

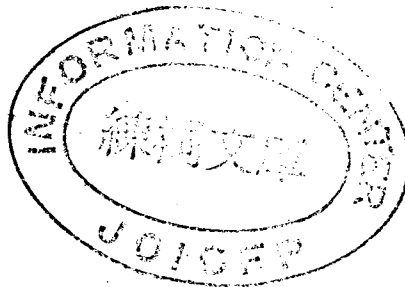
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FORECASTING MANPOWER RESOURCES:  
POPULATION AND LABOR FORCE  
-SOME EXPERIENCES IN JAPAN-

by

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## PREFACE

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statements expressed in this paper.

October 15, 1962

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# Forecasting Manpower Resources: Population and Labor Force

## - Some Experiences in Japan -

### I. INTRODUCTION

Irene B. Taeuber once stated "Japan is the only country of non-Western culture that has achieved substantial industrialization"<sup>1)</sup> and also Wilbert E. Moore said "One of the most interesting and effective of the compromise forms of grafting modern economic organization onto non-industrial social organizations was that worked in Japan".<sup>2)</sup>

In forecasting Japan's future manpower resources, we have to first describe very briefly the general picture of the relation between economic growth and demographic change and of manpower utilization during the modernization period before the Second World War.

Also corresponding to the sudden change in social and cultural institution after the end of the Second World War, Japan had gone through a sudden vital revolution which she

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- 1) I. B. Taeuber, "Population Growth and Economic Development in Japan", The Journal of Economic History, Fall, 1951, p.417
  - 2) W. E. Moore, Industrialization and Labor. Social Aspects of Economic Development, Ithaca and New York, 1951, p.30

had never experienced before. In the present paper, it is aimed to predict the population, especially the changes in age distribution, in the near future, taking good consideration of the above-mentioned changes.

On the basis of this prediction, then, an assumption will be made on the change in labor force participation rate in consideration of the changes of social and cultural institution and economic structure, in order to predict the labor force in the near future. Related problems will also be pointed out for further reference.

## II. BRIEF RETROSPECT OF MANPOWER IN THE MODERNIZATION PERIOD IN JAPAN

The new government organized after the Meiji Restoration in 1868 established the policy for the modernization of Japan in due reference to the Western industrial revolution. According to the National Count of Population conducted by the Government in 1872, considered with necessary adjustments, the total population of Japan at that time was about 36 million and the population density was 91 persons per km<sup>2</sup>. Due to the geographical conditions of Japan, the cultivable land was only 15% of the total area, which led as much as 77% of the working population into the primary industry and only 4% was

engaged in manufacture. In such an agricultural country, the population density can be regarded to have been extremely high. Before the Meiji Restoration in 1868, for about 140 years, the Japanese population had been stagnant maintaining the level of 33 million, and had already reached a saturation point under the closed feudalistic economy. Thus, Japan's "economic take-off" had to be executed with neither any accumulation of capital nor any trained manpower required for industrialization and with a population which was big and dense. About 20 years had to be devoted to the preparation until the start of the industrial revolution in 1890's. What should be noted here, however, is the fact that up to the beginning of the industrial revolution, the annual rate of population increase had been maintained as extremely low as between 0.5% to 0.7%, that the annual rate of increase in real national income was around 5%, and that the demographic elasticity against economic growth showed 8 or thereabouts. (Table 1)

During this period, the Government endeavored for the training of high level manpower, with the introduction of western sciences and technology by inviting university professors and high level experts to Japan. In 1872,

Table 1. Total Population and National Income Growth Rates, 1880 - 1960.

Year	Population (in 000's)	Annual average increase rate %	Population density per km <sup>2</sup>	Real national income growth rate	Demogra- phic elasticity
	(1)	(2)	(3)	(4)	
1880	38,166		101		
1890	40,353	0.6	106	4.3	7.2
1900	43,785	0.8	115	5.3	6.6
1910	49,066	1.1	129	2.9	2.6
1920	55,391	1.2	146	4.0	3.3
1925	59,179	1.3	156	5.1	3.9
1930	63,872	1.5	168	5.9	3.9
1935	68,662	1.4	181	3.8	2.7
1940	71,400	0.8	188	3.9	4.9
1945	72,200	0.2	196	—	—
1950	83,200	0.9	226	—	—
1955	89,276	1.4	242	8.7	6.2
1960	93,419	0.9	253	9.4	10.4

(1) 1880-1910, estimated by the Institute of Population Problems, 1920-60, census population.

(2) Computed based on the national income estimates by K. Okawa (K. Okawa ed., Economic Growth Rate in Japan, 1956)



compulsory education system was started to elevate the literacy rate of the general public. At the same time, the Government made efforts to promote middle-level manpower by developing and extending the agricultural production on the one hand and establishing model factories in textile and other various modern industries as public enterprises on the other, in which on-the-job training was developed. While the government initiated the industrial revolution by turning these public enterprises over to the larger private enterprises, the latter was also responsible for developing the middle-level manpower training in a similar way as by the public enterprises. During this period numerous small and medium scale industries were also growing where the training of middle-level manpower was continued under the old-fashioned system of apprenticeship. A large number of middle schools and technical schools in agriculture, industry, commerce, etc. were established by the government for the purpose of furthering the training of middle-level manpower in these fields. In order that a sound development of modern enterprises be attained on the foundation of a very pre-modern, oriental, social and cultural institutions, a great effort had to be made by

both the Government and the private enterprises at the training of middle-level manpower required for the development of the modern enterprise.

The industrial revolution, which began in the 1890's and proceeded at a rapid pace, was accelerated by the First World War and reached its final stage in about 1920. The modern population census was late in its start in Japan and the first census by quinquennial system took place in 1920. According to the result of the census, the population of Japan was over 55 million and showed 1.6 times increase in 48 years as compared with the population in 1872. Since the 1890's, along with the progress of the industrial revolution, the population increase rate rose gradually. Those who were employed in primary industries decreased while the increase was noticed in the numbers of those who engaged in secondary and tertiary industries. Those who were employed in primary industries who occupied 76% of the total number of the employed in 1890 decreased to 54%, but they were still composing over half of the total number of the employed. (Table 2) It is well known that in Japan the agricultural management unit is very small in size and

Table 2. Change in Population Composition by Industrial Sectors.

Year	Total employed	Primary	Secondary	Tertiary
	(A) Real Number (in million)			
1880 <sup>1)</sup>	19.5	16.1	1.1	2.4
1890 <sup>1)</sup>	22.6	17.2	2.0	3.4
1900 <sup>1)</sup>	24.8	17.3	2.9	4.5
1910 <sup>1)</sup>	26.2	16.5	3.9	5.8
1920 <sup>1)</sup>	27.0	14.4	5.6	6.9
1930 <sup>1)</sup>	29.3	14.5	6.0	8.9
1940 <sup>1)</sup>	32.2	14.2	8.4	9.6
1947 <sup>2)</sup>	33.3	17.8	7.4	8.1
1950 <sup>3)</sup>	35.6	17.2	7.8	10.6
1955 <sup>4)</sup>	39.3	16.1	9.2	13.9
1960 <sup>4)</sup>	43.7	14.3	12.7	16.6
	(B) Proportion			
1880	100	82	6	12
1890	100	76	9	15
1900	100	70	12	18
1910	100	63	15	22
1920	100	54	21	26

1930	100	49	20	30
1940	100	44	26	30
1947	100	53	22	24
1950	100	48	22	30
1955	100	41	24	36
1960	100	33	29	38

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Source: 1880-1910, Estimated by Prof. K. Okawa.  
1920 and after, Population Census Reports,  
adjusted by the Bureau of Statistics of  
the Prime Minister's Office and the  
Institute of Population Problems.

Note: 1) For total employed, 2) Employed 10  
years old and over, 3) Employed 14 years old  
and over, 4) Employed 15 years old and over.

the same applies to the secondary and tertiary industries  
where many of them are in small and medium scales.

During this period, it is considered that the middle-  
level manpower showed remarkable increase, but there are  
not many available statistical materials. However, if  
reference is to be made to a few data, indication is  
given as shown in the Table 3, that the number of school  
teachers in primary schools, middle schools, high schools  
and other special schools increased by 3 times in 1920

compared with the number in 1890. On the other hand, as shown in the Table 4, the number of engineers in manufacturing industry also increased by 3 times, although these engineers are mainly higher-level workers rather than middle-level manpower. In Table 5 it is seen that the increase of physicians licenced legally had been very gradual, while that of dentists and pharmacists is considerable. Midwives and physicians as profession had been established before the Restoration and the legal regulation was formalized in around 1870. It was after 1915 that the nursing system was established but the really modern system was established after the Second World War. The establishment of training systems for social development workers and social welfare workers was also delayed and it was only after 1920 when the endeavor or the establishment was started and after the Second World War, the really modern system was attained.

Although the modern industrialization was built up on the considerable remnant of old-fashioned social and cultural institution, population in urban areas gradually increased as the industrialization progressed. The Table 6 shows the population rate in cities with over 50,000 population.

The industrial revolution came to an end by around 1920

Table 3. Increase of School Teachers  
(in thousands)

Year	Total	Male	Female
1880	76	73	3
1890	73	69	4
1900	104	90	14
1910	177	130	46
1920	222	153	69
1930	314	—	—
1950	592	372	220
1960	712	469	243

Teachers of the primary, middle, high, and special schools.

Source: Bureau of Statistics, Statistical Yearbooks, and Population Census Reports.

Table 4. Increase of Engineers  
(in thousands)

Year	Engineers	Proportion to the employed in manufacturing industry
1880	9	0.7 <sup>%</sup>
1890	18	0.8
1900	28	0.8
1910	39	0.9
1920	48	0.9
1930	56	1.0
1940		
1950	264	3.7
1960	306	2.5

Source: 1920-60, Population Census Reports.  
1880-1910, Estimates by the Institute  
of Population Problems (Preliminary)

Table 5. Physicians, Dentists and Pharmacists.

Year	Actual number (,000)			Per 100,000 population		
	Physi- cian	Dentist	Phar- macist	Physi- cian	Dentist	Phar- cist
1880	36	-	-	94	-	-
1890	42	3	3	104	7	7
1900	44	3	3	100	8	8
1910	38	1	5	78	2	9
1920	45	6	8	82	11	15
1930	50	16	19	78	25	30
1940	65	23	31	90	32	44
1950	76	27	46	92	33	55
1960	96	32	60	103	34	65

Source: Bureau of Statistics, Statistical Yearbooks.



Table 6. Proportion of Population of Cities and Towns with Population of 50 Thousand and Over to the Total Population.

Year	Percentage	Year	Percentage
1898	9.4	1935	30.8
1908	13.3	1940	34.6
1913	14.1	1945	22.8
1918	16.5	1950	33.2
1920	15.9	1955	45.5
1925	20.5	1960	51.9
1930	24.8		

Source: 1920-60, Census population.

1898-1918, Computed by the Institute of Population Problems, Ministry of Health and Welfare.

but an economic crisis followed, and further, from 1930 onward, Japan had to face with the influence of the world crisis, and the economic growth was slowed down to a great extent. Although the real national income increased by 10 times and also per capita national income was raised during the period from 1880 to 1935, the foreign investment was extremely limited in Japan which necessitated the high saving rate (15 - 20%) to be maintained for capital formation, and "austerity life" continued. As the population growth rate rose because of the industrial revolution as shown in the Table 1, the tendency was seen in continuous decrease in demographic elasticity against growth of national income and continued increase of population pressure.

After around 1920, Japanese population movement started to indicate a modernized form. In other words, mortality rate evidently started to show a tendency to come down and fertility rate also started to be lowered because of delayed marriages and fertility control. However, the modern fertility control measures, in spite of the ardent efforts of the forerunners, succeeded only among the salaried men in big cities.

Owing to the world crisis in the 1930's, the number of the unemployed and also the never-employed increased especially in modern large-scale industries. But, most of these people were absorbed in agricultural households or small-scale industries in the form of "under-employment" or "disguised unemployment", and the cases of complete unemployment were not as many as it was seen in highly developed countries.<sup>3)</sup>

In modern large-scale industries, strong efforts were made for the "rationalization of industry" and an increasing demand was felt for the expansion of employment opportunities and the elevation of general level of skills. In meeting this demand, since 1930 the government extended and improved its vocational training system which had been established already in the 1920's. Unfortunately, since the end of the 1930's, Japan fell into a special economic situation in the preparation for the War.

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3) Cf. A. J. Jaffe and Charles D. Stewart, Manpower Resources and Utilization, Principles of Working Force Analysis, New York and London, 1951, pp. 469-476.

### III. RAPID DEVELOPMENT OF VITAL REVOLUTION AFTER THE END OF THE WORLD WAR II.

As a result of the second World War, Japan lost 46% of her area and her economy was completely destroyed. At the immediate postwar time, the index number of production in mining and manufacturing industries suddenly fell down to 1/3 of the prewar level and it did not regain the prewar level until 1951. As the Table 8 indicates, the real national income per capita dropped to one half of the prewar level. It regained the prewar level in 1955 and, in recent years, surpasses the population increase index.

After the termination of the War, the population of Japan swelled suddenly. Directly after the war-end, the population was 72 million and in 1950 it was 83 million, a marked increase of 11 million in 5 years' time. This extraordinary increase was due to three reasons; repatriation of overseas Japanese, decrease in death rate and the "baby boom". Japanese who were repatriated from overseas were as many as 6.3 million while the foreigners repatriated from Japan did not exceed 1.2 million. As a result, Japan experienced the remarkable population increase of 5 million in 5 years. As shown in the Table 7,

Table 7. Vital Rates.

(per 1,000 population)

Year	Birth rate	Death rate	Natural increase rate
1900-04	32.1	20.4	11.7
1905-09	32.2	21.0	11.2
1910-14	33.7	20.3	13.4
1915-19	32.5	22.6	9.9
1920-24	35.0	23.0	12.0
1925-29	34.0	19.8	14.3
1930-34	31.8	18.1	13.6
1935-39	29.2	17.4	11.9
1940-43	30.7	16.3	14.4
1947	34.3	14.6	19.7
1948	33.5	11.9	21.6
1949	33.0	11.6	21.4
1950	28.1	10.9	17.2
1951	25.3	9.9	15.4
1952	23.4	8.9	14.5
1953	21.5	8.9	12.6
1954	20.0	8.2	11.9
1955	19.4	7.8	11.6
1956	18.5	8.0	10.4
1957	17.2	8.3	9.0
1958	18.0	7.5	10.6
1959	17.6	7.5	10.1
1960	17.2	7.6	9.6
1961*	16.8	7.4	9.5

\* Preliminary

Source: Vital Statistics Reports.

Table 8. Index Numbers of Population and Real National Income Per Capita.

Year	Population	Real income per capita
1934-6 average	100.0	100.0
1946	110.4	51.9
1947	113.8	53.3
1948	116.6	60.9
1949	119.1	68.6
1950	121.2	80.0
1951	123.2	86.7
1952	125.0	93.8
1953	126.7	98.1
1954	128.6	99.5
1955	130.1	109.5
1956	131.4	119.0
1957	132.4	126.2
1958	133.7	131.4
1959	134.9	151.0
1960	136.1	171.9

Source: Computed by the Economic Planning Agency. For fiscal year (April 1st to the end of March of the next year)

in spite of the marked drop of the level of living, the crude death rate has shown a rapid decrease since 1947 and this tendency is still pronounced at present, and it is now about one half of the prewar level. The recent crude death rate of Japan is one of the lowest rates among the highly developed countries of the world. However, the fact should be taken into consideration that the number of younger people is comparatively much larger in Japan than other highly developed countries. The improvement in the mortality rate after the end of the war was due notably to the decrease in the infant mortality rate and tuberculosis mortality rate in adolescence. Thanks to these improvements, the expectation of life at birth was strikingly prolonged in a short time. Although in 3 years from 1947 to 1949, the "baby boom" led to the rise of the crude birth rate above the prewar level, the birth rate has been decreasing since 1950, in such a rapid speed as the developed countries have never experienced. According to various surveys, this tendency was induced by the fact that many married couples started to feel the economic pressure because of the sudden drop of their level of living and they became strongly desirous of limiting the family size. The limitation of family size was felt necessary

in order to raise the level of living. However, as briefly mentioned before, the family planning was not fully appreciated in wide enough scope in prewar times and unfortunately the number of those who took recourse to the induced abortion increased. According to a report under the Eugenic and Maternal Protection Law of 1948, the number of cases of induced abortion has been gradually decreasing after the peak in 1955. This reflects the fact that the government pursued a policy for the encouragement of family planning by means of contraception and also under private auspices a positive cooperation was rendered in a popular movement for family planning. However, the reported figure of over 1 million cases of induced abortion at present is still high enough to require further attention. In view of the fact that very many cases of induced abortion are the recourses taken to deal with the conception caused by the failure in contraception, the policy is directed to and reinforced in the programs of dissemination of information for family planning. It is considered that the fundamental issue is to truly modernize the family life and to permeate the idea of family planning in daily life.



During the "baby boom" period from 1947-49, the natural increase rate was conspicuously elevated due to the increase in birth rate and decrease in death rate. After that period, the death rate maintained the tendency to decrease while the birth rate started since 1950 to show a rapid decrease, and the natural increase rate was rapidly lowered to annual rate falling below 1% in recent years. The Table 11 shows that in 1959, the gross reproduction rate of women was less than 1 and the net reproduction rate also came down below 1 to 0.92. In other words, due to a remarkable drop of fertility, the increasing tendency of the Japanese population has now potentialities of changing into the decreasing one after a generation.

This rapid progress of vital revolution in the postwar period mentioned above caused a conspicuous alteration in age distribution of the Japanese population. As it is clearly indicated in the Table 12, during the period from the industrial revolution in Japan up to the beginning of the Second World War, the expanded rate of child population and the reduced rate of aged population lowered the average age of the Japanese. On the contrary, after the end of the World War II, noticeably after 1950, the population under 15 years of age was reduced,

Table 9. Expectation of Life at Birth.

Life table	Period	Male years	Female years
Bureau of Statistics, No.6	1935-36	46.92	49.63
Health and Welfare Ministry, No.8	1947	50.06	53.96
Health and Welfare Ministry, No.9	1950-52	59.57	62.97
Health and Welfare Ministry, Abridged	1961	66.03	70.79

Table 10. Proportion of Couples Practising Contraception Whose Wife's Age is Under 50.

Year	Whole country	6 big cities	Other cities	Rural
	%	%	%	%
1950	19.5	23.7	23.6	17.4
1952	26.3	34.8	31.1	22.1
1955	33.6	37.7	34.0	31.9
1957	39.2	44.5	39.5	36.1
1959	42.5	47.0	43.0	39.9
1961	42.3	48.0	41.0	

Table 11. Reproduction Rate of Woman.

Year	Total fertility	Gross rep. rate	Net rep. rate
1925	5.11	2.51	1.56
1930	4.71	2.30	1.52
1937	4.34	2.12	1.49
1947	4.52	2.20	1.71
1950	3.63	1.76	1.50
1955	2.36	1.15	1.05
1959	2.03	0.99	0.92

Source: Computed by the Institute of Population Problems, Ministry of Health and Welfare.

in spite of the betterment in infant and child mortality, because of the decrease in births, the proportion of the population in productive ages, 15-64 years, expanded remarkably and the proportion of the aged population of 65 years old and over rose at a rapid speed, thus leading to a sudden gain of the population. In prewar times, the statistics show, 100 persons of productive age supported 63 children, but in 1960, 47 children. At the same time, the prewar figures of 8 aged dependants to 100 productive age population

increased to 9 in 1960. In this way, the ratio of dependants decreased from 71% of prewar times to 56% in 1960.

Table 12. Percentage of Population by Age Group.

Year	Total	0-14	15-64	65 and over
1880	100.0	31.9	61.7	6.4
1890	100.0	32.8	60.8	6.3
1900	100.0	33.9	60.7	5.4
1910	100.0	36.0	58.8	5.2
1920	100.0	36.5	58.2	5.3
1925	100.0	36.7	58.3	5.1
1930	100.0	36.6	58.7	4.7
1935	100.0	36.9	58.5	4.6
1940	100.0	36.1	59.2	4.7
1947	100.0	35.3	59.9	4.8
1950	100.0	35.4	59.7	4.9
1955	100.0	33.4	61.3	5.3
1960	100.0	30.0	64.2	5.8

1920-60, Population Census Reports.

1880-1910, Estimated Population by the Institute of Population Problems.

Table 13. Future Population Estimated by the Institute of Population Problems, Ministry of Health and Welfare. (medium)

Year	Population (real number)				Percentage to total		
	Total	0-14	15-64	65 and over	0-14	15-64	65 and over
	mil- lion	mil- lion	mil- lion	mil- lion	%	%	%
1955	89.3	29.8	54.7	4.7	33.4	61.3	5.3
1960	93.9	28.0	60.5	5.4	29.9	64.4	5.7
1965	98.2	24.7	67.4	6.2	25.1	68.6	6.3
1970	102.2	23.2	71.9	7.1	22.7	70.4	6.9
1975	106.3	23.5	74.8	8.0	22.2	70.3	7.5

#### IV. FORECAST OF FUTURE POPULATION AND LABOR FORCE

In 1960, the Institute of Population Problems of the Ministry of Health and Welfare completed the estimate of the future population by sex and age in three categories, maximum, minimum and medium, on the basis of the age distribution of census population in 1955. In this estimate, a detailed analysis was given to the postwar demographic change which was outlined in the previous section of this paper and consideration was made on the

changes of social and cultural pattern such as the modernizing tendency of the family, the attitude toward family size, etc., while further consideration was given on the shift of industrial structure and development in economy. Then the two types of maximum and minimum were assumed with respect to the age-specific fertility rate. Concerning the sex-age-specific mortality rate, the postwar tendency was analysed with each cause of death, and one type of sex-age-specific mortality rate was assumed for 1970. Assuming the two types of differential fertility rate, maximum and minimum for 1970 and one type of age-sex-specific mortality rate to remain constant, the future population was projected. Accordingly, for the period of 1955 to 1970 it was the population prediction and from 1970 on, it was the population projection. The general result of the medium estimate is shown in the Table 13.

According to the result, the Japanese population is going to exceed the line of 100 million in around 1968. However, a more important social and economic implication is seen in the conspicuous change in the age distribution. Because of a rapid decline in birth rate since 1950, the

child population under 15 years of age will show a continuous decrease from 1955 through 1970. The productive age population of 15 to 64 years of age will increase by 1.2 million in annual average in the period of 1955 to 1960 and it will reach the peak with 1.4 million annual increase during the period of 1960 to 1965. However, by the period of 1965 to 1970 when the decreased births since 1950 will affect the productive age group, the annual average increase of productive age population will come down to 0.9 million and during 1970-75 period, it will suddenly drop to 0.6 million. This sudden shrinking of the annual growth in productive age population will be especially noticeable in lower age group. As referred to before, the increase in the aged population will be accelerated both absolutely and relatively. Before the War, the aged population had been supported by the pre-modern family system. However, judging from the general tendency shown in the results of various surveys, Japanese households have been rapidly becoming smaller in size and the percentage of "nuclear family" households composed of married couple and their child or children is increasing in recent years. Further, with the strengthened modern consciousness about human relations among the family members,

Japanese family can be said to be undergoing a rapid modernization process. Thus, the need for social security for the living of the aged people came to be felt, and in 1960, the national old age pension programs were instituted. In Japan, the labor force participation rate of the aged population is notably higher than that in highly developed countries. This is caused by the fact that many of the aged people are engaged in agriculture and small-scale industries. Accordingly, the rapid increase in the aged population may be considered to have a complicated effect on the labor market and the employment structure.

It has been pointed out that in spite of a rapid development in modern economy, the percentage of the population engaged in the primary sector of industry was as high as 44% of the total employed population in prewar times. The number of those who were employed in the primary sector occupying 41% in the 1955 population census suddenly dropped to 33% by the time of the 1960 census. The employed population in secondary sector jumped up to 29%, the highest rate ever experienced, and those in tertiary sector also increased to 38%. The rapid



modernization has come to show itself in such ways in the industrial structure. (Table 2)

One of the prominent characteristics of the Japanese industrial structure is that it contains the development of modern large-scale enterprises on the one hand, and possesses in a large measure the remnant of per-modern small-scale family-unit enterprises. As shown in the Table 14, in the manufacturing industry in 1960, 73% of the total establishments are of extremely small-scale industries with less than 10 workers. These industries comprise 17% of the total workers. However, if the data are compared with those of 1957, generally the proportion of the smallest-size industries decreased and that of the larger-sized ones, especially those which employ 200 and over increased in this short period. The proportionate number of workers dropped in small-size establishments and considerably increased in large ones. In the tertiary sector of industry, the proportion of small establishments and workers is even higher. Thus, these factors must be taken into consideration in referring to the industrial structure shown in the Table 2 above.

According to the Table 15, even in 1960 the employees who are in modern employment relation including government

Table 14. Proportion of Manufacturing Establishments and Their Workers by the Scale of Management.

(1957 and 1960)

Number of workers	Establishments		Workers	
	1957	1960	1957	1960
Total	100.0	100.0	100.0	100.0
1 - 9	75.7	72.9	20.2	16.7
10 - 29	17.4	18.5	20.5	18.6
30 - 99	5.4	6.5	19.4	20.1
100 - 199	1.1	1.1	13.5	9.6
200 and over	0.4	0.9	26.4	34.9

Source: Bureau of Statistics, Establishment Survey Reports.

Table 15. Proportion of the Employed 15 Years Old and Over by Class of Workers.

Class of workers	Proportion		
	1950	1955	1960
Total of the employed (15 years old and over)	100.0	100.0	100.0
Employers	26.1	2.8	2.7
Workers on Own Account		21.1	19.5
Unpaid Family Workers	34.4	30.3	24.0
Employees in Private Business		37.8	45.8
Government Employees	39.5	8.0	8.0

Source: Bureau of Statistics, Population Census Reports.

employees occupy 54% and 24% are unpaid family workers. However, in comparison with the data for 1950 and 1955, the proportion of modern employees is increasing while that of unpaid family workers is decreasing, and from these tendencies it is evident that the modernization in employment relations is taking place.

Results of population census and labor force surveys show that the number of the complete unemployed have always been small and the ratio of the complete unemployed against the labor force population have been as low as 1-2%. In spite of the evident tendency for modernization, however, due to special industrial, establishment and employment structures of Japan as mentioned above, the number of the under-paid employees with short working hours and low labor productivity is extremely many especially in medium and small-scale industries even at present. It is said that in postwar Japan, the number of the completely unemployed is extremely small as the "labor force concept" is being used in surveying the economically active population, but on the other hand, the size of "under-employment" is not small.

As pointed out before, although the productive age population is increasing in rapid speed and in large

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4) A.J. Jaffe and C.D. Stewart, Ibid.

quantity as never before, the "shortage of labor" is felt in certain sectors. Various reasons can be assumed for this, but one of the major reasons is that although there are many medium and small scale industries which depend on the untrained and low-wage young labor force just out of the compulsory education, the rate of those who completed the compulsory education proceeding to higher education is increasing. According to the survey conducted by the Ministry of Education, while in 1950 about 60% of those who completed the compulsory education went into work, in 1960 only about 40% started to engage in work. The shortage of labor force is also felt in modern large-scale industries. Generally speaking, this was caused by the qualitative, not quantitative imbalance between demand and supply of labor force derived from the "technical innovation". In this field, the need for higher-level or top-level labor force is keenly felt on the one hand, and at the same time various efforts are being made to adjust the middle-level labor force to new technology.

With the present status of economic structure and social institution such as stated above, which is especially in the process of rapid modernization, the rapid change in age distribution of population which is predicted to take place

starting from the present in the near future, and which will be accompanied by a sudden change in labor force, will no doubt exert a tremendous effect on the future economic and social development of Japan. Thus the need for forecast of labor force in the future.

There are many different methods for forecasting labor forces. In the present paper, a brief explanation will be given on the preliminary findings of the survey conducted recently by the Institute of Population Problems of the Ministry of Health and Welfare.

It is impossible to forecast on a distant future in Japan which is undergoing an extremely rapid transition economically, socially and demographically. So forecast is limited to the period of ten years from 1960 to 1970 with annual estimation by sex and quinquennial age groups. The method used was to take as a basis the labor force by sex and age group found by the 1960 population census, and to apply the sex and age specific labor force participation ratio under the three types of assumed values to the above-mentioned sex and age distribution of the future population. Assuming that the specific labor force participation ratio taken from the 1960 population census will continue to

remain constant, this was set as the Estimate A. This assumption is the most improbable assumption but serves as a standard in reference to the forecasting by other assumptions. Then, by analysing the trend of temporal change in participation ratio up to the present time, the same was extended to the future and was given as the Estimate B. Further, in the light of the target set for the ten years to come in the "double the national income plan" decided by the cabinet meeting of December 1960 which forms the basis of the economic planning by the present government, the labor force participation ratio was assumed and estimated as the Estimate C. The Table 16 shows the annual total of labor force by sex estimated by these three types of Estimates. The Table 17 indicates the data for 1960, 1965 and 1970 by sex and age group.

Take any of the three estimates, it indicates a rapid shrinking of annual increase in labor force after the peak in 1966-67, reflecting the above-mentioned change in age distribution. The data for 1960 and 1970 of the labor force ratio in the population group of ages 15 years and over are as follows:

	Male	Female
1960: A, B, C	85.5%	50.9%
1970: A	86.4	50.9
B	84.6	47.2
C	83.9	40.4

If the Estimate A is considered separately because of the nature of the assumption underlying it, both the Estimate B and the Estimate C show the decrease in the ratio.

Although the change in male labor force in the Estimate B and the Estimate C is almost similar, considerable difference is noticed in the change of female labor force. This is because in the Estimate C, from the nature of the plan, although the increase of female labor force in the secondary and tertiary industries is assumed, a large measure of decrease in the labor force in primary industries and in medium- and small-scale industries, especially the unpaid family workers who are still numerous at present, is presumed.

"Emancipation" of women, or the improvement of social status of women, was realized for the first time after the last war and it is very difficult to predict women labor force in the future accurately.

In both the Estimates B and C, a considerable decrease is estimated for the labor force of 15-19 years of age, because, it is assumed that the increasing number of those who complete the compulsory education will proceed to the higher education, as mentioned before.



On the other hand, the increase in the middle age labor force of 35-44 years of age is most conspicuous. The labor force of 20-24 years of age shows a fairly marked increase, and that of 65 years and over decreases.

In this way, the labor forces in the near future seems to represent the overall picture of the change in the age distribution and the modernizing process of Japan's social and economic structure.

In any event, the vital revolution which progressed rapidly in the postwar period with the accompaniment of the change in the age distribution served as one of the essential factors in the elimination of the overflow of labor forces in multiple employment with low wages and in the promotion of Japan's social and economic development, and national efforts are further necessary in this direction. The above-mentioned "double the national income plan" represents the government's effort in this respect.

However, caution must be exercised to prevent as much as possible the various frictions anticipated to occur in the course of the development. For example, the remarkable change in the age distribution which will take place in the near future and the social and economic modernization,

especially the rapid development of economy caused by the introduction of technical innovation, may have the potentiality of increasing the unemployed among middle and high age groups. From the point of view of manpower, not only the training of top-level manpower is needed, but it will be necessary to train middle-level manpower for new technology, or retrain them to adjust to new technology, and especially to retrain them in order to raise the mobility of middle and high age labor force between different industries and occupations.

Table 16. Future Labor Force by Sex, Estimated by the Insitute of Population Promblems, Ministry of Health and Welfare, 1960-1970.

(Preliminary)

(in millions)

	Estimate A			Estimate B			Estimate C		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
1960	44.6	27.3	17.3	44.6	27.3	17.3	44.6	27.3	17.3
1961	45.3	27.7	17.5	45.2	27.7	17.5	45.0	27.7	17.2
1962	46.4	28.4	18.0	45.9	28.2	17.7	45.3	28.2	17.2
1963	47.5	29.1	18.4	46.7	28.8	17.9	45.9	28.7	17.2
1964	48.7	30.0	18.9	47.4	29.3	18.1	46.4	29.2	17.2
1965	50.0	30.4	19.2	48.1	29.8	18.3	46.7	29.7	17.1
1966	50.5	31.0	19.5	49.0	30.4	18.6	47.3	30.3	17.1
1967	51.4	31.6	19.8	50.1	31.2	19.0	48.1	31.0	17.1
1968	52.3	32.2	20.1	50.8	31.7	19.1	48.5	31.5	17.0
1969	53.1	32.7	20.4	51.3	32.2	19.1	48.7	32.0	16.7
1970	53.9	33.2	20.6	51.7	32.5	19.1	48.7	32.3	16.4

Table 17. Future Labor Force by Sex and Age Group, Estimated by the  
Institute of Population Problems, 1960, 1965, 1970. (preliminary)

(in thousands)

Year	1960						1965					
	A, B, C			A			B			C		
Age	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total	44,577	27,254	17,323	49,659	30,439	19,220	48,099	29,785	18,314	46,737	29,674	17,063
15-19	4,979	2,665	2,314	5,766	3,107	2,659	5,148	2,677	2,471	5,148	2,677	2,471
20-24	6,735	3,781	2,954	7,048	4,181	3,227	7,404	4,120	3,284	7,404	4,120	3,284
25-29	6,103	4,015	2,088	6,244	4,127	2,117	6,189	4,144	2,045	6,041	4,144	1,897
30-34	5,587	3,643	1,944	6,126	4,005	2,121	6,032	4,015	2,017	5,912	4,015	1,897
35-39	4,499	2,692	1,807	5,659	3,594	2,065	5,575	3,609	1,966	5,387	3,609	1,778
40-44	3,784	2,223	1,561	4,483	2,647	1,836	4,400	2,656	1,744	4,235	2,656	1,579
45-49	3,652	2,194	1,458	3,686	2,153	1,533	3,614	2,155	1,459	3,414	2,155	1,259
50-54	3,080	1,961	1,119	3,371	2,082	1,289	3,312	2,086	1,226	3,144	2,086	1,058
55-59	2,485	1,627	858	2,700	1,730	970	2,605	1,730	875	2,497	1,730	767
60-64	1,769	1,186	583	2,007	1,334	673	1,940	1,334	606	1,866	1,334	532
65-69	1,070	722	348	1,263	853	410	1,073	725	348	964	660	304
70-74	546	363	183	613	412	201	522	351	171	469	320	149
75-79	210	134	76	244	160	84	208	136	72	186	124	62
80-84	67	42	25	76	48	28	65	41	24	58	37	21
85 and over	11	6	5	15	8	7	12	6	6	12	7	5

Table 17. (Continued)

Year	1970								
	A			B			C		
Age	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total	53,859	33,230	20,629	51,676	32,535	19,141	48,656	32,283	16,373
15-19	4,777	2,575	2,202	4,771	2,436	2,335	4,771	2,436	2,335
20-24	8,592	4,880	3,712	8,579	4,738	3,841	8,579	4,738	3,841
25-29	6,890	4,573	2,317	6,766	4,607	2,159	6,438	4,607	1,831
30-34	6,280	4,127	2,153	6,077	4,138	1,939	5,838	4,138	1,700
35-39	6,217	3,961	2,256	6,014	3,982	2,032	5,609	3,982	1,627
40-44	5,641	3,539	2,102	5,449	3,559	1,890	5,071	3,559	1,512
45-49	4,375	2,570	1,805	4,200	2,575	1,625	3,733	2,575	1,158
50-54	3,405	2,046	1,359	3,274	2,051	1,223	2,922	2,051	871
55-59	2,960	1,841	1,119	2,739	1,842	897	2,492	1,842	650
60-64	2,184	1,421	763	2,032	1,421	611	1,864	1,421	443
65-69	1,434	960	474	1,002	671	331	756	528	228
70-74	726	488	238	509	342	167	383	269	114
75-79	274	182	92	191	127	64	144	100	44
80-84	88	57	31	62	40	22	47	32	15
85 and over	17	9	8	11	6	5	9	5	4

## V. RECAPITULATION.

In reviewing the Japanese experiences, it is certainly a heavy burden to execute the economic take-off with dense and large population. But what is more important is the relation between the economic growth rate and the demographic growth rate, and it is advantageous that the latter is lower than the former. Further, every effort is necessary to train the manpower responsible for the economic take-off, especially enough middle-level manpower in relation to high-level manpower.

Japan has attempted to develop her economies by introducing the industrial revolution to the pre-modern social and cultural institution, and this was accompanied by a special employment pattern and wage system peculiar to Japan and the pre-modern institution has long remained. It was only after the second World War that the modernization process of these social and cultural institution started to develop rapidly, and corresponding to this development, the vital revolution was accelerated. As a result, a sudden change took place in the age distribution of population as the source of manpower. The decreasing tendency of excessive labor force supply can be one of the factors for promoting the development

of Japanese economy in the near future, and effort is necessary to such an end. For that purpose, development of manpower to correspond to the technical innovation is essential. In other words, side by side with the endeavor for training of top-level manpower, training and retraining of middle-level manpower is required. Especially in Japan, as the change will be precipitous in the near future, special effort must be made to raise the mobility of manpower by means of the retraining of mid-age and middle-level manpower in order to prevent possible frictions.

