Working Paper

EXPLORATORY ANALYSIS OF THE UMEA DATA AT IIASA

Arno Kitts

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WP-86-1

International Institute for Applied Systems Analysis
A-2361 Laxenburg, Austria

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This research was conducted in conjunction with a summer research seminar on heterogeneity dynamics, under the direction of James W. Vaupel and Anatoli I. Yashin, in the Population Program at IIASA led by Nathan Keyfitz.

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Foreword

A group of eleven Ph.D. candidates from seven countries--Robin Cowan, Andrew Foster, Nedka Gateva, William Hodges, Arno Kitts, Eva Lelievre, Fernando Rajulton, Lucky Tedrow, Marc Tremblay, John Wilmoth, and Zeng Yi--worked together at IIASA from June 17 through September 6, 1985, in a seminar on population heterogeneity. The seminar was led by the two of us with the help of Nathan Keyfitz, leader of the Population Program, and Bradley Gambill, Dianne Goodwin, and Alan Bernstein, researchers in the Population Program, as well as the occasional participation of guest scholars at IIASA, including Michael Stoto, Sergei Scherbov, Joel Cohen, Frans Willekens, Vladimir Crechuha, and Geert Ridder. Susanne Stock, our secretary, and Margaret Traber, managed the seminar superbly.

Each of the eleven students in the seminar succeeded in writing a report on the research they had done. With only one exception, the students evaluated the seminar as "very productive"; the exception thought it was "productive". The two of us agree: the quality of the research produced exceeded our expectations and made the summer a thoroughly enjoyable experience. We were particularly pleased by the interest and sparkle displayed in our daily, hour-long colloquium, and by the spirit of cooperation all the participants, both students and more senior researchers, displayed in generously sharing ideas and otherwise helping each other.

Arno Kitts worked on two different analyses while at IIASA, one pertaining to contemporary France and the other pertaining to nineteenth-century Sweden. This working paper adumbrates his investigations into the Swedish data. It is a first step, but an important first step, that researchers who continue this analysis will find very useful. The Swedish data was supplied to IIASA with the help of Gun Stenflo, who will join IIASA for some months in 1986 as a research scholar. We are grateful to the various researchers at the Demographic Data Base at Umea University in Sweden who have cooperated with us in starting this project.

James W. Vaupel
Anatoli I. Yashin

Abstract

The Demographic Data Base at Umea University, Sweden, has been in existence for over ten years now. A file dedicated to the study of individuals over time has recently been made available for research; a copy of this data is now at IIASA. The file consists of individual life event histories for women in seven different parishes in Sweden in the nineteenth century. Here, the author merely presents some very elementary analyses of the data concerning migration, and fertility, as a guide for future research. He also suggests that the data will be of considerable value in the study of heterogeneity in fecundability; a topic generating widespread publicity.

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INTRODUCTION

One of the problems in historical demography is that given an archive containing heaps of original documents, one doesn't really know what one has until hundreds, sometimes thousands, of man-hours have been devoted to processing the data. Fortunately, the UMEA data at IIASA has already been processed. A full description of the demographic data base at the university of Umea, Sweden can be found elsewhere (Sundin 1977; Kalvemark 1977), but I will briefly summarize the data available at IIASA. We have life histories of women living in seven parishes, in various different parts of Sweden, during the nineteenth century. These life histories have been reconstructed using the technique of record linkage familiar to family reconstitution studies. Because of the quantity and quality of the sources, it has been estimated that the record linkage procedure is 95% successful.

Table 1. The sources.

1. Church examination registers
2. Migration registers
3. Birth and baptism registers
4. Marriage registers
5. Death and burial registers

The seven parishes, as well as being situated in different parts of Sweden, have significantly different populations during the periods in which data was collected.

Table 2. Population in the seven parishes in the 19th century.

Parish	Period	Population		
		1805	1865	1900
Nedertornea	1818-1896	1093	2115	3056
Tuna	1804-1896	1088	2356	3577
Svinnegarn	1817-1894	555	523	633
Trosa	1817-1895	877	933	889
Gullholmen	1837-1922	428	489	724
Locknevi	1821-1899	1538	2498	2237
Fleninge	1819-1890	627	1239	1325

In Table 2 the parishes appear with the northernmost (Nedertornea) at the top, and the southernmost (Fleninge) at the bottom. However, from now on we shall always present the parishes in order of size, starting with the smallest (Gullholmen), and ending with the largest (Nedertornea).

INFORMATION RECORDED

The data at IIASA has been divided by parish so that one parish at a time can be studied. Each record begins with a ten digit code uniquely identifying the parish, and the woman, to which the data refers.

The amount of information following this reference code varies a great deal from woman to woman, depending on the number, and lengths of periods for which she was under observation in that parish.

As can be seen from Table 3, the amount of potential information on any one female life history is huge. The next step is to determine how much of this data is actually recorded per woman. Some sense of this can be gained from Table 4.

Except where the entries in this table are preceded by #, they represent the percentage of the total number of records for which the relevant information is present.

Table 3. Life event history data recorded.

Data recorded	# Digits	Cumulative # Total
Reference code	5,5	10
Date of birth : year,month,day	3,2,2	17
Date of death : year,month,day	3,2,2	24
Type of entrance into the community	1	25
Type of exit from the community	1	26
Number of observation periods; up to 10	2	28
Time period for each observation period	3,2,2,3,2,2	168
Civil status and first date; up to 5	1,3,2,2	208
Number of children	2	210
Information on each child; up to 15:		
Date of birth : year,month,day	3,2,2	
Type of exit from community	1	
Last date in community	3,2,2	
Own or relatives occupation	2	
Legitimacy	1	

In all seven parishes, the date of birth of the women are very well recorded, and, in all but two of the parishes, over 90% of these dates are accurate to the day.

The date of death is far less commonly recorded. This is partly because, at the beginning of the registration period, the dates of birth of many of the women present in each parish could be determined, while, at the end of the nineteenth century many of the women then present had simply not died yet. Another reason for the low recording of death dates will undoubtably be out-migration; we shall discuss this fully in due course.

Type of entry, and exit from the parish are very accurately recorded. A closer analysis of this data would reveal whether the percentages of death dates correspond to the percentages of women who exited their respective parishes from causes other than it being the end of the period of registration.

The recordings of marital status will not always represent changes in status; they may, for example, simply record the marital status of a woman who has just moved into the parish. However, it may be that when the first date of a certain state is recorded to the day; the change in status occurred on, or near, that date. One can see that the number of women who have more than one marital status

Table 4. Completeness of information recorded per woman (%).

	Gull-holmen (1)	Svin negern (2)	Fleninge (3)	Trosa (4)	Locknevi (5)	Tuna (6)	Neder-trornea (7)
# Records	1328	3047	3296	4453	6184	6608	7895
# with children	402	954	939	1189	1956	1976	2167
Year of birth	99	100	100	99	100	98	99
Year, month, day	96	87	99	90	98	92	87
Year of death	34	19	21	18	25	25	38
Year, month, day	33	19	20	17	24	25	37
Type of entrance	92	99	98	98	98	94	93
Type of exit	92	99	98	98	98	94	93
Observation periods	92	99	98	99	98	94	100
1st marital status	91	98	97	98	97	94	91
Year, month, day	79	54	73	30	90	75	63
2nd marital status	25	20	15	16	25	23	20
Year, month, day	25	19	14	16	24	21	18
Children	30	31	28	26	31	29	27

recorded is relatively low, the number of women who have more than two recorded declines proportionately.

Perhaps the most striking of all the rows of data in Table 4 is the one concerning the number of women records who have any information recorded about children. It is highly unlikely that only approximately 30% of the female population of nineteenth century Sweden were producing any children. I have not yet discovered the exact causes of this, but I expect that it is due to many women being under observation for short lengths of time; because of migration, etc.

For the women who do have children, the information per child is presented in Table 5, as it was for all the women in Table 4.

Since we have no reliable estimate of the number of childless women, we can only compute the mean family size of women who do have children; this figure does not correspond to the gross reproduction rate.

Table 5. Completeness of information recorded per recorded child (%).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
# Women	1328	3047	3296	4453	6184	6608	7895
# Children	1681	2756	3133	3346	6415	6218	9440
# Average per fertile woman	4.18	2.89	3.34	2.81	3.28	3.15	4.36
Year of birth	100	100	99	99	100	99	99
Year, month, day	99	98	99	99	99	99	98
Type of exit	94	97	97	97	97	97	93
Year of exit	94	97	97	97	97	97	93
Year, month, day	90	70	88	51	94	88	81
Own/relatives occupation	55	59	62	65	68	57	49
Legitimacy	67	10	74	64	91	77	86

We have a very high recording of dates of birth (mostly accurate to the day), and exit from the community (except for Trosa (4)). Recording of occupation is less common, while the data on legitimacy varies greatly from parish to parish (the 10% recording of legitimacy information in Svinnegarn (2) is due to a data transcription error on the computer tape; the actual data for Svinnegarn is expected to arrive at IIASA shortly.

The rest of this paper will be devoted to the presentation of some preliminary results concerning the demography of these seven Swedish parishes in the nineteenth century. The data is ideal for the analysis of fertility (since most of the data covers children).

However, the effects of migration can bias many measures in historical demography, so we shall discuss these before conducting analyses for which the data appears to be more appropriate.

MIGRATION

The quantitative study of migration will always be difficult because we are examining an event which reflects two dimensions: space and time. Usually the data available for such studies is large in quantity, but often desperately restrictive in detail. Essentially, there are three types of evidence used for the study of migration in historical communities:

1) *Direct evidence for migration*

In Sweden the existence of migration registers has provided very direct evidence for migration. In England, licenses to move have been analysed. On the international level, passport lists and shipping registers can be examined.

2) *Indirect evidence for migration*

Settlement Papers, and Church Court Depositions have generally been used by historians of Early Modern England. Settlement Papers were normally drawn up when an individual obtained Poor Relief from Parish authorities; the Parish responsible for a persons Poor Relief would change during the life of an individual depending on where he served his apprenticeship, lived for a certain length of time, etc. Settlement Papers have been analysed to examine the mobility of poorer men and women. Church Court Depositions were the statements made by witnesses appearing in the Church Courts and often include detailed descriptions of past movements (Souden 1981).

Indirect evidence for migration can also sometimes be obtained from nominative lists. Censuses, for example sometimes include a record of the place origin from which migration can be deduced.

3) *Inferential evidence for migration*

Studies of early periods after the introduction of surnames into Europe have been used to infer that migration has occurred because these surnames were often place-names. Lists of tenants, taxpayers, parish registers, and apprenticeship records have also been used. Where two lists exist, compiled at different dates, migration can be inferred from the exclusion of an individual from one or other of the lists (Buckatzch 1951; Cornwall 1967). A more ambitious type of analysis has been attempted using Parish Registers (Souden 1981).

This analysis is based on the assumption that if a person is not registered for a certain life event, then that individual did not experience that event in the parish being examined. Thus, if a resident of a certain parish does not appear on the baptismal records for that parish, it is inferred that he was, at some stage of his

life, an in-migrant to that parish. Thus, we have seven possible combinations of Baptism, Marriage, and Burial; and the, in addition, the possibility that an individual resident in a certain parish for part of his life, was, however, not born, married, or buried there :

No events:	-----.
One event only:	B----, --M--, ----B.
Two events:	B---B, B-M--, --M-B.
Three events:	B-M-B.

This type of study is fraught with problems :

i) Omissions are indistinguishable from migrants

ii) Common-law marriages are not recorded

iii) Marriage often took place in the parish of the wife's father

iv) Women often bore their first child in their fathers parish

v) Temporary migration cannot be estimated

Even more serious problems emerge with burial registration. Old people often insisted on burial in the parish of their birth. It has been estimated that no less than 30% of burials recorded in Barming, Kent, England, between 1788 and 1812 were of "imported corpses" (Schofield 1985). Also, burial was not inexpensive, and it was often possible for a parish to eject people likely to die in order to save money.

It is unlikely that Swedish parish registers suffer from exactly the same biases as English ones, but, I suspect that they have peculiar biases of their own. It is, however, important to bear in mind, when analysing historical data that results can be, and often are, inaccurate.

The UMEA data provides a perfect opportunity for examining this technique in detail, and assessing the effects of the presence of any peculiarities on our results.

In Table 6, I present the number of recorded women in each of the seven migration categories, as a percentage of the women for which information on entry and exit from the community is recorded (as in Table 3), together with the proportion of recorded women who experience none of the three events in the parishes in which they are registered :

Table 6. Number of women recorded as born, married or died, in each parish as a percentage of the number of women for whom information on birth and death is recorded.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
B----	28	13	19	13	26	26	23
--M--*	10	15	14	11	17	17	12
----B	4	9	9	9	6	8	8
B---B	13	6	7	6	8	10	18
B-M--*	12	2	3	4	7	7	6
--M-B*	11	4	4	2	9	5	8
B-M-B*	1	0	0	0	1	2	1
-----	21	51	44	55	74	25	24
Total	100	100	100	100	100	100	100

*Marriages are approximated by the number of women having a married status recorded, with the date of this status to the day.

Before discussing the figures in Table 6, we must examine carefully the numerators and denominators used to calculate them. The different categories of entry and exit are listed in Appendix 1. Our calculations have not been adjusted for the categories 1, 8+9. Thus, all the figures involving birth and death will be slightly lower than they ought to be. Future work will correct for these errors.

Note also, that, since marriage is not an event that will certainly happen to every woman, it is possible that a migration category B---B represents someone who has lived her whole life in one parish, but has simply not got married.

If we proceed under the assumption that the data in each parish is as accurate as it is in any other, we are able to draw conclusions about the relative incidences of migration. It would appear that less than 30% of the female population remain in their parish of birth until marriage or death, roughly 10-20% live temporarily in their parish of marriage without having been born there. The extremely low figures for death can be quite simply explained by referring back to Table 4, where we see that date of death (and hence information on death) is only recorded for about 30% of the women.

The category B---B gives some indication of the extent of return migration, bearing in mind that this figure also includes women who never marry. Where birth and marriage, or marriage and death only are recorded, we have an idea of the

movement of married couples into and out of the parish.

The final figure concerning B-M-B is particularly striking, but we must remember that it is biased by the lack of death data. The largest variation between the parishes appears in the last row concerning those women with none of the three life events recorded. This figure ranges from 21% in Gullholmen (1) to 74% in Locknevi (5).

If we examine the figures across columns, we can see that the percentages in the different migration categories vary significantly from parish to parish.

My reason for this analysis was to gain some feeling for the differences between the parishes, and, I shall therefore defer full discussion of the implications of the results in Table 6, until I have a sounder knowledge of the backgrounds of these parishes, and have developed methods for the adjustment of the denominators used in the calculations.

FERTILITY

In this section I shall present a few simple statistics concerning fertility, infant mortality, and the subsequent movements of offspring. It is important to remember that we are using data covering about one hundred years to get some idea of what the data consist of, we are not yet in a position to examine trends in any of our measures over time. So, in Table 7, we have various measures related to fertility (data for Svinnegarn (2) is missing).

Table 7. Average family size, percentage legitimacy, and infant mortality for each parish.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
# Children	1681	2756	3133	3346	6415	6218	9440
# Average family	4.18	2.89	3.34	2.81	3.28	3.15	4.36
Legitimate	66	-	66	59	87	69	77
Illegitimate	1	-	7	5	4	8	9
Betrothal child	0	-	2	1	0	0	1
Crude rate of infant mortality	0.07	0.11	0.12	0.14	0.13	0.14	0.17

One can clearly see that the rate of infant mortality rises with the number of births per woman (family size). I was surprised at the infant mortality rates; expecting them to be far higher. In order to examine infant mortality further, I had to work on just one parish (because of the vast quantities of computer time used in repeatedly processing about 40,000 records), I chose to work on Nedertornea (7), since it was the parish with the highest infant mortality rates, and illegitimacy rates.

Before exploring the data for Nedertornea further, in Table 8, I present the distribution of types of exit by which the offspring left the community.

Table 8. Completeness of information on children's movements (%).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
# Children	1681	2756	3133	3346	6415	6218	9440
Living at end of registration	41	14	23	16	23	29	31
Died in parish	29	20	23	21	24	30	37
Moved in Sweden	0	62	45	59	43	30	15
Moved in Scandinavia	0	0	1	0	0	0	5
Moved out of Scandinavia	1	0	0	0	1	3	3

Again, we can clearly see some significant differences between the parishes which shall be explored in full detail at a later stage. But for now we shall turn to Nedertornea in particular to attempt some crude evaluation of the accuracy of data.

NEDERTORNEA

Infant Mortality

In order to check the data on infant mortality, I produced the figures presented in Appendix 3. The results represent an analysis of infant mortality by year of birth of the child, 1800-1899. To the left of each sheet is a column giving the relevant year of birth, we are then left with ten more columns of numbers:

(a) In this column, the number of children recorded as having been born in that year is given.

(b) The number of these children who also have their year of exit from the community recorded, appears here.

(d) and (e) represent (respectively) figures for the number of children who died, or merely exited the community within their first year of life:

(w) The number who died/exited within a week of birth

(m) The number who died/exited 1 week to 1 month from birth.

(y) The number who died/exited 1 month to 1 year from birth.

((d)) and ((e)) represent the corresponding infant mortality rates per thousand, calculated as $((w)+(m)+(y))/(a)$.

Conclusions

It appears that, in most years, the rates of death, and exit, are fairly close to one another. Nevertheless they do imply heavy out-migration of mothers with small children in some years, at levels that I am inclined to question.

More important though, is the fact that the rates of infant mortality are significantly lower than those found in other studies (Brandstrom, 1984); I am presently in contact with Umea to discover the reasons for this.

Problems with the data

When examining the data on marital status for Nedertornea, I found that some women were, for example, recorded as married at one point, and as unmarried at some later point. It seems to me that this would mean that the record linkage is in error in some cases which could certainly have been verified earlier. Other discrepancies include women recorded as having children before they were themselves born, or at very young ages, and some dates completely out of the period of registration. These errors are by no means common, but their existence must be borne in mind when conducting analyses, and, particularly, when writing computer programs to process this data (some of my FORTRAN programs crashed due to faults in the data); unless of course you are fortunate enough to have the facilities to create a database in which to store the information.

DISCUSSION

I hope by now to have given the reader some feeling for the type of data available, and the form in which it is stored in. I do not propose to have given a full analysis of the UMEA data at IIASA, but the information I have provided should certainly help in assessing the feasibility of research into various demographic topics.

I would also have liked to present more substantive background information on the seven parishes; but, unfortunately, I myself am having difficulty in accessing this material.

Directions for future research

My own interests in this data lie in both, the study of the extent and effects of migration in historical communities, and, the analysis of fertility with respect to determining trends, variations, and heterogeneity in fecundability. Why, for example, is it that in a population with natural fertility some women have just one child, while others have more than twelve? The answers lie in the change in a woman's fecundability with age, and parity, together with the effects of breastfeeding habits, anovulation, sterility, and the frequency, and nature, of coitus.

Differences between women do not end with these characteristics; it has long been known that apparently similar women will differ in their monthly probabilities of conception because of many unobservable factors (Sheps 1973). We classify these effects as attributable to unobserved heterogeneity (Vaupel 1983).

When examining conception intervals (= birth intervals - months) in Nedertornea, for example, the length of interval clearly decreased as the family size increased.

The importance of fecundability can perhaps be best understood with an example. It is more and more common for women in developed countries to delay their fertility in the belief that they will be just as able to have children at later ages; but this may not be true (Trussell 1985). We should, therefore, very much like to understand, more fully, the effects of the aforementioned factors on fecundability.

The UMEA data provides us with natural birth intervals, for many women, accurate to the day in a population with natural fertility. We are therefore in a position to approach the analysis of fecundability, and maybe provide some answers to the questions that are generating widespread publicity at the present time.

Appendix 1: Codes and Categorical Variables

Parish codes:

76190	Gullholmen
51580	Svinnegarn
72440	Fleninge
63200	Trosa
55970	Locknevi
83590	Tuna
83290	Nedertornea

Type of entrance/exit:

1	living when registration starts/ends
2	born/died in parish
4	moved to another parish in Sweden
5	moved to another parish in Scandinavia
6	moved out of Scandinavia
8+9	denote irregularities in the data

Civil status:

1	married
2	unmarried
3	widowed (only used if verified; else 2)
4	divorced

Legitimacy:

1	born in wedlock
2	born out of wedlock
3	born a betrothal child

Appendix 2: Occupational Codes

01	Big business man
02	Higher civil servants and salaried employees
03	Smaller business men, master craftsmen
04	Lower civil servants and salaried employees
05	Farmers including tenants and lease-holders
06	Crofter
08	Soldiers
09	Workers
10	Farm-hands, -maids
11	Rural proletarians
12	Titles with no occupational reference

Appendix 3: Investigation of data on infant mortality in Nedertornea (see page 10)

			(d)			(e)				
	(a)	(b)	(w)	(m)	(y)	(w)	(m)	(y)	((d))	((e))
1800	6	6	0	0	0	0	0	0	0	0
	18	18	0	0	0	0	0	0	0	0
	8	8	0	0	0	0	0	0	0	0
	23	23	0	0	0	0	0	0	0	0
	15	15	0	0	0	0	0	0	0	0
1805	23	23	0	0	0	0	0	0	0	0
	25	24	0	0	0	0	0	0	0	0
	18	18	0	0	0	0	0	0	0	0
	14	14	0	0	1	0	0	1	71	71
	13	13	0	0	0	0	0	0	0	0
1810	43	43	0	0	0	0	0	0	0	0
	37	36	0	0	0	0	0	0	0	0
	40	40	0	0	0	0	0	0	0	0
	40	38	0	0	0	0	0	0	0	0
	54	42	0	0	0	0	0	0	0	0
1815	45	35	0	0	0	0	0	0	0	0
	69	53	0	0	0	0	0	0	0	0
	73	52	0	0	0	0	0	0	0	0
	67	46	2	1	3	2	1	3	89	89
	62	51	1	0	2	1	0	4	48	80
1820	77	75	1	3	18	2	3	20	285	324
	94	91	5	10	12	5	10	14	287	308
	71	55	3	3	12	3	3	12	253	253
	98	77	1	0	9	2	0	10	102	122
	77	51	2	1	6	2	1	6	116	116
1825	90	74	4	1	16	4	1	17	233	234
	93	66	1	1	6	1	1	7	86	96
	94	81	3	0	11	3	0	11	148	148
	92	69	3	1	12	3	1	12	173	173
	81	68	3	1	4	4	1	5	98	123
1830	87	64	3	0	4	3	0	5	80	91
	95	70	2	1	7	4	1	8	105	136
	90	62	1	2	11	1	2	11	155	155
	88	64	1	1	9	2	1	9	125	136
	81	73	1	1	17	2	1	18	234	259

			(d)			(e)				
	(a)	(b)	(w)	(m)	(y)	(w)	(m)	(y)	((d))	((e))
1835	87	70	3	0	8	3	0	9	126	137
	100	72	1	1	9	1	1	10	110	120
	92	71	1	1	6	2	1	6	86	97
	86	63	6	0	11	6	0	11	197	197
	95	74	0	0	8	0	0	9	84	94
1840	80	77	3	1	6	3	1	8	125	150
	78	76	0	2	2	0	2	2	51	51
	98	95	0	0	3	0	0	4	30	40
	82	79	0	2	8	1	2	10	121	158
	92	86	2	5	16	2	5	16	250	250
1845	103	99	2	2	7	2	2	8	106	116
	93	92	0	1	5	0	1	8	64	96
	105	90	3	0	6	3	0	6	85	85
	93	92	0	0	6	0	0	7	64	75
	90	88	1	0	6	1	0	7	77	88
1850	97	96	1	3	10	1	4	10	144	154
	89	83	1	0	13	1	0	14	157	168
	94	92	0	0	11	1	0	12	117	138
	88	85	2	0	6	3	0	8	90	125
	109	108	0	0	14	1	0	15	128	146
1855	90	90	3	9	13	3	9	14	277	288
	121	119	3	11	20	3	11	21	280	289
	109	109	3	4	12	3	4	13	174	183
	133	133	4	10	16	4	10	17	225	233
	127	125	9	7	14	9	9	15	236	259
1860	119	119	7	3	6	7	3	7	134	142
	128	127	6	6	19	6	6	20	242	250
	132	132	4	6	25	4	6	28	265	287
	150	145	3	8	18	3	9	18	193	200
	137	137	5	3	16	5	3	18	175	189
1865	127	126	2	5	13	2	5	16	157	181
	126	126	2	3	23	3	3	24	222	238
	94	92	3	2	20	3	3	22	265	297
	88	86	0	0	11	0	0	12	125	136
	119	115	5	6	16	5	6	17	226	235
1870	118	117	3	1	14	3	1	15	152	161
	103	103	2	2	20	2	2	20	233	233
	123	122	1	1	16	1	1	17	146	154
	128	127	4	2	20	4	2	21	203	210
	117	116	2	1	14	2	1	15	145	153
1875	144	144	1	2	17	2	2	18	138	152
	122	122	2	2	15	2	2	16	155	163
	138	137	2	1	22	2	1	22	181	181
	141	140	0	3	12	0	4	14	106	127
	165	162	8	5	20	8	5	20	200	200

			(d)			(e)				
	(a)	(b)	(w)	(m)	(y)	(w)	(m)	(y)	((d))	((e))
1880	168	165	2	0	14	2	0	15	95	101
	149	145	5	2	23	5	2	24	201	208
	157	155	6	2	17	6	2	19	159	171
	156	149	1	1	17	1	1	18	121	128
	165	163	3	0	30	3	0	31	200	206
1885	149	149	0	1	25	0	1	25	174	174
	170	164	2	2	21	2	2	22	147	152
	183	182	0	2	21	0	2	23	125	136
	142	142	0	1	15	0	1	17	112	126
	182	180	7	1	24	7	2	26	175	192
1890	139	138	1	3	19	1	3	22	165	187
	148	144	7	1	20	7	1	20	189	189
	136	136	1	1	16	1	1	17	132	139
	128	125	1	1	11	1	1	13	101	117
	138	136	1	6	14	1	7	17	152	181
1895	140	102	3	7	9	3	8	9	135	142
	13	12	0	0	0	1	1	10	0	923
	3	0	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	0	0
1899	0	0	0	0	0	0	0	0	0	0

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