

FERTILITY AND RESEARCH ON FERTILITY IN JAPAN

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IF the trends in the fertility of the Japanese in the years from 1920 to 1950 are viewed in broad perspective, the downward movement is quite comprehensible to those who have studied the dynamics of fertility in Western countries.¹ In 1920 and 1925 fertility was higher in agricultural than in industrial prefectures, higher in villages than in cities, higher in the north-east than in the southwest. These relations were maintained in 1950, but levels of reproductive performance were appreciably lower in all geographic areas and all social-economic groups. Differences in age at marriage for women were similar to those in fertility. In 1950 as in 1920 the percentage of younger women who were married was highest in the agricultural areas, lowest in the great cities, but for women of all areas and in all groups age at marriage was more advanced in 1950 than it had been in 1920 or in 1930. Increasing age at marriage and declining fertility in marriage moved together; differences and trends in marital fertility were similar to those in total fertility for women in most of the age groups in the reproductive span.

This deceptively simple picture of the declining fertility of the Japanese is an artifact of the time period covered, and particularly of the specific years in which the censuses were taken. There was a period of ordered transition from 1920 to 1937; annual fertility rates deviated only slightly from a straight line

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¹ A systematic bibliography of the prewar and war publications of Japan was published in 1946: Taeuber, Irene B., and Beal, Edwin G., Jr.: *Guide to the Official Demographic Statistics of Japan, Part 1. Japan Proper, 1868-1945. Supplement, Population Index, Vol. 12, No. 4, Oct., 1946.* 36 pp. The major postwar census, that of 1950, was published by the Bureau of Statistics of the Prime Minister's Office (Sōri-fu, tōkei-kyoku) in eight numbered volumes, one including a separate volume for each of the forty-six prefectures. Detailed vital statistics for 1946 and later years were published by the Division of Health and Welfare Statistics of the Welfare Ministry (Kōsei-shō, eisei tōkei-bu).

downward trend.² With the mobilization of manpower and the conversion of industry for war in 1938 and 1939, there were significant declines in fertility. Economic recovery, the élan of victories, and extensive pronatalist activities brought fertility to its projected trend values in the years from 1940 to 1943. There were sharp reductions from late 1944 until early 1945 and then a major baby boom, but by 1950 fertility was close to that which would have been expected on the basis of the experience of the "normal" years from 1920 to 1937. By 1953 fertility was far below anything that could have been anticipated on the basis of prewar Japanese or Western experience. Data on births by age of mother in the years 1925, 1937, 1947, and 1953 suggest the sharpness of the transition in the postwar years as contrasted with the relatively slow transition of the prewar years.³

<i>Age of Women</i>	<i>Female Births per 1,000 Women</i>			
	<i>1925</i>	<i>1937</i>	<i>1947</i>	<i>1953</i>
15-49	75.7	66.7	64.9	40.6
15-19	24.0	10.8	7.2	3.6
20-24	116.8	90.6	81.6	59.3
25-29	131.2	123.9	131.0	94.0
30-34	115.5	105.2	114.2	64.5
35-39	88.8	78.4	76.6	32.0
40-44	38.4	34.1	27.9	8.9
45-49	6.5	5.1	3.4	0.6

The declines in fertility in the years from 1947 to 1950 involved the movement toward normalcy in reproductive behavior after the deep depression and sharp recovery of the late war and early postwar years. The continuation of those declines in the years from 1950 to 1954 suggests the operation of forces

² Time series and measures for geographic areas at given periods of time yield high correlations of crude birth rates, general fertility ratios, ratios of children to women, age-standardized rates, and gross reproduction rates.

³ Distributions of women by age; 1925, census of that year, 1937, census of 1935 projected to 1937 on the basis of the national life table. 1947-1953, Japanese only. *Nihon. Sōri-fu, tōkei-kyoku. Zenkoku nenrei betsu jinkō no suikei*, 1951, 1952, 1953. Births by age of mother are from the annual volumes on vital statistics, *Jinkō dōtai tōkei*. 1925 and 1937, adjusted for under-reporting and the absence of data on the mothers of recognized legitimate births.

new at least in their intensity. The annual changes for the eight years from 1947 to 1954 indicate that the forces of decline are not yet spent. In fact, the decline has been so rapid and so persistent that it has forced new estimates of the probable future population and new definitions of the population problem.

<i>Year</i>	<i>Births per 1,000 Total Population</i>	<i>Female Births per 1,000 Women 15-49</i>	<i>Gross Reproduction Rate</i>
1947	34.3	64.9	2.2
1948	33.4	63.6	2.1
1949	32.8	63.3	2.1
1950	28.1	53.6	1.8
1951	25.8	48.3	1.6
1952	24.6	44.4	1.5
1953	21.4	40.6	1.3
1954	20.0	37.8	1.2

If we examine the declines in recent years by age of mother and order of birth, we see disproportionate declines in births at the beginning and end of the reproductive years and in births of higher orders. (Table 1.) Crude birth rates for prefectures classified by industrial type have maintained the traditional relationships to each other in the course of a downward movement that extended from Hokkaido and the Tohoku region of northeast Honshu to the agrarian prefectures of southwest Honshu.

Concern over the population problem of Japan became acute in the 'twenties, but studies on the extent and the formal structure of the declines in fertility that were occurring were limited, while studies of the means whereby the limitation of marital fertility was achieved were virtually non-existent. However, there were evidences of increasing interest. A special study of family and fertility was made in Tokyo in 1935.⁴ Studies of the levels of fertility in the prefectures and cities were made in the late 'thirties by the Institute of Population Problems which had

⁴ Tōkyō shiyakusho [Tokyo City Hall]: *Tōkyō-shi, kazoku tōkei. Showa ku'nen chōsa*. [Family statistics, Tokyo City. 1934 survey.] Tokyo, 1935. 370 pp.

been established on recommendation of the Commission on Food and Population.⁵ Numbers of births and stillbirths had been tabulated by age of father and mother for prefectures and

Table 1. Numbers of live births per 1,000 women by age of mothers and order of birth, 1947, 1950, and 1953.

ORDER BY YEAR	15-49	QUINQUENNIAL AGES						
		15-19	20-24	25-29	30-34	35-39	40-44	45-49
<i>All Births</i>								
1947	133.3	15.0	167.9	270.3	234.8	156.9	56.7	6.3
1950	109.8	13.3	161.4	237.6	175.5	104.8	31.6	2.3
1953	83.4	7.4	121.4	192.8	132.7	65.5	18.3	1.2
<i>First</i>								
1947	38.1	14.2	117.5	71.5	16.1	4.5	1.1	0.3
1950	29.9	11.7	92.8	53.1	13.0	3.6	0.7	0.0
1953	23.5	6.5	73.5	43.6	9.6	2.6	0.4	0.0
<i>Second</i>								
1947	27.0	0.7	40.0	92.4	31.9	7.4	1.5	0.3
1950	30.9	1.6	56.8	96.4	29.9	6.9	1.1	0.1
1953	21.3	0.8	35.7	66.4	22.4	5.1	0.8	0.1
<i>Third</i>								
1947	20.3	0.0	8.4	64.4	51.3	13.2	2.3	0.3
1950	18.2	0.1	10.2	57.5	42.2	10.9	1.7	0.1
1953	17.8	0.1	10.4	56.7	39.4	9.0	1.1	0.1
<i>Fourth</i>								
1947	15.2	0.0	1.6	28.8	54.6	21.0	3.5	0.3
1950	11.7	0.0	1.2	22.5	41.8	16.3	2.6	0.1
1953	9.8	0.0	1.6	20.6	32.6	12.1	1.7	0.1
<i>Fifth</i>								
1947	11.3	0.0	0.3	9.6	41.3	27.6	5.3	0.5
1950	7.5	0.0	0.2	6.2	27.1	19.3	3.7	0.2
1953	5.6	0.0	0.2	4.5	17.6	12.6	2.3	0.1
<i>Sixth to Ninth</i>								
1947	19.4	—	0.0	3.6	39.1	77.2	33.0	2.9
1950	10.7	—	0.0	1.8	21.3	44.9	16.5	1.1
1953	5.6	—	0.0	1.1	10.9	23.0	9.9	0.5
<i>Tenth and Higher</i>								
1947	2.0	—	—	0.0	0.5	6.0	10.1	1.7
1950	1.0	—	—	0.0	0.2	2.9	5.3	0.6
1953	0.4	—	—	0.0	0.1	1.1	2.1	0.3

Sources of Data: Births: Nihon. Kōsei-shō, eisei tōkei-bu. Jinkō dōtai tōkei. 1947-1953. Population estimates: 1948-1950: *Ibid.* VITAL AND HEALTH STATISTICS OF JAPAN. Part II, Table I-1. 1951-1953; Nihon: Sori-fu, tōkei-kyoku. Zenkoku nenrei betsu jinkō no suikei. 1951, 1952, and 1953.

⁵ Tachi, Minoru, and Ueda, Masao: Taishō ku'nen, Taishō jūyo'nen, Shōwa go'nen, Shōwa jū'nen. Dō fu ken betsu, shi gun betsu hyōjunka shusseki ritsu, shibō ritsu oyobi shizen zōka ritsu. [Standardized Birth Rates, Death Rates, and Rates of Natural Increase by Prefectures, for 1920, 1925, 1930, and 1935.] *Jinkō mondai kenkyū* April, 1940, 1, No. 1, pp. 21-28. Also: *Idem.* Shōwa jū'nen naichi

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large cities in 1925 and 1930;⁶ in 1937 and later years national vital statistics included tabulations by age of mother and occasionally of father.⁷

In 1938 and 1939 birth rates dropped sharply and the problem of fertility became defined as one of inadequacy rather than of super-abundance. In 1940 a major field study was conducted in an attempt to secure the reproductive histories of women of completed fertility and to relate the levels of the completed fertility to the social and economic characteristics of the women and their husbands.⁸ Some 137 thousand schedules were

127 shi hyōjunka shusseï ritsu, shibō ritsu, oyobi shizen zōka ritsu. [Standardized Birth Rates, Death Rates, and Rates of Natural Increase for the 127 Cities in Japan in 1935.] *Jinkō mondai kenkyū* August, 1940, 1, No. 5, pp. 20-27. Summaries of these studies were issued by the Institute in English in 1948. There was a major development in formal demographic research in the Biometrics Institute of what was then the Imperial University of Keijo in Korea under the direction of Professor Haruo Mizushima. Intrinsic birth rates and gross and net reproduction rates were computed for the prefectures of Japan and for selected cities. See especially: Koyama, Yūkichi: Fu ken betsu shin no jinkō shizen zōka ritsu. [The True Rates of Natural Increase of Population for Each Prefecture in Japan, 1930.] *Chōsen igakkai zasshi* [Journal of the Korean Medical Association] 1941, 31, No. 2, pp. 1-15. Fu ken betsu shin no jinkō shizen zōka ritsu dai-2-kai, Shōwa 6-10 nen. [The Second True Rates of Natural Increase of Population for Each Prefecture in Japan, 1931-1935.] *Idem*, 1942, 32, No. 7, pp. 11-19.

⁶ Nihon. Naikaku tōkei-kyoku: Fubo no nenrei to shusseï to no kankei. [Births in Relation to Age of Parents.] *Chōsa shiryō* [Research Materials], No. 1. Tokyo, 1927. 55 pp. *Idem*. Fubo no nenrei betsu shusseï tōkei, Taishō 14-nen. [Statistics on Fertility by Age of Parents. 1925.] Tokyo, 1927. 99 pp. *Idem*. Fubo no nenrei betsu shusseï oyobi shisan tōkei, Shōwa go-nen. [Statistics of Live Births and Stillbirths by Age of Parents in 1930.] Tokyo, 1935.

⁷ Nihon. Naikaku tōkei-kyoku. Jinkō dōtai tōkei. [Vital Statistics.] 1937-1942; 1943 unpublished. In 1937 and 1938 tabulations of births by legitimacy status by age of mother were published for the total country and for cities of 100 thousand and over as a group. In 1939 the tabulations for cities of 100 thousand and over were omitted, but a tabulation of births to Japanese women living outside Japan was added. There were also distributions of births by age of mother for Karafuto.

⁸ Okazaki, Ayanori: Shussanryoku chōsa kekka no gaisetsu. [Outline on Fertility Investigation Results.] *Jinkō mondai kenkyū* October, 1940, 1, No. 7, pp. 1-95. Birth-Intervals according to Birth-Orders. A Research from the Result of Investigation on Fertility Surveyed in 1940. Jinkō mondai kenkyūjo. Demographic Researches, A-11. Tokyo, 1948. Fūfu kankei jizoku kikan to shussanryoku. [Duration of Married Life and Fertility.] *Jinkō mondai kenkyū* February, 1946, 5, No. 2, pp. 1-14. Investigation on the Differential Fertility by Marriage Ages, Duration of Married Life, Level of Education, Occupations, and Economic Ranks of Husband and Wife. Surveyed in 1940. Jinkō mondai kenkyūjo, Social-Economic Researches, B-2. Tokyo, 1948. Nōgyōsha no shussanryoku ni kansura tōkeiteki kansatsu. [Statistical Observations on the Fertility of Farmers.] *Jinkō mondai kenkyū* September, 1951, 7, No. 2, pp. 1-18. Also: Fertility of the Farming Population in Japan. Tokyo, 1951. 17 pp. And: Toshi ni okeru kyūryō seikatsusha no shussanryoku. [Fertility of Salaried Men in an Urban Area.] *Jinkō mondai kenkyū* October, 1952, 8, No. 2, pp. 1-9. (With Sato, Y.)

distributed by government officials, organizations, and business firms in areas and groups purposively selected; 81 thousand were returned, and 11 per cent of these were eliminated as incomplete or erroneous. In general, demographic patterns and the economic and educational variations were similar to those of Western countries in their periods of still high but declining fertility. Two other large studies of fertility were made in the war years, but here also contemporary analysis was limited and no postwar analysis is known.⁹ There were many less ambitious studies during this period as professional and educational resources were mobilized in the interests of a great pro-natalist policy.¹⁰

Interest in and legal attention to abortion and infanticide suggest that these means of limitation had survived even in the period of the late prewar and war years. Legal prohibitions of the sale of contraceptives and enforcement regulations concerning abortions may be assumed to have been related to the practices considered in the legislation. Field studies indicated the survival of practices of *mabiki*,¹¹ and major research attention

⁹ Koyama, Eizō: Investigation on the Fertility of Koreans in Japan. Surveyed in 1940 about 48,000 Couples. Nihon. Kōsei-shō, jinkō mondai kenkyūjo, Social-Economical Researches, B-5. Tokyo, 1948. 24 pp. And: Shimamura, T.: Research on Difference in Fertility as Occupations of Wives Vary. Surveyed 1943. Nihon. Kōsei-shō, jinkō mondai kenkyūjo, Social-Economical Researches, B-3. Tokyo, 1948. (An analysis of 40 thousand cases from 60 *machi* and *mura* in 10 prefectures.)

¹⁰ The diversity and the magnitude of this literature is apparent in the publications of a series of national conferences on population held by the Institute for Population Research, Jinkō mondai kenkyū-kai, a semi-official institution, in the years from 1938 to 1942. See especially: Dai-ikkai jinkō mondai zenkoku kyōgi-kai hōkokusho. [First National Conference on Population Problems.] Tokyo, 1938. 828 pp. Dai-nikai jinkō mondai zenkoku kyōgi-kai hōkokusho. [Second Conference on Population Problems.] 1939. 1104 pp. Dai-sankai jinkō mondai zenkoku kyōgi-kai hōkokusho. [Third National Conference on Population Problems.] 1941. 956 pp. Dai-yonkai jinkō mondai zenkoku kyōgi-kai kaihō. [Summary report. Fourth National Conference on Population Problems.] 1941. 142 pp. Dai-gokai jinkō mondai zenkoku kyōgi-kai kaihō. [Summary report. Fifth National Conference on Population Problems.] 1942. 124 pp.

¹¹ Saitō, Kiyoshi, and Homma, H.: Nyūyōji shibō o shiheisura inshi ni kansura kenkyū. Ibaraki-kenka nōson ni okeru chōsa kenkyū, Dai-ippo, jumbi chōsa to sono seiseki no kenkyū. [Causal Factors in Mortality of Infants and Pre-School Children. An Analysis of a Village in Ibaraki-ken. Report 1. Results of Preliminary Survey and Its Statistical Analysis.] *Kōshū eisei* [Journal of Public Health] January, 1943, 4, No. 1, pp. 76-88. *Idem.* Dai-nihō, nyūyōji shibō gen'in no shinso. [Report No. 2 Causes of Death of Infants and Pre-School Children.] *Ibid.* September, 1947, 6, Nos. 1-2, pp. 6-10.

was given to the levels of fertility and the infanticide practices of the late Tokugawa and early Meiji eras.¹²

In postwar Japan the population problem was acute and the realization of it widespread. The consequence was a notable extension of the scope of census and vital statistics data on fertility, an increase in the collection and analysis of data by government agencies and research institutes at all administrative levels, public attention to and some study of fertility by newspapers and public opinion institutes, and research by people in universities. Each move toward policy was accompanied by a survey of the situation if not by new research. The Economics Council Board, the Ministry of Labor, the Ministry of Agriculture, and the Repatriate Relief Board were among the many government agencies that found population an element in their assessments of the present and their projections of the future.

In 1947 and later years there were more numerous tabulations on fertility, but data for demographic analysis as contrasted with public health evaluations remained limited.¹³ Births have been tabulated by legitimacy status and age of mother, and by age of mother and birth order but not by legitimacy status. In 1951 and 1952 live births were given by total birth order for the individual prefectures; in 1952 there were prefectural data on legitimate births by duration of marriage. And, also in 1952, numbers of legitimate births were related to the ages of fathers and of mothers. Presumably detailed data on births by age of mothers and of fathers and by parity will be published for the prefectures as of the census years 1950 and 1955. It is to be hoped that the more detailed data in the volumes for recent years 1951 and 1952 presage more adequate data for the years

¹² The term *mabiki*, literally thinning, was used for infanticide. See especially: Honjō, Eijirō: NIHON JINKŌ SHI. [HISTORY OF JAPANESE POPULATION.] Tokyo, Nihon hyōron-sha, 1941. 429 pp. Sekiyama, Naotarō: NIHON JINKŌ SHI. [HISTORY OF JAPANESE POPULATION.] Tokyo, 1942. 261 pp., 3 tables. Takahashi, Bonsen: NIHON JINKŌ SHI NO KENKYŪ. [STUDIES IN JAPANESE DEMOGRAPHIC HISTORY.] Tokyo, Sanyū-sha, 1941. 853 pp.

¹³ Nihon. Kōsei-shō, eisei tōkei-bu. Welfare Ministry. Division of Health and Welfare Statistics: Jinkō dōtai tōkei, 1947-.

from 1954 to 1956, when the data on age and marital status as of 1955 will be available for prefectures, cities, and minor civil divisions.

The census of 1950 included a question on number of children ever born; the results of the initial analysis were included in the publications of the results of a 10 per cent sample tabulation.¹⁴ A more detailed analysis now in process will relate the reproductive histories to the social and economic characteristics of the women and their husbands for the major urban-rural groups and the broad sub-cultural regions of the country. These data on the fertility of women in 1950 portray the net levels of reproduction at specified ages as influenced by the secular trends in national fertility, the dislocations and losses of the years of war, and the compensatory movements in the postwar years.

Table 2. Number of children ever born per 1,000 total women, by age, prefectures by industrial type, 1950.

AGE OF WOMEN	ALL JAPAN	PREFECTURES BY INDUSTRIAL TYPE ^a				HOKKAIDO
		Metro-politan	Other Industrial	Tran-sitional	Agricul-tural	
15-49 ^b	2,634	2,085	2,455	2,689	2,825	2,991
15-19	17	14	15	20	17	18
20-24	416	296	389	452	443	458
25-29	1,423	1,170	1,329	1,466	1,490	1,754
30-34	2,588	2,134	2,468	2,589	2,746	3,176
35-39	3,641	2,960	3,374	3,630	3,949	4,434
40-44	4,388	3,411	4,044	4,336	4,857	5,396
45 and Over	4,632	3,864	4,355	4,563	4,928	5,774

Sources of Data: Nihon. Sōri-fu, tōkei-kyoku: SHŌWA 25-NEN KOKUSEI CHŌSA HŌKOKU. POPULATION CENSUS OF 1950. Vol. III. 1. Table 28.

^a Prefectures were classified according to the proportion of the gainfully occupied in agriculture in 1930; comparable classifications for other years would have differed only slightly from the classification on the basis of the situation in 1930. Metropolitan prefectures are those with less than 20 per cent of the gainfully occupied in agriculture, other industrial prefectures those with 20 to 39 per cent gainfully occupied in agriculture. In the transitional prefectures 40 to 59 per cent were gainfully occupied in agriculture; the comparable percentage in the agricultural prefectures was 60 or more. Because of its economic, demographic, and cultural differences, Hokkaido is presented as a distinct region.

^b Under 15 are classified with 15 to 19, 50 and over with 45 to 49.

¹⁴ Nihon. Sōri-fu, tōkei-kyoku: Shōwa 25-nen kokusei chōsa hōkoku. Population census of 1950. III. 1. 10% CHUSHUTSU SHŪKEI KEKKA, SONO ICHI. DANJO BETSU, NENREI, HAIGŪ KANKEI, KOKUSEKI MATA WA SHUSSHIN-CHI, KYŌIKU, SHOTAI, JŪTAKU, SHUSSANRYOKU. RESULTS OF TEN PER CENT SAMPLE TABULATION. PART I. SEX, AGE, MARITAL STATUS, CITIZENSHIP, EDUCATION, HOUSEHOLD, HOUSING, FERTILITY. Tokyo, 1952. 206 pp.

The completed fertility of women aged 45 to 49 and above reflects the levels and differentials of fertility in the historic "normal" Japan of the period prior to the Manchurian venture and the continental involvement. For all age groups of women and for all marital status categories and durations of marriage there was a direct association between agricultural life and high fertility, between industrial activities in the monetary economy and reduced fertility. The data on numbers of children ever born per 1,000 total women by age in prefectures classified by industrial type are given in Table 2. They are illustrative of the signal contribution to demographic knowledge made by the inclusion of a question on fertility in the schedule of the census of 1950.

Soon after the end of the war the Institute of Population Problems of the Welfare Ministry made the first of a long series of studies of contraceptive practice.¹⁵ These studies indicated the number of women who reported that they were then practicing or had once practiced contraception; they revealed an urban-rural and a professional-agricultural continuum in admitted practice rather similar to that in Western cultures. Their results were quite consistent with the observed trends in numbers of live births by age, birth order, and urban-rural or rural-agricultural character of the area of residence of the women. In only a few cases, however, were there attempts to secure detailed case histories that would permit measures of the effectiveness of contraceptive practice.¹⁶ The deficiency was almost

¹⁵ Nihon. Kōsei-shō, jinkō mondai kenkyūjo: Tōkyō-to chūshin to suru sanji seigen no jittai ni kansuru shiryō. [Materials on the Actual Situation of Birth Control Centering on Tokyo Metropolitan Area.] Tokyo, 1949. 34 pp. Revised, 1949. 24 pp. Also: Shinozaki, Nobuo: The Investigation on the Actual State of the Practice of Contraception in Japan. Surveyed in 1947. Social-Economical Researches, No. 11. Tokyo, 1948. Also: Nihon. Kōsei-shō, jinkō mondai kenkyūjo: Ken betsu oyobi toshi, chō, son betsu sanji chōsetsu jittai chōsa shukei kekka hyō. [Tables on Results of Survey on Birth Control by Prefecture and by *toshi*, *chō* and *son*.] Report No. 76. Tokyo, 1952. 30 pp. (Report on a Survey in 17 Prefectures in 1949 and 1950.) And: Shinozaki, Nobuo: Nihon ni okeru sanji chōsetsu fukyū no genjō. Pp. 50-57. Present Condition of Spread of Birth Control in Japan. Pp. 65-75. In: Nihon jinkō gakkai. The Population Association of Japan. *Nihon jinkō gakkai kiyō*. Archives of the Population Association of Japan. No. 1. Tokyo, 1952.

¹⁶ Aoki, Hisao. Waga kuni ni okeru sanji seigen jikkō kōka no sokutei—pāru no

inherent in the research situation in Japan. Contraception was not diffusing through organized clinics whose records could be used for analytical purposes. Studies in the general population would have required funds and research facilities of an order of magnitude not possessed by the Institute of Population Problems.

Polls and surveys of expressed attitudes toward contraception and contraceptive practice were numerous. One, that of the National Public Opinion Institute, was based on a national sample and presented with its results carefully analyzed and evaluated.¹⁷ It is this survey, however, that casts major doubt on the results of the many cursory surveys presumed to measure attitudes toward and practice of contraception. Here all but five per cent of the people who answered the questions were confused as to the distinction between birth limitation as a generic term and contraception.

The Mainichi Newspaper Company through its Population Problems Council not only kept the question of fertility before a substantial segment of the Japanese people but conducted field surveys that bore directly or indirectly on the levels and correlates of fertility. The first of a series of studies on fertility control was made in 1950.¹⁸ Like the later studies, it was based on a sample of the national population, and it secured data on the social and economic as well as the demographic characteristics of the women and their husbands. There were detailed questions on opinions as to the social acceptability and the morality of limitation, the sources of information as to techniques, and the specific means utilized. This first study was

sokutei-hō ni yoru Tōkyō-to ka kiō chōsa kekka no sai-shūkei. [The Effectiveness of Contraceptive Practice in Japan . . .] *Jinkō mondai kenkyū* June, 1950, 6, No. 2, pp. 67-73. *Ibid.* Chihō ni okeru jutai chōsetsu no jikkō kōka ni tsuite-Yamakata-ken jūgo shi, chō, son no moderu chōsa. [The Effectiveness of Contraceptive Practice in Local Districts. Model Survey in 15 Cities, Towns, and Villages in Yamagata Prefecture.] *Jinkō mondai kenkyū*, September, 1951, 7, No. 2, pp. 19-28.

¹⁷ Nihon. Kokuritsu yoron chōsa kenkyūjo. National Public Opinion Research Institute: Public Opinion Research on Population. Research No. A-10. Tokyo, 1950. 2, 47 pp.

¹⁸ Mainichi shimbun-sha. Jinkō mondai chōsa-kai. Mainichi Press. Population Problem Research Council: A Survey of Public Opinion in Japan on the Readjustment of Over-Population. Population Problems Series No. 3. Tokyo, 1951. 31 pp.

limited to contraception; the second and third studies included some materials with reference to abortions.¹⁹

While contraception was becoming increasingly significant as a subject of controversy and field for research, the legal basis for the diffusion of a more comprehensive fertility limitation was being prepared. Revisions of the Pharmaceutical Control Law permitted the production and sale of contraceptives. The Eugenics Protection Law as passed in 1948 and amended in the succeeding years was designed to prevent the increase of inferior descendants and to protect women for whom pregnancy would involve health hazards.²⁰ The bases for passage were overtly eugenic and medical, not demographic, but the three provisions of the law relative to fertility established what amounted to government sponsorship of the extension of contraceptive facilities, legalized abortions by private physicians, and sanctioned voluntary sterilization. As government controls were relaxed and the non-medical reasons for birth limitation were interpreted more liberally, the numbers of reported abortions increased sharply—from 246 thousand in 1949 to 748 thousand in 1952 and 1,143 thousand in 1954.²¹ Numbers of reported induced abortions per 1,000 women aged 15 to 49 increased from 23.1 in 1950 to 47.7 in 1953 and 50.2 in 1954; the number of induced abortions per 1,000 live births increased from 209 in 1950 to 572 in 1953. The incidence of abortions in

¹⁹ Mainichi shimbun-sha. *Jinkō mondai chōsa-kei*. Mainichi Press. Population Problem Research Council: Public Opinion Survey on Birth Control in Japan. By Tatsuo Honda. Population Problems Series No. 7. Tokyo, 1952. 55 pp. Third Public Opinion Survey on Birth Control in Japan. By Tatsuo Honda. Population Problems Series No. 13. Tokyo, 1955. 38 pp.

²⁰ Nihon. [Japan.] [Eugenics Protection Law, Law No. 156 of 1948.] Tokyo, 1948—[Amended as of April, 1952.] 1952. [Status as of August, 1954.] 1954. *See particularly*: The Eugenic Protection Law, pp. 8–19 in: Mainichi shimbun-sha, *jinkō mondai chōsa-kai*. Some Facts about Family Planning in Japan. By Minoru Muramatsu. Tokyo, 1955. 120 pp.

²¹ Nihon. *Kōsei-shō, kōshū hoken-kyoku*. Welfare Ministry. Public Health Bureau. General Affairs Section: Activities under the Eugenic Protection Law for the Year of 1949–. Tokyo, 1950–. (The last report used was that for 1953, issued in 1954.) *See also*: Nihon. *Kōsei-shō*. Ministry of Health and Welfare: Summary of the Program to Promote Conception Control. Bureau of Public Sanitation. Western Pacific Regional Seminar in Vital Statistics /VS/13. Tokyo, 1952. 17 pp. (Statement prepared by Y. Koya, Institute of Public Health.) *Also*: Mainichi Shimbun-sha, *jinkō mondai chōsa-kai*: *op. cit.*, pp. 20–32 and 69–71.

relation to numbers of women and the frequency of childbearing at the various ages reveal abortions not as aberrant phenomena but as modal means of fertility control in the society. (Table 3.) Proportionate reduction in fertility through abortion was greatest at the young ages where few women were married and at the older ages where childbearing was not appropriate to the role of the wife. In absolute terms, however, abortions were most frequent at the ages of maximum childbearing. In all years for which data are available, more than 85 per cent of all women having induced abortions reported as such were in their twenties and thirties. More than forty per cent of all reported abortions were secured by women in their twenties, the age at which in theory they should have been fulfilling their

Table 3. The incidence of induced abortions by age, 1950-1954.

AGE OF WOMAN	1950	1951	1952 ^a	1953	1954 ^b
	ABORTIONS PER 1,000 WOMEN				
ALL WOMEN	23.1	29.6	36.3	47.7	50.2
15-19	4.0	4.7	3.8	3.9	3.7
20-24	} 28.3	} 37.5	33.3	42.6	43.6
25-29			57.2	76.9	81.2
30-34	} 39.4	} 49.7	65.9	88.0	92.7
35-39			59.2	76.7	81.8
40-44	} 20.3	} 14.5	32.5	41.4	42.4
45-49			4.2	5.7	5.6
	ABORTIONS PER 1,000 LIVE BIRTHS				
ALL WOMEN	209	299	398	572	—
15-19	302	441	432	525	—
20-24	} 144	} 212	254	351	—
25-29			278	399	—
30-34	} 279	} 391	443	663	—
35-39			765	1,172	—
40-44	} 592	} 879	1,411	2,259	—
45-49			3,149	4,877	—

Sources of Data: Populations, Estimates of the Bureau of Statistics; Live Births, Reports of the Division of Health and Welfare Statistics, Ministry of Welfare; Abortions by Age of Woman, *Mainichi shimbun-sha, jinkō mondai chōsa-kui, Some Facts about Family Planning in Japan*, Pp. 24-25.

^a Age of women having abortions in the year assumed to be the same as the reported numbers in the last half of the year.

^b Live births by age of mother not available.

familial responsibilities for the succession of the generations. The proportion of all abortions secured by women aged 25 to 29 was 25.6 in 1952, 26.3 in 1953, and 26.7 in 1954. Numbers of abortions per 1,000 women or per 1,000 live births to women in this age group were moving very sharply upward.

The trends in fertility and in research on fertility in Japan in the last six or seven years have been so complex as to defy easy summary. The most spectacular development was the rapidity and extent of the resort to abortions to terminate unwanted pregnancies, but abortions are not amenable to simple reporting systems or research designs. Substantial proportions of reports are erroneous as to names or addresses, and substantial proportions of the occurrences are not reported. Reticence if not shame seems to surround the resort to induced abortion. Moreover, abortions performed prior to the fourth month of the pregnancy—and a major proportion of them are—escape reporting through the stillbirth reporting systems. There are some indications that rather complex tabulations with cross-classifications by age of mother and order of pregnancy are now being made, but they do not seem to be included in the regular statistical publications of the Division of Health and Welfare Statistics of the Ministry of Welfare.

The major puzzle presented for demographic research involves the relations between the declines in fertility, the increasing numbers of reported abortions, and the increasing frequency of contraceptive practice. Perhaps the most critical of the theoretical questions are those concerning the interrelations of contraception, abortion, and sterilization and the relevance of these to the frequency of marriages, the characteristics of the married, the spacing of births, the size of completed families, and the prospects for the population of the future. There have been some attempts to measure the influence of reported or hypothetical numbers of abortions on numbers of births;²² there

²² Terao, Takuma, and Ozaki, Iwao. *Bankon to hinin no jinkō seigenteki kōka to sono sokutei*. Pp. 58–65. *Restrictive Effects of Late Marriage and Contraception upon Increase of Population and Measurement Thereof*. Pp. 76–85. In: *Nihon jinkō gakkai. The Population Association of Japan. Nihon jinkō gakkai kiyō. Archives of the Population Association of Japan*. Tokyo, 1952.

have been attempts to segregate the influence of various factors in the declines in fertility between 1925 or 1930 and the time of study.²³ The most fruitful approach, though, lay in the direct analysis of limitation practices. Major studies were made by the Institute of Population Problems of the Welfare Ministry, the Population Problems Council of the Mainichi Newspapers, and the Institute of Public Health of the Welfare Ministry. They will be noted in this order.

The Institute of Population Problems has continued its studies of contraceptive practice, although they have not been given major emphasis in its research program. A national sample survey of fertility was made in 1952, the enumeration being conducted by the Bureau of Statistics and utilizing the sample designed for the Monthly Report on the Labor Force.²⁴ Information on contraception and abortion was secured through leaving a questionnaire with women who were in the disappearing third of the Labor Force sample and asking them to mail it in. The analysis of the data thus secured was devoted primarily to levels of reproductive performance in relation to demographic, economic, and social characteristics. Neither the design of the study nor the analysis was oriented toward the study of the incidence, the demographic aspects, or the economic, urban-rural, and social correlates of the declines in current fertility. The returns in the mailed schedules on limitation were deficient, but they indicated that abortions were resorted to in a major portion of the cases where pregnancy had resulted from contraceptive failures.²⁵

²³ Kubo, Hideshi. Saikin no shussan chōsetsu no shusseki ritsu ni taisuru eikyō. Pp. 12-16. The Influence of Birth Control against Birth Rate in Japan. Pp. 16-21. In: Nihon jinkō gakkai. The Population Association of Japan. *Nihon jinkō gakkai kiyō*. Archives of the Population Association of Japan, No. 1. Tokyo, 1952. 102, 130 pp.

²⁴ Okazaki, Ayanori: A Fertility Survey in Japan of 1952. Tokyo, Ministry of Welfare, Institute of Population Problems, 1953. 87 pp. Nihon. Kōsei-shō jinkō mondai kenkyūjo. Sanji chōsetsu no fukyū jōkyō ni kansuru chōsa. [A Survey of the Extent of Contraceptive Practice.] Report No. 85, 1952. Tokyo, 1953. 33 pp. Also: Dai-niji, Shōwa 27-nen, shussanryoku chōsa no sokuhō. Report No. 87, 1952. Tokyo, 1953. 53 pp.

²⁵ Honda, Tatsuo: A Survey of Spread of Birth Control. Tokyo, Welfare Ministry, Institute of Population Problems, 1953. 37 p.

The early Mainichi study of fertility control has been noted previously. The second survey, taken in 1952, and the third, taken in 1955, included questions as to abortions.²⁶ These surveys indicated a definite relationship between the practice of contraception and the resort to induced abortion. Women admitting abortions reported previous contraceptive practice; few women not admitting contraceptive practice admitted abortions. The demographic, economic, and urban-rural incidence of abortions and contraceptive practice were quite similar. The increases in reported contraceptive practice were extraordinary. They characterized all age classes and all social and economic groups in cities and in rural areas. Between 1950 and 1952 the relative increases in the percentages practicing were greatest in the six great cities, intermediate in the other *shi* (cities), and least in the *gun* (areas outside the *shi*). (Table 4.) Between

Table 4. The practice of contraception, 1950, 1952, and 1955 (per cent of couples admitting practice.)

AREA	PER CENT OF COUPLES			INCREASE IN PRACTICE			
	1950	1952	1955	Amount		Per Cent	
				1950-1952	1952-1955	1950-1952	1952-1955
	PRESENT PRACTICE						
ALL JAPAN	19.5	26.3	33.6	6.8	7.3	34.9	27.8
Six Cities	23.7	34.8	37.7	11.1	2.9	46.8	8.3
Other Shi	23.6	31.1	34.0	7.5	2.9	31.8	9.3
Gun	17.4	22.1	31.9	4.6	9.8	38.5	44.3
	EVER PRACTICED						
ALL JAPAN	29.1	40.2	52.5	11.1	12.3	38.1	30.6
Six Cities	35.7	52.0	56.6	16.3	4.6	45.7	8.8
Other Shi	32.9	46.0	52.9	13.1	6.9	39.8	15.0
Gun	26.6	34.6	50.8	8.0	16.2	30.1	46.8

Sources of Data: Mainichi shimbun-sha, jinkō mondai chōsa-kai, Public Opinion Survey on Birth Control in Japan. Pp. 30-31. Third Public Opinion Survey on Birth Control in Japan. Pp. 23-24.

²⁶ References, footnote 19.

1952 and 1955, on the other hand, increase was relatively slight in the six great cities and the other *shi*, but it was rapid in the *gun*.

In the spring of 1954 the Welfare Ministry used an attached questionnaire on contraceptive practice with its annual survey of a one per cent sample of households. Preliminary results indicate a sharp increase in the extent of contraceptive practice, an increase that was especially great in the *gun* in general and in the originally high fertility prefectures of the Tohoku region in particular.²⁷ This study, taken in conjunction with the earlier studies of the Institute of Population Problems and the Mainichi Population Problems Council, indicates that increas-

Table 5. Crude birth rates in selected prefectures, 1920-1925 to 1953.

PREFECTURES	YEARS				
	1920-1925	1930-1935	1947	1950	1953
<i>Northeastern Japan</i>					
Aomori	44.8	40.9	41.5	36.0	28.8
Iwate	42.1	38.2	36.5	33.9	27.2
Miyagi	41.6	36.9	35.4	32.0	25.1
Akita	43.4	39.3	38.0	32.6	25.7
Yamagata	40.5	35.8	32.8	30.0	22.8
Fukushima	40.3	35.7	35.7	32.8	25.9
<i>Southwestern Japan</i>					
Kumamoto	34.8	32.3	34.6	30.3	24.5
Oita	35.3	32.0	34.3	29.3	23.0
Miyazaki	36.6	35.6	37.6	32.4	25.4
Kagoshima	37.2	35.0	33.6	30.5	26.0

Sources: The rates for the intercensal periods prior to the war are based on births adjusted for mal-registration and under-reporting and related to the total population; they concern the prewar area of the country. The rates for 1947 and 1950 are the official rates of the Division of Health and Welfare Statistics of the Ministry of Welfare; births of Japanese allocated to place of residence are related to total populations. The births for 1953 are the preliminary figures from the summations of the monthly reports; they pertain to Japanese only. The populations are the estimates of Japanese populations made by the Bureau of Statistics of the Prime Minister's Office. The discrepancies are not sufficient to bar comparisons in agricultural prefectures such as the ones considered here. Declines are slightly less rapid if comparisons are made using preliminary reports on numbers of births for 1947, 1950, and 1953. It should be noted that fertility has declined substantially since 1953. It should also be noted that age structures are becoming progressively more favorable for reproduction so that crude rates under-estimate the magnitude of the declines in fertility that are occurring.

²⁷ Nihon. Kōsei-shō: [Survey of Prevalence of Contraceptive Practice in Japan . . . April 1, 1954.] Kōsei no shihyō [Welfare Index], October, 1954. Translated by M. Muramatsu. See also: Mainichi shimbun-sha, jinkō mondai chōsa-kai. Some Facts About Family Planning in Japan. Pp. 87-93.

ing proportions of the women in the agricultural villages have adopted precautionary as well as *ex post facto* means of planning family size. The relations between the diffusion of abortion and contraception in the remote agricultural areas are not yet portrayed clearly.²⁸ Whatever the nexus of forces and whatever the means, however, declines in fertility are coming rapidly. The data on crude birth rates given in Table 5 suggest the magnitude of the declines in the agricultural prefectures of the Tohoku region of northeastern Japan and in the agricultural prefectures in Kyushu in southwestern Japan.

The most distinctive of the studies undertaken in Japan in recent years are those of the Department of Public Health Demography of the Institute of Public Health. Since the legal basis for the extension of contraceptive services in Health Centers and the performance of abortions and sterilizations by physicians was predicated largely on the protection of the health of mothers and children, there was a broad range of problems that lay specifically within the domain of the national health services. Moreover, the wide prevalence of abortions, and particularly the known existence of multiple abortions to individual women, was believed to constitute a health hazard of major proportions. Experimental studies were designed and implemented, first in three agricultural villages and later among the employees of a coal mining company, to determine the feasibility of, and the requirements for, the substitution of contraception for abortion.²⁹ Field studies were also undertaken. The first, time-limited in its relevance, was a detailed study of the demographic characteristics, the economic background, the attitudes, and the reproductive histories of women

²⁸ For summary and analysis of data available to 1950, see: Shinozaki, Nobuo: *NIHONJIN NO SEI SEIKATSU. [SEXUAL LIFE OF THE JAPANESE.]* Tokyo Bungei shuppan-sha, 1953. 276 pp. English summary: Report of Sexual Life of Japanese. *Jinkō mondai kenkyūjo*, Research-data C., No. 11. Tokyo, 1951. 38 pp.

²⁹ Koya, Yoshio, et al.: *Research on Population Health, Especially Test Studies in Three Rural Villages.* Published on behalf of The Japan Association of Public Health. Tokyo, 1952. 27, 28 pp. Bilingual, Japanese and English. *Idem.* [A Study of Family Planning of Coal Miners.] *Nihon iji shimpō*, No. 1573. June 19, 1954. *Idem.* Present Situation of Family Planning among Farmers and Coal Mine Workers in Japan. United Nations World Population Conference, E/CONF. 13/50. Rome, 1954. 7 pp.

having induced abortions with the approval of a Eugenics Protection Committee, together with an analysis of the physical and psychological consequences of the abortions.³⁰ There was also an intensive field study of the background, status, and adjustments of women who had been sterilized.³¹ The methodological significance of these studies lies in the fact that they are public health demography in plan, field work, and analysis. Work was done within and under the auspices of the Institute of Public Health. All interviews were conducted by doctors; publication was by doctors in medical or health journals. The research was accepted as an appropriate aspect of health service. The substantive results have demographic significance, also, for in the reproductive histories of the individual women there are sequential relations between contraception and abortion. Sterilization emerges as a permanent solution to problems of unacceptable means.

The unanswered questions as to fertility in Japan are numerous. Data remain inadequate for the analysis of the structure and the social-economic correlates of fertility at its existing levels and in its downward movements. Census and vital statistics data are not coordinated, and neither emphasizes fertility. However, activities contemplated or under consideration may antiquate these statements with their implied criticisms. Special analyses of 1950 data on children ever born and the 1955 data

³⁰ Koya, Yoshio; Muramatsu, Minoru; Agata, Sakito; and Koya, Tomohiko: *Waga kuni ni okeru jinkō ninshin chūzetsu no kōshū eisei narabini jinkōgakuteki kenkyū*. Pp. 1-19. (Preliminary Report on a Survey of Health and Demographic Aspects of Induced Abortion in Japan.) Pp. 1-9. In: *Nihon jinkō gakkai*. The Population Association of Japan. *Nihon jinkō gakkai kiyō*. Archives of the Population Association of Japan, Tokyo, 1953, No. 2. 92, 102 pp. Also, in Japanese: *Nihon ijū shimpō*, Oct. 24, 1953, No. 1539. In English: *Milbank Memorial Fund Quarterly* July, 1954, 32, No. 3, pp. 282-293. Also: Koya, Yoshio, and Muramatsu, Minoru: *Waga kuni ni okeru jinkō ninshin chūzetsu no kōshū eisei narabini jinkōgakuteki kenkyū shōhō*. Sono ichi. A Survey of Health and Demographic Aspects of Induced Abortion in Japan. Special Report No. 1. *Kōshū eisei-in kenkyū hōkoku* June, 1953, 3, No. 1, pp. 10-13. Special Report No. 2. *Ibid.* December, 1953, 3, Nos. 2-3, pp. 18-24. Special Report No. 3. *Ibid.* September, 1954, 4, Nos. 1-2, pp. 1-9. Special Report No. 4. *Ibid.* June, 1955, 4, No. 3.

³¹ Koya, Yoshio; Muramatsu, Minoru; Agata, Sakito; and Suzuki, Naruo: A Survey of Health and Demographic Aspects of Reported Female Sterilizations in Four Health Centers of Shizuoka Prefecture, Japan. *Milbank Memorial Fund Quarterly*, October, 1955, 33, No. 4, pp. 368-392. In Japanese: *Nihon kōshū eisei* December, 1954, 1, No. 10, pp. 11-20.

on children enumerated in the various areas and social-economic groups will be substantial contributions. If the monographic materials on vital statistics for 1950 are published and extended data on parity and marital durations are continued for the years from 1954 through 1956 for prefectures, knowledge can begin to substitute for deduction and speculation in many fields.

It would be difficult to over-emphasize the importance of data and analysis on fertility in Japan. To the broad problem of the relations between economic modernization of an industrial type and fertility has been added the array of problems associated with a sharp drop in fertility. Japan's experience may be thrust aside as relevant only to Japan on a variety of grounds: The precipitant declines of recent years occurred in a country that had had a century of economic modernization, three-quarters of a century of compulsory education, and perhaps sixty years of slowly declining fertility; the resort to abortion occurred in a culture with a tradition of rational control that was within the memory of the grandparents of today's youth; Japanese culture is unified and its people disciplined. These are easy arguments. It is possible, however, that there are elements of commonality as well as uniqueness in the demographic history of Japan in contrast with her neighbors. The external analyst is disturbed by questions as to the relative roles of traditions, of government policy or implicit government approval, of massive public debate, of a deep economic and spiritual crisis, and of aspirations for which fulfillment is not anticipated. These questions, it is submitted, are as significant for research as those involving the means whereby motivations to limit reproduction become manifest in reduced fertility.

The real unknown in Japan is the cultural and psychological process whereby a generalized wish to regulate reproduction became the basis for incisively implemented practice. There is the further significant question of the social, psychological, and political consequences of a reduction in fertility such as that occurring in Japan. The experience of the countries of the West

indicates slight likelihood of a cessation or reversal of decline until fertility has gone appreciably below the levels necessary for permanent replacement of the population. Beyond this, the experience of the West seems to indicate an economic basis for the cyclical changes if not the long-run trends in controlled fertility. Thus if trends in fertility in Japan are contrasted with those in Western countries, interest is focused on the means whereby an educated people with high aspirations but low incomes can be induced to replace their numbers.

If trends in fertility in Japan are contrasted with those of neighboring agrarian societies, the interest is focused on the patterns, the motivations, and the means of the changing reproductive behavior. The research most significant for countries in which the high fertility of agricultural people still poses major problems would be intensive study of the declines in the fertility of the village women in the agricultural areas. If it is true, as present data suggest, that the agricultural people in the villages of Tohoku region are practicing family limitation through abortion and contraception, this is a highly significant fact in itself. Beyond this there should be careful study of the genesis of the psychological awareness and the firm motivations that led to actual limitation rather than merely expressions of desires to achieve limitation. The answers to these questions in previous studies of fertility have been in such economic terms as population pressure, low income, and low levels of living. The declines in fertility have occurred in negative rather than positive association with economic poverty, however, and the acceleration of the diffusion of practice has occurred with economic restoration and rising economic indicators, not with economic collapse, blocked migration to the cities, and declining *per capita* income.

Given knowledge of the social psychology of planned parenthood as reality in peasant society, there is a further need to know whether the relations were associated with the specific modernization of Japan or with specific aspects of the non-material culture of that country.

Analysis of the implications of declining fertility among the Japanese for the future size and structure of the population of Japan is in process. In a sense population projections constitute such an analysis, for in all those made since the beginning of precipitant declines in fertility, the age pyramids of the future populations resemble those drawn for Western populations in the late 'thirties and the early 'forties.³² The tools of modern demographic analysis permit a more ordered picture of the population structure and the population dynamics that are inherent in the future if present levels of fertility continue in force or if the downward movements continue.³³

Research on the cultural and the social-psychological aspects of declining fertility in contemporary Japan has a dual relevance. From the standpoint of nations desiring to curb over-rapid increase, here are studies in a nation in which decline has occurred. From the standpoint of the problems of Japan, study of the subjective correlates of decline is not unrelated to the estimation of the future of fertility and the evaluation of whether or when positive policies are indicated. Entirely aside from questions of policy for other countries or for Japan, the research of the Japanese on the changing fertility in their country has contributed to the world's fund of knowledge on human fertility and its variability.

³² Tachi, Minoru; Ueda, Masao; and Takagi, Naobumi: *Shōwa 24-nen yori Shōwa 90-nen ni itaru danjo nenrei gosai kaikyū betsu jinkō no suikei*. [Projection of Population, 1950 to 2015, by Sex and Age.] Pp. 79-94 in: *Nihon. Kōsei-shō, jinkō mondai kenkyūjo. Chōso kenkyū shuyō kekka*, 1952. Tokyo, 1953. Also: Tachi, Minoru: *Nihon no shōrai jinkō no ichi suikei*. Pp. 47-50. *An Estimate of Future Population of Japan*. Pp. 50-53 in: *Nihon jinkō gakkai. The Population Association of Japan: Nihon jinkō gakkai kiyō. Archives of the Population Association of Japan*. Tokyo, 1954, 50, No. 3, 53 pp.

³³ Tachi, Minoru: *Waga kuni saikin no shusseitō shibō no hendō go jinkō kōzō ni oyobosu eikyō ni kansuru kenkyū*. [On a Relation of the Recent Changes of Fertility and Mortality to the Sex-Age Distribution Population in Japan—in View of "Actual" and "Potential."] *Jinkō mondai kenkyū*, March, 1955, 60, pp. 1-74.