

# CHILEAN SOCIAL AND DEMOGRAPHIC HISTORY: SOURCES, ISSUES, AND METHODS\*

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Historical research on Chilean population has been thwarted for some time by intractable sources and rudimentary methods. Nevertheless, within the past two decades researchers have begun to achieve some successes. Attention has turned from simply ascertaining gross population totals and growth rates to a much wider range of topics. Significant examples include: the relationship between population growth, illegitimacy, vagrancy, and labor supply; the social context of marriage, family formation, and kin ties; the nature, frequency, and intensity of mortality crises; demographic responses to population pressure; the social and economic repercussions of European immigration; and the determinants and consequences of rapid growth and redistribution of population in the twentieth century (Góngora, 1965; Bauer, 1975; Hurtado, 1966; Solberg, 1969; Young, 1974; Sadie, 1969). To study these topics satisfactorily we must both maintain the healthy skepticism of our distant precursors (e.g., Barros Arana, 1880–1900; Palacios, 1904; and Vergara L., 1900) and integrate the demographer's analytical tools with the historian's skill in finding, selecting, and interpreting a whole range of quantitative and qualitative documents. Demographers have demonstrated that even post-1920 data collected by the Chilean Statistical Bureau have substantial and varying degrees of error, notwithstanding the considerable advances in data collection techniques, improvements in the educational levels of the population, and economic inducements to insure the public's cooperation (Somoza and Tacla, 1969; Gutiérrez, 1969). In the not too distant past, civil administrators and priests received crude, if any, instructions, administered several hundred square kilometers of poorly defined territory, and faced an almost insurmountable task of enticing information from a widely dispersed, highly mobile, poor, and uneducated populus. Consequently, historical studies

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with exclusively demographic ends, using narrowly defined data bases and relying principally on arithmetical or statistical techniques, may prove to be extremely frustrating to carry out and somewhat barren in their findings. Attempts to replicate European studies with Chilean materials, whether simple aggregations of annual totals or tediously reconstructed family life histories, will run a high risk of failure unless researchers incorporate broader questions of social history, exploit an extensive range of documentation, and integrate historical, demographic, and statistical reasoning. While little mathematical sophistication may be necessary—elementary measures may prove the most powerful—a mature, sensitive understanding of the logic of these disciplines, which comes only with considerable study and experience, is essential. The slavish application of demographic formulae and the invention of ill-considered measures are direct pathways to embarrassing nonsense.<sup>1</sup>

Materials for Chilean population history may be conveniently classified in two broad categories according to the level of cumulation: individual and aggregate. The former includes lists of inhabitants, entries in parish books and vital events registers, wills, health histories, and other documents that relate the particular experiences of individuals. The latter consists of tabulated census returns and vital events series. If the sparse, eccentric data from the early colonial period are discounted, there are three epochs in the production of Chilean demographic data: 1750–1830, 1830–84, 1885–present. Reorganization of the colonial bureaucracy in the mid-eighteenth century, with periodic demands for information on population size and the regular inspection of parishes, produced a tremendous amount of material from every section of the colony. With the devastation and dislocations of the Independence Wars, these administrative strengths evaporated. By mid-nineteenth century, the state and church were sufficiently reorganized to far exceed the data collection abilities of the colonial regime. In 1854, the Statistical Bureau carried out the first truly national census and in 1860 initiated the publication of annual demographic series. After years of debate, a civil registration system was established in 1885. These efforts produced the longest continuous string of censuses (12 in 116 years) and vital events series in Latin America.

Modern research on the population of colonial Chile has been directed at fundamentals, ascertaining population size, rates of increase, and age and racial composition. Ignoring the unwieldy nominal data, historians have relied on tabulated reports almost exclusively, particularly the counts of 1777–78, 1791, and 1812–13. Barros Arana argued almost a century ago that colonial returns are at best informed guesses by local governors (6:373–74; 7:312–14). Nevertheless, some reports were based on house-to-house enumerations. Carmagnani's attempt (1967) to calculate growth rates for the late colonial period by bringing together all known counts, including those for the militia and the confessional population, demonstrates the difficulties researchers face in dealing with this disparate and highly aggregated material. The rather high growth rates that he obtained—1.8 percent per year from 1700 to 1835—are based on highly conjectural methods and with no consideration for variations in undercounting. By

rearranging Carmagnani's periodization scheme, one can produce negligible increases over many decades and explosive rates of almost 5 percent for others. Rejecting the caution of earlier historians, the author reduces the exercise to a matter of arithmetic and guesses. The results are presented with the precision that only numbers permit.

A study of a few of the surviving population lists on which the colony-wide counts are based reveals some of their more obvious shortcomings. A comparison of three lists dated 1777, 1779, and 1788 for Valparaíso, the major port city of the colony, indicates that enumerators ignored infants, varied enumeration boundaries at their pleasure, and inconsistently applied ethnic classifications (*Fondo Varios* 450, pieces 7, 8; British Museum *Manuscript Collection*, Add. 17599).<sup>2</sup> In an enumerated population of over two thousand inhabitants there were only twenty-two children under two years of age listed in the 1777 census, notwithstanding the one hundred or more baptisms per year in the parish register. Tabulated returns and the corresponding population lists may be much more appropriate for community social histories than for purely demographic colony-wide studies. The shortcomings of ineptly prepared censuses, immediately apparent in micro-analyses, become obscure at the macro level (other lists in *Fondo Varios* 224, 227, 450, 451, 696; *Fondo Antiguo* 26). For the captaincy general of Chile, population size and rates of growth remain unanswered. Colonial counts and lists must be the basis for future research, but they must also be subjected to intensive scrutiny in the process.

The first substantial corpus of lists of inhabitants dates from the early eighteenth century, when the expanding rural population began to create administrative problems for the Spanish crown. The residue of the ensuing flood of petitions, decrees, and founding papers presents a unique opportunity for studying the social, economic, political, and demographic dynamics of the settling of new towns (*Capitanía General* 666, 937, 938). Frequently house-by-house surveys were carried out to establish allotments. At the founding of Los Angeles in 1749, the inhabitants were listed by residential group with an indication of age, sex, and kin relation for each individual. Information on servants, *criados*, and slaves was detailed with special care (*Capitanía General* 706, *legajo* 8260). Controversies over the location of new towns, the allocation of town sites, and the compensation of landowners produced considerable litigation and occasionally recurrent listings of inhabitants with their allotments. In the founding of the village of Petorca (1754–1802), the population was enumerated on two occasions and land cadasters were drawn up repeatedly because of the villagers' refusals to honor the *censos* assessed against them by the previous owner (*Capitanía General* 563, 706, 724, 750, 938; *legajos* 147, 8260, 9464, 12699, 17029, respectively).

Parish registers, which have provided the materials for an entirely new dimension of European history, are not as promising for the study of colonial Chile. Although many parish archives were founded over three hundred years ago, the baptism, burial, and marriage registers typically have major shortcomings for strictly demographic purposes well into the nineteenth century.<sup>3</sup> Parish priests were overworked and poorly prepared to record effectively the sacra-

ments for all their parishioners, as the following remark indicates: “Las partidas de aqui para adelante . . . que van de mi letra sin embargo de ser dos anos antes de mi entrada a este curato me las entregó el Padre Fray Luis Velasquez en varios papeles sueltos” (Parroquia de Petorca, *Libro de Bautismos*, 1766, fol. 251). A quantitative indication of the problem can be obtained by pursuing the example of Valparaíso. The crude birth rates in the 1780s appear a reasonable fifty per thousand population. Upon examining the baptism books, one finds that the intervals between birth and baptism are much too long for complete coverage (median age of two to four months) and that a not inconsiderable number of infants must have died without being baptised. Burial registers yield an unlikely crude death rate of twenty per thousand. Closer inspection reveals only three infant burials inscribed in 1781 and four in 1782, when one might expect to find from twenty to fifty annually (assuming roughly 15 to 40 percent of baptised infants dying during the first year of life). Ages at death reveal remarkably extreme heaping: of sixty-six adults aged thirty years or more in the burial registers of 1781 and 1782, only three were noted with ages ending with the digits 5, 6, 7, 8, or 9. Marriage books for this period appear to be more complete, reflecting both the legal importance of marriage and ecclesiastical preoccupation with bigamy, consanguineous marriages, and miscellaneous sexual transgressions. Nevertheless, illegitimacy was widespread with bastards accounting for as many as 40 percent of baptisms (28 and 41 percent for Valparaíso, 1781 and 1782). Careful study of the marriage registers and the often considerable information collected for the purposes of publishing banns may assist in understanding the character and relative frequency of concubinage and illicit sexual liaisons so repeatedly condemned by the moralists of the period.

To dissect the social and economic dynamics of a colonial Chilean town, Arturo Grubessich has painstakingly constructed life histories of individuals residing in Valparaíso from 1777 to 1788. Three population lists have been linked with data from parish books, wills, land cadasters, annual commercial licenses, and a score of other documents. Employing demographic concepts of life cycle stages and cohort analysis, he is attempting to dissect the social life of the community to ascertain the determinants of the astonishingly frequent shifts in racial status. Thirty to 60 percent of both male and female heads of household, appearing in successive lists, changed racial designations from one census to the next. The richness of the reconstitution approaches that obtainable from modern survey research; nevertheless, these materials contain serious biases, confounding any straightforward demographic analysis. Family size and fertility ratios derived from the lists are unreliable because of the readily evident underenumeration of children. Theoretically one should be able to calculate mortality rates with considerable confidence either through a nominal approach—following individuals through the decade, noting whether they survived, died, or disappeared (Wrigley, 1968)—or with the customary vital statistics method—dividing deaths for each group during a census year by the corresponding enumerated population. The latter proved unreliable because of highly inaccurate ages for the deceased. The former, unsuccessful in a preliminary analysis of

the entire population because of the high proportion of adults who disappeared from one census to the next, yielded remarkably consistent results for married heads of *don* households.

The deficiencies of the parish books should not prevent us from recognizing their considerable importance for social history. While there may have been a marked proportion of unrecorded births, deaths, and consensual unions, the recorded events contain much detail, more than that found in some European parish books, particularly the English. In addition to the usual information (name, type of sacrament, and date), the Chilean colonial registers invariably indicate ethnicity, legitimacy, and parentage and often indicate age, marital status, place of birth, and length of time resident in the parish as well as godparents and witnesses. If directly derived fertility and mortality rates seem unattainable, ratios calculated from a single source with presumably similar biases in both numerator and denominator may be more promising.<sup>4</sup> Relative population growth may be enticed from burial-baptism ratios; fertility levels from baptism-marriage ratios. For population lists, which were fabricated by an unspecialized bureaucracy without routinized procedures, age, sex, and ethnicity ratios are easily derived but more perverse to interpret. Brading and Wu (1973) demonstrate that very deficient records can be manipulated to yield clues about significant social and demographic processes. In a study of Leon, Mexico, they show that still in the late eighteenth century mortality crises had the most devastating effects on the Indian population and accelerated racial out-breeding because widowed Indians upon remarriage chose proportionately more non-Indian spouses.

The transition from colony to nation had important repercussions for the collection and preservation of Chilean population information. Following the enumeration of 1812–13 (*Archivo Nacional*, 1953), a hiatus, in which even the meagre colonial practices were virtually swept away, stretches over two decades. The 1830–35 census, according to the Chilean Statistical Bureau the first national enumeration, has been known as a single, obscurely published table until recently, when many of the original tabulation sheets were rediscovered (*Ministerio del Interior* 87, 113, 115, 116, 118, 119, 120–122).<sup>5</sup> These reports offer a perplexing opportunity to investigate age, sex, and marital structure of rural districts from the Norte Chico to Chiloé. The detail of the returns, rare for any population of that epoch, and the surviving commentaries reveal both the novelty and the crudeness of these early operations. Administrators obviously adjusted at least some figures to suit preconceived notions about both population size and structure. For example, returns for several districts indicate the same number of married men and married women within each age group. Other tables show incredibly high proportions of married males aged seven to fifteen years, while I have not uncovered a single male marrying under age fifteen in any parish book of that epoch. Crude guesses rather than surveys formed the basis of other returns. The figures for the city of Santiago are all stated in thousands. While the paucity of material for this period demands that these figures be given some consideration, a summing of the tables to produce aggregate totals would certainly be a barren exercise.

Since 1854 the Statistical Bureau has succeeded in carrying out a national census at roughly ten-year intervals and publishing extensive geographical and analytical tables. Historians have usually shunned this impressive collection. The spatial redistribution of Chilean population, one of the most important social processes in nineteenth-century Chilean history, is yet to be studied in any detail. Hurtado (1966) indicated with simple population totals the importance of internal migration for Chilean economic development, the growth of internal markets, and the fluidity of labor in responding to work opportunities in the northern mines, on the southern frontier, and in the cities. The format and accessibility of the published data permit the exploitation of census figures for a variety of research purposes. Tables for age categories, literacy, marital status, and geographical distribution of the population follow a fairly uniform pattern from one census to the next. Unfortunately, the censuses do not present social information cross-classified by age nor are the occupational categories consistent over time.

The availability of population lists are as scarce as the published censuses are abundant; only a few scattered volumes have been located for the national period. With the reorganization of the 1850s, printed forms were designed to systematize the collected information, but unfortunately the bureau also established a deliberate policy of destroying the census manuscripts. Nevertheless, a search of some uncataloged collections of departmental archives recently turned up the following volumes: census of 1854, Atacama, Coquimbo, Concepción, and Talcahuano; census of 1865, Los Andes and Petorca; census of 1907, Buín and Rancagua (*Intendencia de Concepción* 418, 419; others uncataloged). Manuscripts indicate type of housing (*casa*, *rancho*, etc.) and each person's name, age, sex, occupation, marital status, nativity, and literacy. People are clearly grouped by residence, but there are no indications of kinship affinities. As the cataloging of local collections contained in the *Archivo Nacional* proceeds, more census lists from the national period will probably be located, particularly for the better endowed departments in the Central Valley.

A handful of scattered listings may yield valuable insights. These lists are essential to determine the meaning and reliability of published census data from an epoch in which census officials neglected to describe or assess their operations. The vaguely defined, printed age groupings (e.g., 0-7, 7-15, 15-25, 25-50) must cause some puzzlement. A comparison of official figures for a portion of Petorca Valley with data tabulated from enumeration sheets dated 1865 indicates that the categories correspond to discretely defined intervals (1-6, 7-14, 15-24, 25-49). Curiously no children were listed with age zero, a practice explicitly recognized in the 1854 census with the table head "1-7." A matching of enumerated people with family genealogies constructed from parish records indicates a surprising tendency to state age in terms of prospective instead of elapsed years. The printed age category "0-7" in modern terms becomes "0-5." The problem is further complicated by extraordinarily poor declarations at all ages.

Because historians have typically overlooked the social and economic information that may be gleaned from census lists, the following extended illustration is presented. Recently Bauer argued that Chilean agriculturalists success-

fully expanded into the Pacific and European grain markets simply by exploiting idle labor, land, and capital (1975:145ff). As production grew, so did the need for masses of day laborers, or *gañanes*. Rootless, underpaid, and underemployed, they wandered the countryside providing needed manpower at harvest time and scrounging their livelihood the remainder of the year. Contemporary accounts disparage them as nomadic, indigent, and slothful, a recalcitrant but essential cog in the annual cycle of grain production. Census lists provide no information about pay or mentalities, but they can indicate much about residence patterns and labor force structure.

Lacking specific information on geographic mobility, I propose to use kinship patterns as an indicator of rootlessness. Because family relations are also omitted, I have been forced to impute kinship from surnames, marital status, age, and the ordering of people within households. In elaborating a set of classification rules, the principal guideline is to take advantage of the cultural forms reflected in the lists. A married man and woman on the first lines of a household list are classified as husband and wife. An immediately following string of people at least fifteen years younger than the wife, bearing the surname of the husband and listed from eldest to youngest are presumed to be offspring of the heads. Persons having the family name of either spouse become relatives. Those with other surnames are classified as unrelated to the family. Presumed kin more than fifteen years older than the heads are inferred to be their parents. Persons bearing appropriate surnames and within fifteen years of age of the heads are classed as their siblings. In the case of a complex household containing several presumed families the same rules are applied to each.

These procedures must produce some incorrect inferences. Cousins or other relatives bearing the matronym of either head will be classified as unrelated, while two persons living in a household with the same family name but no kin tie will be presumed to be related. The absence of a father from a family and unwed mothers create further uncertainties, although the presence of a string of children listed in descending order of age and immediately following an older woman leads to a presumption that they are her offspring. Inferences checked against previously constructed genealogies produced few positive misclassifications, notwithstanding the remarkable complexity of households in the lists. On the contrary, the genealogies proved to be disappointingly incomplete; many enumerated individuals were unlocateable in any family history. The matching of mid-nineteenth century census lists with reconstituted families quickly becomes a quagmire because of the poor registers during the period 1810–38. This procedure for inferring relations may appear unsettling, but it offers many advantages. Assignments can be made speedily, applied to each enumerated individual, and confront remarkably few ambiguous situations.

In the following analysis, isolated individuals including *gañanes* without relatives resident in the immediate household are not classified as family heads, even where they appear on the first line of a household. *Gañanes* enumerated at mines or foundries are referred to here as mining *gañanes*; others are presumed to be agricultural workers. In the census lists, this distinction is not explicit; all were referred to as "*peón gañan*."

TABLE 1 Male Occupations by Age: Two Petorca Communities, 1865

Occupation	10–14	15–19	20–24	25–29	30–39	40–49	50+	All Ages	N
Agricultural									
Gañanes	63.2%	46.4%	29.4%	27.6%	12.8%	23.2%	17.9%	28.8%	213
Farmers	—	1.8	4.6	9.2	17.4	21.2	35.0	13.9	103
Miners	23.5	25.5	35.8	36.8	38.3	27.3	24.8	30.9	228
Mining/Foundry									
Gañanes	2.9	18.2	14.7	4.6	2.7	—	1.7	6.5	48
Others*	10.3	8.2	15.6	21.8	28.9	28.3	20.5	19.9	147
Total (N)	68	110	109	87	149	99	117	739	739
Not Specified (N)	123	18	9	3	3	10	12	178	178

Source: Departamento de Petorca, *Censo de Población, 1865*. Enumeration sheets for *subdelegación* 2, districts 4, 5 and 6 and *subdelegación* 4, districts 1, 2 and 3.

\*Includes 42 mule drivers, 19 laborers, 13 servants and 173 men in 28 miscellaneous occupations.

Instead of rootless vagabonds, most gañanes in the 1865 Petorca manuscripts resided with kin. Only thirty-five of 213 agricultural gañanes were listed in households with no presumptive kin present. A portion of this fraction resided not in agricultural households, but with families headed by merchants, miners, or artisans. Older gañanes were typically heads of families; younger ones resided with their fathers, who were frequently described as agriculturalists. For the overwhelming majority of gañanes the presence of immediate kin was an everyday reality; some 80 percent lived with close relatives. For most boys, family determined access to an occupational stream. Age marked one’s movement. Interpreting the cross-sectional data in table 1 diachronically—generally a foolhardy undertaking in a rapidly changing society, but not unduly risky in this case—one could conclude that gañan was an entry occupation for boys who with age, experience, and brawn became farmers, miners, and mule-drivers, although some gañanes were unable to go beyond their original status even with marriage. As a group, though, gañanes were principally young men. Fully one-fifth were less than fifteen years old and almost half were teenagers.

As they grew older and married, many gañanes could realistically aspire to becoming farmers. Both maturity and marriage were important for achieving the status of farmer and abandoning that of gañan. Of the two principal agricultural occupations, gañan and farmer, young, single men were almost exclusively gañanes. Older married men were predominantly farmers. Marriage was apparently more intimately related with higher status than simply age. The remarkably high first order associations (table 2, A and B) shrink slightly upon controlling for age (C), but are reduced to virtual insignificance when marital status is held constant (D). Gañanes were more than simply unskilled laborers; performing the work of adolescent boys, they possessed a lower status and a more dependent position. Farmers, who enjoyed either the ownership of a small strip of land or the right to work hacienda lands as renters, sharecroppers, or informal occupants, were more independent. Marriage was apparently an

TABLE 2 Agricultural Occupations, Marital Status, and Age: Petorca Valley, 1865

	A. Marital Status		B. Age	
	Single	Ever-Married	10–29	30+
Gañan	161	52	150	63
Farmer	16	85	15	86
Q	.89		.86	

	C. Controlling for Age				D. Controlling for Marital Status			
	10–29		30+		Single		Ever-Married	
	Single	Ever-Married	Single	Ever-Married	10–29	30+	10–29	30+
Gañan	143	7	18	45	143	18	7	45
Farmer	9	6	7	79	9	7	6	79
Q	.86		.64		.72		.34	

Source: Departamento de Petorca, *Censo de Población*, 1865.

Note.  $Q = (ad - bc)/(ad + bc)$ . Cells of each cross-tab are located as follows:  $\begin{matrix} a & b \\ c & d \end{matrix}$

important requisite for obtaining these privileges. Nevertheless, for gañanes as well as agriculturalists, family was an important facilitator of occupational status. Both groups lived and worked in an environment surrounded by kinfolk. Rootless gañanes seem to have numbered very few.

This example is plagued by the usual quandaries of micro-studies—representativeness, small numbers, and underenumeration. The enumeration occurred not at harvest time but several weeks later, in April. Haciendas and minifundia, the two principal tenure patterns of the Chilean countryside, were well represented in these lists. The Petorca Valley (with its mixed mining and agricultural economy) is not typical of Central Chile. In the prime agricultural zone gañanes made up over 50 percent of the male work force, while in these lists they accounted for only 28 percent. Further soundings in other population lists are necessary to assess the generality of this pattern.

Chilean vital events series extend back beyond the first published census to 1848. With the growing interest in studying the sweep of population change and in particular testing the demographic transition paradigm outside Western Europe, researchers have begun to turn to this collection. The ahistorical view of olden times as an epoch of demographic stasis, the occasional epidemic aside, is being overturned as demographers reveal the kaleidoscope of past social, cultural, economic, and population interrelationships. The quest for a demographic Garden of Eden, a regime of natural, high fertility stifled by the oppressive air of death, has now become a search for exploring the dynamics of population processes. In France, the seedbed of historical demography, researchers have discovered that there is no transcendental level of natural fertility, stretching backward millennia or across cultures. European parish studies demonstrate conclusively

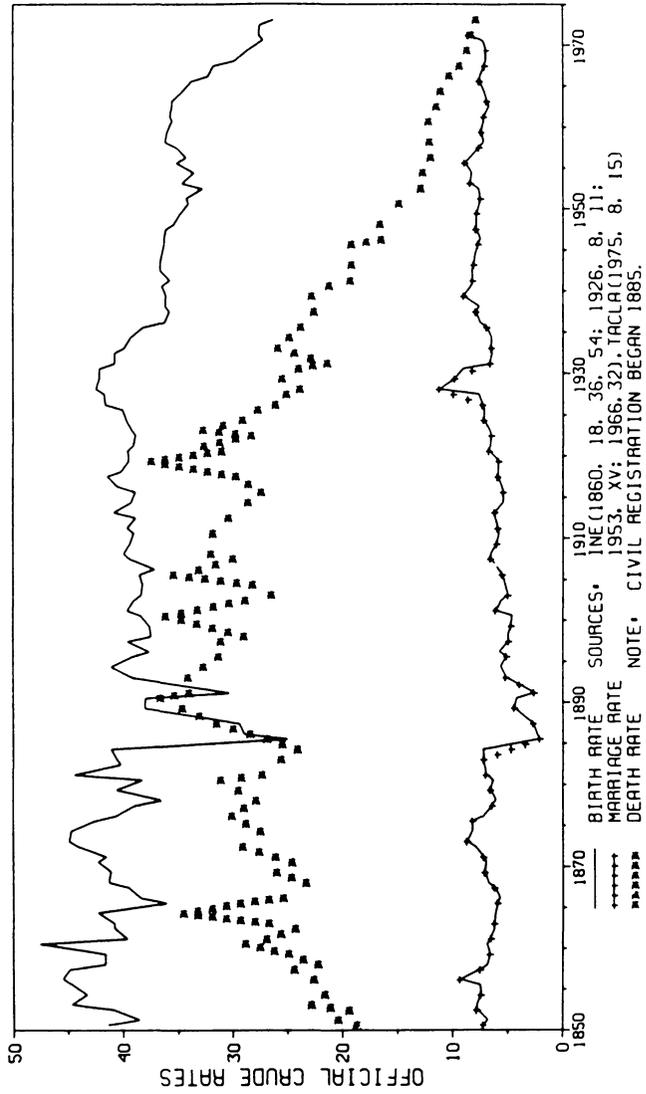
that both fecundity and nuptiality, as well as mortality, varied, sometimes substantially, from parish to parish, century to century, and even year to year.

Massive quantities of parish records and lengthy published series notwithstanding, the outlook for the study of nineteenth-century Chilean demographic levels is not sanguine. During the first decades of the Republic, vicarial administration frequently escaped central control and depended more on the curate's sense of responsibility and personal energy than on bureaucratic norms. One priest justified his decision to cut short his entries as follows: "De resultados de el Decto. que absuelbe a los gañanes libres a derechos en sus casamientos y no abiendo notario dotado qu llebe este archibo con la formalidad de prosesos en sus informaciones, he venido, cansado de aser este trabajo de valde, en solo declararlos pa saber sy estan o no impedidos, en llebar solo una rason ligera de qe los declare y exige, su consentimiento pa proseeder a sus proclamas y casarlos" (Parroquia de Petorca, *Informaciones Matrimoniales*, legajo 1, 10 November 1825). The administrative renaissance of the 1840s resolved the problem of disorganized and ill-kept archives, but as late as 1865, with one priest per two thousand parishioners, the provision of sacraments continued woefully inadequate. To reach outlying communities, vicars organized annual missions during which several hundred souls might be baptized on a single day. Many parishioners died without benefit of last rites or mention in the parish books. Registers frequently and explicitly reveal their shortcomings; to permit a widowed person to remarry it was not unusual to present witnesses to provide oral corroboration of an unrecorded death of a previous spouse.

Given these mundane obstacles to the proper functioning of the parroquial system, coherent crude rates must cause some surprise (figure 1). For the period 1850–84, the unadjusted figures definitely seem the proper magnitudes. Many fluctuations display a certain demographic logic. Peak years of burials are often followed by noticeable declines in baptisms. Nevertheless, few research options are offered by these aggregated data. Their published format, maintained well into this century, simply display numbers of events by local administrative divisions with few, if any, social or demographic cross-classifications.

That researchers are turning away from published figures to nominal data should not be surprising. However, manuscript entries also prove unyielding, particularly for the construction of family life histories. This approach founders at the linking stage. Aliases, orthographic variations in surnames, and erroneously noted entries turn the reconstitution work into a highly conjectural affair. For much of the second half of the nineteenth century parents were left off burial inscriptions in most parishes; consequently the linking of children's deaths to appropriate families is almost impossible for several decades. In a search for alternative sources and methods, attention has turned to the *informaciones matrimoniales*, petitions for the publication of banns, as the single most promising material in the parish archives for this period. This ostensibly desperate strategy of seeking information from one rich source has certain substantive advantages, as well as cost economies. Marriage and family formation were critical junctures in people's lives in that epoch, high illegitimacy rates notwithstanding. The petitions also provide exceptional information about premarital sexual relations,

FIGURE 1. BASIC DEMOGRAPHIC RATES: CHILE, 1850-1973



cultural practices, social attitudes of ordinary people, and sociobiological in-breeding. An abbreviated example illustrates their rich content. August 31, 1850, PCP, a farmer, thirty-two, and single, brought the permission of his father to wed ICC, single, twenty-seven, and requested dispensation of consanguineous and affinitive impediments to their union. As first cousins, they wished to marry within the prohibited degrees. Moreover, PCP had experienced illicit sexual relations with the fiancée's first cousin. As justification for their dispensations, the couple cited the notoriety of their relationship, the shame of the fiancée, her age ("que es imposible otro la tome por esposa"), and orphanhood ("abiendose casado su padre en segundas nupcias, lleva con ella serias obligaciones y se encuentra cargado de hijos"). After paying an eight peso fee, the equivalent of more than one month's wages for a day laborer, the couple obtained the dispensation and hurriedly married (Petorca Parish, *Informaciones Matrimoniales*, 1850, *Expediente* 1).

Mortality estimates may also be derived from the banns documents, as Arretx et al. (1976a), applying a method elaborated by Henry (1960), demonstrate. The innocuous bit of information about parental permission may be tabulated by age of the betrothed to yield survival probabilities for the mothers and fathers of marrying couples. Several technical implications should be considered when applying this method. Because the remarriage of a widowed parent inflates the survival ratio and since the widower remarriage rate is much greater than that of widows, data on mothers should probably be excluded. Registers with missing or vaguely worded declarations (e.g., "prestaron consentimiento los padres de los novios") should be avoided. Since mortality is principally a function of age and the ages of parents at the birth of their marrying children are unknown, the missing parameter may be approximated by the mean age at childbirth for mothers and fathers. In practice, until fertility studies for this period provide guidelines, the researcher is forced to select a figure from a model life table. Given the arbitrariness of the choice, a range of mean ages may be more appropriate, at least to gain an appreciation of the possible effects of an incorrect assumption. A further complication is introduced by the markedly different pattern of marriage for men and women. To take into account these unknowns, it may be advantageous to tabulate the two sexes apart. Moreover, it should be noted that the demographic estimates derived through this procedure are based exclusively on information about adult survival. Lacking data on infant and child mortality, caution would suggest restricting the final estimates to adults. Finally, the choice of model life table types may significantly affect conclusions about mortality levels. If the authors had selected Coale and Demeny's tables, Region South, instead of the United Nations tables, their life expectancy at birth estimates would have declined by 5.4 years.

Table 3 presents the basic data developed in the study of Nuñoa parish. Several anomalies stand out. According to the declarations, few mothers have died for those marrying under twenty years of age, while this group had fewer living fathers than those marrying at ages 20–24. The process of demographic elaboration used by the authors to arrive at final estimates is presented in table 4. The ensuing life expectancies—35 to 41 years at birth for men and 40 to 55 for

women—are surprisingly high. Estimated mortality levels for Chile in 1907 indicate much worse conditions. Using the 1907 enumerated population and model life tables, Arriaga (1968) estimates that life expectancy at birth was only 27 years for men and 29 for women. As late as 1940, general mortality levels had not reached those estimated from the Nuñoa data. Arriaga estimated life expectancies for Chileans at 37 and 39 years at that date. If the Nuñoa material is representative, a wholly unwarranted supposition, it implies a dramatic worsening of life chances after 1870—a tendency not apparent in the national death series (see figure 1). These losses would be recouped only in the 1940s with the introduction of modern medical technology and the fruition of substantial investments in public health.

The year 1885 marks the beginning of a new epoch in the preparation of Chilean population data. The best census of the century, in terms of coverage and published details, was carried out in that year, and a civil registry system was initiated. Figure 1 indicates the severity of the deterioration in the birth and marriage series resulting from the abandonment of parochial registration.

Chilean census publications, at least prior to 1952, are characterized by relatively sparse social and demographic tabulations, although much geographic detail. This compromise discourages a national analysis of demographic questions at the same time that it facilitates studies of communities. Researchers investigating the interplay between, say, economic activity and fertility levels are forced to resort to synoptic circumvolutions, such as rectilinear correlation and regression analysis. Problems of ecological fallacy, complex models, and the sparse number of areal units lessen the utility of the purely statistical approach. The quality of the modern censuses is certainly high, as demonstrated by rigorous indirect tests (Gutiérrez, 1969; Sadie, 1969; Tacla, 1975).

Few manuscript census materials survive for the twentieth century. Even the enumeration sheets of an unusual economic census (1943), an undertaking independent of the census bureaucracy, were recently incinerated. However, the National Statistical Institute has plans to provide machine readable copies of portions of the 1970 census schedules with appropriate privacy safeguards. Should these intentions be realized, this material could become a pivotal source for establishing baselines of a rapidly changing demographic situation. Their value for historical demography is difficult to underestimate. A reconstitution of two communities in the Petorca Valley was salvaged by the possibility of capping off the life histories with the 1970 enumeration schedules.<sup>6</sup>

The civil registration data look very bad, at least prior to 1920. Since Vergara L.'s brief commentary (1900), assessments of the graphic decline portrayed in the national figures have been limited to very gross estimates (Collver, 1965). Post-1920 registration data, particularly birth series, have been assayed many times. Demographers, in their efforts to estimate accurately vital rates, have constructed population balance sheets comparing net intercensal movement of births, deaths, and international migration with the growth shown between two censuses. Differences are usually attributed to either birth registration deficiencies or the varying quality of censuses. For historians who find the

TABLE 3 *Orphanhood at Marriage: Nuña, 1869–1871.*

<i>Age of Offspring</i>	<i>N</i>	<i>Living Fathers</i>		<i>Living Mothers</i>	
		<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
15–19	82	47	57.3	75	91.5
20–24	234	159	67.9	193	82.5
25–29	123	56	45.5	67	54.5
30–34	50	8	16.0	24	48.0
35–49	24	6	25.0	6	25.0
Total	513	276	53.8	365	71.1

Source: Arretx et al. (1976a), p. 12.

world of hypothetical constructs distasteful, a study by Behm (1962) may be appealing. Eschewing the demographic balancing method, he simply counted and tallied registered births by year of occurrence instead of inscription. This retabulation is necessary because the published series have not in fact reported calendar-year births. Prior to 1928, demographic annuals actually refer to numbers of inscribed births regardless of year of occurrence. From 1928 through 1951, the national series report numbers of children inscribed at less than two years of age within the calendar year. Since 1951, the series indicates births occurring within a calendar year and inscribed within the first three months of the following year (Behm, 1962:22ff). By rearranging birth data by year of occurrence without regard to year of registration, Behm sought to construct an annual series of underregistration estimates. He was astonished by the results. Retabulations produced counts several percentage points greater than the officially corrected series. However, this seemingly direct procedure has a pitfall. His data apparently included an unknown, but perhaps substantial proportion of late, repeated registrations. The series used by Behm may include duplicate inscriptions arising from the process of legitimizing children, changing names, correcting errors, and the like. Regardless of method, the various estimates all point to the same conclusion: substantial, steady improvements in birth registration since 1930.

In contrast to the numerous critiques of birth statistics, the assessment of death registration is virtually unknown. Lacking empirical indications, specialists have been compelled to suggest possible minor underrecording, decreasing with improvements in education and transportation. In 1973 these intuitions were shattered with the publication of the results of an exhaustive investigation of infant mortality sponsored by the Pan American Health Organization (Legarrete et al., 1973). The researchers sampled the death records of Santiago hospitals and then searched vital events books in an attempt to empirically assess the rate of omissions for deaths occurring in hospitals. Their conclusions are surprising. As many as 80 percent of infant deaths occurring within one hour of birth were not officially registered. Overall, some 56 percent of all infant deaths in the sample could not be traced in the civil registration books. It should be empha-

TABLE 4 Determination of Mortality Levels from Averaged Survival Probabilities

	Survival Probabilities for Fathers	
	${}_{20}P_{35}$	${}_{25}P_{35}$
Nuñoa Data (transformed)	65.2%	59.9%
Model Life Table $e^{\circ} = 35$	63.9	—
Model Life Table $e^{\circ} = 40$	69.9	59.3
Model Life Table $e^{\circ} = 45$	—	65.3
Interpolated Estimates $e^{\circ} =$	36.1 years	40.5 years
Averaged Estimates		38.3 years
Averaged Estimate from Coale and Demeny, South		32.9

Source: Arretx et al. (1976), p. 12; and Coale and Demeny, p. 659ff.

Note: Transformations explained in Arretx and Henry (1960).

sized that these extraordinary findings may reflect conditions peculiar to large Chilean cities: extremely crowded hospitals with procedures for burying unclaimed bodies at the hospitals' expense, exorbitant private burial fees even for newborn infants, long lines and short hours at the registry offices, and the failure of hospital staff to file prepared death reports.

Substantial omissions at the national level must arouse low expectations for the use of Chilean civil registry books. A view from the countryside is quite different. A study of Petorca and Chicolco districts demonstrates a rapid, early improvement in birth registration taking place before the turn of the century. For one methodologically important set of families, spouses who legally married in the study area, inscription quality reached acceptable levels by 1900. By the beginning of the century almost two-thirds of known births were inscribed within one month of parturition and 90 percent within two. These data indicate little advancement since that time. Registration of children born to other types of parents (in-migrants, unmarried, or married elsewhere) has been relatively tardy. While the timing of improvements is identical for both groups, the levels are very different. As late as 1930, at least 5 percent of the second group were still unregistered at death. The corresponding figures for prime families rarely exceed 2 percent and are frequently less than 1 percent. Table 5 indicates the implications of omissions for birth, death, and infant mortality rates. Measured incompleteness cannot reveal absolute levels, but it may indicate relative magnitudes and trends over time. The observed rate of omissions (percent of births) must be considered a minimum. The ratio of omissions to total deaths may be much nearer to the mark; however, a segment of the populus must have been estranged from both the birth and death registries, particularly those who moved on and died elsewhere. The third indicator, related to the infant mortality rate, comes from the assumption that the observed infant deaths without birth slips reflect the larger, also unregistered, population at risk. This estimate must be biased both upward, because many infants died soon after delivery and their

TABLE 5 Birth Underregistration Estimates: Petorca-Chincolco, 1885–1969

Period	All Known Unregistered Births				Unregistered Births to Parents Married in Petorca-Chincolco			
	N	% Births	% Deaths	% Recip.	N	% Births	% Deaths	% Recip.
1885–1894	171	6.1	18.9	18.6	50	3.8	10.8	14.7
1895–1909	102	2.8	7.9	9.8	15	0.8	2.3	6.5
1910–1929	62	1.6	4.9	5.2	8	0.5	1.4	3.4
1930–1949	31	0.7	3.1	3.5	12	0.4	2.0	1.9
1950–1969	41	0.9	6.8	13.2	12	0.4	3.2	5.5

Sources: Petroca and Chincolco Registry Books.

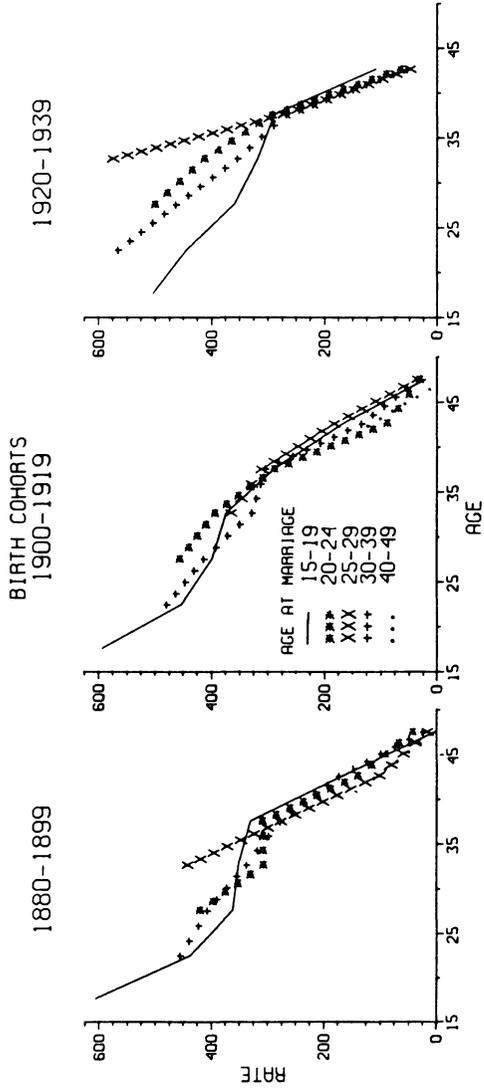
Note: Table includes only children born within the Petorca-Chincolco registration districts and inscribed in at least one registry book. % Recip. is the number of inscribed infant deaths lacking birth slips times the reciprocal of a hypothesized infant mortality rate for each period (240, 220, 200, 150, 130 per thousand live births, respectively).

births might have been recorded opportunistically had they lived longer, and downward by a substantial omission of infant deaths. All estimates show that birth registration has been surprisingly complete since 1895. Omissions for families legally constituted in the Valley were particularly small. These figures also show a considerable deterioration in registration quality since 1950. The proportion of infant deaths without a birth slip has risen sharply. This pattern contradicts, but, of course, cannot disprove, the linear progression estimated by the National Statistical Institute and others (INE, [1968]: 62; Behm, 1962:35; Sadie, 1969:18–19).

Historians may make their most important contribution to the study of recent Chilean population change through the nominative analysis of civil registry data. There is little published vital events material before 1940 appropriate for the social and economic analysis of demographic variables. Without turning to nominative data, fertility change may be particularly difficult to study. Child-woman ratios calculated from census age and sex tables seem the most promising aggregated data but their value is reduced by the highly variable underenumeration of infants (Cabello, 1953). Community studies involving the transcription and retabulation of officially registered events may, for example, provide important clues to the frequency and intensity of fertility differentials and the evolution of fecundity patterns. Fans of the widely disparaged but imperishable demographic transition paradigm, encouraged by the sharp decline in Chilean fertility (inexorably predictable according to the theory), must be eager to study the evolution of the process at the micro-level.

The accelerating decline in the Chilean crude birth rate, observable since the early 1960s (figure 1) is more than simply an urban phenomenon. Figure 2, which displays marital fertility curves for the Petorca-Chincolco district during this century, illustrates the restructuring of fertility patterns that occurred in the valley. For women born prior to 1920, age-specific marital fertility rates were remarkably uniform, regardless of age at marriage. During the first years of

FIGURE 2. MARITAL FERTILITY RATES, PETORCA-CHINCOLCO, 1900-1970  
BY WOMEN'S BIRTH COHORT AND AGE AT MARRIAGE



marriage, women had perhaps one-third more children than women already married for five or more years. This is a statistical artifact to some extent. Most brides, particularly teenagers, were pregnant at marriage (i.e., at entry into observation) and consequently the number of their births are inflated relative to years at risk. Otherwise, age at marriage had only minor effects on childbearing for women of the first two birth cohorts. At any specific age, whether a woman had been married fifteen years or only five, apparently made little difference in fertility. This uniformity of fertility rates suggests that, if there were efforts to restrict fertility they were unrelated to the number of years married. For the third cohort, women born between 1920 and 1939, these patterns changed drastically. Prior to age thirty-five, fertility rates were significantly lower for women marrying at younger ages. This strong correlation between age at marriage and frequency of childbirth is a classic pattern of fertility limitation. A reasonable, *ex post facto*, explanation should be put forth. With family limitation beginning and spreading rapidly within the experience of a single generation and with an efficient birth control technology as a means, it is possible that all women after reaching their mid-thirties were restricting their fecundity without regard to the number of previous births or years of marriage.

Regrouping the curves in figure 2 by age at marriage indicates that, while the form of the curve for teenage brides varies but little from one cohort to another, there have been considerable changes for women marrying in their twenties. The trend has been toward much higher fertility during the first years of marriage followed by lower rates beyond age thirty-five. The net effect has been a steady increase in total fertility for all ages at marriage except those under twenty years at marriage (table 6). This trend is in agreement with the rise in the national crude birth rate which occurred in the 1950s. It also adds a new dimension to the argument that rising birth rates in an epoch of general mortality decline is the result of improved joint survival probabilities of spouses (Arriaga, 1970). In the Petorca Valley, rising fertility was much more than the result of increased survivalhood of spouses. Fecundity apparently increased within marriage as well, perhaps the result of improved morbidity and changing suckling practices. Moreover, had the women born between 1920 and 1939 achieved the peak fertility rates empirically demonstrated by successive ages at marriage, the overall fertility would have been considerably higher. It is worth noting that from the early 1950s, over 10 percent of all women admitted to the local hospital for pregnancy-related causes involved complications following induced abortions. Finally, even with the recent increase in marital fertility, these rates are not much different from those obtained for an eighteenth-century French parish.

The study of Chilean population is still in its infancy. The pitfalls awaiting the novice are many. The nature of the available information necessitates the use of a powerful logic: arithmetic. The inherent risk, at least for historians, is that this logic may encourage a peculiar charade of self-deception, a mindless, at times frustrating, and in the end embarrassing exercise, which fortunately often exposes its own contradictions. The risk is only slightly more serious than literary forms of deception, where prejudice, ideological passions, and professional pres-

TABLE 6 Total Fertility Rates

Women's Birth Cohort	Age at Marriage				
	15–19	20–24	25–29	30–39	40–44
1880–1899	10.9	8.2	5.9	4.1	0.6
1900–1919	11.3	8.3	6.2	4.3	0.7
1920–1939	10.1	8.5	6.4	4.5	—
Tourouvre au Perche, 1665–1765	9.2	8.5	6.7	4.8	0.6

Sources: Petorca and Chincolco Registry Books; Charbonneau (1970), p. 101.

Note: Rates exclude fertility for ages 45–49 to maintain comparability with birth cohort 1920–39.

tures have occasionally led to considerable nonsense, if at times cleverly concealed with elegant prose.

Scavenging for source materials must also extend beyond documents that lend themselves exclusively to tallying. Some of the most exciting and enlightening information is contained in obscure court cases, municipal records, governors' reports, wills, inheritance settlements, criminal suits, and the like. For some historical epochs we may learn more about the social significance of demographic events from this kind of material than from considerable counting, summing, and analyzing of erratically kept registers or haphazardly conducted censuses. For example, the severity of smallpox epidemics and their effects on family structure in the 1780s is forcefully depicted in a suit that grew out of a municipal order for the militia to search the countryside for children orphaned by a recent epidemic (*Capitanía General* 29, *legajo* 580). The cholera epidemic of 1887–88 can be followed in the hourly logs and daily communications prepared by the provincial governors and their medical teams (*Ministerio del Interior* 1454–1459). Fortunately, both the ministerial and colonial collections have been cataloged. Local sources, whether sheltered in the locality or in the National Archives, cannot be exploited as easily because most lack indices. Hospitals are an obvious source that should not be overlooked. Records of the hospital of Petorca contain family case cards prepared by the rural medical service during the 1930s, indicating much about the health and social circumstances of its clients.

Because of the substantial investment that studies in demographic history are likely to require, expectations must be firmly grounded at the outset. Macro-studies encounter serious problems of the highly aggregated form and low reliability of much of the data. Micro-studies produce results that may have little generality. Statistical manipulations, even much hallowed tests of statistical significance, will not be of much use in the leap from chunks of data rooted in a local historical matrix to the national composite. Generalizations tediously composed from local records subject at all stages to legitimate criticism depend more on the historian's creative imagination than the statistician's calculus. With the growing interest among Chilean historians, the elaboration of more sensitive

approaches grounded in earlier experiences, and the increasing sophistication of historical questions, the outlook for this relatively unexplored dimension of Chilean history may be improving.

## NOTES

1. For the ultimate word in demographic analysis, consult Shyrock et al. (1975). Presat's *Demographic Analysis* (1972), poorly organized, occasionally obscure, and in the English edition cluttered with typographical errors, is nevertheless important because of its many historical examples, asides directed to historians, and availability in several languages. Henry (1967) and Fleury and Henry (1965) provide very specific instruction in the techniques of French historical demography, while Hollingsworth (1969) offers historiographical overviews. A basic statistical text, strong on the logic of quantitative analysis, is Mueller, Schuessler, and Costner (1970). The historians' penchant for writing notwithstanding, the logic of historical research is principally acquired through apprenticeship.
2. Cited documents are in the Archivo Nacional, Santiago, except parish materials and where otherwise noted. Professor Arturo Grubessich informed me of geographical and ethnic discrepancies. Professor René Salinas Meza directed my attention to the 1779 census.
3. Parish books are generally kept in the local church with access provided at the discretion of the priest. Larraín Eyzaguirre (1956) published the most complete survey of extant parish books, but his listing usually includes only the oldest data found in each type of book. Contreras Arias et al. (1972) discuss eighteenth-century population sources and reprint Larraín Eyzaguirre's survey.
4. Celade's study of the mortality of San Felipe (Arretx et al., 1977) demonstrates the problem of trying to apply classic demographic measures to colonial materials. The standard application of age-specific death rate produces absurdly high results. The burial inscription area did not correspond to the enumeration area. Moreover, age declaration errors were much greater in the burial inscriptions than in the census lists. The authors attempt to overcome these difficulties with crude adjustments (burials over age 60 are ignored; the remainder are deflated by a factor of 0.4!) and innovative technique—all received with considerable skepticism at the Second International Seminar of Latin American Historical Demography (Santiago, 15 March 1977).
5. Professor Arnold Bauer brought one of these reports to my notice.
6. The Census Bureau provided copies of the enumeration sheets with names omitted. A random linking procedure based on the ages of both spouses at the time of the census was used to tie the family histories to the census.

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