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A DEMOGRAPHIC ANALYSIS OF PALMERSTON NORTH,
1870-1911.

A research exercise presented in partial fulfilment of
the requirements for the degree of BA Honours in History.

A.B. Tod.

Massey University

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Preface.

A knowledge of a society's demography can give insights as to the composition of that society. By studying the demographic trends of a society over time we can see how this composition changes and the different types of composition associated with the different stages in the society's development. Historical demography is a much underestimated discipline within New Zealand's historical writing and this dissertation is aimed at being a very small contribution which will have to be added to and compared with to give a more clear picture of New Zealand society in the latter half of the nineteenth century and the first one and a half decades of the twentieth. Because this is merely a beginning I have decided not to go beyond some basic manipulation of the available data upon which to study Palmerston North. My main aim is to describe and account for the patterns of population growth that occur by relating them to the history of the Palmerston North - Manawatu area and also New Zealand as a whole.

One of the first problems to be faced by a historical demographer studying New Zealand history is the great lack of any previously published material. What has been written is usually found in either economic or social histories in the form of general statements including simple computations of numerical or percentage growth of the population. The only piece of work of note dealing with the turn of the twentieth century that has had 'population' as its central theme is Willoughby's unpublished thesis about the northward drift of population in the late nineteenth century.¹ He gives a limited coverage of general trends as those included are intended to support his thesis accounting for the 'drift north' rather than giving a full coverage.

This lack of secondary information on the population has

forced me to examine primary resources such as the New Zealand Censuses and the New Zealand Yearbooks for basic data with which to work. From the very beginning there is a possibility of inaccuracies occurring as it is impossible to be completely sure of the accuracy of the figures in a census. Censuses are well known to carry inaccuracies through human error as not everyone fills in the return accurately. It is hoped that any such errors do not affect the end result. Most of the statistical analysis is merely on a comparative basis, therefore the inexactitudes of the raw data will probably not have as much effect as might occur if only numerical data was used. However this is not always true. When using Age-Sex pyramids in a small population, a relatively small numerical variation can translate into a larger percentage variation especially when the population grows at such a rate as occurs in Palmerston North. A similar situation occurs when discussing marriage statistics amongst the older age groups especially in the early years of settlement where there may have been only one or two people in that age group. Where there are two married people making up the group, that is 100 percent married, whereas if only one is married of the two that means only 50 percent of the group is in the married state. This would appear highly significant in percentage terms but is not in numerical terms.

It should be noted that the divisions used in the age-sex pyramids are not mutually exclusive. The groups used share their boundary limits which should not occur but that is how the groups were divided by the census takers. It is hoped the inexactitude of such definition is apparent rather than real. I have maintained the divisions as used in the censuses as it would be an arbitrary decision as to what the limits should be or were, as applied by the census takers and enumerators. Being only used in general terms

it is hoped that any discrepancies that have been included in the distributions do not affect the analysis significantly.

One area where a problem did arise was in dealing with births and deaths in Palmerston North. The registers held at the Palmerston North Courthouse do not cover the whole period. The holdings of registers of births begins with that of 1880 whilst that of deaths starts halfway through 1885. A fire in 1882 destroyed newspaper files, Borough and Road Board records, and the early registers of births, deaths and marriages. Apart from the problem of incomplete holdings it was necessary to rely on the cooperation of a Courthouse assistant to look through the registers and record the various totals, because of a lack of facilities for research. Another problem related to these registers was that they do not only include entries for Palmerston North but also include surrounding areas such as Stoney Creek (now Whakarongo), Ashhurst, Karere, and Awahuri. I was only able to peruse the Register of Births for 1881 and the Register of Deaths for 1886 and also for 1891. I arrived at an average percentage of some 65 percent actually belonging to Palmerston North. This again may lead to errors in my computations but it is hoped they are not so great as to affect the study to any significant extent.

Another problem of definition arises when considering what exactly constituted Palmerston North in this period. When the Manawatu was surveyed by J.T.Stewart he saw the Papaioea clearing as an ideal site for a town. This town was duly surveyed and laid out and sections were offered for sale in Wellington. In a report to the Wellington Provincial Council in 1866 Stewart described what was laid out and it included 160 town lots of a quarter to one acre and 180 suburban and small farm lots with a total area of 1500 acres.² This was the size of the town until it was declared a borough in 1877.

To reach the necessary population to become a borough the Town Board extended the boundaries so that the area of the borough was "one of the largest in the Colony, [at] 4595 acres" ³ although most of it was bush. With such a large area for its population no doubt the boundaries remained unaltered for some time. The statistical boundary would be the same for most of the period under study.

For a general history of Palmerston North the most important work is G.C. Petersen's Palmerston North: A Centennial History (1973). This is the most substantial work since T.L.Buick's Old Manawatu which was published in 1903. Other articles of a more specific nature provide the remainder of my sources for the Manawatu's history in this period. To cover the general economic history of this period Condliffe's New Zealand in the Making (revised edition, 1959) is useful as is Lloyd Frichard's An Economic History of New Zealand to 1939 (1970).

I would like to thank Professor Oliver for his assistance in reviewing the initial draft.

Footnotes to Preface.

1. Willoughby, D.E. "Population Changes in New Zealand 1867-1911, 'the drift north'," Unpublished M.A. thesis, University of Auckland, 1962.
2. Reports from Mr Stewart on the Manawatu Survey, Acts and Proceedings of the Wellington Provincial Council 1866.
3. Petersen, G.C. Palmerston North: A Centennial History, (Wellington, 1973) p.99.

I. Introduction.

The form that any growth takes depends greatly on its foundation and then the various catalysts and restraining factors which mould the growth that occurs. This is especially true in relation to the growth of Palmerston North as well as to the rest of New Zealand. Many New Zealand towns were founded in the 1870 to 1911 period with some expanding rapidly whilst others grew slowly and others failed to take root. The settlements planned for Martins Bay (Jamestown) and Jackson Bay (Seacombe) collapsed after several years growth with very few families there today because of a lack of resources.¹ Some settlements such as Feilding, Dannevirke, and Masterton developed slowly whilst others like Palmerston North developed rapidly because of their favourable situation. Palmerston North was very much favoured by the governmental expenditure of the Public Works and Immigration Act of 1870, as well as the investments of the Wellington - Manawatu Railway Company. These can be seen as the two major factors for the growth of Palmerston North with other minor factors also contributing.

The exploration of the Manawatu for settlement stemmed from the lack of suitable land in the Wellington area for the Wakefieldian settlers. This led to E.J.Wakefield being sent to find more suitable land which he did very soon after the New Zealand Company ship Tory, and others, had reached Wellington. The New Zealand Company negotiated the purchase of 25,000 acres around the lower Manawatu River when surveys began in 1842. Early activity was restricted to the area around Te Awahou (Foxton) and Paiaaka (ten miles upriver from Foxton). The upper Manawatu was surveyed by J.T.Stewart for the Government during the late 1850's and the 1860's. He travelled up the Manawatu River and reported the existence of large amounts of land still available in the

Manawatu and that the river was an excellent means of communication.² Stewart was struck by one area in particular as a suitable site for locating a township and this was the Papaioea clearing. This clearing was natural in origin and covered an area of some 900 acres. It was surrounded by dense bush and was located approximately half a mile inland from the river near the Hokowhitu pa.

Surveys of the Papaioea clearing and the surrounding Ahuaturanga block were completed by 1867 and sections were offered for sale in Wellington including 160 town lots and 180 suburban and farm lots.³ Most of the town sections were sold but it was some two years before there was any movement towards actual settlement of the sections. One of the main limitations on initial settlement was the difficulty of transportation into the area, with its dense barrier of forest. There was no suitable road from Foxton to Palmerston North so goods had to be brought upriver by canoe even though it was quite expensive. The cost of freight from Wellington to Foxton was one pound per ton whilst from Foxton to Palmerston North it was twenty.⁴ More interest in taking up already purchased land was shown when the government promised the construction of improved transport facilities between Palmerston North and Foxton. This was put into effect by the completion of a dray road between the two in 1871 and a tramway by 1873.

The beginnings of Palmerston North's growth is inextricably associated with transport. The year 1870 heralded the coming of Julius Vogel's massive Public Works and Immigration Act which aimed at opening up the country by constructing transport routes. As insufficient suitable people could be found in Great Britain to emigrate quickly enough, some from Scandinavian countries were selected and their first group arrived at Awapuni (Palmerston North) in February 1871 followed by a second group who arrived in Wellington

one month later. The first group was allotted land, on a deferred payment scheme, along the projected route of the road and tramway between Palmerston North and Foxton. This group consisted of eighteen married couples with all the males being employed on the construction of the road. The second group who arrived were settled at Stoney Creek and included some unmarried men and women.⁵ This group assisted in the construction of the road through the Manawatu Gorge which was begun in 1871 and completed in 1875.

When not involved in roadbuilding the early settlers in the area busied themselves with clearing their sections of the forest cover. The sections were of forty acres for married men and twenty acres for single men, the price to be paid over a period of five years from their wages from roadbuilding.⁶ It is not surprising considering the nature of the surrounding environment that the first economic enterprise undertaken was sawmilling. Timber however was only of use as a means of income once the tramway was completed and the timber could be transported to Foxton and from there transhipped to the various markets. The rate of the clearance of the land was such that by 1880 large areas surrounding Palmerston North were cleared of bush and dairy stock were being introduced. Such was the growth of the dairying enterprise that the first cooperative dairy factory was opened in 1884 at Longburn. Soon various dairy factories were sited throughout the area surrounding Palmerston North as well as up the Pohangina Valley.

The most important catalyst to the growth of the Manawatu and Palmerston North especially, was the location of the railway. The importance of transport routes can easily be seen in the location of colonial settlement in both Australia and New Zealand. The first points of contact were usually the best harbours with major cities developing nearby. This is seen in the growth of Sydney, Adelaide, Hobart, and Perth in Australia; and Auckland, Wellington, Christ-

church (Lyttleton), and Dunedin (Port Chalmers) in New Zealand. Later as the population grew in each colony the transport routes between the cities spread out along the favourable natural features which allowed for relatively easy movement. A good example of this was that the beach between Wellington and Wanganui was for several decades the 'main trunk line'. Exploration of the interior was carried out mainly by travelling up rivers such as the Manawatu and the Rangitikei which resulted in the development of river-mouth ports such as Foxton and Patea. With the initial development of the hinterland came a demand for coach roads and later still railways which gave birth to towns on their routes, initially as construction bases and then continuing because of the business generated by through traffic. The development of these internal routes allowed for the further exploitation of the hinterland's resources, which in the Manawatu was mainly timber and flax, and the improvement of these activities by providing a rapid means of transport to markets and also service centres. Palmerston North benefitted from all these factors in the long run.

The development of the transport system led to the development of the agriculture in the region. This was greatly assisted by the development of refrigeration techniques in the 1880's which made frozen meat (and at a later date dairy products) among the colony's largest exports. This gave the earning power of the Manawatu farmer a great boost when the 'depression' of the 1880's was casting a shadow over the New Zealand economy as a whole. During the 1890's an increasing amount of land was brought into production by a growing population and Palmerston North grew to accommodate the needs of this population. This increase can be seen as coming from two main sources after the initial immigration; natural increase (excess of births over deaths) and from the 'drift north'. A later

high growth rate occurred in the twentieth century with another burst of immigration to New Zealand which started in 1901 and continued until the war interrupted the flow in 1914. The immigration was not entirely unassisted as it was boosted by the help of government aid in 1904.⁷ By the end of the first forty years of Palmerston North's existence (that is 1911) the population had reached an impressive figure of nearly 11,000⁸ and the town's population was now in a relatively settled urban existence.

Footnotes to Introduction.

1. Knox, Ray "The Settlements That Failed", in New Zealand's Heritage, Vol.3, Part 43, pp.1177-1181.
2. Stokes, Evelyn "Settlers in the Manawatu", in New Zealand's Heritage, Vol.3, Part 44, p.1221.
3. See footnote 2 of Preface for reference.
4. Hely, A.S.M. 'Some Effects of Changes in Transportation upon the Economic Development of the Manawatu 1876-1946', Unpublished M.A. thesis, Victoria University of Wellington, 1947, p.40.
5. A full listing is given in 'Papers relative to the introduction of Scandinavian immigrants', Appendices to the Journals of the House of Representatives, 1871, D.3. p.9.
6. Petersen, G.C. Palmerston North: A Centennial History, (Wellington, 1973), p.71.
7. Lloyd Prichard, M.F. An Economic History of New Zealand to 1939, (Auckland, 1970), p.182.
8. Palmerston North was the third largest borough in the North Island and seventh largest in New Zealand behind Auckland, Wellington, Christchurch, Dunedin, Invercargill, and Timaru. Napier and Wanganui both had a population of over 10,000 so were not far behind Palmerston North. (N.Z. Census, 1911.)

11. The Population Growth.

Palmerston North was non-existent before the first groups of Scandinavian immigrants settled in the area. Most of the sections that had been surveyed and laid out had been sold but settlers were slow in arriving. Petersen's description of Palmerston North at this time (1870) shows the relatively undisturbed nature of the area, "... the native duck and pukeko haunted undisturbed the shallow lagoons and the wild pig had undisputed possession of the public square".¹ Before the immigrants arrived the population was limited to the surveyors who lived in whares bordering the already laid out square, Robert Menzies, and the Coles' who supplied travellers with accommodation.² The first boost from the Scandinavians occurred with the arrival of the Government steamer Luna at Foxton, from Wellington, on 14 February 1871 which contained 51 immigrants (men, women and children) bound for the town of Palmerston (as it was then known). A second group arrived at Foxton on 8 April 1871 and were later settled at Stoney Creek. This early input of people was to have definite effects on the population patterns that were to follow.

Rate of Growth.

Palmerston North had rapid growth in its early years. This appears very large in percentage terms but it is not very large in numerical terms. Using percentages however is the only means of comparing Palmerston North's growth with that of other towns and the country as a whole. Palmerston North as we have seen had a great initial impetus to its growth through the Scandinavian immigrants. A high level of immigration continued through the first decade. The first census in which Palmerston North is entered as a single entity is 1874, only three years after its original occupation, when it had a population of 193. Within the next four years, by the 1878 census, the population had grown to 880, more than a fourfold in-

North by the end of the period.

From the figures (see Table 1) we can see that Palmerston North is a highly exaggerated example of the pattern of New Zealand's growth.

Table 1. Percentage population growth in the intercensal periods between 1874 and 1911.

	New Zealand	Palmerston North	Feilding	Master-ton	Hamilton	Napier	Wanganui
1874-1878	38	356	289	-	87	54	42
1878-1881	18	55	21	34	9	6	27
1881-1886	18	90	41	41	-12	33	5
1886-1891	15	65	22	-1.5	1	8	2
1891-1896	11	37	29	12	6	10	18
1896-1901	9	11	12	13	-2.5	-5	23
1901-1906	16	57	29	27	71	8	11
1906-1911	13	7	6	3	65	11	33

(Source: Computed from censuses 1874-1911)

There is a relative decline till 1901 whereupon there is another jump back to the growth level at the 1891 census. New Zealand's growth would be less subject to the fluctuations within a single borough as it has the many fluctuations within the country to temper the rate of growth for the country as a whole. Diverging patterns are hidden by these fluctuations. The growth pattern of Feilding most closely resembles that of Palmerston North. It has a very large initial rate because of the small actual numbers resident at the time of the 1874 census with the growth rate then declining rapidly to the level that it achieved at the 1881 census. The rate virtually doubled by the next census followed by another decline down to the level of 1901 with a renewed burst in the 1901-1906 period from where it declines to its lowest level in the period studied. The higher growth rate exhibited by Palmerston North over

that of Feilding would seem to show that Palmerston North had comparative advantages in its settlement but that trends as a whole affected both towns in a similar fashion.

Masterton had a growth pattern of a vaguely similar nature to Palmerston North. It had a slight increase up to 1886 followed by a sharp decline; however this decline is of a more rapid nature than Palmerston North's with a loss of population occurring between 1886 and 1891. From then it slowly gained reaching another peak in 1906 and then declining as did the Palmerston North rate. Masterton seems to have had a similar initial outburst with little significant growth until after the turn of the century, no doubt as a result of better transport routes in and out of the area. Hamilton, the other inland town, had a very disturbed growth pattern. It had a very high growth rate up to the 1878 census which fell away very rapidly. By the next census in 1881 the growth rate was only 9 percent. In the next five years Hamilton lost 12 percent of its population and the total remained relatively static till the census period up to 1906 when the rate jumped up to 71 percent and was followed by, in the next five years, a rate of 65 percent. This latter period's rate was far removed from the pattern of declining rates of the rest of the country. Hamilton had its own disjointed history which explains its divergence. It started off as a military town located in the much troubled 'king country' area. This meant that when the military function ceased the town held little other attraction and it was not until the twentieth century that it started to become an attractive area for settlement once the local situation had been cleared up.

The growth rates for Napier and Wanganui also show an initial decline in this period but apart from this minor similarity their growth rates are dissimilar to that of Palmerston North.

Both towns were well settled by the time of Palmerston North's inception so the difficulty of comparison by percentages is well highlighted. The actual numerical growth was far greater to begin with in both port towns but this soon changed as by 1906 Palmerston North had surpassed both in size of population. The populations of the ports were relatively stable in their growth as they were the point of contact with the outside world to begin with and there was no great growth in later years as this was being siphoned off into the development of the interior. This is shown in the difference in growth rates between Napier and Wanganui, and the other towns in the period of immigration between 1901 and 1906. However this great growth phase was short lived as Napier and Wanganui surpassed all but Hamilton in growth rate in the next census period.

From this type of comparison it can be seen that Palmerston North's pattern of growth was not unique but the actual rate of growth was, with Feilding being the closest to emulating that rate. Palmerston North therefore must have made an attractive impression upon those moving about within the country and those entering the country from elsewhere. Another way of tracing this uniqueness is by tracing Palmerston North's growth in comparison to that of Wellington Province. Wellington Province's growth is again of similar trends but not to such a marked extent. This similarity is emphasised in the 1891 census where of the 87 boroughs in existence in the previous census 54 increased - 23 being in the North Island and 31 in the South Island.³ Of these 54 only 5 increased by a total of more than 500 people. These five boroughs were Wellington, Petone, Palmerston North, Napier and Hastings. This reflects a growth in the southern half of the North Island and Palmerston North was the only one not a port or with easy access to a port of significant size. As an inland town in this period then, Palmerston North would appear to be relatively unique, both

in the size of its population growth in the terms of percentage increase and in terms of its numerical increase.

Age-Sex Distribution.

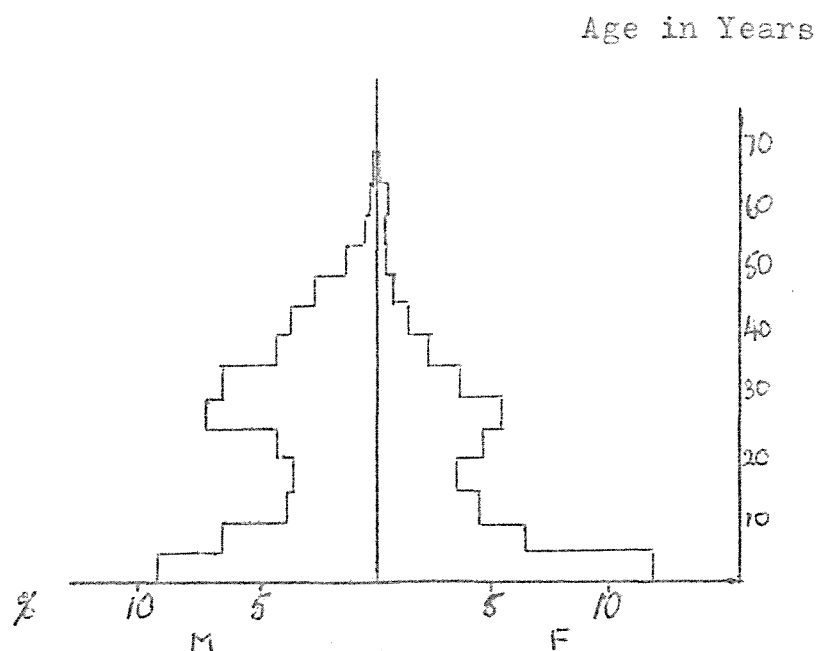
Apart from population growth it is of value to study how the population was distributed amongst the various age groups and the sexes in an effort to understand the community that it formed. The effects of a particular environment are reflected in the composition of the population. The composition of a population also has distinctive features which depend on the stage of development.

The most common way of representing the age-sex composition of a population is by constructing an age-sex pyramid from which various characteristics of that population can be ascertained. It is also valuable to study such compositions over time so these characteristics can be seen developing and also the general nature of development can be observed. As long as the history of the situation, such as periods of migration, is kept in mind the age-sex pyramid can be very useful.⁴

The first break down of ages for the Palmerston North population in the national census was in 1878, so the first years' growth of Palmerston North can not be seen in the light of their age-sex composition. The only evidence to show a relatively young population (adults) with young children is the lists of Scandinavian immigrants.⁵ These show that the first group consisted of eighteen married couples whose ages ranged from 20 to 35, with the eldest child being eight. The second group was of a similar age composition although it did include numerous single people. It must also be remembered that these people were not the sole occupants of the town. The influx of immigrants and the general pioneering nature is reflected in the first age-sex pyramid (Figure 1) which gives a

high proportion of young adults especially amongst males.

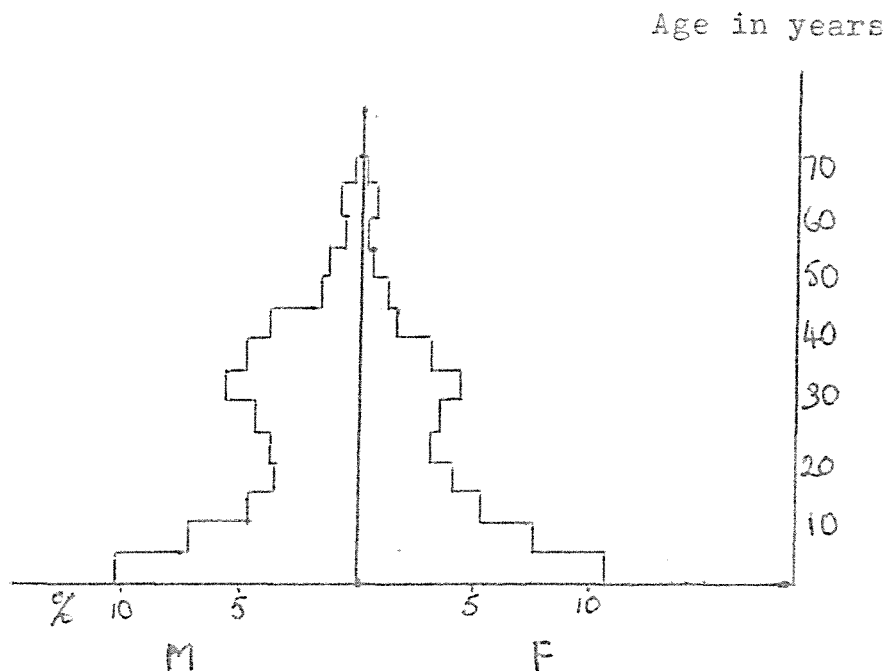
Figure 1. Age-sex distribution, 1878.



With this distribution it is noticeable immediately that there is an excess of females over males in the 0-5 age group. It is however normal⁶ for the number of males born, to outnumber the number of females because of usually higher male mortality in the early years of life.⁷ The rapid drop in percentages in the first three age group divisions, reflects the normal decrease associated with a high child mortality rate. This phenomenon was still common despite New Zealand having a generally low mortality rate during the period as will be seen later. The main reason for the low percentages in the divisions covering the ages 10 to 20 would be a result of the form of settlement. Most of those settling the area were young couples with very young families, if they had any children at all. The majority of the immigrants were young adults as can be seen from the high proportion of males in the 25-40 age groups and females from 20-35, and there were few in the age groups over 55 years. This first pyramid reflects an area which has just been settled by the normal composition of a pioneering community.

This type of distribution, not surprisingly, did not change greatly by the time of the census of 1881 (Figure 2).

Figure 2. Age-sex distribution, 1881.

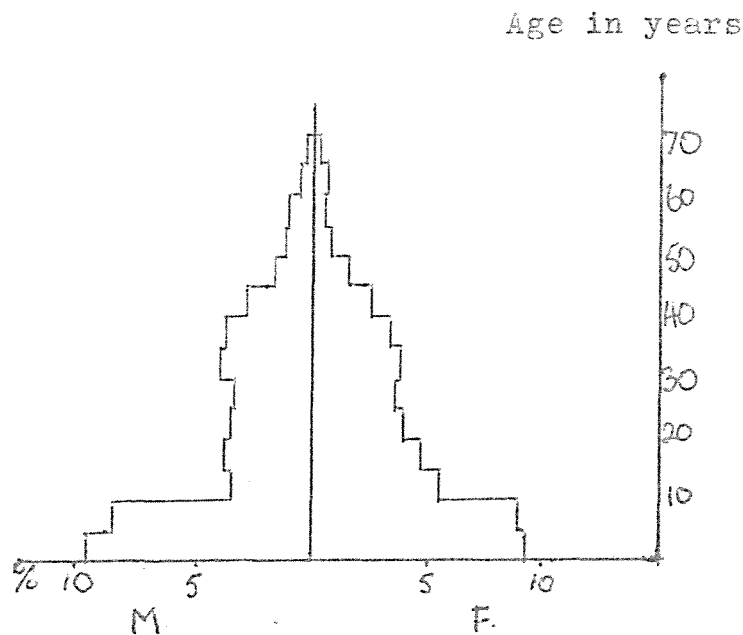


The proportion in the under five age group is slightly lower in this distribution although still by far the largest single group with some twenty percent of the total population within its bounds. There does not seem to have been any great increase in the influx of young adults as the 20-25 age group for males and the 25-30 age group is significantly smaller than in the previous census. This distribution is much the same as the previous distribution although the proportions have moved up one age group.

The distribution of the population that occurs in the age-sex pyramid for 1886 (Figure 3) approaches much more what would be considered a normal distribution. Much of this occurs because of the influx of people to the area. The population almost doubled, increasing from 1366 in 1881 to 2606 in 1886. This distribution still shows a high proportion of the population being included in the age groups under 10 years of age. The most obvious feature of this census is the absence of a significant percentage of males in the

10-15 age group and also, to a lesser extent, in the 15-20 age group.

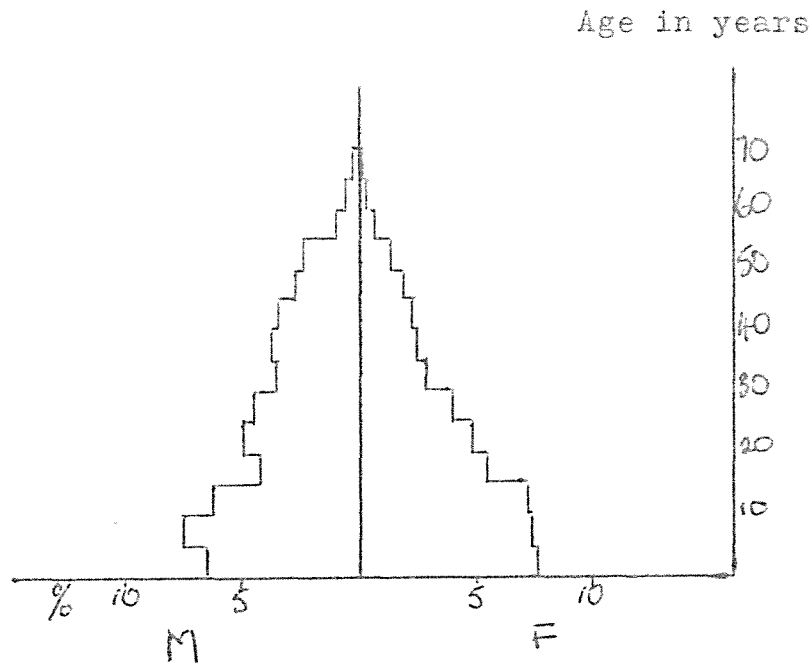
Figure 3. Age-sex distribution, 1886.



This distribution shows a relatively normal distribution within the female portion of the population with only a slight excess in the middle age groups of 30-35 and 35-40, a legacy of the early settlement pattern which affected the whole country in the decade of the 1870's.

By the time of the next census in 1891 the population of Palmerston North had increased by a further 1697 from 2606 to 4303. The distribution here (Figure 4) is again towards a normal distribution. The most obvious exception is the relatively small percentage of the population in the male age group of 15-20 which is more than likely a legacy of the abnormality noticed in the previous distribution in the 10-15 age group. Another less visible occurrence is the lessening of the proportion of the population under the age of ten. In the 1886 census 36.6 percent of the population were under the age of ten whilst in the 1891 census this had dropped significantly to being only 29.5 percent. The male side of the pyramid is more closely resembling the female now, and both are looking closer to what would

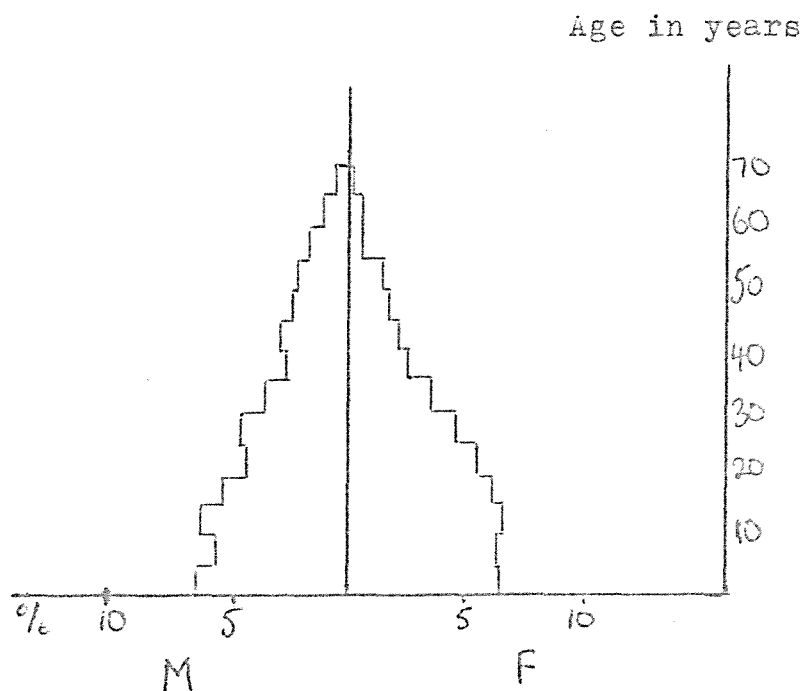
Figure 4. Age-sex distribution, 1891.



be described as a normal distribution. The smaller base to the pyramid than had previously occurred was the result of a reduced birth rate rather than increased infant mortality. This can be seen in the later section on the birth and death rates.

The distribution of the population coming from the 1896 census (Figure 5) comes very close to a normal distribution with few abnormalities appearing.

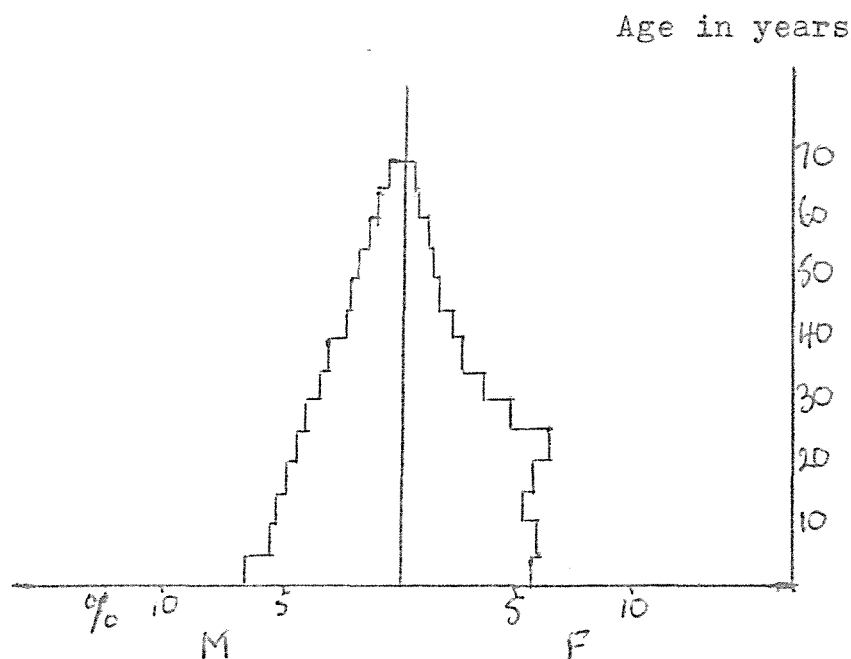
Figure 5. Age-sex distribution, 1896.



Those that do occur are also apparent in the previous distribution. These include the low percentage of males in the 5-10 age group which had progressed from the 0-5 age group's low percentage in 1891, and also the 20-25 age group being relatively small in 1896 having come from the low percentage in the 15-20 age group in 1891. On the female side the most notable feature is the relatively similar percentage in the first three age groups with only a maximum difference of 0.1 percent between the three groups.

The abnormalities in the male portion of the population have disappeared by the time of the 1901 census (Figure 6).

Figure 6. Age-sex distribution, 1901.

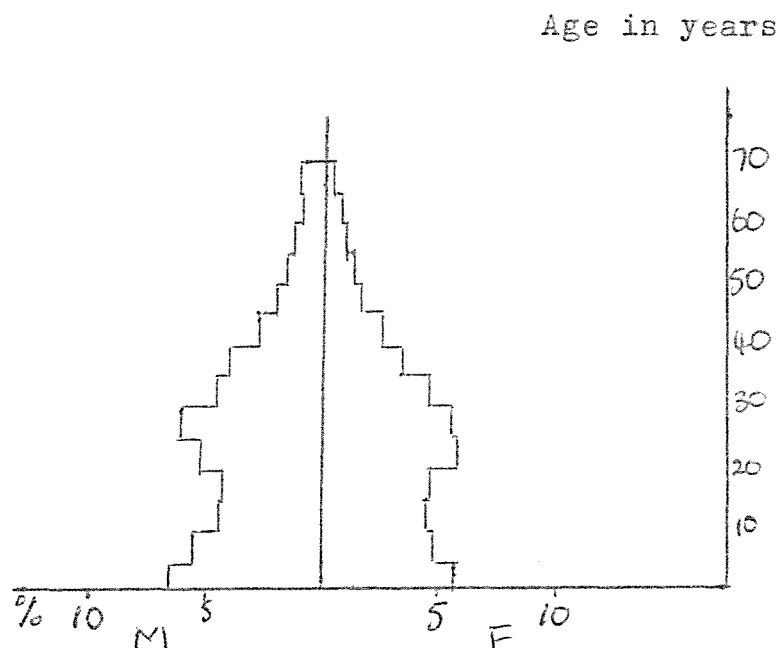


There is a gradual decrease of percentages of the population all up the male side of the pyramid. The abnormalities appear on the female side of the pyramid. There are lower percentages in the 0-5 age group, than in the 5-10 age group. This would seem to indicate something about the numbers of births of females in the intercensal period 1896-1901. Most of the increase was by natural increase which would seem to support the hypothesis that there was an abnormally low number of females born. The most significant factor, otherwise,

is the relatively high percentage of females in the 20-25 age group. This group is 1.5 percent larger than its male counterpart. Apart from these discrepancies the distribution of the remainder of the age groups is what would be considered normal.

The distribution that appears as a result of the 1906 census (Figure 7) shows again the characteristics, though somewhat modified, of the earlier pioneer distributions.

Figure 7. Age-sex distribution, 1906.

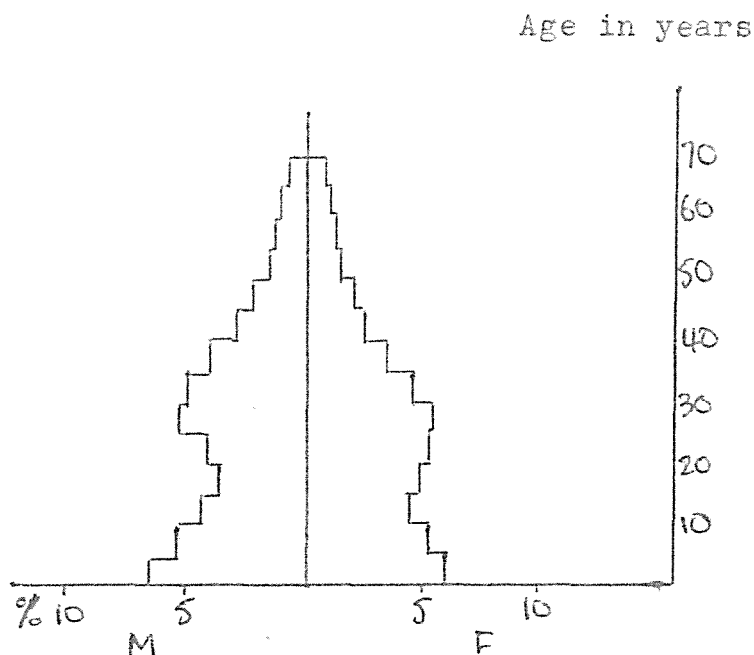


The population increased by some 3708 from 6534 in 1901 to 10239 in 1906. This was prompted by a resurgence of government assisted immigration to New Zealand which brought the nationwide growth rise which was especially noticeable in the inland towns. As was stated before the distribution of immigrant populations tends to show a relatively high percentage in the middle age groups. In the 1906 Palmerston North distribution this occurs in the 20-25, 25-30, and 30-35 age groups - virtually the same as noted previously. The highest percentages again occur in the 25-30 age group for men. It is most likely that before this age a man could not afford to bring him and his family to New Zealand.

The distribution of the population in 1911 does not alter

significantly from the 1906 census (Figure 8).

Figure 8. Age-sex distribution, 1911.



This is a result of the relatively small growth of Palmerston North between 1906 and 1911. The population increased by only 752 (7%) during the five year period. One feature is a slightly higher proportion of the population under the age of ten. In 1906 the proportion of the population under ten was 23 percent whilst in 1911 it had increased to 23.6 percent. The 1911 distribution has merely lessened the amount of some of the earlier abnormalities as noted for the 1906 distribution.

By studying the age-sex distributions of the population as calculated from census data we have been able to trace the age groups into which the majority of immigrants fell in both periods of immigration. This immigration was slightly male dominated whilst the males were predominantly older than the females. However there are also other irregularities which occur but usually disappear over time and are merely quirks of life. By surveying these distributions we have evidence of a declining birth rate as the proportion in the 0-5 and 5-10 age groups have declined significantly during

the period. The increasing percentage in the older age groups - above 65 - is a result of the earlier settlers passing through into these groups and also indicative of a higher life expectancy.

The general decline in the youth of the population is reflected in the decline of the percentage of the population under twentyone. The youth of a newly settled area is shown by comparing the Palmerston North figures with the New Zealand figures. (Table 2)

Table 2. The percentage of the population under 21, 1878-1911.

	New Zealand	Palmerston North
1878	51.94	51.34
1881	52.82	54.61
1886	53.26	57.18
1891	52.46	54.2
1896	49.94	52.09
1901	46.59	47.74
1906	43.33	42.72
1911	41.84	42.54

(Source: N.Z. Censuses, 1878-1911)

The lower percentage of Palmerston North in 1878 is more than likely a result of the influx of middle age groups in the settler population. The relative youth of these settlers is reflected in the fact that the population under 21 increases rapidly showing the new settlers starting their families. The declining birth rate gives the lower percentages under 21 in the later census years. This gives a complementary comparison to the age-sex pyramids, giving a more general picture of the trends of the youngest sector of the population.

Male/Female Distribution.

When discussing the distribution of the population the sex distribution is very important. It can give information about the development of the ^{population} as does the age distribution. A common

feature of populations that are of, or heavily influenced by, Western European origins is that "regardless of the overall distribution amongst the sexes, rural areas display a high degree of masculinity ... and urban areas have a high degree of femininity".⁸ In his study Franklin also points out that in countries experiencing a high degree of immigration the ratio of females to males is very low, with time and economic development balancing the ratio.⁹ Palmerston North illustrates these factors quite distinctly within its history (Table 3).

Table 3. The female to male ratio, 1874-1911.

(Females per 100 males)

	New Zealand	Wellington Province	Palmerston North
1874	75.17	83.37	47.33
1878	79.4	83.19	87.63
1881	81.72	87.58	88.93
1886	85.28	86.16	94.04
1891	88.26	86.59	96.3
1896	89.31	88.67	101.15
1901	90.33	90.42	98.54
1906	88.65	86.11	95.33
1911	89.59	89.71	100.93

(Source: N.Z. Censuses, 1874-1911)

For 1874 we can see that the female proportion of the population is very low. This is a definite reflection of the pioneering nature of the settlement despite the equality of numbers of the sexes coming from the Scandinavian arrivals referred to earlier. This however soon changes to a greater equality by 1878. The Palmerston North ratio has surpassed the Wellington provincial ratio and the New Zealand ratio. The Wellington province was relatively urban

in nature by comparison to the other provinces at this time as little development of the interior had occurred. Palmerston North had developed into a borough by 1878, having achieved this status in 1877, as opposed to a mere settlement, as it was in 1874. Palmerston North developed quite an urban appearance of population because of the high ratio of females to males. The ratio of Wellington Province approached that of New Zealand as the New Zealand population urbanised on a national basis and the Wellington Province slowly began exploiting its interior with the impetus of Vogel's Public Works and Immigration policies.

The ratio of females to males in the Palmerston North population expands to such an extent that it actually surpasses the males total by the 1896 census. This however declines rapidly with the great immigrant influx in the first half decade of the twentieth century but the difference has disappeared again by 1911. The lessening of the ratio of females to males was a nationwide swing in the 1906 census as shown by the ratios of both New Zealand and Wellington Province. It is most clearly noticeable when it is realised that the net migration in the ten years 1902 to 1911 was at the proportion of 179 males to every 100 females.¹⁰ The influence of this migratory trend had disappeared by 1911 when the ratio again shows a higher proportion of females to males.

The population trends as shown by the sex ratio reflects closely the assumptions that were mentioned earlier. In the pioneering days the population is of high masculinity whilst as the urban growth continues Palmerston North becomes increasingly feminine. The effects of the immigration of the early twentieth century is very obvious in the sex ratio figures as well. Palmerston North is a good example of an area of urban growth as it shows the high femininity of an urban population. This is easily observed

through comparing the ratios of Palmerston North with the ratios for New Zealand and Wellington Province.

Marriage.

Trends in population growth also can be seen by its effects on the proportion of the population that are in the married state. The settlement of New Zealand was mainly on the basis of setting up a new family life style. For those who were primarily seeking economic gain it was far easier to migrate to North America, or even Australia, as the destination was closer and therefore less expensive to migrate to than New Zealand from Great Britain. Those who came to New Zealand were interested in a permanent residence although not exclusively so as can be seen by the numbers that left New Zealand in the 1880's depression. Advice to prospective migrants was to be married, as a wife could share the hardships (she was also often a cheap labouring assistant) as well as easing the loneliness. This type of advice is reflected in the high percentage who were married of those coming to Palmerston North amongst the Scandinavian parties. Of the first party all the adults were married. Of the second party forty percent were married all the remainder being described as single male farmers.¹¹ These early beginnings resulted in 51 percent of the population being stated as married (though this was only for the Scandinavian sector). By the time of the 1878 census Palmerston North had a married proportion of 38 percent which was still higher than the national average (Table 4).

As the population grew the percentage of the population stated as married declined. This would have been a result of the increasing diversity of occupations available attracting diverse elements of those entering the country as well as the general expansion of the population as noted before. This includes the growth of the proportion of the population under the age of twenty one

Table 4. Percentage of the population married.

	New Zealand	Palmerston North
1878	30.5	38.0
1881	30.1	35.5
1886	29.4	30.8
1891	29.2	29.9
1896	29.5	31.5
1901	30.7	33.5
1906	32.4	35.4
1911	34.2	36.5

(Source: Computed from N.Z. censuses
1878-1911)

within the total population which on the whole has a very low percentage being stated as married for much of the period. This will be enlarged upon later. Another factor that more than likely affected the percentage being married would have been the depression. The burden of a wife and family would have deterred those on the verge of bankruptcy from marrying. What lends credence to this argument is the fact that the percentage of those stated as married increased again after 1896 when the financial situation became more stable. The end of the depression would have seen an increased propensity to marriage whilst marriages delayed by the depression were finally performed. The decline of marriages also can be explained by a trend for marrying later in the life cycle.

The increase in the percentage of the population stated as married, observed in the later census years, occurs as less of the population is found in the under twenty one sector of the population which therefore gives a greater proportion of the population in the marriageable age group. The urban nature of the population is reflected in the fact that Palmerston North's values

(percentages) are consistently higher than those for the rest of the country with the least difference between the two sets of figures (0.7 percent) appearing in 1891 - whilst the country was still within the grip of the depression.

Another way of looking at the changing situation in marriage is by dividing the population up into its census divisions of sex and age groups. This gives an easily observable picture of the trend for older marriages and also a comparison between the sexes. In the graphical representation of the data I have only included the groups where the change is readily observable, that is in the groups from age fifteen to forty. The under 14 group has the total number replying as unmarried for the entire period. The results that are observed for the 14-15 age group (one of the divisions used for marriage statistics) are similar to the previous group for the period of the study. The returns for the older age groups (over 50) can be misleading at times because of the very small numbers often within the group and the disparities appear very great when working on the percentage level. The 50-55 age group does show a general decline in the percentage being married down to 1891 with an increase to 1901 and declining again after that date. The most important part of the population to look at however is the age group between 15 and 40 (see Figures 9 and 10).

The percentage of males in the married state in the 15-20 age group is virtually non-existent with affirmative replies only being recorded in the 1878 and 1891 censuses. For the female population there is a significant change. One-fifth of the female population between 15 and 20 was stated as married in 1878 which was almost halved by 1881 when the level was down to 12.7 percent. This further declined to only 3.3 percent of the female population in this group by 1886. It maintains a similar level though declining

Figure 9. Percentages of the Male Population (ages 15-40) stated as married, 1878-1911.

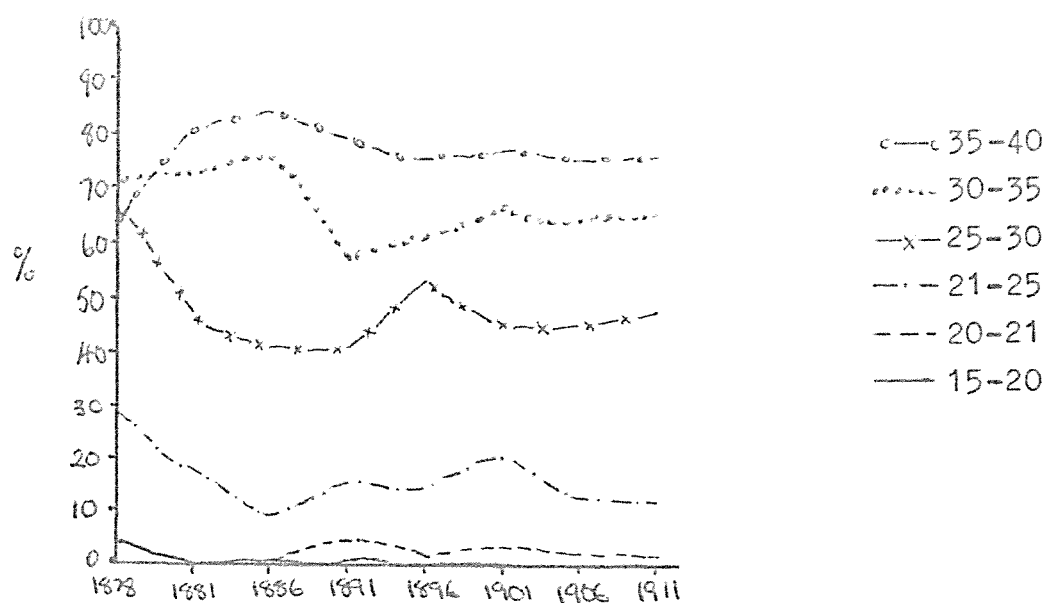
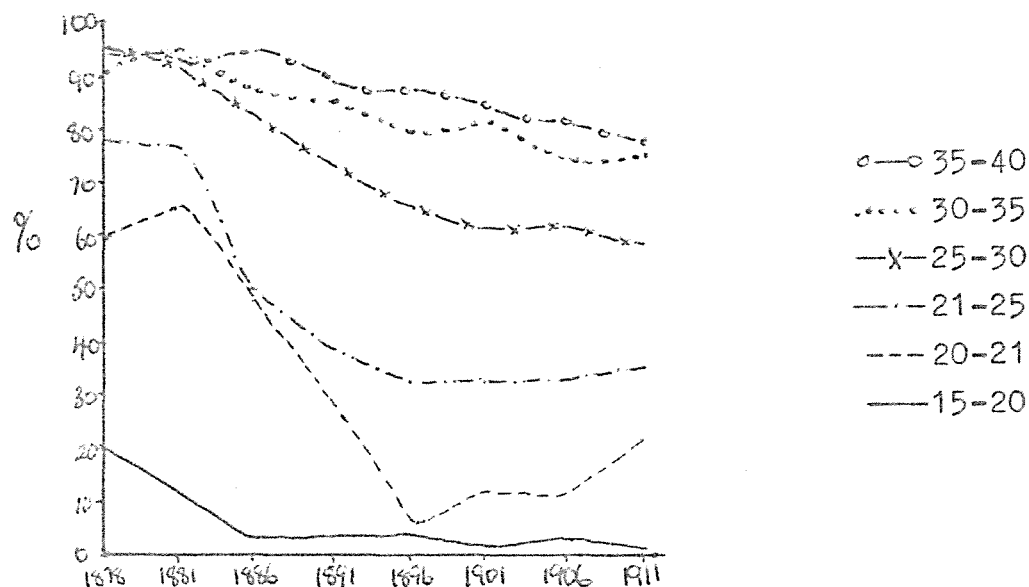


Figure 10. Percentages of the Female Population (ages 15-40) stated as married, 1878-1911.



to only one percent by 1911. The 20-21 age group is also indicative of a noticeable change in the proportions being married. The males stated as married are again negligible in number with no returns in the census years 1878, 1881, and 1886. A total of 4.8 percent are stated as married in 1891 but only 1.9 percent in 1896 which increased to 3.6 percent in 1901 but by 1911 the figure had again

decreased, down to 1.6 percent. The female side was more indicative of the change occurring. In 1878 60 percent of the female population in this age group was stated as married with an increase of 6 percent by the next census but is followed by a decline of 20 percent in each of the next three censuses so that by 1896 only 7.4 percent of this group is stated as married. The proportion however increases to 12 percent by 1901 and to 21 percent by 1911. This shows an overall trend to a lesser propensity to marriage within this age group, for females at least, but an increase in the more stable years of the twentieth century.

The returns in the 21-25 age group also indicate an overall change in marriage patterns with the change not as strikingly noticeable in the male population but still evident. The male percentage married declined from 28.6 percent in 1878 to 9.5 percent by 1886 but this increases to 16.2 percent by 1891 with a further increase to 20 percent by 1901 with it then decreasing to be at a level of 11.2 percent in 1911. It is a fluctuating pattern but it does show an overall decline for the period of some 17 percent from beginning to end. The female population shows a declining proportion throughout. A decline of 1.7 percent occurs between 1878 and 1881 but a larger decrease of 28 percent occurs by the next census period which ends in 1886 and a further 10 percent drop in the next census period. The censuses of 1896, 1901, and 1906 show a virtually static proportion of the population being stated as married with a slight increase occurring between the censuses of 1906 and 1911. On the female side of the population the overall decline in the proportion stated as married is just over 43 percent.

Similar changes occur within the 25-30 age group with the males showing again an overall decline of approximately 17 percent whilst the females show a decline of approximately 35 percent. The

male proportion married declines from 64.5 percent in 1878 to 40 percent in 1886 and 1891 with an increase to 53.3 percent by 1896. This level declines to 45 percent for the years 1901 and 1906 with a slight increase of 2.5 percent in the final census of the study period. The female population again shows a continual though gradual decline from 95.8 percent in 1878 to 59.4 percent in 1911. The rate of change is 9 percent at its greatest during the census periods from 1881 to 1896.

The picture is not so clearly painted within the next age group, that from 30 to 35. The male population only changes from 70 percent in 1878 to 66.6 percent in 1911; however this is far from a gradual change. The percentage of males married increases from 70 to 73 percent from 1878 to 1881 with a further 3 percent increase to 76 percent by 1886. This is followed by a drop of 19 percent to 57.2 percent by 1891 and then increases to 68 percent by 1901 and back to 66 percent by 1911. The fluctuations seem to show that the depression years had a profound effect on the male proportions being married as shown by the large drop between 1886 and 1891. This could be explained by a greater influx of single men seeking employment in a relatively unaffected area rather than an aversion to marriage. The female population in this group shows an overall decline of 16 percent with two census periods showing growth rather than decline. These occurred between 1878 and 1881 with a 6 percent increase, and there was a 0.7 percent increase between 1896 and 1901. The decline was from 90.6 percent married to 74.9 percent in 1911.

The 35-40 age group is of unique development amongst those subjected to close study. The percentages stated as married at the beginning and at the end of the study are less than one percent apart. The uniqueness lies in that between the two dates there is

an increase in the proportion being married, rather than a decrease, with the rate of increase slowly declining rather than the fluctuating pattern of the other age groups. This increase is due almost entirely to the male portion of the population as the female portion has only one small increase throughout the period studied. The male population starts off at a level of 63.9 percent married in 1878 and by 1911 reached the level of 75.9 percent although there was a much higher level in 1886.. From the 1878 figure the proportion rose by almost 17 percent to 80.6 percent and rose by another 4 percent by 1886. The level dropped to 76.6 percent by 1896 and levelled out for the remainder of the period. The female portion of the population started at the very high figure of 95.5 percent married but declined by 2 percent by the 1881 census but increased by a similar amount by the 1886 census. The proportion then declined gradually so that the female level only just surpassed the male level in 1911 with a total of 77.5 percent married.

The next age groups although not included in this close study follow a similar pattern to the 35-40 age group with an overall decline of a few percent but with the male sector increasing slightly and the female gradually declining. The age groups after these have differing patterns because of the small numbers composing each group as earlier mentioned.

From the graphs it can be seen that there is in the male population a marked decline in the proportion married amongst the marriageable age groups up to the age of 30 after which there are fluctuating patterns. The patterns for the females show an overall decline in marriage with the most significant declines occurring in the age groups from 20-30 with the 30-40 age groups showing a decline but at a less outstanding rate. The trends show a move to later marriage, with more people waiting till their mid-twenties for

marriage especially females with males even later in the life cycle, nearer to thirty. The move to later marriage is a result of a more stable community. There were no longer the pressures for marriage as there were for the pioneer such as loneliness and hardship.

Birth and Death Rate.

A trend accompanying that for later marriage is a decline in the crude birth rate. With the high proportion of women being in the childbearing age group in the early population it is not surprising that the rate was so high compared to the New Zealand level (see Table 5).

Table 5. Crude BirthRate (Births per thousand of the population)

	New Zealand	Palmerston North
1881	37.95	82.8
1886	33.15	58.7
1891	29.01	47.7
1896	26.78*	34.9
1901	25.6 #	30.5
1906	27.22	29.1
1911	25.97	26.9

*1895 figure

#1900 figure

(Source: P.N. - computed from registers of births; N.Z. - N.Z. Yearbooks)

The spreading of the population through the range of age groups resulted in proportionally fewer women being in the childbearing age group. This type of spreading caused an apparent decline in the birth rate. The best way of discovering if this was true is by using the refined birth rate which compares births with the number of women within the childbearing age range which is normally given as from 15 to 45. This refined rate still gives a sharply declining birth rate (see Table 6). As this refined rate could only

Table 6. Refined Birth Rate. (Births per thousand women 15-45)

	Palmerston North
1881	405.4
1886	279.6
1891	221.6
1896	144.0
1901	117.8
1906	110.2
1911	102.4

(Source: Registers of Births
and N.Z. Censuses)

be calculated for Palmerston North it is necessary to refer to the crude birth rate to make a worthwhile comparison with New Zealand as a whole.

The figures for 1881 show how different the structures of the two populations, Palmerston North and New Zealand as a whole, were distributed and also the high birth rate of the women. The youth and the femininity of Palmerston North's population as compared with New Zealand's is reflected in the higher crude birth rate of Palmerston North although the difference between the two lessens over time. Part of the reason for the decline in the birth rate was the rise in the age at marriage which effectively cuts down the birth rate although not ignoring the possibility of ex-nuptial births. Births also tend to decline in times of economic hardship in some sectors of the population, as people can usually ill afford to feed extra mouths. Urban families tend to be smaller in number than rural but this is not reflected in the crude birth rate because of the higher femininity of the urban population as compared to the rural.

The general youth of the New Zealand population also gives a mortality rate which is lower than the rate in Great Britain at

this time. The death rate for Palmerston North, which can only be calculated for some of the period because of missing records, is rather erratic as compared with the stable nature of the New Zealand death rate (see Table 7).

Table 7. Death Rate, 1886-1911. (Deaths per thousand of the population)

	New Zealand	Palmerston North
1881	11.13	-
1886	10.54	9.97
1891	10.35	11.15
1896	9.1	9.13
1901	9.81	8.46
1906	9.31	6.6
1911	9.39	8.93

(Source: P.N. - computed from registers of Deaths; N.Z. - N.Z. Yearbooks)

A detailed analysis would be necessary to see what was causing deaths and to see if such causes were normal or otherwise. The fluctuations show that little comparison can be made between the Palmerston North and New Zealand figures although we can see that the New Zealand rate is relatively stable in nature. The decline in mortality rate for Palmerston North reflects the more settled existence of an urban area with better health facilities than previously existed. Dairy farming was a less dangerous occupation than felling timber. In the early pioneering days of Palmerston North's existence there was quite some delay between an accident and the arrival of assistance. The Palmerston North death rate shows a relatively stable position with a lower than expected level occurring in 1906.

Footnotes.

1. Petersen, G.C. Palmerston North ... p.63.
2. ibid. pp.67-68.
3. Of the 33 boroughs that decreased in size, nine were in the North Island and twentyfour in the South Island.
4. The age-sex pyramid, over time, sometimes shows these periods occurring.
5. Their age and occupation were given in 'Papers relative to the introduction of Scandinavian immigrants', AJHR 1871 D.3, p.9. (They are listed in Appendix 1)
6. 'Normal' is used in this dissertation as describing an ideal which is hardly ever actually achieved but is a guideline for comparisons.
7. New Zealand Yearbook, 1912, p.155
8. Franklin, S.H. 'The Pattern of Sex Ratios in New Zealand', in Economic Geography; Vol.32, (1956), pp.162-176.
9. ibid. p.163.
10. New Zealand Yearbook, 1912, p.155.
11. AJHR 1871, D.3.

III. Conclusion.

From the various forms of demographic analysis there are some obvious developments that can be noticed. Palmerston North had a period of very rapid growth which saw it grow from next to nothing in 1871, to being the seventh largest borough in the dominion. This growth however had slowed down considerably by the end of the forty year period under study. The growth between 1906 and 1911 of only 7 percent was the first time a growth percentage between censuses had been in single figures for Palmerston North in its short history. Even when the country as a whole had been losing people overseas because of the recession of the 1880's, Palmerston North still had a high, though diminishing, growth rate.

The graphs showing the changing age-sex distribution (Figures 1 to 8) reflect the periods of growth of the population by migration by showing clearly the increases in the younger adult age groups, especially among males. The declining birth rate is reflected in the decreased percentage of younger people in the population on the whole. This decrease in younger people is also a reflection of the population forming a more normal distribution with the population spread throughout all age groups. The disappearance of the excessively 'masculine' pioneering community occurs very rapidly in Palmerston North with a more feminine urban community being formed as can be established by the male-female sex ratios for the period.

By looking at the proportion of the population stated as married we can see the workings of two different factors. Firstly there is a lessening propensity to marriage in the younger age groups which can be seen in the change in the age at marriage. In the later census years there is an increased percentage being stated as married than previously. That is because there are

numerically more within the later age groups than previously that are getting married. The overall trend through the period is toward later marriage. The only possible exception to this is seen in the 20 to 21 female division.

The comparison of birth and death rates gives an overall decline in the rate of natural increase which is in turn reflected in the lessening population growth on the whole. Palmerston North's population can be seen in this forty year period as becoming better distributed through the various age groups, less young, more feminine, with an older age at marriage, and giving birth to less children. It would seem on the whole to be taking up the appearance of being a settled urban area with its characteristic demographic features by the end of the period whilst at the beginning it was a male dominated pioneering area.

A more thorough investigation of the Registers of Births and Deaths, if facilities are available, would hopefully not affect the findings of this study. This study would also be of greater value when demographic studies are undertaken for other areas and a comparison made of the same period as I have undertaken to study. From this comparison it could be found whether the trends that occurred in Palmerston North at this time were unique or merely part of a nationwide trend. Bear in mind also that some points warrant further investigation but were beyond the scope of my resources.

Appendix 1. Composition of the First Shipload of Scandinavian
Immigrants to Palmerston North.

The group included:-

Carpenter (aged 27) + wife (aged 30) & 2 children (aged $2\frac{1}{2}$ and an infant)
Common Workman (26) + wife (32)
Common Workman (26) + wife (28) & 1 child (an infant)
Workman (28) + wife (33) & 2 children (5 and an infant)
Carpenter (25) + wife (25) & 1 child (2)
Carpenter (31) + wife (27) & 1 child (an infant)
Machinist (20) + wife (20)
Cattle Driver and Tender (29) + wife (28) & 2 children (8 and 5)
Workman (27) + wife (27) & 1 child (an infant)
Workman (22) + wife (21)
Tailor (33) + wife (28)
Blacksmith (22) + wife (22)
Workman (20) + wife (21)
Baker and Miller (30) + wife (30) & 1 child (2)
Carpenter (32) + wife (22) & 2 children ($4\frac{1}{2}$ and an infant)
Workman (26) + wife (24) & 1 child ($1\frac{1}{4}$)
Workman (29) + wife (28) & 1 child (an infant)
Workman (35) + wife ($24\frac{1}{2}$) & 2 children (4 and an infant)

Total = 18 married couples + 17 children.

(Source: 'Papers relative to the introduction of Scandinavian immigrants', AJHR 1871, D-3.)

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