 1960 are based on the National Census.

tion to the total population of corresponding ages with the mining and manufacturing production index and the growth rate of national income. Figures in this table show that, except for the year 1950, increases in the percentage of students against total population of corresponding ages roughly corresponds to that of the production index and the national income growth rate.

Thus, the quantitative development of school education at all levels during the past 90 years since the establishment of the modern school education system has led to changes in the percentage distribution of the productive age population by level of school completed. It has provided a highly qualified labour for and contributed greatly toward economic development. Table 4 shows the productive age population has achieved qualitative improvement as seen from the percentage distribution by level of school completed.

2. QUALITATIVE DEVELOPMENT OF EDUCATION AND ECONOMIC GROWTH

Just as the quantitative development of education has a close relationship to the development of society and the economy, so has its qualitative development, namely the improvement of its aims and contents, a close bearing on the socio-economic development of the country. Many arguments may be advanced on the task and functions of education, but when we view the development of education in a selected country from a historical perspective, we must take it for granted that the purpose of education is to produce a younger generation in the image of the state or society of the country. To attain this purpose of education, the contents of education are formulated, the curriculums organized, the education system formalized, textbooks and other teaching materials prepared and teachers trained.

In the following we will touch on the development of aims and contents of Japanese education in consideration of the socio-economic growth of the country.

Change in the Aims of Education

In the early years of the Meiji Era the national policy of 'Wealth and Military Strength' and 'Promotion of Industry' determined the contents of education so that Japan might maintain itself as an independent country by repelling pressure brought to bear on her by foreign powers. During the period in which heavy industries were gradually developed to take the place of light industries after the Sino-Japanese and Russo-Japanese wars, the training of technicians required by industry and the economy, was added to the aims of education, extending the social development of the country. In the Taishō Era, tendencies of democracy and liberalism were introduced into education, but as the nation's economy

was placed on a wartime footing, ultra-nationalism became the uppermost aim of education. And in the postwar Japan the rights and needs of the individual have become the cornerstone of education.

Subjects and their Contents

The syllabus to be taught in elementary and secondary education was basically decided in 1886. Later, this was increased in scope and contents enriched in keeping with the development of society and the economy.

Then, on what subjects was emphasis placed in elementary education? Up until 1900 or thereabouts, a large proportion of time was allocated to the teaching of the national language and arithmetic in view of the need for the entire nation to be taught in the basic subjects of the three Rs. Later, as the national economy and character developed, Japanese society began to require the younger generation to be equipped with broader academic and technical attainments. It was under these circumstances that in 1907 the period of compulsory education was extended to six years and that the subjects of history, geography and science were added and time for gymnastics and music increased.

Recent advances in science and technology have created increasing demands for training in the fields of science and mathematics. And it is worthy of note that in the new curriculum formulated in 1958 the time allocated to science and mathematics showed an unprecedented increase when compared to the total. A change in the contents of secondary education in and after 1931—a decrease in hours for physical culture, and the establishment of “job training”, military drills and martial arts as new formal subjects—secondary education in and after 1931 is another illustration of how the contents of the curriculum are closely related with the socio-economic conditions of the country at a given time.

Changes in the contents of the subjects taught in school may be observed through textbooks, which are the main teaching material.

In the early part of the Meiji Era emphasis in the textbooks had been laid on the acquisition of knowledge and techniques. These books, both practical and utilitarian in nature, were in most cases translations of foreign texts, however.

After the Sino-Japanese War (1894-95), improved educational levels were strongly demanded for the unity of the nation, and the question of replacing the Government-approval system of textbooks with a system of compulsory use of Government-compiled textbooks was discussed. Finally, in 1904, school education was unified on a nationwide scale through the adoption of the Government-compiled textbooks in all the elementary schools throughout the country. This system continued until 1949, when the Government-approval system was re-adopted for textbooks. In the meantime, Government-compiled textbooks were revised four times with the aim of improving and enriching the contents in keeping with the development of society and to unify the nation's awareness of the ethics of loyalty and filial piety.

In the case of a typically Japanese subject "morals", moral virtues dealt with in this subject mostly concerned "diligence", "thrift," and "application to studies". This is interesting in view of the fact that the rapid development of the Japanese economy depended largely on a high rate of national savings, which registered 15-20 per cent after 1900. We should not underrate the role played by "morals" in the growth period of the Japanese economy, which discouraged wasteful spending and encouraged saving as a commendable virtue. In most cases, these virtues were inculcated in the minds of the pupils through historical figures. It would be interesting to see what historical figures were most frequently referred to as examples of these virtues. In elementary education, such figures as Emperor Meiji, Ninomiya-Kinjirō, Uesugi-Yōzan, Toyotomi-Hideyoshi and others were dealt with in more than 10 lessons, and in the case of Emperor Meiji more than 20 lessons. If the frequency of reference in the national language textbooks were added to these figures, they would be greatly increased. It is easy to understand why these figures and their acts must have left an indelible imprint on the minds of the school children—Emperor Meiji as laying the foundation for the development of Japan; Ninomiya-Kinjirō as a man who succeeded in life thanks to thrift, perseverance, and devoted application to studies; Uesugi-Yōzan as a feudal lord who succeeded in developing industry in his domain through application of his doctrine that economic development should be supported by strong moral virtues; and Toyotomi-Hideyoshi as an exemplary person who rose to eminence from a low social position. The words and acts of these historical figures, regarded as examples for the nation to follow, helped the people to acquire the virtue of diligence. More worthy of attention is the fact that historical figures selected as exemplifying the moral virtues did not belong to a particular class but to various classes of the nation. From the standpoint that man is the indispensable factor for economic development, it is of special importance that these examples gave hope and encouragement to the pupils in that they showed that any man could rise in the world depending on his ability and effort, whatever his station in life might be.

The syllabus may be said to have changed in keeping with or in anticipation of social development. If the tempo of social development leaves this behind, investment in education fails to achieve its desired effect and can no longer be a factor to promote the development of society and the economy. In this sense, it may be said that the contents of education in Japan accorded well with the social and economic requirements of the country, particularly during the period of its development. A glance at Government-compiled textbooks will show how the contents and teaching methods of the subjects other than "morals", such as geography and history, mathematics and science, improved in keeping with the new social and economic requirements of the country.

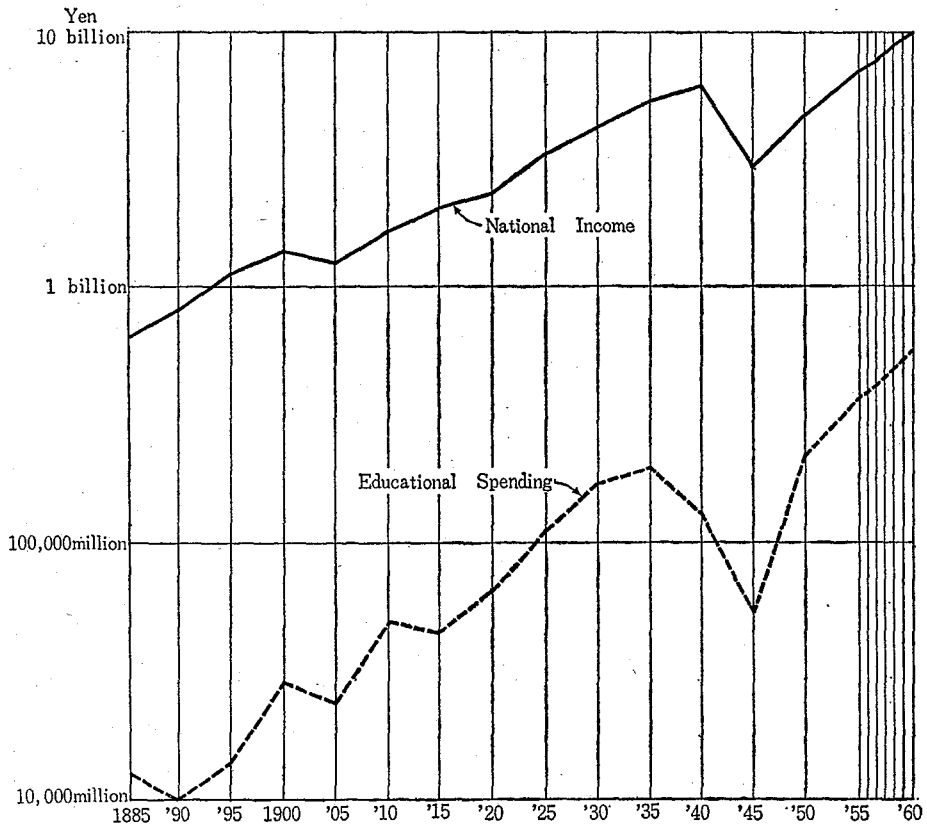
3. EDUCATIONAL INVESTMENT

So far we have outlined historically the development of education in this country. In the following we shall examine educational investment in the past 90 years.

In the first place, we will consider the proportion of educational spending to the total national income, its historical analysis and its international comparison. Here we will discuss the proportion of public educational spending, that is, spending for educational purposes by the central government and local public bodies, against the total national income.

Shown in Figure 2-a are shifts in the actual figures of national income and public educational spending in and after 1885. Except for the World War II years, national income followed a steady upward curve, particularly after World War II. In the meantime, the increase in educational

Figure 2-a. INCREASE IN NATIONAL INCOME AND PUBLIC EDUCATIONAL SPENDING



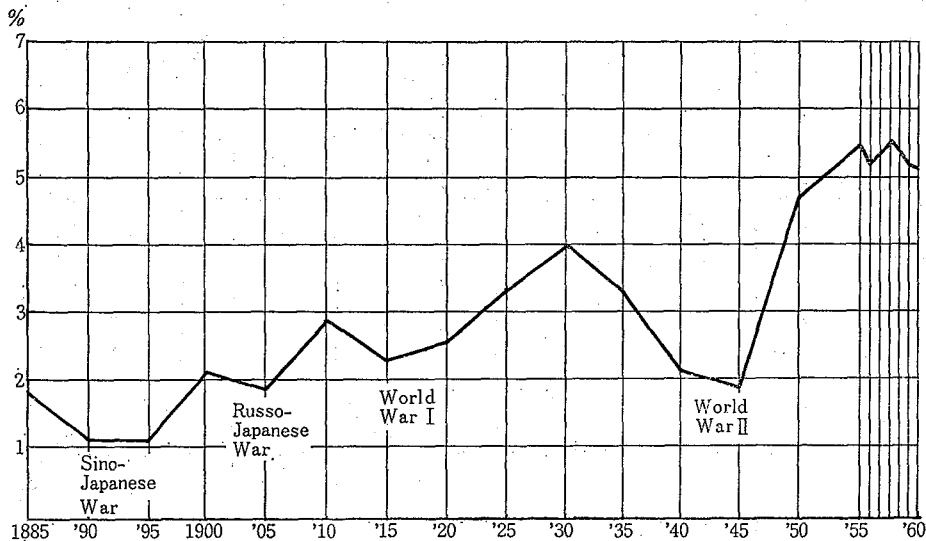
spending was arrested in 1905, 1915 and 1935-1945, that is, in the Russo-Japanese, the first and second World War years. Naturally, this was due to pressures brought to bear on it by increased military spending. After World War II, educational spending continued to rise in keeping with advances in national income.

Figure 2-b indicates shifts in the proportion of public educational spending to national income. The figure shows that the rate of educational spending has increased from some 2 per cent to about 5 per cent during the past 75 years, showing the same tendency as the actual amount of educational spending.

The tendency toward increased educational spending against national income is in keeping with worldwide social and economic trends. This will be clearly seen when Japan is compared with other countries.

In a country where per capita gross national product is low, it is practically impossible for economic reasons for a large number of people to receive secondary and, further, higher education after completing an elementary education, while at the same time public demand for education is seldom heard. However, in a country where there is a highly developed economy and where per capita gross national product is high,

Figure 2-b. PERCENTAGE OF NATIONAL INCOME SPENT FOR PUBLIC EDUCATION



Sources: K. Ōkawa, ed. *op. cit.*, p. 161., Economic Planning Agency, *Kokumin Shotoku Hakusho* (National Income Statistics of Japan), Tokyo, 1960, pp. 140-143; Ministry of Education, *Mombushō Nempō*, 1885-1940, *passim*; *Gakkō Kihon Chōsa Hōkokusho* (Report on the Basic Research on Schools), Tokyo, 1951-1960, *passim*; and *Chihō Kyōikuhi no Chōsa Hōkokusho* (Report on the Research on Education Spending by Local Autonomous Bodies), Tokyo, 1960, *passim*.

it is easily seen that there is a stronger public demand for higher level education and individuals can afford to bear its expenses.

However, it is interesting to note that, as will be seen in Table 5, there are considerable differences in the proportion of public educational spending against national income among countries where per capita national income is roughly on the same level. Like Spain and Mexico, Japan belongs to a group of countries where annual per capita national income ranges from \$200 to \$499, but falls within the category of countries where the proportion of public educational spending to national income is more than five per cent. This presents a sharp contrast to Spain and Mexico, where the proportion is less than two per cent.

Table 5. PER CAPITA NATIONAL INCOME AND PROPORTION OF PUBLIC EDUCATIONAL SPENDING TO NATIONAL INCOME IN VARIOUS COUNTRIES

Rate of Educational Spending to National Income	Per capita National Income				
	More than \$900	\$899-\$500	\$499-\$200	\$199-\$100	Less than \$100
More than 5%	U.K., Norway	U.S.S.R., Finland, Belgium, Netherlands	Japan		
4-5%	U.S.A., Canada	Germany, Venezuela		Ceylon, Republic of Korea	
3-4%	New Zealand, Sweden, France	Australia, Italy, Israel		Philippines	Burma
2-3%			Yugoslavia, Chile, Turkey, Portugal	Peru, Thailand	
Less than 2%			Spain, Mexico	Ghana	India, Pakistan, Indonesia

Sources: UNESCO, *Basic Facts and Figures*, Paris, 1961, pp. 72-79.

U.N., *Report on the World Social Situation*, New York, 1961, p. 71.

This situation, indicating as it does the traditional policy of attaching importance to education, is considered to be a main factor contributing to the rapid development of the Japanese economy.

We will also throw some light on the question of to what level of education priority was given in allocating educational investments. As will be clear from Tables 6-a & 6-b in the early stage of modern industrialization, emphasis was laid on the spread of elementary education and the training of leaders through higher education. In addition, the

Table 6-a. PERCENTAGE DISTRIBUTION OF TOTAL EXPENDITURES FOR NATIONAL, PUBLIC AND PRIVATE SCHOOLS, BY SCHOOL LEVEL

Year	Total	Elementary	Secondary	Higher	Teaching training*-
1885	100.0	84.3	2.8	8.3	4.6
1890	100.0	76.9	3.1	10.9	9.1
1895	100.0	77.1	6.1	10.2	6.6
1900	100.0	67.6	16.5	7.0	8.9
1905	100.0	64.6	18.2	10.2	7.0
1910	100.0	68.0	16.5	9.6	5.9
1915	100.0	65.5	17.3	12.0	5.2
1920	100.0	67.6	17.9	10.6	3.9
1925	100.0	61.1	20.1	14.6	4.2
1930	100.0	58.4	20.1	17.8	3.7
1935	100.0	61.9	18.7	16.9	2.5
1940	100.0	55.7	21.8	20.1	2.4
1950	100.0	41.8	46.2	12.0	—
1955	100.0	46.0	42.3	11.7	—
1960	100.0	42.4	44.5	13.1	—

* The expenses for teacher training are included in the expenses for the higher education during the period 1950-1960.

Table 6-b. PERCENTAGE DISTRIBUTION OF ENROLMENT IN NATIONAL, PUBLIC AND PRIVATE SCHOOLS, BY SCHOOL LEVEL

Year	Total	Elementary	Secondary	Higher	Training training*
1885	100.0	98.9	0.5	0.4	0.2
1890	100.0	98.6	0.6	0.6	0.2
1895	100.0	98.3	1.1	0.3	0.3
1900	100.0	97.0	2.3	0.3	0.4
1905	100.0	95.8	3.1	0.7	0.4
1910	100.0	95.6	3.4	0.6	0.4
1915	100.0	94.7	4.2	0.7	0.4
1920	100.0	93.8	5.1	0.8	0.3
1925	100.0	90.2	8.0	1.3	0.5
1930	100.0	89.2	8.8	1.5	0.5
1935	100.0	89.3	9.0	1.4	0.3
1940	100.0	86.7	11.3	1.7	0.3
1950	100.0	59.3	38.6	2.1	—
1955	100.0	57.4	39.7	2.9	—
1960	100.0	56.1	40.7	3.2	—

* Enrolment in institutions for teacher training is included in that of institutions for higher education during the period 1950-1960.

training of teachers was promoted systematically and preponderantly, under the governmental plans. This education policy provided conditions for the development of the Japanese industry from its infancy. Then, consideration was given to the spread of secondary education and education of women, in order to meet the demands of the developing secondary and tertiary industries. Further special emphasis was given to higher education during the economic boom following World War I and later, prior to the outbreak of World War II, in order to carry out the Government's "manpower" policy. Today, a remarkable development is observed in the spread of higher education, owing to increased demands for trained personnel in the heavy and chemical industries and in the expanding tertiary industries as well. There is also an additional individual demand due to the general rise in living standards and income. Thus, what we pointed out in discussing the spread of education, is also observed in educational spending.

In considering the distribution of the burden of educational spending among different administrative bodies; it is noted that in the early days a greater part was borne by municipal, town and village authorities, and then the proportion borne by prefectural and Central Government gradually rose. The proportion borne by the national treasury increased in step with the increased importance of the role of education in the social and economic development of the country, and as the social and economic activities of the nation advanced in scale from a regional to a national basis. Thus, the shifting of the burden from the shoulders of local authorities to the national treasury was carried out in many smooth stages.

4. ECONOMIC RETURNS OF EDUCATIONAL INVESTMENT

A continued expansion of the industrial productivity is not possible without the existence of people who produce highly efficient equipment, people who operate them, and people who are capable of organizing these workers and efficiently combining physical capital with the labour force. Here the factor of human quality, together with physical capital and labour force, asserts itself as an important factor for economic growth. And it is precisely education that plays the leading role in improving the quality of man.

Expansion of the scale of education and the raising of its levels necessitate an increase in educational spending. Therefore, spending for the purpose of expanding education may be regarded as an investment for enhancing production. In this sense, outlays for educational purposes may be called educational investment, and accumulated educational investments educational capital. Since educational investments are accumulated in the form of the ability of educated people, educational capital is owned by people who are engaged in production. Consequently,

the amount of educational capital may express in money value the amount and level of education of the working population.

As the following table shows, educational capital is on the increase. Then, what is the economic return of educational capital?

Table 7. SHIFTS IN NATIONAL INCOME, LABOUR FORCE, PHYSICAL CAPITAL AND EDUCATIONAL CAPITAL IN INDICES (1905=100)

Year	National Income	Labour Force	Physical Capital	Educational Capital
1905	100	100	100	100
1910	129	102	138	152
1913	169	103	149	188
1917	168	104	147	236
1919	228	104	174	260
1924	250	110	304	367
1930	335	115	398	600
1935	433	123	447	831
1955	594	153	374	1,731
1960	979	171	686	2,286

Sources: K. Ōkawa, ed., *op. cit.*, p. 161; Economic Research Institute, Hitotsubashi Univ., ed., *Kaisetsu Nihon Keizai Tōkei* (Japanese Economic Statistics, with Annotations), Tokyo, Iwanami, 1961, p. 4; and Economic Planning Agency, *Kokumin Shotoku Hakusho*, Tokyo, 1960, pp. 140-143.

Leading international specialists in this field have already attempted to measure in concrete terms the return of educational capital in their respective countries.

Prof. T. W. Schultz of Chicago University computed the return rate of educational investment by figuring out the differences in income among graduates of different school levels and by obtaining the ratio between these differences and educational spending by school levels. He proceeded to estimate the share of educational investment in the total increase in national income at around 33 per cent.¹

Mr S. Strumilin, member of the Soviet Academy of Sciences dealt with this problem in the following way: One who takes a job requiring a high level of technique, must have a high level of education and be paid a high wage. In other words, the level of school completed is in proportion to the amount of wage. Then, high class engineers are expressed in the number of workers engaged in simple labour on the basis of wage rates. From the results he obtained from this calculation, he says that about 30 per cent of the increase in the national income of the Soviet Union may be attributed to an improvement in the percentage distribution of the total population by level of school completed.²

¹ T. W. Schultz, *Education and Economic Growth—Social Forces Influencing American Education*, Chicago, University of Chicago Press, 1961, pp. 78-82.

² S. Strumilin, *The Effectiveness of Education in the U.S.S.R.*, *Soviet Education*, New York, International Arts and Sciences Press, April, 1962. pp. 3-11.

In estimating the return of educational capital in Japan, a period of 25 years from 1930 to 1955 was selected and the Prof. Schultz's method employed. A tentative conclusion was reached that about 25 per cent of the increased part of the national income was due to an increase in educational capital.

Shown in Table 8 are the national income, the share of labour in the national income, and labour force between 1930 and 1955.

Table 8. THE SHARE OF LABOUR IN NATIONAL INCOME

	1930	1955	Increase for 1930-1955
National income (in million yen)	4,053,600	7,189,200	3,135,600
Share of labour in national income (in million yen)	2,634,800	4,673,000	2,038,000
Labour Force (in thousands of persons)	29,341	39,154	9,813

Sources: Same as Table 7.

National income may be divided into income due to physical capital and earned income. In this calculation, the share of labour in national income was estimated at about 65 per cent. This is because the share of labour in national income is estimated on the basis of distributed national income to have increased from 60 to 70 per cent during the 25-year period, and a mean between the two figures was taken. During this period, the share of labour advanced by 2,038,200 million yen and the labour force by 10 million persons, registering a 33.6 per cent increase. Therefore, if it is assumed that the quality of the labour force and consequently its average income in 1955 was the same as in 1930, the share of labour in the national income would be 3,519,000 million yen taking into consideration the increase in labour force. But actually, the figure stood at 4,673,000 million yen. The difference of 1,154,000 million yen is regarded as an increase due to education and other factors.

The amount of educational investment, with which the labour force is equipped, increased by 3,515,100 million yen during the 25-year period from 1,864,900 million yen in 1930 to 5,380,000 million yen in 1955. The return of this educational investment, amounting to 3,515,100 million yen, is estimated at 808,400 million yen. These estimates are not final but they may have to be revised later as a result of further studies of this subject. However, according to tentative research results, it is estimated that the return of elementary, secondary and higher education, stands at 30, 20 and 10 per cent, respectively. These percentages are averaged in consideration of the percentage distribution of the population by level of school completed, and the figure of 23 per cent is obtained as the return of educational investment. Then the following computation is made.

$$¥3,515,100 \text{ million} \times 23\% = ¥808,400 \text{ million}$$

This sum of 808,400 million yen accounts for 70 per cent of 1,154,000 million yen, which represents such a portion of the increase in the national income that cannot be ascribed to a simple increase in labour force. In other words, 70 per cent of such a portion of the increase in the national income that can be ascribed neither to an increase in physical capital nor to an increase in labour force, is considered to be the return of educational investment. The total of this portion comprises about 37 per cent of the increase in the national income. Consequently, the return of educational investment, which accounts for 70 per cent of this unaccountable part of the increase in national income, is regarded to be slightly less than 26 per cent of the increase in the national income.

This figure of 26 per cent appears to be reasonable, but there are many points open to question in the whole process of calculation. The most important one concerns the estimation of the distributed national income and that of the return rates of educational investment by school levels. Needless to say, these points should be examined more closely in the future by more accurate methods.