Chinese Genealogies as a Source for the Study of Historical Demography

Ts'ui-jung Liu*

This article was originally published in *Studies & Essays in Commemoration of the Golden Jubilee of Academia Sinica*《中央研究院成立五十周年紀念論文集》(Taipei: Academia Sinica, 1978), pp. 849-870.

INTRODUCTION

More than forty years ago, some life tables were constructed from a Chinese genealogy by a biologist, I-chin Yuan.[1] This drew the attention from demographers and social historians to the genealogy as a major source for the study of Chinese historical demography.[2] However, the source has not really been well explored. My study is based on an investigation of two genealogies available from the library of the University of Pennsylvania and is aimed at demonstrating how the technique of historical demography can be applied to this type of historical material. As there are more than one thousand Chinese genealogies collected in libraries located in Asia and America, a thorough investigation of all of them is, indeed, beyond one person's reach, and would require a joint effort of interested demographers and historians in the future.[3]

In this paper, I shall first try to define the group of people under investigation by information collected from the two genealogies. The processing of the data will then be briefly described. The findings will be presented in terms of marriage, fertility, and mortality.

---

* Associate Research Fellow, Institute of American Culture, Academia Sinica. I wish to thank the Population Studies Center of the University of Pennsylvania for granting me a post-doctoral fellowship during the year of 1976-1977. The methods of demography that Professor Etienne van de Walle has taught me opened a new field of research for me in the future, for this I am grateful. Professors John Durand and Vincent Whitney have also provided valuable comments on my manuscript, I wish to thank them. I also wish to express my gratitude to Academia Sinica for allowing me a leave of absence during this year.

[1] I-chin Yuan, "Life Tables for a Southern Chinese Family from 1365 to 1849," *Human Biology*, 3.2 (1931), pp. 157-179.

[2] T. H. Hollingsworth, *Historical Demography* (Ithaca, 1969), pp. 200-201; Wolfram Eberhard, "Chinese Genealogies as a source for the Study of Chinese Society," in S. J. Palmer ed., *Studies in Asian Genealogy* (Utah, 1972), pp. 30-33.

[3] For a quite comprehensive bibliography, see Tage Akigorō 多賀秋五郎, *Sōfu no kenkyū* 宗譜の研究 (An analytic study of Chinese genealogical books, Tokyo, 1960), pp. 80-478; for a bibliography of collection in Taiwan, see Ch'ang Pi-te 昌彼得, *Taiwan kung-ts'an tsu-p'u chieh-t'i* 臺灣公藏族譜解題 (An annotated bibliography of genealogical collections in Taiwan, Taipei, 1969), pp. 1-104; also see Hsiang-lin Lo, "The Preservation of Genealogical Records in China," in Palmer ed., *Studies in Asian Genealogy*, pp. 38-55 for a quick reference.

THE PEOPLE

The two genealogies used for this study are the Genealogy of the Chien 簡 Clan and the Genealogy of the Yu 游 Clan, both recently published in Taiwan. These two genealogies were compiled in the same format.[4] The genealogical records began in the fourteenth century, however, information valuable for demographic analysis can be found only for a much later period. Owing to the fact that vital dates of the earlier generations were often not available, this study will start observation with the generation that moved to Taiwan in the late seventeenth and early eighteenth centuries and end with those born before the twentieth century. Thus, the population of this study includes descendants of 17 branches of the Chien clan and 70 branches of the Yu clan; the number amounts to 90 husbands and 99 wives of the former and 833 husbands and 913 wives of the later. There are also 291 Yu clan males who died young or unmarried.

Before migrating to Taiwan, the Chien clan people resided in Nan-ching 南靖 county, Chang-chou 漳州 prefecture in Fukien province; the Yu clan people resided in Chang-p'u 漳浦 county of the same prefecture. The first residences of the Chien clan people in Taiwan were located at Feng-shan鳳山, Chia-yi嘉義, Ts'ao-t'un草屯, Nan-t'ou南投, Hsin-chu新竹, T'ao-yuan桃園, Tan-shui淡水, and Pai-chieh-pao 擺街堡 (today's Chung-ho-hsiang中和鄉, near Taipei city).[5] The first residences of the Yu clan people were not clearly recorded except that Feng-shan and I-lan宜蘭 were mentioned.[6] These places scatter in Taiwan from south to north. Today, the descendants of the two clans can be found almost all over Taiwan as shown in the lists of addresses in the two genealogies. In the eighteenth and nineteenth centuries these people were certainly not as widely spread as their descendants are today.

The social status of these people cannot be easily defined mainly because occupational information is scarce. The Chien clan had an ancestor who once served as an assistant secretary on the Board of Revenue in Nanking in the late fourteenth century. After moving to Taiwan, it is known that one member died in 1789 while traveling to take the provincial examination in Fukien. Another, born in 1839, was a student of the Imperial Academy. It is also known that a certain twelfth generation ancestor who first migrated to Taiwan had established a farm from which about 2,000 units (unit unclear) of rent could be collected. Moreover, some engaged in trade.[7] As

---

[4] See Hsiang-lin Lo, "The History and Arrangement of Chinese Genealogies," in Palmer ed., *Studies in Asian Genealogy*, pp. 13-17 for a general discussion.

[5] Chien T'ien-lai 簡天來 ed., *Chien-shih ta-tsu-p'u* 簡氏大族譜 (The genealogy of the Chien clan; Taichung, Taiwan, 1970), section of explanation, pp. 9. 13-17, 20-25.

[6] Yu Yu-ts'ai 游有財 ed., *Yu-shih ta-tsu-p'u* 游氏大族譜 (The genealogy of the Yu clan; Taichung, Taiwan, 1970), section of explanation, pp. 9, 18-19.

[7] Chien T'ien-lai ed. *Chien-shih ta-tsu-p'u*, pp. 4, 10, 16-17, 23.

for the Yu clan, it is recorded that in the late sixteenth century, the family became very rich. In 1693, one member became a Chü-jen 舉人 (a graduate of the provincial examination) who failed twice in the metropolitan examination and died while taking it the third time in 1700. In the first half of the nineteenth century, it is mentioned that three persons held titles through purchase and that one passed the first level of military examination. Also, there were merchants in this clan and a few of them even went abroad.[8]

From the scanty information stated above, it seems possible that when these people first migrated to Taiwan, they must have been quite wealthy as they could afford to move and settle down on the new land. However, it is also clear that they did not belong to the very top stratum of Chinese society and their prestige, if they had any, might have gradually declined in later generations.[9] It might be improper to say that these people belonged to an "aristocratic" class simply because they kept a genealogy, as upward social mobility had become relatively easier since the eleventh century and most Chinese clans had compiled a genealogy during the last centuries of the imperial China.[10] If a category should be assigned to these people, it might be possible to label them as "middle class".

PROCESSING THE DATA

The data which can be collected from the genealogies for demographic analysis are dates of birth and death of male descendants and their wives, and the number and names of sons born to each wife. To be sure, not every person in the record had complete information about his vital dates and thus these cases should be treated as unknown.

Before any analysis can be done, it is first necessary to convert all dates from the Chinese calendar to the Western calendar. This is, perhaps, the most tedious task that a student of Chinese historical demography will encounter and that, for the time being, cannot be done by a machine. After converting the dates, the next step is to standardize them by converting the month and date into fractions of a year. This can be done by a computer. Finally, with the standardized dates one can proceed to analyze the data.

In order to investigate changes through time, a convenient periodization is taken to divide the people under study into groups according to their dates of birth. For the Chien clan, there are two periods: 1700-1799 and 1800-1899; for the Yu clan, three:

---

[8] Yu Yu-ts'ai ed., *Yu-shih ta-tsu-p'u*, pp. 4, 7, 32-33, 38, 51.

[9] It is interesting to note, for instance, some rather rustic given names, such as Ch'a-mou 查某 (in Taiwanese, it means "woman"), were found twice in the later generations of the Yu clan. See *Yu-shih ta-tsu-p'u*, pp. 51, 54.

[10] W. Eberhard, "Chinese Genealogies as a source for the Study of Chinese Society," pp. 28-29.

1750-1788, 1800-1849, and 1850-1899.

THE FINDINGS

A recent article by demographers at Princeton University has concluded that the population of traditional rural China in 1930 appeared to be "a population with high mortality, low marital fertility, and a rate of increase little different from zero, characteristics that were of sufficient persistence to have generated a stable distribution."[11] Every important aspect of the demography of rural China in 1930 has been thoroughly treated with new techniques by these demographers. Their findings will serve as guidelines with which later findings about any Chinese population should be compared. In this paper, my findings will be compared with theirs when it is possible to do so.

Marriage

Strictly speaking, it is difficult to talk about marriage because the genealogies did not record the date of marriage. However, a proxy for age at marriage can be derived by comparing the birthdates of the first son and his parents. The result from this calculation are summarized in Table 1 and illustrated in Figures 1 to 3.

Table 1 shows that on the average, the mean age at birth of the first son within first marriage was about 26-27 for husbands and 21-22 for wives throughout the late eighteenth and the nineteenth centuries. It is also notable that in the case of the Yu clan, the age of both husband and wife at birth of their first son was slightly lower in the nineteenth century than in the previous period. It is not unexpected to find that the husband's age at remarriage was higher; the age of second wives was also higher. But it is not clear whether these women were marrying for the first or the second time. It should be noted that although polygamy was practiced in traditional China, a second wife was not a concubine. In the genealogies under study, the term used to refer to a wife other than the first one was "chi" (繼 literally, "succeeding"). A man could have a second wife after the decease of his first wife or because the first wife did not give a male birth. It should be pointed out, however, that these estimates are based on the first male birth and this overestimates the age at marriage.

The three figures illustrate the distribution in percentage of age at birth of the first son within all marriages. Figure 1 shows that the ages at peak for husbands of the Yu Clan in the three periods were 35, 26-30, and 23. Figure 2 shows that for wives of the Yu clan, the peaks were 20, 18, and 19 respectively. Both demonstrate that the

[11] George W. Barclay, Ansley J. Coale, Michael A. Stoto, and James T. Trussell, "A Reassessment of the Demography of Traditional Rural China," *Population Index,* 42.4 (October 1976), p. 625.

people seem to have got married younger in the nineteenth century. Figure 3 shows the distribution of the Chien clan husbands and wives in two parallel panels. Due to a much smaller number in observation, it is difficult to discern a trend.

Table 1: Age at Birth of the First Son, the Yu and Chien Clans

Clan	Period	No. of Observation	Mean Age at Birth of First Son	
			Husband	Wife
(1) Sons born by First Wife				
Yu	1750-1795	46	28.93	22.80
	1800-1849	138	27.35	21.71
	1850-1899	76	24.90	21.71
	Average		27.06	22.07
Chien	1700-1799	14	26.66	19.96
	1800-1899	12	25.84	22.41
	Average		26.25	21.18
(2) Sons born by Second Wife				
Yu	1750-1799	1	29.93	25.95
	1800-1849	10	40.09	28.58
	1850-1899	12	35.22	27.87
Chien	1700-1799	1	30.80	?
(3) Sons born by Third wife				
Yu	1800-1849	3	32.66	25.17
(4) Fourth Wife				
Yu	1850-1899	1	35.09	17.55

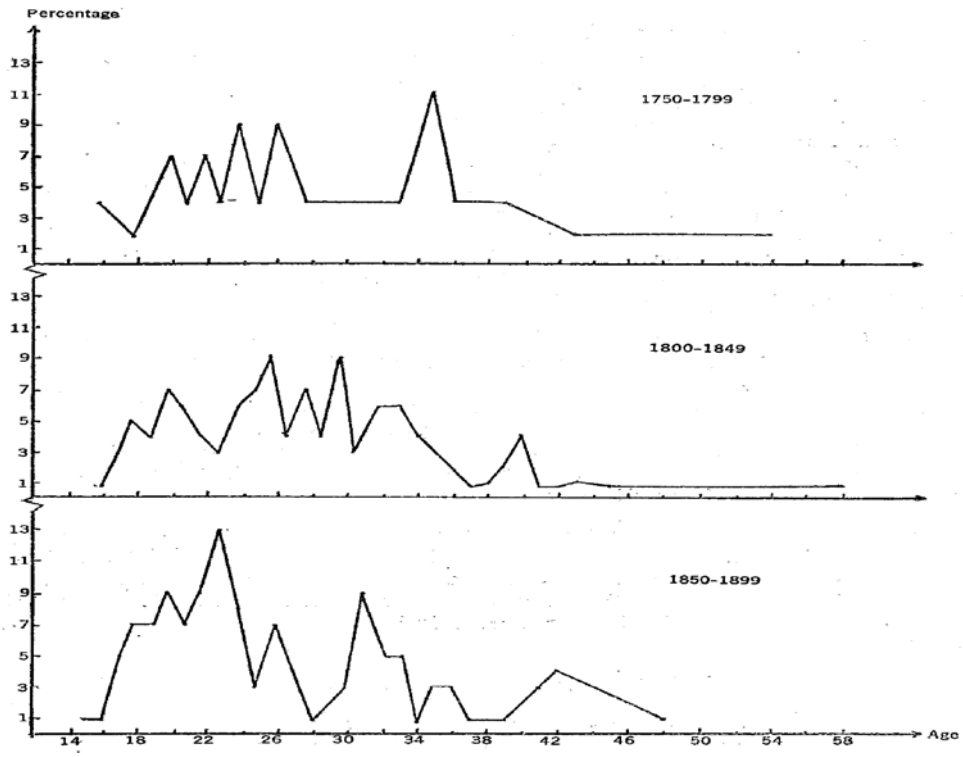

Figure 1: Distribution in Percentage: Age at Birth of the First son, Yu Clan Husbands

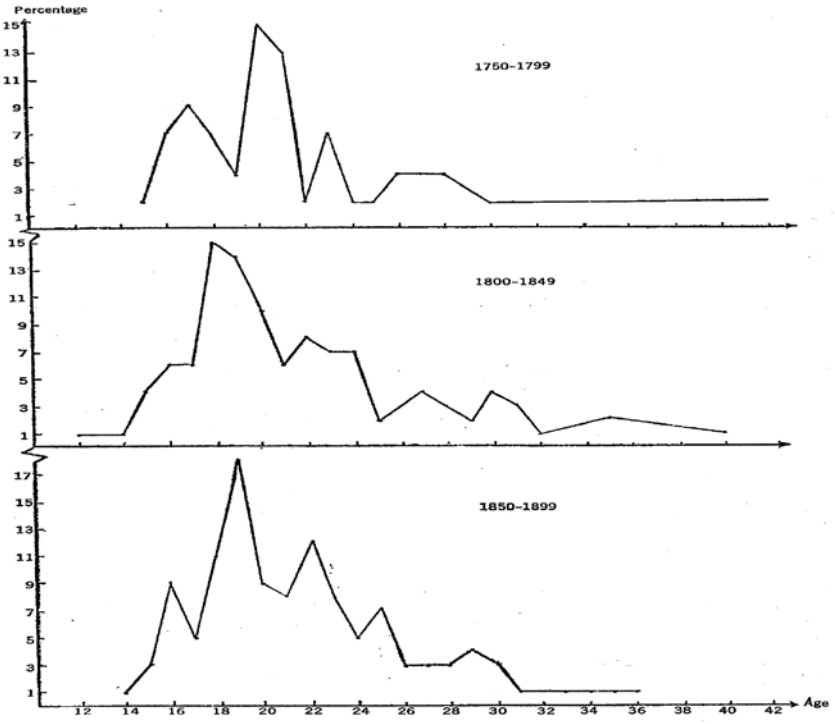

Figure 2: Distribution in Percentage: Age at Birth of the First Son, Yu Clan Wives

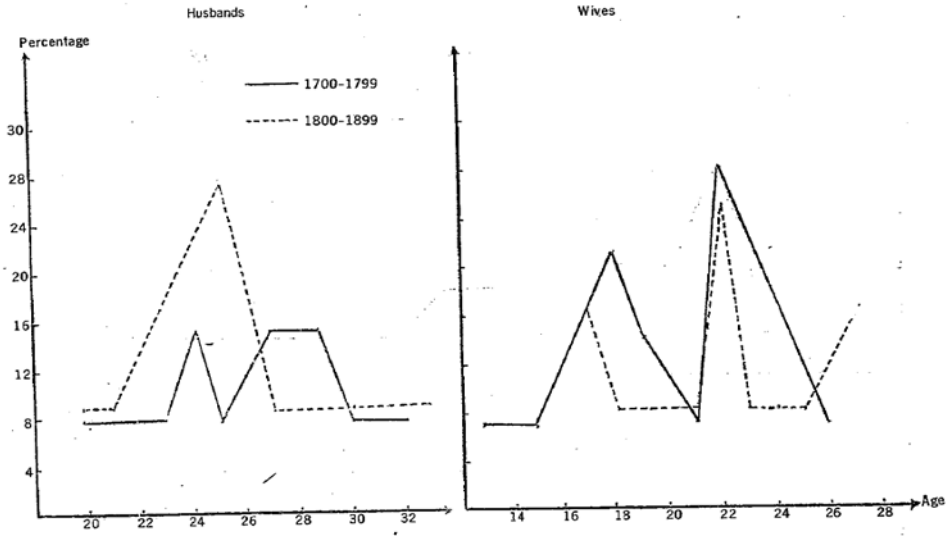

Figure 3: Distribution in Percentage: Age at Birth of the First Son,
Chien Clan Husband and wives

Comparing with the pre-modern Western European pattern of marriage, the people of the Chien and Yu clans, especially the women, were indeed married very young.[12] The older age of the Yu clan husbands in the first period (1750-1799) might

[12] See John Hajnal, "European Marriage Pattern in Perspective," in D. V. Glass and D. E. C. Eversley eds., *Population in History* (London, 1965), pp. 101-143.

be due to the fact that some men were the first migrants in the family and they waited to get married until after they had moved to Taiwan.

It has been assumed that a universal marriage pattern prevailed in traditional China.[13] This assumption can be tested by the record of genealogies, since the Yu clan genealogy identified unmarried males by indicating it under their names or else listing their names unaccompanied by a wife's name. The number and percentage of these unmarried men are listed in Table 2.

Table 2: Percentage of Married and Unmarried Men, Yu Clan

Period	No. Unmarried died at Age					No. Married* 50+	Total 50+	Percentage	
	Unknown	-15	15-19	20+	50-			Married	Unmarried
1750-1799	17	0	1	8	3	42	45	93.3	6.7
1800-1849	24	9	4	12	3	98	101	97.0	3.0
1850-1899	38	5	8	11	0	41	41	100.0	0.0

* For total no. married, see Table 1, number of observation (1), Yu clan.

Form the percentage of those who died unmarried above age 50, the tendency toward universal marriage was more certain in the nineteenth than in the late eighteenth century. That the proportion of single men was larger in the late eighteenth century might be also due to the fact of migration. When the people were more settled in the nineteenth century, the universal marriage pattern prevailed. The percentage single for the females cannot be estimated because of a lack of information about daughters in the genealogies. However, as the universal marriage pattern was quite certain for the Yu clan males, it might be more so for the females.

At this point, it may be noted by passing that the Yu clan genealogy mentioned every case in which a young widow was married again (there were 18 of them). This practice of remarriage of the widow is rather striking as it was in contrast to the traditional ideal that discouraged remarriage of the widow. It should be noted that some marriages were arranged when both parties were still very young, for there were a few cases in which both husband and wife, or wife alone died before even reaching age ten. For example, there was a man who had first and second wives died when they were aged five and four and he was 23 when his first son was born by his third wife.[14] Obviously, this man was only nominally married to the first two girls by arrangement. Moreover, the Yu clan people also practiced the custom of adopting a girl who then was introduced to her husband by marrying into her foster family in order to bear children for carrying on the family line. A few Yu clan males were also said to be

[13] Frank Lorimer, *Culture and Human Fertility* (New York, 1969), pp. 159-160.
[14] *Yu-shih ta-tsu-p'u*, p. 34.

married out of his family. It is commonly known that when a man was married out of his family he was probably rather poor.[15] These marriage practices seem to further suggest that the Yu clan people were just common people.

Fertility

The genealogical data can be used to investigate marital fertility in two ways. First, a fertility rate can be derived by counting the total number of sons and mother and dividing the former value by the latter to obtain the average number of sons per mother. The fertility rates derived by this method for the two clans are shown in Table 3 in two parts: (1) all wives included and (2) only second wives. The second wives had a lower fertility rate because the age of their husbands was older and they themselves also married at an older age. The difference between the two clans might be due to the fact that there were more cases other than first marriage found in the Yu clan and this might be the cause and effect of the lower fertility in this clan.

Table 3: Fertility Estimated by Sons/Mothers Ratio

Clan	Period	No. of Mothers	No. of Sons	Fertility
(1) All Wives				
Chien	1700-1799	34	120	3.52
	1800-1899	65	196	3.01
Yu	1750-1799	83	185	2.23
	1800-1849	336	649	1.92
	1850-1899	517	989	1.91
(2) Second Wife				
Chien	1700-1799	3	5	1.66
	1800-1899	6	7	1.16
Yu	1750-1799	5	10	2.00
	1800-1849	37	40	1.08
	1850-1899	60	86	1.43

The second method is a sort of partial family reconstitution. When the cases in which dates of birth of all sons of the same parents are known and large enough, the family reconstitution method can be applied to estimate age specific fertility rates and then derive the total fertility rate. The fertility rates estimated by these two methods are, of course, related to sons only. Assuming a certain sex ratio at birth, these rates can be related to both sexes. In the case of China, the neglect of daughters by the genealogies would not really affect a reasonable estimation, as the female population in traditional China was often under-recorded if it was recorded at all.

[15] As a matter of fact, both the Yu and Chien clans had an ancestor in earlier generation married out to a family which was richer than his own and thus became prosperous later. See *Chien-shih ta-tsu-p'u*, p. 4; *Yu-shih ta-tsu-p'u*, p. 3.

The method of partial family reconstitution is applied to the Yu clan as there are more data suitable for this technique. Since the genealogy was compiled by listing generation after generation, there is actually not much to be reconstituted, except for the cases in which a son or two were adopted by one's brother or cousin. Then, the siblings can be gathered together by looking through a few pages in the genealogy. This practice of adoption sometimes also makes it necessary to rearrange the order of birth among brothers according to their birthdays regardless of their nominal ranking. This task is much easier than the real family reconstitution from parish registration in European countries.[16]

The conjugal families thus reconstituted from the Yu clan genealogy were first sorted by completeness of dates at birth of sons into four types:

I. All dates were known;

II. Date at birth of one son in the middle was missing;

III. Date at birth of the last son was missing; and

IV. Date at birth of the first son was missing when there was more than one son.

Those families with two or more son's birthdays missing were discarded. The numbers of these families are listed in Table 4(1). It is clear that a large proportion belong to type I. The missing dates in other types of family were filled in by the following rules:

(1) In the case of type II family, the missing date is obtained by taking the average of the two ranking above and below.

(2) In the case of type III family, the missing date is obtained by adding 3 years to the birthday of the one ranking next below.

(3) In the case of type IV family, the missing date is obtained by subtracting 3 years from the birthday of the second son.

The above four types were further classified according to completeness of dates of parents:

A. Both parents' dates at birth and death were known;

B. Both parents' dates at birth were known but the father's date at death was unknown;

C. Both parents' dates at birth were known but the mother's date at death was unknown;

D. Both parents' dates at birth were known but both dates at death were unknown.

Families with only one parent's birthday available were thus discarded. There were also cases in which the wife was not the first wife. These families were also abandoned due to the difficulty of deciding a starting point of marriage (see below).

[16] See Louis Henry, *Manuel de démographie historique* (Geneve-Paris, 1967), pp. 78-105; E. A. Wrigley, "Family Reconstitution," in E. A. Wrigley ed., *An Introduction to English Historical Demography* (New York, 1966), pp. 96-159.

The number of families classified by the second criterion and those abandoned are listed in Table 4(2).

Table 4: Types of Conjugal Families Reconstituted from the Yu Clan Genealogy

(1) Classified by Completeness of Son's Date at Birth

Period \ Type	I	II	III	IV	Discarded	Total	% of I
1750-1799	47	3	4	0	1	55	85.5
1800-1849	131	11	12	8	13	175	74.9
1850-1899	68	5	17	4	8	102	66.7

(2) Classified by Completeness of Parents' Dates

Period \ Type	A	B	C	D	Discarded	Total	% of A
1750-1799	29	2	15	4	5	55	52.7
1800-1849	81	13	28	35	18	175	46.3
1850-1899	12	10	12	36	23	102	11.7

It is clear that except for the third period, about half of the families belonged to type A. Analysis based on type A families will certainly yield results that are more reliable, especially for the first period. In order to include more cases in the analysis, however, types B, C, and D will also be considered with following rule: the duration of marriage for these couples is counted up to (and excluding) the age group when the last son was born.

A problem of uncertainty existed in the third period because of a large proportion of type D families and there was no way of knowing whether these couples were still alive throughout their reproductive age.[17] Hence there would be too few women in the last age groups and the fertility rates would turn out to be too high for these age groups (this will be further discussed below).

One more assumption is required before the computation of fertility rates can be started. As mentioned before, the genealogy did not provide the date at marriage, but the problem of a starting date for the marriage has to be solved. There is no prefect solution; however, an estimate can be arrived at by estimating the age at marriage from age at first male birth and an estimate of the average interval between marriage and first male birth. The former value has been estimated in the previous section on marriage, the latter value can be derived by the following reasoning.[18]

We assume that the average length of time between marriage and a first birth is 14 months. This average is taken from the experience of European parish studies. Moreover, the average interval between births, in the same monographs, is of the

[17] These couples were all born before 1885 and the genealogy was published in 1970. The genealogy indicated those who were still alive when it was compiled, but none of these couples was so specified.

[18] This estimate has been suggested to me by Professor van de Walle in his comments on a first draft of this article.

order of 25 months. These values are not definitive ones, but they should do for an order of magnitude.

We further assume that half of the women have a boy for first birth. Half of the others have a boy following upon the birth of one girl. Of the remaining fourth, half once again have a boy as their third child, and, and so on. Thus:

> 1/2 of childbearing women have a first male birth 14 months after marriage, accounting for 7 months (1/2 x 14 months); 1/4 have it 39 months after marriage, accounting for just under 10 months (1/4 x 39 months); 1/8 have it 64 months after marriage, accounting for 8 months (1/8 x 64 months), ……

The outcome of this computation is that women would, on the average, have their first male birth approximately 3 years after marriage.

As shown in Table 1, on the average, the mean age at birth of first son for the Yu clan wives in first marriage was 22. Since the mean age at marriage tends to be higher than the median, the median age at birth of first son for these Yu clan wives will also be calculated for our purpose here.[19] The median age at birth of first son for the Yu clan wives in the three periods were 20.14, 19.53, and 19.50 respectively, and the average of the three was 19.72. Let us take the average of the mean and the median age at birth of first son here and it is 21. Therefore, the average age at marriage would be 21-3 = 18. But there were, in fact, a considerable number of first sons born to mothers whose ages were lower than 18; for these cases, the age at marriage would be at birth of first son minus 2 years.

To compute the age specific marital fertility rate, the nominator is obtained by adding up the number of sons born to mothers at each age group; the denominator is obtained by adding up person-years spent by mothers at each age group. The fertility rates thus obtained are related to sons only. In order to relate them to both sexes, let the sex ratio at birth be 1.06. Suppose the age specific fertility rate in sons is f(a) and that for both sexes, it is F(a), then F(a) = f(a) x 1.9434. The total fertility rate can then be derived by the sum of F(a) times 5. It should be noted, however, that the total fertility counted from age 15 up introduces a bias because women were assumed to be exposed to fertility from age 15 on instead of 18. In order to eliminate this bias, the total fertility should also be counted from 20 up; this would stand for the total number of children that a woman married at age 20 would have throughout her reproductive age.

The results obtained from the above calculation are presented in Table 5. The total fertility rates computed in both ways indicate that they were higher in the first

[19] See E. A. Wrigley ed., *An Introduction to English Historical Demography*, p. 150, for the comparison of the mean and the median age at marriage.

than in the second period. As for the third period, the total fertility rate was much higher than that in the other two periods. Note that the age specific fertility rate above age 30 increased with age, reaching a peak at ages 40-44. This rather surprising shape of the age specific fertility curve is due to the fact that there were more unknown cases in this period and that made the numbers of women in the last age groups too small. It is also likely that the genealogy had left out women without children at the end. This finding at least shows that data from this last period may be unusable. However, if the high fertility had any implication for the fertility trend, it might be found somewhere.

Table 5: Age Specific and Total Fertility Rates, Yu Clan

Age of Mothers	No. of Sons	Person-years	Fertility	
			f(a)	F(a)
(1) Wives born 1750-1799				
15-19	18	139.1	.1294	.2515
20-24	30	222.9	.1346	.2616
25-29	24	205.0	.1171	.2276
30-34	26	181.5	.1433	.2785
35-39	9	155.8	.0578	.1123
40-44	11	115.9	.0950	.1846
45-49	1	87.9	.0114	.0222
Total				1.3385 x 5 = 6.6915
Total (from 20 up)				1.0868 x 5 = 5.4340
(2) Wives born 1800-1849				
15-19	65	409.9	.1585	.3080
20-24	68	648.8	.1358	.2639
25-29	74	359.8	.1322	.2569
30-34	51	443.9	.1149	.2233
35-39	30	304.7	.0985	.1914
40-44	5	217.8	.0229	.0445
45-49	0	--	--	--
Total				1.2880 x 5 = 6.4400
Total (from 20 up)				0.9800 x 5 = 4.9000
(3) Wives born 1850-1899				
15-19	31	179.4	.1727	.3356
20-24	38	280.0	.1357	.2637
25-29	24	177.0	.1356	.2635
30-34	16	108.3	.1477	.2870
35-39	9	49.6	.1891	.3673
40-44	4	20.8	.1923	.3737
45-49	0	--	--	--
Total				1.8908 x 5 = 9.4540
Total (from 20 up)				1.5552 x 5 = 7.7760

For instance, let us consider the first four age groups. The total fertility of these age groups for the three periods was 5.096, 5.261, and 5.749 respectively. In other words, the fertility seemed to be higher in the later periods. Referring back to the first look at the total fertility of the first and second periods, the trend was just opposite. How could this contradiction be explained? One way to argue is that difference was really not very large and the fertility remained rather constant. The other way is to say that there is no contradiction when other aspects of demography are brought into consideration. When there was no control of fertility, a younger age at marriage would lead to a higher fertility. As a mater of fact, the Yu clan people were married younger in the nineteenth century than in the late eighteenth century as pointed out before. Moreover, the mortality was probably higher in the nineteenth century than in the eighteenth century (see below).

Moreover, because the births were probably under-recorded as will be seen below in estimates of child death rates (see Table 8), the fertility rates derived above were underestimated. It is difficult to gauge the degree of underreporting with the material of the Yu clan genealogy. However, when other genealogies of better quality are investigated, the problem of underreporting may be solved. At this point, it seems possible to say that the fertility remained rather constantly high and this could be further explained by a comparison of the fertility indexes.

In order to obtain fertility indexes, the age specific marital fertility rates of the observed population are compared with those of the Hutterites in 1921-1930. Because there is no information about illegitimate births and number of women unmarried, only I_g, the index of marital fertility, can be computed for the Yu clan wives. To compute the I_g index, it is necessary to know the number of married women in each age group. Using the same rule stated before, the number of married women in each age group is counted by following the women up to (and excluding) the age group when the last son was born in the cases in which the end of marriage was unknown. The third period is deleted because of the defective data. The details of deriving the I_g index for the Yu clan wives are shown in Table 6. The I_g index of the Yu clan wives born in 1750-1799 was slightly lower than that of those born in 1800-1849; both values were slightly lower than that of Taiwan in 1915 (I_g = .597) but slightly higher than that of rural China in 1930 (I_g = .510). [20] This comparison suggests that the marital fertility level of the Yu clan wives was probably higher in the nineteenth than in the eighteenth century and that the population in Taiwan might have a higher marital fertility than in mainland China.

[20] See Barclay *et al*., "A Reassessment of the Demography of Traditional Rural China," p. 616.

Table 6: I_g Index of the Yu clan Wives

(1) Number of Married women (m_i) at Each Age Group

Age Groups / Periods	15-19	20-24	25-29	30-34	35-39	40-44	45-49
1750-1799	48	46	41	37	32	26	19
1800-1849	152	132	114	93	65	46	38

(2) Standard Schedule of Births per woman (F_i) at Each Age Group

Age Groups	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Hutterities	.300	.550	.502	.447	.406	.222	.061

(3) g_im_i at each Age Group and the Sum (The value of g_i see F(a) column of Table 5)

Age Groups / Periods	15-19	20-24	25-29	30-34	35-39	40-44	45-49	Sum
1750-1799	12.0750	12.0336	9.3316	10.3045	3.5936	4.7996	.4218	52.5567
1800-1849	46.8160	34.8348	29.2866	20.7669	12.4410	2.0470	--	146.1923

(4) F_im_i at Each Age Group and the Sum

Age Groups / Periods	15-19	20-24	25-29	30-34	35-39	40-44	45-49	Sum
1750-1799	14.4000	25.3000	20.5820	16.5390	12.9920	5.7720	1.1599	96.7440
1800-1849	45.6000	72.6000	57.2280	41.5710	26.3900	10.2120	--	253.6010

(5) I_g Index (I_g = the sum of g_im_i / the sum of F_im_i)

Periods	I_g
1750-1799	.543
1800-1849	.576

Furthermore, in order to compare with the fertility of other populations in which natural fertility was predominant, the m and M values must be computed according to Coale's model:

$$r(a) = Mn(a)e^{v(a)m}$$

In this model, r(a) is the age specific martial fertility rates of the observed population; m is the degree of voluntary control and v(a) is the universal pattern; M is the level of natural fertility experienced at ages 20-24, that is, M = r(20-24)/n(20-24), where n(20-24) is the standard natural fertility at that age groups; both n(a) and v(a) are standard values.[21] The m and M values computed for the Yu clan wives are presented in Table 7 and the m curves are shown in Figure 4.

[21] See Barclay *et al*., "A Reassessment of the Demography of Traditional Rural China," pp. 614-615.

Table 7: Values of m and M Required for Coale's Model of Marital Fertility, Yu clan

(1) Values of m and M

Periods	Value of m at Each Age Group and the Average							M
	20-24	25-29	30-34	35-39	40-44	45-49	Average	
1750-1799	0.0	-.2730	.3156	-.4723	.4679	.2973	-.0221	.569
1800-1849	0.0	.2260	.0298	.0626	-.5342	--	-.0471	.575
1850-1899	0.0	.2519	.3600	(.6554)	(.9667)		(.4468)	.573

(2) Standard Values of n(a) and v(a) by Five-year Age Group

Age Groups	20-24	25-29	30-34	35-39	40-44	45-49
n(a)	.4597	.4309	.3946	.3223	.1671	.0237
v(a)	.0	-.2790	-.6770	-1.0420	-1.4140	-1.6710

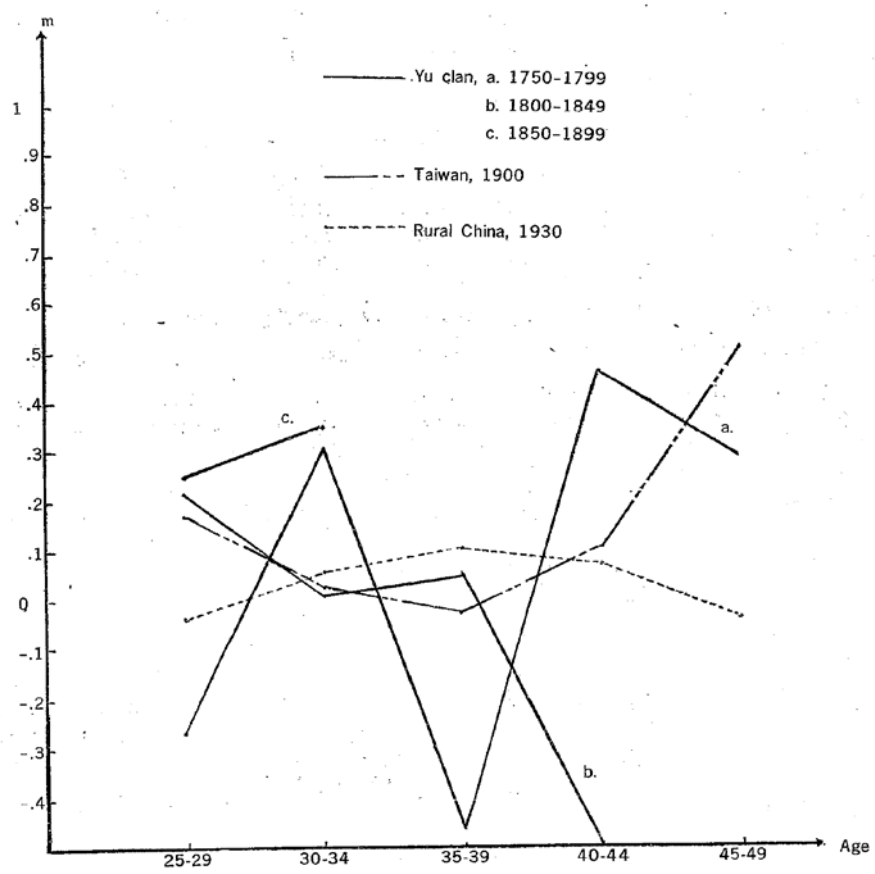

Figure 4: Value of m, the Index of Fertility Control

Table 7 shows that the M values of the Yu clan wives were about the same in the three periods. These M values are much lower compared with the M values of Taiwan in 1900 (M = .79), but only slightly lower than that of rural china in 1930 (M = .62).[22] This comparison suggests that the level of natural fertility of the Yu clan wives was

[22] Barclay *et al*., "A Reassessment of the Demography of Traditional Rural China," p. 615.

rather constant throughout the eighteenth and nineteenth century.

Figure 4 illustrates the m curves of the Yu clan wives in comparison with other Chinese populations. The curves of the Yu clan fluctuate more drastically than others mainly because the number in observation is rather small. Regardless of the fluctuations, it is certain that the degree of voluntary control of fertility was low among the Yu clan wives.

Mortality

As in estimating the fertility, mortality can be roughly estimated from the aggregate data. It is possible to count the number of child deaths and divide it by the number of births. The Yu clan genealogy identified sons who "died young" under each mother and hence these sons were not mentioned again individually. It is possible to make a rough estimate of child death rates from these numbers and the results are shown in Table 8. The ratios of children's deaths/births for the three periods seem too low for child mortality; the deaths must have been under-recorded.

Table 8: Rough Estimates of Child Death Rates, the Yu Clan Males

Periods	No. of Births	No. of Deaths	Death Rate
1750-1799	185	9	.0489
1800-1849	649	43	.0662
1850-1899	989	104	.1051

It should be noted that the definition of "died young" was not clearly stated in the Yu clan genealogy. However, other genealogies had certain rules of recording. For instance, a general rule stated that boys died within three months after birth were not considered as "died young" (the term use for this category is "shang" 殤), this implied that infant deaths were systematically unregistered; those died under age 7, counting in Chinese way, were not recorded either, as they were not mourned according to the rite; those died between ages 8 and 15 were identified as "died young" under their father; only those died above age 15 were recorded individually with dates. But this rule may vary among the genealogies.[23] Materials gathered from the genealogies with consistent recording may be used to gauge the degrees of underreporting of births and deaths.

The adult mortality can be investigated by constructing life tables using ages at

[23] See *T'ung-p'i Chao-shih tsung-p'u* 桐陂趙氏宗譜 (The genealogy of the Chao clan at T'ung-p'i. 1883 ed.), the head volume, p. 3. The other genealogy set the age of recording from age 10. See *Liu-shih tsung-p'u* 劉氏宗譜 (The genealogy of the Liu clan in Kiangsu, 1896 ed.), general rules, p. 2. These two genealogies are in the collection of Harvard-Yenching Library.

death of the married men and women recorded in the genealogies. In constructing life tables, the first problem to be solved is the distribution of the unknown numbers. Two criteria with which the unknown can be distributed have been suggested by Henry: the one is to determine from other information whether a person was still alive in a certain age group; the other is to determine whether a person died before a certain age group.[24] Henry's method could be used if there were few unknowns. However, because information other than dates and number of sons was scarcely available from the genealogies under study, and because the unknowns were quite numerous among the Yu clan people, only tentative estimates would be made with the known data.

In Table 9 the known numbers of the Chien and Yu clans married members died at each age group and the numbers and percentages of the unknowns are listed. Also listed are the ${}_{10}q_x$ values computed with the known data alone. Except for the Yu clan members born in 1850-1899, in other cases the percentage of the unknowns was less than or about half of the total number. Compared with 17 percent of the unknowns in the case of males in Mr. Yuan's study, the records of the two genealogies of this study seem to be not as good in quality.[25]

Tentative estimates of the ${}_{10}q_x$ values with the known data alone show that irregularities can be found in the values of the Chien clan husbands born in 1700-1799 and the Yu clan husbands and wives born in 1750-1799, as well as wives born in 1850-1899. These reflect that when the number in observation is small, fluctuations along a smooth curve are likely to occur. Tentative estimates of life expectancy made with the known cases indicate that the mortality seemed to be higher in the nineteenth century as it has also been found by Mr. Yuan.[26] Recent study on the population of rural China in 1930 has found an even higher mortality level.[27]

If the increasing mortality during the nineteenth and early twentieth centuries would be true for China, it seemed the increasing mortality might have coincided with the deteriorating economic condition of China in general. Detailed investigation on the causes of mortality has yet to be made and usable estimates of the life expectancy have yet to wait for discoveries of more reliable genealogical records. However, it is a problem that required further study, as at a time when the length of life expectancy of people in some European countries was gradually improving; China might have found her people were dying at younger ages.[28] This might be of significance to those who are concerned with the problem of China's modernization during the late nineteenth and early twentieth centuries.

---

[24] Louis Henry, *Manuel de démographie historique*, pp. 113-115.
[25] I-chin Yuan, "Life Tables for a Southern Chinese Family from 1365 to 1849," p. 164.
[26] I-chin Yuan, "Life Tables for a Southern Chinese Family from 1365 to 1849," p. 170.
[27] Barclay *et al.*, "A Reassessment of the Demography of Traditional Rural China," p. 620.
[28] For instance, see Etienne van de Walle, *The Female Population of France in the Nineteenth Century* (Princeton, 1974), p. 199, for estimates of life expectancy of French females.

Table 9: Distribution of Deaths in Ten-year Age Groups,
the Married Members of the Yu and Chien Clans

(1) Husbands

Age at Death	Chien Clan				Yu Clan					
	1700-1799		1800-1899		1750-1799		1800-1849		1850-1899	
	No.	q_x	No.	q_x	No.	q_x	No.	q_x	No.	q_x
10-19	1	.0400	2	.0377	0	.0	4	.0214	3	.0209
20-29	1	.0416	5	.0784	1	.0172	16	.0874	30	.2143
30-39	4	.1739	5	.1063	6	.1052	24	.1237	38	.3454
40-49	2	.1057	9	.2142	9	.1764	45	.3147	31	.4305
50-59	6	.3529	15	.4545	9	.2143	51	.5204	24	.5853
60-69	6	.5454	10	.5555	17	.5152	26	.5532	10	.5852
70-79	3	.6000	7	.8750	12	.7500	18	.8571	6	.8571
80+	2	1.0000	1	1.0000	4	1.0000	3	1.0000	1	1.0000
Unknown	4		8		17		139		288	
Total	29		61		75		326		431	
% Unknown	13.8		13.1		22.7		42.6		66.8	

(2) Wives

Age at Death	Chien Clan				Yu Clan					
	1700-1799		1800-1899		1750-1799		1800-1849		1850-1899	
	No.	q_x	No.	q_x	No.	q_x	No.	q_x	No.	q_x
10-19	--	--	--	--	2	.0526	5	.0333	13	.1102
20-29	0	0	3	.0652	3	.0833	13	.0896	26	.2476
30-39	0	0	7	.1627	1	.0303	19	.0439	21	.2658
40-49	1	.0476	3	.0833	8	.2500	25	.2212	17	.2931
50-59	4	.2000	8	.2424	4	.1606	39	.4432	15	.3658
60-69	6	.3750	9	.3600	11	.5500	28	.5714	9	.3461
70-79	7	.7000	11	.6875	7	.7777	14	.6666	12	.7053
80+	3	1.0000	5	1.0000	2	1.0000	7	1.0000	5	1.0000
Unknown	13		19		45		177		395	
Total	34		65		83		327		513	
% Unknown	38.2		29.2		54.2		54.1		70.0	

CONCLUSION

It should be concluded that in Chinese genealogies one will find valuable data for the study of historical demography although the defects of this source should not be neglected. There are problems created by the unknowns and there are apparent underreporting of child births and deaths. However, the findings obtained from an investigation of two genealogies at random suggest that many technique developed recently by demographers can be applied to analyze the data collected from this source. It is also significant to find that the fertility might not have declined and the mortality might be increasing in the nineteenth century. There are still more than one thousand Chinese genealogies required careful studies, more similar and dissimilar cases are needed to test the credibility of findings in this study.

中國族譜的歷史人口學分析

(中文摘要)

劉翠溶

四十幾年前，我國生物學家袁貽瑾先生曾用一部廣東族譜來研究該家族人口的死亡率。但是自從他的論文發表以來，人口學界雖知中國族譜是相當可用的材料，卻至今尚未有其他研究發表。本文利用兩部臺灣的族譜 ——《游氏大族譜》和《簡氏大族譜》——以歷史人口學之分析方法來研究婚姻、生育率和死亡率。

本文的發現有以下幾點：(1)以長子出生之時間作為觀察結婚年齡之指標，游氏和簡氏的族人在十九世紀之婚齡有降低之趨勢。(2)就生育率來說，繼室較元配之生育率低，這顯然是因為娶繼室之男子年齡較大，而且成為繼室之女子年齡亦較大。再以「家庭重組」之方法來探討游氏元配的生育率，發現在十八、九世紀中，生育率一般相當高，似無降低之趨勢；而其已婚生育率指數 (I_g) 亦顯出十九世紀略高於十八世紀。(3)就死亡率來說，由於族譜記載未成年者之死亡頗不完全，故其資料難以用來估計未成年者之死亡率。至於成年人的死亡率，可用編製生命表的方法來探討。初步以已知死亡年齡之人數估計的結果，顯示游、簡二氏家族口人的死亡率在十九世紀有增高之趨勢。但是，因死亡年齡未知之人數占相當高的比率，故死亡率之可靠估計尚待以其他資料較佳之族譜來研究。

本文之目的，不僅在於介紹歷史人口學方法，亦在於喚起對歷史人口學有興趣之學者注意族譜之利用。收藏於國內外之中國族譜不下一千餘種，絕非一、二人在短期內可以全部仔細研究的。目前歐美歷史人口學界對中國歷史人口之研究亦開始注意，深盼國內人士能有較長遠的計劃來進行研究。