Congenital Cleft Lip

A Genetic Study of 496 Propositi*

CHARLES M. WOOLF†

Numerous genetic studies (Fogh-Anderson, 1942; Curtis, Fraser, and Warburton, 1961; Woolf, Woolf, and Broadbent, 1963a) have shown that close relatives of a series of proposti with cleft lip with or without cleft palate [CL(P)] have a significantly increased incidence of CL(P), but not of isolated cleft palate (CP), while the close relatives of a series of proposti with CP have a significantly increased incidence of CP but not of CL(P). Furthermore, when concordance is present in parent-child combinations, the type of cleft appearing in a parent [i.e., CL(P) or (CP)] is the type usually found in his child (Woolf, Woolf, and Broadbent, 1969). The lip develops during the fifth to eighth week of gestation and the palatal region about the ninth week (Canick, 1954). The genetic data suggest that a mechanism altering the first developmental process may secondarily alter the second, but the second may be altered independently of the first. Studies have also demonstrated the existence of a mutant gene that alters either developmental process in an independent manner. An individual with the dominant autosomal gene responsible for the Van Der Woude syndrome (lip pit syndrome) may have cleft lip, cleft palate, and fistulae of the lower lip, a combination of two of these traits, one, or none of them (Van Der Woude, 1954). Related syndromes have been described with additional anomalies (Gorlin and Pindborg, 1964).

Clefts of the lip and palate have been described as features of numerous additional syndromes (Gorlin and Pindborg, 1964). The aetiological mechanisms range from recessive genes, polygenes, chromosomal aberrations, and aneuploidy to possible interacting exogenous factors. Each of

these syndromes is rare. Even though recent studies (Carter, 1969; Woolf *et al.*, 1969) suggest that the majority of cleft cases result from the action of polygenes, definitive genetic conclusions are lacking because of the limited number of family histories collected in any one study and the aetiological heterogeneity of cases.

In 1963, a study was published by the present author and collaborators (Woolf, Woolf, and Broadbent, 1963a) dealing with the family histories of 418 CL(P) proposti from Salt Lake City, Utah. In order to increase the number of families, additional proposti with this anomaly were obtained from Phoenix, Arizona. All family histories were obtained by field workers who visited the homes of the proposti and interviewed family members. The present study deals with the families of 496 CL(P) proposti. Data concerning the proposti and their relatives were used to test specific hypotheses concerning the aetiology of CL(P). The 496 proposti are classified in Table I as to sex, presence of cleft lip (CL), or cleft lip with cleft palate (CLCP), and whether the cleft was right, left, or bilateral. The results conform to those reported in previous studies (Greene, 1963), i.e. CL(P) is more common in males than females, CLCP is about twice as frequent as CL, and in unilateral cases the cleft more often involves the left side.

TABLE I
496 PROPOSITI WITH CL(P) CLASSIFIED AS TO
SEX AND TYPE OF CLEFT

Proposti	Total No.	Frequency
Female	176	0.3548
Male	320	0.6452
Bilateral	96	0.1935
Unilateral right	82	0.1653
Unilateral left	126	0.2540
Unclassified	192	0.3871
Cleft lip	161	0.3246
Cleft lip and palate	335	0.6754

Received 16 February 1970.

* Supported by AEC Contract AT(11-1)-2013 to Arizona State University.

† Department of Zoology, Arizona State University, Tempe, Arizona 85281, U.S.A.

5—J.M.G.

TABLE II
CLEFT LIP WITH OR WITHOUT CLEFT PALATE [CL(P)] IN RELATIVES OF THE PROPOSITI

	Sibs	Fathers	Mothers	Paternal Relatives				Maternal Relatives			
				Grand-parents	Uncles	Aunts	First Cousins	Grand-parents	Uncles	Aunts	First Cousins
Males	782	496		496	1184		3032	496	1267		2959
Females	792		496	496		1147	2859	496		1149	2848
Total	1574	496	496	992	1184	1147	5891	992	1267	1149	5807
Affected males	37	13		2	8		20	7	10		10
Frequency	0.0473	0.0141		0.0040	0.0068		0.0066	0.0141	0.0079		0.0034
Affected females	26		6	0		6	6	1		7	6
Frequency	0.0328		0.0121	0.0000		0.0052	0.0021	0.0020		0.0061	0.0021
Total affected	63	13	6	2	8	6	26	8	10	7	16
Frequency	0.0400	0.0262	0.0121	0.0020	0.0068	0.0052	0.0044	0.0081	0.0079	0.0061	0.0028

Frequency of CL(P) in Relatives of the Propositi

The frequencies of CL(P) in various relatives of the proposti are shown in Table II. Data extracted from this Table plus those published previously (Woolf, Woolf, and Broadbent, 1964) for just the Utah proposti can be used to test the hypothesis that the bulk of CL(P) cases have a polygenic mode of inheritance.

The coefficient of relation (r) between proposti and parents, proposti and sibs, and proposti and children, is in each case $\frac{1}{2}$. If CL(P) has a polygenic mode of inheritance (quasicontinuous variation) where the probability of occurrence is increased if the number of these genes is above a threshold number, then the frequency of CL(P) should be similar in the parents, sibs, and children of the proposti. In the present study, children were not tabulated since the Arizona proposti were all children. For the Utah proposti, the frequency of affected children was 4.58% ($n=171$) (Woolf *et al.*, 1964). In the present study (see Table II) the frequency among sibs is 4.00% ($n=1574$). These relatively similar values for children and sibs support the polygene hypothesis. Similar values would not be expected if CL(P) had a recessive mode of inheritance. A similarity in frequency values for children and sibs has been well documented in other studies (Carter, 1969). It is of interest, however, that the frequency of affected parents (1.92%; $n=992$) in the present study is less than half that observed for sibs and children. The reduced value for parents probably represents biased sampling resulting from natural and social selection against infants with CL(P). Since there is a decreased probability that an individual with CL(P) will survive infancy and marry and have offspring, a random sample of proposti tend to be born to normal parents.

A criterion for polygenic inheritance, which distinguishes it from dominant inheritance, is a conspicuous decrease in the frequency of affected individuals as one proceeds from first degree to second degree to third degree relatives. Carter (1969) has emphasized this fact and presented data showing the decrease for several anomalies including CL(P). This decrease in frequency of affected individuals is seen in the data extracted from Table II: first degree relatives (sibs only), 4.00% ($n=1574$); second degree relatives (aunts and uncles), 0.65% ($n=4747$); third degree relatives (first cousins), 0.36% ($n=11,698$). Assuming a population incidence value of 1.2 per 1000, which is an approximate incidence among Caucasians in Utah (Woolf *et al.*, 1963a), the frequencies in these three degrees of relatives are about 33 times, 5 times, and 3 times, respectively, that found in the general population. This decrease with degree of relation is of the order of magnitude expected for polygenic inheritance (Carter, 1969). When dominant inheritance is present, the frequency of affected individuals decreases by $\frac{1}{2}$ in each successive group of relatives.

Family History and Frequency of CL(P) in Sibs

Polygenic inheritance differs from recessive inheritance for congenital malformations by the influence of family history on the frequency of the anomaly in the sibs of the proposti. For example, if the parents of a propostus with the recessive type of albinism are normal, the risk of albinism in all subsequent sibs of the propostus is 25% regardless of the presence of albinism in any other relative. Assuming polygenic inheritance and complete heritability, proposti will vary as to the number of genes they possess above the threshold number; their normal parents will vary as to the number of

genes they possess below the threshold number. The obvious rule is that the larger the number of genes possessed by the parents, the higher the probability they will have an affected child. Furthermore, *propositi* with a history of the disorder in a close relative likely have more of the genes than *propositi* with a family history of the disorder in a distant relative or with no family history. The larger the number of genes possessed by the *propositi*, the higher the probability they will have an affected sib.

In the present study, the overall frequency of CL(P) in the sibs is 4.00% ($n=1574$). The frequency of CL(P) in the sibs when there is no family history of CL(P) is 2.24% ($n=848$). The value is increased to 3.69% ($n=293$) when there is an occurrence of this disorder in a fourth degree relative; it is increased to 6.90% ($n=87$) and 9.91% ($n=111$) when CL(P) occurs in a third and second degree relative, respectively. The frequency is 15.55% ($n=45$) when CL(P) is present in one of the parents. In each of the above cases, a more distant relative may also have been affected. The number of individuals used to test the relation between the frequency of CL(P) in sibs and closeness of affected relatives can be increased by using the cumulative method shown in Table III.

TABLE III

INFLUENCE OF FAMILY HISTORY OF CL(P) ON
FREQUENCY IN SIBS OF PROPOSITI

Family History	Total Sibs	% Frequency
None	848	2.24
Occurrence of CL(P) in fourth degree relative	298	3.69
Occurrence of CL(P) in third degree relative	87	6.90
Occurrence of CL(P) in second degree relative	111	9.91
Occurrence of CL(P) in parent	45	15.55
<i>Cumulative Values</i>		
Occurrence of CL(P) in fourth degree or more remote relative	298	3.69
Occurrence of CL(P) in third degree or more remote relative	385	4.42
Occurrence of CL(P) in second degree or more remote relative	496	5.65
Occurrence of CL(P) in first degree or more remote relative	726	6.06

The relatively high frequency of CL(P) in the sibs when a parent is affected [(i.e., 15.55% ($n=45$))] is not present when a second sib is affected; the latter value is 4.86% ($n=185$). This reduced second sib effect apparently results from the tendency for parents to terminate the sibship after having produced two affected children. Correcting for this tendency by noting the frequency of CL(P) in sibs born subsequently to the second affected sib gives a frequency value of 14.58% ($n=48$), which is

similar to the value obtained when a parent is affected.

It is clear that a family history of CL(P) increases the frequency of CL(P) in the sibs of the *propositi*. Reversely, the presence or absence of an affected sib influences the frequency of CL(P) in the other relatives. The frequency of CL(P) in the other relatives (parents, second, and third degree relatives) of the *propositi* is 1.00% ($n=2,378$) when a sib is affected; it is 0.46% ($n=16,391$) when a sib is not affected. The difference is highly significant ($\chi^2=10.7$; $p<0.01$).

Consanguinity of Parents

One procedure for testing the hypothesis of polygenic inheritance is to look for a consanguinity effect. This may be done by comparing the frequency of consanguineous marriages in the parents of the *propositi* with the frequency found in the general population.

Only two of the *propositi* (both from Utah) had consanguineous parents. In one case the parents were first cousins; in the second case the parents had a common great grandfather. Even though the observed frequency of first cousin marriages (1 in 496) is low when compared with many world populations, it is still compatible with a slight consanguinity effect. Though no data are available for the Arizona population, information on inbreeding is available for various sections of the Utah population (Woolf *et al.*, 1956). During the years 1930-1950, the frequency of first cousin marriages in the state of Utah (urban and rural) was estimated to be 1 in 2,500. For the years 1949 to 1953, the present author could not identify a single first cousin marriage among 12,268 marriages occurring in Salt Lake County, the most densely populated county in the state.

Sex of Propositi

It has been proposed that CL(P) has a sex-modified polygenic mode of inheritance (Roberts, 1962; Woolf *et al.*, 1964), which indicates that the threshold of genes needed for expression of the trait is lower in one sex than the other. This type of inheritance is characterized by the more frequent hereditary transmission of the trait by the sex showing the lower population incidence of the trait (Carter, 1961). If a female with CL(P) possesses more of the genes, on the average, than a male, there would be an increased probability that the threshold is exceeded in her close relatives. Though no differences are statistically significant, the trend expected for this mode of inheritance is present in the results of the present study. The female *propositi*

TABLE IV

FREQUENCY OF CL(P) IN RELATIVES OF DIFFERENT TYPES OF PROPOSITI

The hypothesis (H_0) in each case is that $p_1 \leq p_2$. Using $\alpha = 0.05$, a one-tailed test of significance leads to rejection of the hypothesis if $\chi^2 \geq 2.71$. Yates' correction for continuity was used in calculating χ^2 .

Propositi	Total Sibs	% Affected		Total Other Relatives*	% Affected	
Female CL(P)	578	4.67	$\chi^2 = 0.8$	6999	0.51	—
Male CL(P)	996	3.61	Accept H_0	12,422	0.54	Accept H_0
Total CL(P) without associated malformation	1352	4.44	$\chi^2 = 4.0$	16,720	0.59	$\chi^2 = 6.3$
Total CL(P) with associated malformation	222	1.35	Reject H_0	2701	0.19	Reject H_0
Female CL(P) without associated malformation	503	5.17	$\chi^2 = 1.4$	6055	0.56	$\chi^2 = 1.3$
Female CL(P) with associated malformation	75	1.33	Accept H_0	944	0.21	Accept H_0
Male CL(P) without associated malformation	849	4.00	$\chi^2 = 1.8$	10,665	0.60	$\chi^2 = 4.4$
Male CL(P) with associated malformation	147	1.36	Accept H_0	1757	0.17	Reject H_0
Total bilateral CL(P)	328	6.71	$\chi^2 = 3.2$	3729	0.91	$\chi^2 = 11.0$
Total unilateral CL(P)	600	3.83	Reject H_0	7607	0.39	Reject H_0
Female bilateral CL(P)	128	8.59	$\chi^2 = 2.06$	1386	1.01	$\chi^2 = 6.7$
Female unilateral CL(P)	195	4.10	Accept H_0	2355	0.30	Reject H_0
Male bilateral CL(P)	200	5.50	$\chi^2 = 0.66$	2343	0.85	$\chi^2 = 4.3$
Male unilateral CL(P)	405	3.70	Accept H_0	5252	0.44	Reject H_0
Total CLCP	1086	3.87	—	13,403	0.58	$\chi^2 = 1.9$
Total CL	488	4.30	Accept H_0	6018	0.42	Accept H_0
Female CLCP	378	4.76	$\chi^2 = 0.02$	4511	0.64	$\chi^2 = 3.4$
Female CL	200	4.50	Accept H_0	2488	0.28	Reject H_0
Male CLCP	708	3.39	—	8892	0.55	$\chi^2 = 0.02$
Male CL	288	4.17	Accept H_0	3530	0.51	Accept H_0

* Parents, grandparents, aunts, uncles, first cousins.

have a higher frequency of affected sibs than the male propoiti [4.67% ($n=578$) vs. 3.61% ($n=996$)]. Likewise, the parents of the female propoiti have a higher frequency of CL(P) than the parents of the male propoiti [2.27% ($n=352$) vs. 1.72% ($n=640$)]. For the Utah data (Woolf *et al.*, 1964), the female propoiti have more affected offspring than the male propoiti [6.82% ($n=44$) vs. 3.94% ($n=127$)]. This slight increase is not present in the relatives considered as a group (excluding sibs) of the female propoiti (Table IV).

Heritability of CL(P)

Falconer (1965) has developed a method for determining the relative aetiological importance of genetics for anomalies showing polygenic inheritance. Genetic and nongenetic variation exists between affected and non-affected individuals. In the absence of dominance and interaction between genes at different loci, the proportion of the total variance due to genetic differences is defined as the heritability (h^2) of the trait (i.e. $h^2 = \text{additive genetic variance} / \text{total variance}$). Falconer has shown that this statistic can be calculated from the equation $h^2 = b/r$, where r is the coefficient of relation between propoiti and specific relatives and b is the

regression of these relatives on propoiti. For first, second, and third degree relatives the coefficient of relation values are $r = \frac{1}{2}$, $r = \frac{1}{4}$, and $r = \frac{1}{8}$, respectively. The corresponding regression values are $h^2 = 2b$, $h^2 = 4b$, and $h^2 = 8b$, respectively. The regression coefficient can be estimated from the incidence of the anomaly in the general population and the frequency in the corresponding relatives of the propoiti. Using a population incidence of 0.0012 for CL(P) and the observed frequency value of 0.0400 in sibs, the regression value is $b = 0.38$; the heritability value becomes $h^2 = 2b = 0.76$, which states that 76% of the variation between affected and non-affected individuals is due to genetic differences. A similar heritability value is obtained using the regression of first cousins in propoiti [frequency of CL(P) on first cousins = 0.0036, $b = 0.098$, $h^2 = 8b = 0.78$]. A slightly reduced heritability value is obtained from a study of the regression of aunts and uncles on propoiti [frequency of CL(P) in aunts and uncles = 0.0065, $b = 0.16$, $h^2 = 4b = 0.64$]. Heritability values of a similar magnitude for CL(P) were obtained by Carter (1969): first degree, 0.76; second degree, 0.76; third degree, 0.67. It is evident that the genetic component for CL(P) is substantial.

Associated Malformations

Published data (see Greene, 1963) indicate that somewhere between 9 and 25% of infants with clefts of the lip and palate have associated malformations, and that the malformations are more frequent if a cleft of the palate is present. It has been suggested from a study of CL(P) occurring in a parent and child (Woolf *et al.*, 1969) that polygenic cases of CL(P) do not in general have associated malformations and perhaps those cases of CL(P) with associated malformations tend to result from chromosomal aberrations, exogenous factors, or rare mutant genes. The results of the present study support this conclusion. A higher frequency of CL(P) occurs consistently in the sibs and other relatives of female and male probands without an associated malformation (see Table IV). For example, the frequency of CL(P) in sibs of probands with an associated malformation is 1.35% ($n=222$); the frequency is 4.44% ($n=1352$) in sibs of probands without an associated malformation. The difference is significant. Likewise, the frequency in the other relatives (down to and including first cousins) is significantly increased if the probands are free of associated malformations [0.59% ($n=16,720$) vs. 0.19% ($n=2701$)].

Severity of Defect

An adjunct to quasicontinuous variation is a relation between the severity of the defect and the number of polygenes present. The data (see Table IV) of the present study support the hypothesis that unilateral and bilateral CL(P) are part of a genetic continuum, with more genes being required, on the average, to give the bilateral condition. The frequency of CL(P) in the sibs of the probands with unilateral CL(P) is 3.83% ($n=600$); the frequency of this disorder in the sibs of the probands with bilateral CL(P) is 6.71% ($n=328$). Similarly, the frequency of CL(P) is higher in the other relatives (down to and including first cousins) of the probands with bilateral CL(P) than in the same relatives of the probands with unilateral CL(P) [0.91% ($n=3729$) vs. 0.39% ($n=7607$)]. Both differences are significant (see Table IV).

An interaction with sex is present in the data: female probands with bilateral CL(P) have the highest frequency of affected sibs and relatives, an event expected of sex-modified polygenic inheritance (Table IV).

The data do not support the hypothesis that CLCP and CL are part of the same genetic continuum where more genes are required, on the average, to give CLCP. The frequency of CL(P) in the sibs of the CLCP probands is 3.87% ($n=$

1086); the frequency in the sibs of the CL probands is 4.30% ($n=488$). However, females with CLCP show the highest frequency of affected sibs and other relatives (see Table IV), suggesting an interaction between sex and cleft type which needs further investigation. A similar conclusion regarding the genetic relation between CL and CLCP was reached by Woolf *et al.* (1969) in a study of clefts in parent and child.

Relation between CL(P) and CP

With the exception of the Van Der Woude syndrome, the theme of genetic studies of facial clefts is that CL(P) and CP are genetically distinct disorders. However, Rank and Thomson (1960) concluded from a genetic study carried out in Tasmania that CL(P) and CP are frequently found in members of the same family. Woolf *et al.* (1969) noted some discordant parent-child cases that may not be due to chance, especially when the parent had CP. When apparent cases of the Van Der Woude syndrome were omitted, 112 CL(P) probands produced 133 children with CL(P) and 2 with CP; a total of 23 CP probands produced 27 children with CP and 4 with CL(P).

If CL(P) and CP, in general, are genetically distinct, then the frequency of CP in the relatives of the CL(P) probands and also the frequency of CL(P) in the relatives of the CP probands should occur at the frequencies expected in the general population. In the present study, 13 cases of CP occurred in 20,995 relatives (down to and including first cousins) of the 496 probands with CL(P). With the exception of CP occurring in the grandparent and first cousin of one proband, all the CP cases occurred in different families. In Caucasian populations, the estimates of the incidence of CP range from about 0.0003 to 0.0005 (Woolf *et al.*, 1963a; Chung and Myrianthopoulos, 1968). Using the median estimate (0.0004), the expected number of CP cases in the relatives of the probands is 8.4, which does not deviate significantly from the observed value of 13 ($\chi^2=2.0$; $0.20 > p > 0.10$). It may be concluded that the overall frequency of CP in the relatives is similar to that observed in the general population. It is informative, however, to compare the frequencies in the various types of relatives: first degree relatives, 0.00195; second degree relatives, 0.000595; third degree relatives, 0.000341. The frequency of CP is 5.7 and 1.7 times greater in first degree and second degree relatives, respectively, than in third degree relatives. Furthermore, the incidence in first degree relatives is about 5 times greater than the median estimate for the general population. No extensive effort was

made to exclude individuals who had the Van Der Woude syndrome; however, lip pits were not described in any of the propositi or family members. Van Der Woude (1954) estimates that the dominant gene causing this syndrome accounts for about 1 in 200 cleft cases. With this frequency value, it is likely that one or more of the propositi had the gene for this syndrome. The presence of the gene could partially account for the increased incidence of CP in the close relatives of the CL(P) propositi. It is also possible that rare polygenic systems occur in some populations that have an independent effect on the development of the lip and palate. They could account for the slightly increased incidence of CP in the close relatives of the CL(P) propositi, a certain proportion of the discordant parent-child cases for cleft type, and the divergent results of the Tasmania study.

Frequency of CL(P) in Sibs Born Subsequently to Propositi

In the present study the overall frequency of CL(P) in the sibs of the propositi is 4.00%. This value would not be appropriate for genetic counselling if there is a tendency for parents to terminate the sibship after the birth of a child with

CL(P). Any such tendency results in empirical risk values that are biased downwards; for example, if all sibships were terminated after the birth of an affected child the empirical risk value would be zero.

An analysis of the data showed that the overall frequency of CL(P) in sibs born subsequently to the propositi was 5.58% ($n=538$). The risk is influenced by family history as follows: no family history, 4.17% ($n=336$); family history other than parent, 6.91% ($n=188$); family history somewhere, 7.92% ($n=202$); family history including a parent, 21.43% ($n=14$). The elimination of sibs in birth ranks before that of the propositi reduces the number of individuals to the point that risk values for certain categories, such as the last one, are not reliable.

The frequency of a given anomaly will be greater in subsequent sibs than total sibs of the propositi when there is a tendency to restrict reproduction after the birth of the propositi and also if the risk of the anomaly increases with advancing parental age. Both effects may be present for CL(P). There is evidence in the literature that parental age influences the risk of CL(P) (see Woolf *et al.*, 1963b), and it has been suggested from existing data that

TABLE V
BIRTH RANKS OF PROPOSITI

Sibship Size	1	2	3	4	5	6	7	8	9	10	11	Total	Expected No.
2	31	51										82	41.000
3	32	30	58									120	40.000
4	12	14	23	33								82	20.500
5	5	10	15	14	23							67	13.400
6	4	9	5	5	9	13						45	7.500
7	2	3	4	7	8	6	11					41	5.857
8	0	1	3	2	1	4	3	3				17	2.125
9	0	0	0	1	4	2	1	1	2			11	1.222
10	0	0	0	0	0	0	0	0	1	0		1	0.100
11	0	0	0	1	0	0	0	1	1	2	0	5	0.455
Total	86	118	108	63	45	25	15	5	4	2	0	471	132.159
Expected No.	132.159	132.159	91.159	51.159	30.659	17.259	9.759	3.902	1.777	0.555	0.455		
Related frequency*	—	1.37 (118/86)	1.61 (108/67)	1.26 (63/50)	1.50 (45/30)	1.25 (25/22)	1.25 (15/12)	1.25 (5/4)	2.0 (4/2)	1.0 (2/2)	— (0/2)		

* Frequency of CL(P) related to frequency in preceding birth rank.

TABLE VI
TOTAL RELATED FREQUENCIES OF CL(P) ACCORDING TO MATERNAL AGES OF PROPOSITI

	Maternal Age-group					
	15-19	20-24	25-29	30-34	35-39	40 and over
All sibships	0.63 (12/19)	0.84 (89/106)	1.34 (118/88)	2.28 (89/39)	2.95 (56/19)	4.0 (20/5)
Excluding sibships in which birth rank is terminal	0.55 (6/11)	0.97 (61/63)	1.35 (66/49)	1.52 (35/23)	1.80 (18/10)	2.5 (5/2)

this parental age effect may be largely a function of paternal age (Fraser and Calnan, 1961; Woolf, 1963; Greene *et al.*, 1964).

The 418 propoiti from Utah were previously studied for parental age effect by using control data from the Utah population (Woolf *et al.*, 1963b; Woolf, 1963). Birth rank frequencies for the combined Utah and Arizona propoiti are given in Table V. Using the method of Greenwood and Yule (1914), the hypothesis may be rejected that the propoiti occur randomly in each birth rank [$\chi^2(7 \text{ d.f.}) = 39.3$; $p < 0.01$]. The propoiti tend to be born in later birth ranks. Barker and Record (1967) have shown that this correlation is best described by a related frequency method (Table V). This method may also be employed to test whether the correlation is due to advancing parental age (using maternal age as the index) or birth rank *per se*. The total related frequencies were determined for different maternal age-groups, as shown in Table VI. These total related frequencies rise with advancing parental age, indicating that the excess of propoiti in later birth ranks (as seen in Table V) is correlated with parental age and not birth order. Since these results could be influenced by a tendency for older parents to terminate reproduction after the birth of a child with CL(P), total related frequencies were also calculated (Table VI) after exclusion of sibships in which the propoitus was the terminal birth. The total related frequencies still rise with advancing parental age, but as expected, not as steeply.

REFERENCES

- Barker, D. J. P., and Record, R. G. (1967). The relationship of the presence of disease to birth order and maternal age. *American Journal of Human Genetics*, **19**, 433-449.
- Canick, M. L. (1954). Cleft lip and cleft palate. A review of embryology, pathologic anatomy, and etiology. *Plastic and Reconstructive Surgery*, **14**, 30-46.
- Carter, C. O. (1961). The inheritance of congenital pyloric stenosis. *British Medical Bulletin*, **17**, 251-254.
- (1969). Genetics of common disorders. *British Medical Bulletin*, **25**, 52-57.
- Chung, C. S., and Myrianthopoulos, N. C. (1968). Racial and prenatal factors in major congenital malformations. *American Journal of Human Genetics*, **20**, 44-60.
- Curtis, E., Fraser, F. C., and Warburton, D. (1961). Congenital cleft lip and palate. *American Journal of Diseases of Children*, **102**, 853-857.
- Falconer, D. S. (1965). The inheritance of liability to certain diseases, estimated from the incidence among relatives. *Annals of Human Genetics*, **29**, 51-76.
- Fogh-Anderson, P. (1942). *Inheritance of Harelip and Cleft Palate*. A. Busck, Copenhagen.
- Fraser, G. R. and Calnan, J. S. (1961). Cleft lip and palate: seasonal incidence, birth weight, birth rank, sex, site, associated malformations and parental age. A statistical survey. *Archives of Disease in Childhood*, **36**, 420-423.
- Gorlin, R. J., and Pindborg, J. J. (1964). *Syndromes of the Head and Neck*, pp. 117-125. McGraw-Hill, New York.
- Greene, J. C. (1963). Epidemiology of congenital clefts of the lip and palate. *Public Health Reports*, **78**, 589-602.
- , Vermillion, J. R., Hay, S., Gibbens, S. F., and Kerschbaum, S. (1964). Epidemiologic study of cleft lip and cleft palate in four states. *Journal of the American Dental Association*, **68**, 386-404.
- Greenwood, M. and Yule, G. U. (1914). On the determination of size of family and of the distribution of characters in order of birth from samples taken through members of the sibships. *Journal of the Royal Statistical Society*, **77**, 179-199.
- Rank, B. K. and Thomson, J. A. (1960). Cleft lip and palate in Tasmania. *Medical Journal of Australia*, **2**, 681-689.
- Roberts, J. A. F. (1962). Inherited diseases. In *Methodology in Human Genetics*, pp. 129-143. Ed. by Walter J. Burdette. Holden-Day, San Francisco.
- Van Der Woude, A. (1954). Fistula labii inferioris congenita and its association with cleft lip and palate. *American Journal of Human Genetics*, **6**, 244-256.
- Woolf, C. M. (1963). Paternal age effect for cleft lip and palate. *American Journal of Human Genetics*, **15**, 389-393.
- , Stephens, F. E., Mulaik, D. D., and Gilbert, R. E. (1956). An investigation of the frequency of consanguineous marriages among Mormons and their relatives in the United States. *American Journal of Human Genetics*, **8**, 236-252.
- , Woolf, R. M., and Broadbent, T. R. (1963a). A genetic study of cleft lip and palate in Utah. *American Journal of Human Genetics*, **15**, 209-215.
- , —, and — (1963b). Genetic and nongenetic variables related to cleft lip and palate. *Plastic and Reconstructive Surgery*, **32**, 65-74.
- , —, and — (1964). Cleft lip and heredity. *Plastic and Reconstructive Surgery*, **34**, 11-14.
- , —, and — (1969). Cleft lip and palate in parent and child. *Plastic and Reconstructive Surgery*, **44**, 436-440.

APPENDIX

Legend to Appendix

I.D. = Identification of Propositus
M = Male
F = Female

B = Bilateral
L = Left
R = Right

U = Unclassified
N = Normal
A = Affected [CL(P)]

+ = Yes
- = No

I.D.	Sex	Type	Female Sibs		Male Sibs		Mother's Age Status	Father's Age Status	Affected Grandparent	Paternal				Maternal			
			Total	Affected	Total	Affected				Uncles Total	Affected	Aunts Total	Affected	Uncles Total	Affected	Aunts Total	Affected
001	M	B	0	0	1	0	26	N		2	0	0	0	0	0	1	0
002	M	B	3	0	1	0	27	N		1	0	1	0	3	0	4	0
003	M	U	1	0	0	0	20	N		6	0	2	0	0	0	3	0
004	F	L	1	0	1	0	24	N		1	0	0	0	2	0	4	0
005	M	L	2	0	1	0	25	N		3	0	3	0	0	0	1	0
006	M	U	1	0	3	0	28	N		1	0	1	0	4	0	3	0
007	M	R	3	0	1	0	21	N		3	0	3	0	1	0	5	0
008	M	L	5	0	1	0	20	N		3	0	1	0	0	0	0	0
009	M	B	4	0	1	0	31	N		0	0	4	0	6	0	6	0
010	M	M	2	0	2	0	22	N		5	0	6	0	1	0	3	0
011	M	L	0	0	1	0	20	N		2	1	2	1	3	0	1	0
012	M	M	2	0	1	0	33	N		1	0	2	0	2	0	4	0
013	F	U	2	0	3	0	24	N		5	0	1	0	5	0	3	0
014	M	L	5	0	3	0	27	N		7	0	2	0	7	0	3	0
015	M	R	1	0	0	0	23	N		0	0	3	0	4	0	5	0
016	M	L	2	0	2	0	21	N		2	0	2	0	3	0	3	0
017	M	L	0	0	0	0	22	N		1	0	0	0	1	0	4	0
018	M	M	1	0	0	0	35	N		3	0	3	0	2	0	6	0
019	M	U	1	0	4	0	26	N		8	0	5	0	4	0	0	0
020	F	L	1	0	1	0	24	N		4	0	6	0	1	0	1	0
021	M	L	1	0	1	0	23	N		4	0	4	0	3	0	2	0
022	M	M	1	0	2	0	21	N		1	0	0	0	0	0	1	0
023	F	B	2	0	1	0	29	A		2	0	2	0	4	0	5	0
024	F	R	3	0	2	0	35	N		7	0	3	0	4	0	3	0
025	M	B	2	0	1	0	30	N		4	0	3	0	1	0	1	0
026	M	R	0	0	3	0	29	N		2	0	4	0	1	0	3	0
027	M	U	0	0	0	0	24	N	Pat. Gr.F.	2	0	2	0	0	0	2	0
028	M	U	2	0	4	1	22	N		2	0	2	0	1	0	3	0
029	F	B	7	0	1	0	36	N		0	0	0	0	4	0	4	0
030	M	L	1	0	5	0	34	N		6	0	1	0	4	0	3	0
031	F	U	2	0	0	0	27	N		7	0	3	0	4	0	6	0
032	F	R	1	0	0	0	19	N		1	0	1	0	1	0	5	0
033	M	R	1	0	4	0	37	N		5	0	4	0	3	0	1	0
034	M	R	0	0	1	0	25	N		0	0	2	0	5	0	1	0
035	F	L	1	0	2	0	27	N		3	0	5	0	1	0	3	0
036	F	B	2	0	2	0	19	N		1	0	0	0	3	0	1	0
037	M	R	3	0	1	0	22	N		1	0	1	0	3	0	1	0
038	M	B	4	0	1	0	44	N		5	0	5	0	5	0	6	0
039	M	B	3	0	2	0	23	N		2	0	4	0	1	0	1	0
040	M	U	2	0	0	0	30	N		0	0	3	0	0	0	2	0
041	M	U	0	0	2	0	20	N		1	0	5	0	1	0	1	0
042	M	B	5	0	1	0	21	N		0	0	3	0	3	0	2	0
043	M	R	0	0	4	0	29	N		0	0	3	0	2	0	3	0
044	F	M	1	0	1	0	33	N		2	0	1	0	2	0	4	0
045	M	B	2	0	3	0	25	N		2	0	1	0	2	0	4	0
046	F	M	2	0	2	0	31	N		3	0	4	0	3	0	2	0
047	F	U	4	0	3	1	26	N		3	0	4	0	3	0	2	0
048	F	U	4	0	6	0	28	N		2	0	2	0	0	0	0	0
049	F	U	1	0	1	0	38	N		3	0	3	0	1	0	1	0
050	F	L	1	0	0	0	24	N		0	0	0	0	2	0	3	0
051	M	R	1	0	0	0	28	N		4	0	4	0	1	0	1	0
052	M	U	3	0	2	0	33	N		3	0	2	0	2	0	2	0
053	F	L	1	0	2	0	30	N		1	0	1	0	2	0	1	0
054	M	U	0	0	0	0	40	N		1	0	2	0	3	0	5	0
055	M	B	2	0	3	0	19	N		2	0	2	1	0	0	3	0
056	M	U	4	0	3	0	31	N		3	0	4	0	4	0	3	0
057	F	B	0	0	6	0	25	N		1	0	0	0	4	0	0	0
058	F	L	3	0	1	0	24	N		7	0	2	0	2	0	1	0
059	M	U	1	0	1	0	25	N		3	0	5	0	0	0	0	0
060	M	U	1	0	1	1	25	N		2	0	3	0	6	0	3	0
061	M	U	1	0	2	0	28	N		3	0	3	0	0	0	3	0
062	M	L	1	0	3	0	26	N		2	0	9	0	6	0	8	0
063	M	R	0	0	1	0	21	N		0	0	1	0	4	0	2	0
064	F	B	1	0	1	0	23	N		4	0	1	0	0	0	1	0
065	M	U	4	0	1	0	20	N		4	0	2	0	4	0	4	0
066	M	U	1	0	3	0	33	N		0	0	0	0	6	0	2	0
067	F	U	3	0	2	0	38	N		5	0	2	0	4	0	4	0
068	M	B	1	0	1	0	31	N		4	1	3	0	4	0	2	0
069	M	U	4	0	1	0	39	N		3	0	2	0	4	0	1	0
070	M	L	3	0	5	0	31	N		3	0	2	0	3	0	1	0
071	M	L	2	0	2	1	30	N		5	0	4	0	1	0	1	0
072	F	B	3	0	1	0	36	N		1	0	0	0	3	0	2	0
073	F	L	2	0	1	0	27	N		3	0	3	0	1	0	4	0
074	F	U	0	0	1	0	28	N		2	0	2	0	0	0	3	0
075	M	U	3	0	1	0	33	N		4	0	2	0	6	0	4	0
076	M	R	3	0	3	0	27	N		4	0	6	0	4	0	5	0
077	F	B	0	0	2	0	25	N		6	0	0	0	0	0	3	0

APPENDIX—continued

Paternal First Cousins				Maternal First Cousins				Month of Birth of Propositus	Birth Rank of Propositus	Other Malformations	Family History Other than Sibs
Total	Male	Affected	Total	Total	Male	Affected	Total				
4	0	0	2	0	0	0	0	11	2	—	—
0	0	0	3	0	0	16	0	6	3	—	—
4	0	0	4	0	0	0	0	8	1	—	—
1	0	0	3	0	0	8	0	1	2	—	—
11	0	0	7	0	0	4	0	7	3	—	—
1	0	0	3	0	0	9	0	9	4	—	—
6	0	0	11	0	0	15	0	12	4	—	—
0	0	0	0	0	0	1	0	11	4	—	—
13	0	0	11	0	0	24	0	3	6	—	—
28	0	0	12	0	0	1	0	12	2	—	—
2	0	0	2	0	0	2	0	1	2	—	—
5	0	0	4	0	0	8	0	7	4	—	—
13	0	0	10	0	0	12	0	4	2	—	—
13	0	0	16	0	0	10	0	3	5	—	—
3	0	0	1	0	0	9	0	8	2	—	—
14	0	0	6	0	0	11	0	2	3	—	—
0	0	0	0	0	0	0	0	8	1	—	—
7	0	0	8	0	0	9	0	6	1	—	—
15	0	0	22	0	0	11	0	3	3	—	—
13	0	0	15	0	0	0	0	6	3	—	—
16	0	0	12	0	0	6	0	1	2	—	—
3	0	0	4	0	0	1	0	10	1	—	—
1	0	0	1	0	0	11	0	1	3	—	—
13	0	0	11	0	0	0	0	12	6	—	—
14	0	0	10	0	0	7	0	4	3	—	—
3	0	0	10	0	0	7	0	6	4	—	—
4	0	0	0	0	0	2	0	5	1	—	—
6	1	0	6	0	0	4	0	5	3	—	—
0	0	0	0	0	0	8	0	6	6	—	—
7	0	0	11	0	0	13	0	12	6	—	—
12	0	0	6	0	0	14	0	8	2	—	—
2	0	0	7	0	0	4	0	6	2	—	—
20	0	0	22	0	0	5	0	7	6	—	—
2	0	0	1	0	0	4	0	7	1	—	—
16	1	0	11	0	0	0	0	7	4	—	—
1	0	0	2	0	0	1	0	2	1	—	—
4	0	0	1	0	0	8	0	9	2	—	—
16	0	0	11	0	0	9	0	3	6	—	—
10	0	0	9	0	0	3	0	12	3	—	—
7	0	0	2	0	0	6	0	4	3	—	—
5	0	0	7	0	0	3	0	8	1	—	—
2	0	0	3	0	0	4	0	10	4	—	—
4	0	0	2	0	0	6	0	10	3	—	—
4	0	0	2	0	0	6	0	10	1	—	—
6	1	0	15	1	0	8	0	12	5	—	—
8	1	0	12	0	0	21	0	2	2	—	—
3	0	0	3	0	0	0	0	10	4	—	—
12	0	0	8	0	0	3	0	1	4	—	—
0	0	0	0	0	0	2	0	10	2	—	—
18	0	0	10	0	0	7	0	12	2	—	—
16	0	0	8	0	0	15	0	6	6	—	—
3	0	0	4	0	0	5	0	4	4	—	—
2	0	0	2	0	0	8	0	10	3	—	—
1	1	0	0	0	0	0	0	7	2	—	—
7	0	0	6	0	0	17	0	7	3	—	—
2	0	0	1	0	0	2	0	9	2	—	—
8	0	0	8	0	0	2	0	4	2	—	—
6	0	0	5	0	0	0	0	4	4	—	—
4	0	0	10	0	0	5	0	2	1	—	—
14	0	0	10	0	0	3	0	5	3	—	—
12	0	0	14	0	0	18	0	1	4	—	—
3	0	0	1	0	0	2	0	12	2	—	—
8	0	0	11	0	0	1	0	10	2	—	—
0	0	0	0	0	0	0	0	7	1	—	—
0	0	0	0	0	0	6	0	11	3	—	—
11	0	0	6	0	0	5	1	7	5	—	—
8	0	0	17	0	0	10	0	11	3	—	—
7	0	0	9	0	0	4	0	7	6	—	—
12	0	0	8	0	0	12	0	6	5	—	—
16	0	0	15	0	0	17	0	10	6	—	—
3	0	0	3	0	0	6	0	3	3	—	—
7	0	0	12	0	0	12	0	1	4	—	—
3	0	0	2	0	0	12	0	2	1	—	—
13	0	0	11	0	0	16	0	12	2	—	—
18	0	0	18	0	0	16	0	8	5	—	—
3	0	0	4	0	0	5	0	1	3	—	—

APPENDIX—continued

I.D.	Sex	Type	Female Sibs		Male Sibs		Mother's		Father's		Affected Grandparent	Paternal		Maternal	
			Total	Affected	Total	Affected	Age	Status	Age	Status		Uncles	Aunts	Uncles	Aunts
												Total	Affected	Total	Affected
078	M	R	2	0	3	0	35	N	41	N		1	0	5	0
079	M	B	1	0	2	0	24	N	26	N		0	0	1	0
080	M	L	1	0	0	0	28	N	34	N		10	0	0	0
081	F	R	2	0	3	0	26	N	32	N		2	0	5	0
082	F	B	1	0	0	0	20	N	21	N		6	0	3	0
083	M	L	1	0	3	0	25	N	30	N		8	0	4	0
084	F	U	1	0	1	0	32	N	30	N		4	0	6	0
085	F	L	2	0	0	0	22	N	22	N		1	0	3	0
086	M	U	3	0	0	0	35	N	38	N		1	0	2	0
087	M	R	1	1	1	0	23	N	27	N		5	0	3	0
088	M	L	0	0	1	0	27	N	32	N		0	0	0	0
089	M	L	0	0	1	1	21	N	24	N		0	0	4	0
090	M	R	0	0	0	0	18	N	20	N		1	0	1	0
091	M	L	1	0	2	0	20	N	25	N		1	0	2	0
092	F	B	1	0	1	0	22	N	22	N		3	1	2	0
093	M	B	0	0	0	0	30	N	43	N		1	0	2	0
094	M	U	3	0	2	0	27	N	30	N		1	0	4	0
095	M	U	1	0	0	0	35	N	37	N		3	0	2	0
096	F	B	1	0	1	0	18	N	21	N		2	0	1	0
097	M	R	3	0	1	0	33	N	41	N		3	0	5	0
098	F	B	1	1	1	0	32	N	32	N		2	0	1	0
099	F	U	3	0	1	0	42	N	43	N		2	0	6	0
100	F	L	1	0	1	0	18	N	17	N		2	0	2	0
101	M	B	1	0	3	0	18	N	24	N		0	0	0	0
102	M	B	5	0	1	0	25	N	25	N		3	0	3	0
103	M	U	0	0	2	0	21	N	26	N		2	0	1	0
104	F	B	1	0	1	0	23	N	25	N		5	0	4	0
105	M	B	0	0	3	0	27	N	30	N		8	1	2	0
106	F	B	4	0	3	0	34	N	37	N		8	1	2	0
107	F	L	1	0	1	0	33	N	35	N		5	0	5	0
108	M	R	5	0	0	0	32	N	35	N		2	0	1	0
109	M	U	0	0	2	1	27	N	29	N		3	0	2	0
110	F	U	1	0	1	1	34	N	37	N		5	0	2	0
111	F	R	0	0	1	1	23	N	26	N		0	0	4	0
112	F	B	1	0	0	0	24	N	25	N		2	0	3	0
113	F	U	1	0	1	0	28	N	31	N		1	0	2	0
114	M	L	0	0	1	0	32	N	33	N		3	0	3	0
115	M	U	1	0	2	0	22	N	22	N		2	0	3	0
116	F	U	4	0	0	0	39	N	42	N		3	0	3	0
117	F	B	5	1	2	0	24	N	26	N		3	0	5	0
118	F	U	5	1	2	0	21	N	23	N		3	0	5	0
119	M	B	2	0	2	0	24	N	26	N		3	0	3	0
120	M	U	1	0	0	0	28	N	29	N		0	0	4	0
121	F	U	3	0	2	0	27	N	27	N		3	0	2	0
122	M	U	1	0	0	0	27	N	28	N		0	0	0	0
123	M	L	0	0	3	0	32	N	38	N		2	0	0	0
124	M	U	0	0	0	0	19	N	26	N		5	0	5	0
125	F	U	4	0	6	0	38	N	39	A		3	0	2	0
126	M	U	5	0	3	0	37	N	42	N		0	0	3	0
127	F	B	1	0	2	0	34	N	35	N		0	0	0	0
128	M	U	8	0	6	0	33	N	34	N		2	0	5	0
129	M	L	1	0	0	0	21	N	28	N		1	0	1	0
130	M	L	3	0	6	0	44	N	43	N		4	0	2	0
131	F	B	0	0	2	0	26	N	44	A		1	0	9	0
132	M	B	3	0	1	0	28	N	34	N		1	0	1	0
133	F	B	4	2	0	0	26	N	25	N		1	0	2	0
134	M	L	3	0	1	0	33	A	42	N		0	0	1	0
135	M	U	1	0	1	0	20	N	24	N	Mat. Gr.F.	3	0	8	0
136	M	U	1	0	4	0	25	N	27	N		3	0	1	0
137	M	L	2	0	1	0	35	N	39	N		0	0	2	0
138	M	R	2	0	3	0	40	N	39	N		0	0	2	0
139	F	R	1	0	2	0	20	N	20	N		1	0	2	0
140	M	R	1	0	0	0	21	N	21	N		3	0	3	0
141	M	R	2	0	1	0	28	N	33	N		1	0	1	0
142	M	U	2	0	6	0	32	N	39	N		2	0	4	0
143	M	B	0	0	0	0	25	N	31	A		6	0	2	0
144	M	B	4	1	2	0	32	N	38	N		4	1	4	0
145	M	L	3	0	1	0	23	N	31	N		3	0	2	0
146	M	B	0	0	4	0	35	N	37	N		5	0	3	0
147	F	B	3	0	3	1	37	N	43	N		4	1	4	1
148	F	M	2	0	1	0	25	N	28	N		3	0	4	0
149	F	U	4	0	2	0	31	N	35	N		3	0	4	0
150	F	B	1	0	1	0	25	N	26	N		7	0	4	0
151	F	U	2	0	1	0	38	N	48	N		1	0	2	0
152	F	M	2	0	1	0	30	N	32	N		2	0	2	0
153	M	L	0	0	2	1	25	N	27	N		1	0	2	0
154	M	B	1	0	1	0	35	N	41	N		3	0	2	0
155	F	R	2	0	1	0	26	N	30	N		8	0	2	0
156	F	M	2	0	2	0	25	N	24	N		0	0	0	0
157	M	U	0	0	1	0	25	N	38	N		2	0	6	0
158	M	U	1	0	1	0	27	N	26	N		3	0	2	0
159	M	U	1	0	0	0	25	A	34	N		3	0	6	0
160	F	L	2	0	0	0	22	N	25	N		3	0	7	0
161	M	R	1	0	1	0	26	N	31	N		3	0	4	2

APPENDIX—continued

Paternal First Cousins				Maternal First Cousins				Month of Birth of Propositus	Birth Rank of Propositus	Other Malformations	Family History Other than Sibs
Total	Male Affected	Total	Female Affected	Total	Male Affected	Total	Female Affected				
4	0	8	0	12	0	18	0	11	6	-	+
0	0	0	0	1	0	3	0	3	3	-	+
11	0	11	0	10	0	10	0	7	2	+	+
7	0	12	0	11	0	16	0	4	1	-	-
13	0	7	0	0	0	2	0	7	2	+	-
21	0	16	0	2	0	4	0	3	3	-	-
10	0	15	0	5	0	9	0	9	2	-	-
4	0	6	0	8	0	10	0	12	2	-	+
4	0	2	0	9	0	5	0	12	4	-	+
12	1	6	0	8	0	5	0	9	2	-	+
0	0	0	0	4	0	3	0	10	1	-	-
7	0	2	0	5	0	5	0	12	1	-	+
0	0	7	0	1	0	2	0	12	1	-	+
6	0	3	0	8	0	12	0	3	1	-	-
2	0	5	0	8	0	9	0	5	1	-	+
0	0	0	0	3	0	3	0	10	1	+	+
13	0	7	0	1	0	2	0	2	4	-	-
2	0	7	0	6	0	4	0	3	2	-	-
6	0	4	0	3	0	3	0	7	1	-	-
17	0	8	0	7	0	19	0	4	5	-	+
2	0	2	0	4	0	10	0	7	3	-	-
19	0	8	0	16	0	11	0	9	5	-	-
3	0	2	0	1	0	1	0	7	1	+	-
0	0	0	0	6	0	8	0	11	2	-	-
4	0	12	0	8	0	8	0	7	4	-	-
4	0	1	0	0	0	0	0	7	1	-	-
9	0	4	0	14	0	13	0	5	2	-	-
20	0	24	1	15	0	6	0	1	4	-	+
21	1	19	0	10	0	15	0	6	8	-	+
9	0	7	0	14	0	14	0	1	3	-	-
0	0	0	0	14	0	17	0	2	5	-	+
3	0	1	0	0	0	0	0	12	3	-	-
12	1	6	0	8	0	5	0	2	3	+	+
5	0	2	0	5	0	5	0	9	2	-	+
6	0	7	0	0	0	0	0	3	2	+	+
8	0	3	0	11	0	9	0	10	3	+	+
6	0	7	0	4	0	3	0	8	2	-	-
6	0	14	0	1	0	1	0	3	3	+	+
9	0	12	0	1	0	1	0	9	7	-	+
9	0	12	0	3	0	5	0	9	3	-	+
2	0	12	0	3	0	5	0	12	3	-	+
7	0	1	0	0	0	2	0	6	2	-	-
14	0	7	0	4	0	4	0	8	5	-	-
0	0	0	0	5	0	6	0	5	2	-	-
4	0	0	0	14	0	9	0	12	1	-	-
7	0	0	0	0	0	0	0	8	4	-	-
4	0	15	0	0	0	0	0	10	1	-	+
7	0	5	0	7	0	7	0	6	8	-	+
3	0	6	0	28	0	22	0	4	7	-	+
0	0	0	0	9	0	4	0	3	4	-	-
8	0	14	0	0	0	1	0	9	1	-	-
2	0	9	0	3	0	0	0	7	7	+	-
10	0	9	0	22	0	16	0	6	9	-	-
8	0	12	0	3	0	6	0	6	3	-	+
3	0	2	0	7	0	6	0	2	5	+	-
4	0	5	0	3	0	4	0	3	5	-	+
3	0	2	0	2	0	6	0	2	6	-	+
13	0	14	0	6	0	1	0	11	3	-	+
1	0	3	0	0	0	0	0	5	1	+	-
4	0	1	0	4	0	10	0	3	4	-	-
4	0	2	0	27	0	12	0	10	6	-	-
2	0	0	0	2	0	1	0	9	1	+	-
6	1	4	0	1	0	2	0	2	1	-	+
3	0	3	0	17	0	3	0	4	4	-	-
0	0	0	0	0	0	0	0	3	6	-	+
8	0	13	0	1	0	2	0	8	1	+	+
7	0	7	0	2	0	0	0	10	4	-	+
2	0	0	0	11	0	14	0	1	4	-	+
18	0	13	0	0	0	1	0	9	5	-	+
7	0	7	0	2	0	0	0	10	6	-	+
22	0	16	0	7	0	6	0	5	2	-	+
12	0	9	0	5	0	5	0	5	5	-	-
2	0	7	0	0	0	0	0	2	3	+	-
6	0	7	0	6	0	7	0	3	4	-	-
6	0	5	0	2	0	1	0	2	3	-	-
3	0	1	0	0	0	0	0	12	2	-	-
6	0	9	0	3	0	3	0	10	3	-	+
0	0	0	0	5	0	2	0	9	3	-	-
14	0	11	1	12	0	5	0	6	3	-	+
5	0	4	0	0	0	0	0	10	2	-	+
4	0	9	0	2	0	0	0	12	3	-	+
1	1	2	2	0	0	0	0	3	1	-	+
22	0	12	0	0	0	0	0	3	1	-	-
2	0	9	0	0	0	0	0	10	3	-	-

APPENDIX—continued

I.D.	Sex	Type	Female Sibs		Male Sibs		Mother's Age Status	Father's Age Status	Affected Grandparent	Paternal			Maternal		
			Total	Affected	Total	Affected				Uncles Total	Aunts Affected	Total	Uncles Total	Aunts Affected	Total
162	M	U	0	0	1	0	25	N		4	0	3	5	0	5
163	M	U	2	0	1	0	20	N		2	0	2	3	0	1
164	M	U	1	0	3	0	25	N		3	0	4	3	0	4
165	M	U	4	0	1	0	34	N		0	0	1	1	0	1
166	F	U	0	0	1	0	26	N		2	0	0	1	0	3
167	F	L	3	0	2	0	26	N		2	0	5	2	0	1
168	F	R	0	0	0	0	36	N		2	0	4	3	0	4
169	M	L	2	0	2	0	23	N		5	0	4	1	0	0
170	M	B	3	0	3	0	27	N		1	0	2	1	0	0
171	M	R	1	0	2	1	26	N		1	0	1	1	0	3
172	F	U	0	0	3	0	19	N		1	0	3	3	0	4
173	M	R	1	0	2	0	25	N		1	0	1	2	0	2
174	M	M	2	0	2	0	24	N	Mat. Gr.F.	2	0	1	6	0	4
175	F	U	2	0	1	0	22	N	Mat. Gr.F.	3	0	7	6	0	1
176	M	U	1	0	1	0	24	N		3	0	1	0	0	1
177	M	U	1	0	0	0	19	N		4	0	2	2	0	1
178	M	L	4	0	3	0	23	N		5	0	2	1	0	3
179	F	L	0	0	1	0	25	N		2	0	1	4	2	0
180	M	L	2	0	0	0	27	N		0	0	2	4	0	1
181	F	R	2	0	0	0	22	N		1	0	0	1	0	0
182	F	L	1	0	3	0	25	N		4	0	0	3	0	1
183	M	B	2	0	1	0	29	N		3	0	1	1	0	2
184	F	L	1	0	1	0	25	N		2	0	2	3	0	0
185	M	M	1	0	1	0	33	N		1	0	5	2	0	5
186	M	B	2	0	2	0	24	N		1	0	5	1	0	4
187	F	U	3	0	2	0	19	N		4	0	4	5	0	1
188	F	L	2	0	2	0	31	N		2	0	5	3	0	7
189	F	U	6	0	2	0	34	N		3	0	5	3	0	2
190	M	U	1	0	2	0	24	N		0	0	0	0	0	0
191	M	M	0	0	1	0	33	N		1	0	0	1	0	3
192	M	L	0	0	3	0	35	N		2	0	4	2	0	0
193	F	L	0	0	2	0	35	N		1	0	0	3	0	1
194	M	M	1	0	3	0	26	N		3	0	1	2	0	6
195	M	L	2	0	2	1	28	N		1	0	7	3	0	1
196	M	L	2	0	2	1	27	N		3	0	7	3	0	6
197	M	B	0	0	0	0	27	N		0	0	2	7	0	1
198	M	U	0	0	1	0	18	N		2	0	1	8	0	2
199	F	U	1	1	4	0	23	N		0	0	4	1	0	2
200	M	B	2	0	5	1	39	N		2	0	3	5	0	3
201	M	M	2	0	4	0	35	N		3	0	1	4	0	4
202	M	B	1	1	0	0	31	N		3	0	5	1	0	3
203	M	M	1	0	0	0	31	N		0	0	3	2	0	1
204	M	L	2	0	1	0	25	N		1	0	1	1	0	4
205	M	M	0	0	1	0	27	N		1	0	2	0	0	1
206	M	B	1	0	1	0	22	N		1	0	0	2	0	1
207	F	U	2	0	1	0	40	A	Mat. Gr.M.	5	0	4	8	0	4
208	M	U	0	0	0	0	20	N		2	0	1	0	0	3
209	F	U	3	0	3	0	42	N		4	0	3	0	0	2
210	M	U	0	0	1	0	31	N		0	0	1	5	0	1
211	F	U	2	0	1	0	34	N		5	0	2	4	0	3
212	M	U	2	0	1	0	31	N		2	0	0	0	0	4
213	M	R	4	1	3	0	32	N		2	0	2	3	0	1
214	F	R	3	0	4	1	36	N		2	0	2	3	0	4
215	F	U	2	0	2	0	33	N		7	0	2	4	0	3
216	M	L	2	0	1	0	33	N		3	0	4	9	0	4
217	M	B	1	0	0	0	20	N		1	0	2	3	0	0
218	M	R	0	0	3	0	23	N		1	0	3	1	0	4
219	M	U	0	0	3	0	20	N		2	0	7	1	0	1
220	M	R	3	0	3	0	30	N		2	0	4	3	0	3
221	M	U	0	0	3	0	36	N		2	0	7	4	0	4
222	M	U	1	0	0	0	21	A		5	0	3	1	0	9
223	M	R	1	0	3	0	32	N		1	0	3	4	0	1
224	M	U	1	0	1	0	29	N		2	0	1	4	0	4
225	F	U	2	0	3	0	24	N		5	0	0	4	0	4
226	F	B	0	0	2	0	20	N		0	0	0	5	0	4
227	F	U	0	0	1	0	29	N		0	0	0	0	0	2
228	F	M	3	0	0	0	33	N		4	0	3	3	0	6
229	F	L	1	0	0	0	29	A		3	0	0	4	0	7
230	F	M	2	0	1	0	31	N		3	0	1	2	0	1
231	M	U	0	0	1	0	26	N		1	0	2	0	0	0
232	M	U	1	0	2	0	22	N		3	0	2	8	0	3
233	M	U	2	0	4	0	21	N		3	0	4	3	0	4
234	M	L	1	0	2	0	23	N		5	0	0	7	0	0
235	M	R	3	0	2	1	28	N		0	0	0	0	0	3
236	F	L	1	0	0	0	21	N		4	0	8	2	0	7
237	M	L	1	0	1	0	26	N		2	0	1	5	0	1
238	F	M	1	0	2	1	33	N		0	0	1	1	0	1
239	M	B	1	0	1	0	27	N		1	0	1	3	0	2
240	M	L	2	0	2	0	37	N		0	0	1	0	0	4
241	F	U	2	0	1	0	24	N		3	0	2	5	0	5
242	F	U	2	0	4	0	38	N		2	0	3	4	0	4
243	F	B	1	0	2	1	26	N		6	0	3	3	0	1
244	M	L	2	2	1	0	31	N		3	0	1	4	0	0
245	M	R	2	0	0	0	22	N		4	0	2	3	0	4

Congenital Cleft Lip

APPENDIX—continued

Paternal First Cousins				Maternal First Cousins				Month of Birth of Propositus	Birth Rank of Propositus	Other Malformations	Family History Other than Sibs
Total	Male Affected	Total	Female Affected	Total	Male Affected	Total	Female Affected				
12	0	10	0	8	0	12	0	1	2	-	-
4	0	2	0	6	0	5	0	3	1	-	+
7	0	11	0	20	0	13	0	12	3	-	+
1	0	3	0	0	0	0	0	2	6	-	+
1	0	3	0	7	0	5	0	2	2	-	+
3	0	3	0	1	0	0	0	12	4	-	-
6	0	11	0	8	0	5	0	5	1	-	-
8	0	8	0	1	0	2	0	7	4	+	-
8	0	4	0	3	0	1	0	2	6	-	+
0	0	0	0	5	0	2	0	2	4	-	-
5	0	7	0	6	0	6	0	10	1	-	+
1	0	0	0	8	0	5	0	10	2	-	-
6	0	5	0	13	0	15	0	11	3	-	+
23	0	22	0	7	0	4	0	3	2	-	+
1	0	3	0	1	0	1	0	2	2	-	+
7	0	3	0	2	0	4	0	11	2	-	+
5	0	2	0	8	0	6	0	10	3	-	-
4	0	2	0	8	0	6	0	4	1	-	+
0	0	2	0	5	0	5	0	4	3	-	-
0	0	0	0	1	0	0	0	4	1	-	-
8	0	10	0	0	0	4	0	3	4	+	-
3	0	2	0	3	1	5	0	5	2	-	+
2	0	5	0	3	0	0	0	6	2	-	-
9	0	6	0	5	0	13	0	4	1	-	-
2	0	1	0	0	0	0	0	8	4	-	-
0	0	0	0	8	0	7	0	10	2	-	-
5	0	0	0	13	0	21	0	3	3	-	-
9	0	14	0	9	0	3	0	6	5	-	-
0	0	0	0	0	0	0	0	4	4	-	-
2	0	0	0	3	0	4	0	5	2	+	-
5	0	9	0	1	0	3	0	10	4	-	-
1	0	2	0	5	0	3	0	5	3	-	+
6	0	2	0	3	0	5	0	2	3	-	+
17	0	19	0	6	0	10	0	8	5	+	+
17	0	19	0	6	0	10	0	4	4	-	+
3	0	1	0	13	0	7	0	10	1	-	-
7	0	0	0	9	0	9	0	4	1	-	-
5	0	5	0	3	0	8	0	12	3	-	-
10	0	8	0	26	0	14	0	6	8	-	-
8	0	6	0	13	0	13	0	9	5	-	-
12	0	7	0	1	0	2	0	11	2	-	-
5	0	3	0	2	0	10	0	10	2	-	-
2	0	5	0	12	0	11	0	4	3	-	-
2	0	4	0	0	0	0	0	11	2	-	+
3	0	1	0	0	0	0	0	11	3	-	-
25	1	20	0	13	0	12	0	6	2	-	+
1	0	1	0	0	0	1	0	5	4	-	+
9	0	8	0	3	0	2	0	10	1	-	-
1	0	1	0	3	0	13	0	2	5	-	-
16	0	15	0	15	0	12	0	9	2	-	+
2	0	1	0	2	0	2	0	9	4	-	-
5	0	3	0	8	0	4	0	7	4	-	-
5	0	3	0	8	0	4	0	8	6	-	-
18	1	13	0	3	0	8	0	10	8	-	+
13	0	10	0	15	0	13	0	11	4	-	-
0	0	0	0	0	0	0	0	2	2	-	-
6	0	6	0	1	0	1	0	11	4	-	-
2	0	2	0	3	0	1	0	1	2	-	+
7	0	5	0	12	0	6	0	3	1	-	+
22	0	24	0	16	0	18	0	2	4	-	+
11	0	8	0	14	0	17	1	7	4	+	+
4	0	5	0	1	0	5	0	8	2	-	+
1	0	2	0	16	0	17	0	1	5	-	-
13	0	10	0	20	0	12	0	10	3	-	-
0	0	0	0	5	0	2	0	4	2	-	-
8	0	9	0	12	0	12	0	2	1	-	-
8	0	9	0	19	0	12	0	4	2	+	-
9	0	5	0	5	0	3	0	5	4	-	-
6	0	2	0	0	0	0	0	2	2	-	+
7	0	8	0	10	0	16	0	2	3	-	-
7	0	12	0	4	0	15	0	8	1	-	-
7	0	5	0	11	0	10	0	4	1	-	+
0	0	0	0	4	0	2	0	6	2	-	-
30	0	30	0	13	0	16	0	4	3	-	+
0	0	1	0	0	0	0	0	1	4	-	-
1	0	1	0	1	0	2	0	9	3	-	-
2	0	2	0	11	0	5	0	4	3	-	-
0	0	0	0	0	0	1	0	5	4	-	-
8	0	10	0	17	0	11	0	6	3	-	-
5	0	6	0	16	0	10	0	4	5	-	-
12	0	15	0	3	0	8	0	1	1	-	+
12	0	7	0	2	0	1	0	9	5	-	-
12	0	7	0	2	0	1	0	7	2	-	+
4	0	4	0	2	0	1	0	4	3	-	+

APPENDIX—continued

I.D.	Sex	Type	Female Sibs		Male Sibs		Mother's		Father's		Affected Grandparent	Paternal			Maternal			
			Total	Affected	Total	Affected	Age	Status	Age	Status		Uncles Total	Aunts Affected	Aunts Total	Uncles Total	Aunts Affected	Aunts Total	
246	F	L	3	0	3	1	26	N	29	N	Mat. Gr.F. Mat. Gr.F.	1	0	4	0	1	0	5
247	M	R	4	1	2	0	27	N	30	N		1	0	4	0	1	0	5
248	M	U	1	0	1	0	21	N	27	N		1	0	2	0	1	0	1
249	M	R	1	0	1	0	39	N	36	N		3	0	3	0	3	0	4
250	F	B	6	0	2	0	27	N	30	N		3	0	2	1	1	0	4
251	F	U	3	0	1	0	24	N	24	N		3	0	2	0	1	0	1
252	F	U	1	0	5	0	43	N	43	N		0	0	0	0	4	0	4
253	F	B	3	0	4	1	27	N	33	N		2	0	1	0	3	0	1
254	F	U	4	1	3	0	36	N	42	N		2	0	1	0	3	0	1
255	M	B	3	1	3	1	32	N	33	N		3	0	3	0	3	0	3
256	F	B	2	0	4	2	27	N	28	N	Pat. Gr.F.	3	0	3	0	3	0	3
257	F	U	1	0	1	0	24	N	25	N		3	0	2	0	6	0	3
258	M	U	3	0	4	0	33	N	28	N		4	0	2	0	5	0	5
259	M	U	4	0	2	0	43	N	52	N		3	0	1	0	6	0	5
260	F	B	1	0	0	0	23	N	27	N		1	0	4	0	2	0	3
261	M	U	0	0	0	0	24	N	27	N		0	0	1	0	3	0	4
262	M	L	0	0	0	0	20	N	30	N		0	0	0	0	2	0	0
263	M	B	1	0	2	0	20	N	24	N		3	0	2	0	3	1	1
264	M	L	0	0	0	0	30	N	43	N		3	0	0	0	2	0	0
265	M	B	1	0	1	0	29	N	35	N		2	0	2	0	2	0	1
266	M	L	1	0	1	0	25	N	27	N	Pat. Gr.F.	1	0	1	0	4	0	0
267	F	B	2	0	1	0	38	N	38	N		5	0	4	0	2	0	3
268	M	U	1	0	4	0	22	N	27	N		5	0	8	0	6	0	5
269	M	U	0	0	0	0	—	N	—	N		0	0	0	0	2	0	2
270	M	R	1	0	0	0	19	N	22	N		2	0	4	0	0	0	1
271	M	L	0	0	3	0	25	A	35	N		4	0	2	0	3	0	2
272	F	L	0	0	0	0	27	N	29	N		0	0	0	0	0	0	0
273	F	U	2	0	2	0	23	N	25	N		4	0	2	0	3	0	3
274	M	U	2	0	4	1	42	N	43	N		0	0	0	0	0	0	0
275	M	R	1	0	0	0	33	N	32	N		0	0	0	0	0	0	0
276	M	U	1	0	2	1	25	N	27	N	Pat. Gr.F.	1	0	1	0	1	0	3
277	F	B	3	0	3	0	28	N	32	N		4	0	5	0	4	0	7
278	M	U	1	0	0	0	23	N	30	N		0	0	0	0	7	0	3
279	F	L	3	0	1	0	20	N	21	N		3	0	1	0	3	0	3
280	M	L	3	0	2	0	28	N	27	N		2	0	1	0	3	0	2
281	M	B	2	0	2	0	24	N	25	N		3	0	2	0	2	0	1
282	F	R	1	0	0	0	19	N	33	N		6	0	5	0	1	0	0
283	F	R	1	0	1	0	23	N	24	N		0	0	2	0	2	0	0
284	F	U	2	0	0	0	22	N	23	N		3	0	4	0	0	0	1
285	F	B	0	0	1	0	21	N	22	N		1	0	1	0	1	0	1
286	F	R	2	0	5	0	41	N	46	N	Pat. Gr.F.	2	0	2	0	3	0	1
287	M	U	2	0	0	0	28	N	31	A		3	0	1	0	3	0	1
288	M	U	1	0	2	0	31	N	29	N		4	0	1	0	3	0	3
289	F	R	1	0	4	0	19	N	22	N		3	0	2	0	4	0	7
290	F	R	1	0	1	0	24	N	26	N		2	0	2	0	3	0	6
291	F	U	2	0	0	0	20	N	25	N		0	0	0	0	1	0	0
292	F	R	1	0	1	0	26	N	29	N		0	0	0	0	1	0	0
293	F	R	1	0	3	1	24	N	30	N		3	0	3	0	2	0	2
294	M	B	2	0	0	0	26	N	35	N		0	0	3	0	5	0	2
295	F	L	1	0	2	0	23	N	27	N		3	0	3	0	2	0	2
296	F	U	0	0	1	0	20	N	25	A	Pat. Gr.F.	4	0	1	0	1	0	0
297	M	U	0	0	0	0	23	N	25	N		0	0	2	0	2	0	2
298	F	B	2	0	0	0	22	N	25	N		2	0	1	0	3	1	5
299	F	L	2	0	2	0	31	N	36	N		2	0	0	0	1	0	1
300	F	U	5	0	2	0	34	N	35	N		5	0	3	0	9	0	4
301	F	L	2	0	1	0	20	N	20	N		1	0	3	0	3	0	0
302	F	L	0	0	2	0	27	N	32	N		5	0	1	0	6	0	1
303	F	U	4	0	1	0	37	N	44	N		4	0	3	0	10	0	1
304	F	R	1	0	0	0	18	N	18	N		0	0	0	0	4	0	2
305	F	U	5	0	3	0	25	N	35	N		5	0	3	0	4	0	3
306	M	L	5	1	1	0	40	N	41	N	Pat. Gr.F.	3	0	4	0	3	0	2
307	F	U	6	0	4	0	39	N	39	N		5	0	2	0	5	0	1
308	M	U	3	0	3	0	41	N	47	N		2	0	3	0	4	0	0
309	M	U	1	0	0	0	22	N	35	N		3	0	5	0	4	0	1
310	M	L	3	0	2	0	35	N	36	N		2	0	0	0	4	0	0
311	M	U	1	0	1	0	22	N	29	N		4	0	1	0	4	0	2
312	F	U	2	0	1	0	26	N	27	N		6	0	0	0	1	0	2
313	M	U	0	0	4	0	24	N	26	N		3	0	2	0	1	0	2
314	M	L	1	0	1	0	23	N	30	N		3	1	5	0	1	0	5
315	M	L	1	0	2	0	22	N	23	N		3	0	5	0	2	0	5
316	M	L	1	0	1	0	28	N	39	N	Pat. Gr.F.	0	0	2	0	2	0	4
317	M	B	2	0	3	0	30	N	32	N		3	0	4	0	2	0	2
318	F	L	2	0	3	0	35	N	38	N		3	0	2	0	2	0	2
319	M	R	5	0	2	0	41	N	43	N		0	0	0	0	2	0	0
320	F	U	1	0	3	0	31	N	35	N		1	0	0	0	3	0	3
321	M	L	1	0	1	0	23	N	27	N		3	0	6	0	3	0	2
322	M	U	1	0	0	0	24	N	26	N		1	0	0	0	4	0	0
323	F	L	2	0	1	0	37	N	38	N		0	0	1	0	4	0	2
324	M	R	2	0	1	0	36	N	40	N		4	0	4	0	3	0	2
325	M	M	0	0	2	0	20	N	22	N		1	0	4	0	2	0	1
326	M	R	1	0	0	0	22	N	23	N	Pat. Gr.F.	1	0	3	0	2	0	0
327	F	L	0	0	3	0	28	N	28	N		0	0	0	0	0	0	2
328	F	L	2	0	1	0	24	N	27	N		2	0	5	0	2	0	4
329	M	R	2	0	0	0	35	N	37	N		1	0	3	0	5	0	5

Congenital Cleft Lip

APPENDIX—continued

Paternal First Cousins				Maternal First Cousins				Month of Birth of Propositus	Birth Rank of Propositus	Other Malformations	Family History Other than Sibs
Total	Male Affected	Female Total	Affected	Total	Male Affected	Female Total	Affected				
8	1	11	0	17	0	11	0	8	3	—	+
8	1	11	0	17	0	11	0	10	4	—	+
5	0	6	0	1	0	5	0	5	2	—	—
8	0	6	0	4	0	2	0	4	3	—	—
7	0	11	1	12	0	17	0	3	5	—	+
8	1	5	0	1	0	3	0	8	2	—	+
0	0	0	0	16	0	11	0	4	7	—	+
6	0	6	0	5	0	5	0	3	4	—	—
6	0	6	0	5	0	5	0	7	7	—	+
7	0	10	0	4	1	4	0	4	7	—	+
1	0	10	0	4	1	4	0	6	5	—	+
3	0	1	0	5	0	7	0	1	3	—	+
19	0	8	0	7	0	13	0	8	4	—	+
0	0	12	0	5	0	4	0	5	7	—	—
3	0	0	0	4	0	3	0	10	2	—	—
0	0	0	0	13	0	10	0	3	1	—	—
3	0	0	0	0	0	0	0	9	1	+	—
5	0	1	0	2	0	0	0	2	1	—	+
0	0	3	0	3	0	1	0	11	1	—	—
0	0	3	0	8	0	7	0	1	3	+	—
0	0	0	0	0	0	0	0	11	3	—	—
9	0	11	0	14	0	12	0	9	4	—	—
34	0	29	0	27	0	30	0	4	2	—	+
0	0	0	0	10	0	4	0	5	1	—	—
5	0	1	0	1	0	1	0	7	2	—	+
12	0	13	0	0	0	1	0	2	4	—	+
0	0	0	0	0	0	0	0	1	1	—	+
3	0	11	0	3	0	5	0	9	2	—	—
0	0	0	0	0	0	0	0	10	5	—	+
0	0	0	0	0	0	0	0	7	2	—	—
0	0	0	0	5	0	2	0	2	3	—	—
26	0	25	0	21	0	28	0	11	6	+	—
0	0	0	0	16	0	32	0	10	1	—	—
2	0	7	0	10	0	10	0	3	1	—	—
4	0	3	0	3	0	4	0	1	3	—	—
9	0	6	0	6	0	7	0	4	4	—	+
8	0	6	0	0	0	0	0	9	2	—	—
1	0	3	0	10	0	4	0	2	1	—	+
23	0	12	0	0	0	0	0	3	1	—	+
4	0	2	0	2	0	3	0	9	2	—	+
6	0	3	0	1	0	4	0	10	7	—	+
5	0	4	0	3	1	9	0	12	1	—	+
11	0	12	0	4	0	9	0	4	2	—	—
6	0	4	0	12	0	13	0	2	1	—	—
2	0	6	0	16	0	13	0	4	2	—	—
0	0	0	0	11	0	12	1	11	2	—	+
0	0	0	0	0	0	2	0	9	2	—	+
6	0	17	0	3	0	4	0	3	3	—	+
8	0	7	0	7	0	12	0	9	1	—	+
5	0	6	0	1	0	1	0	9	2	—	—
4	0	5	0	0	0	0	0	10	1	+	—
2	0	5	0	2	0	2	0	3	1	—	+
7	0	4	0	9	0	12	0	11	1	—	+
11	0	3	0	6	0	2	0	2	3	+	—
9	0	14	0	17	0	14	0	3	6	—	—
1	0	6	0	2	0	5	0	7	2	—	+
22	0	4	0	6	0	9	0	2	2	—	+
0	0	13	0	22	0	19	0	8	6	—	—
8	0	0	0	1	0	2	0	10	1	—	+
8	0	3	0	17	0	23	0	4	4	—	+
10	1	12	0	12	0	21	0	6	6	—	+
2	0	5	0	10	0	10	0	11	0	—	+
20	0	1	0	8	0	5	0	2	7	—	—
3	0	15	0	0	0	3	0	7	2	—	+
3	0	1	0	2	0	0	0	11	4	—	—
16	0	3	0	9	0	7	0	1	3	+	—
8	0	17	0	4	0	3	0	5	2	—	+
6	0	5	0	5	0	3	0	2	3	—	—
9	0	2	0	3	0	4	0	5	2	—	+
1	0	10	0	7	0	4	0	8	1	—	+
13	0	0	0	10	0	21	0	10	3	—	—
7	0	10	0	4	0	5	0	10	5	—	+
0	0	2	0	1	0	1	0	2	5	—	—
2	0	0	0	17	1	18	0	6	9	—	+
10	0	7	0	7	0	10	0	7	5	—	—
2	0	12	0	8	0	4	0	12	3	—	—
0	0	1	0	0	0	0	0	5	2	—	—
11	3	3	0	3	0	7	0	3	4	—	—
2	0	1	0	4	0	6	0	10	4	—	+
7	0	3	0	3	0	0	0	4	2	—	—
6	0	5	0	1	0	0	0	8	1	—	—
8	0	3	0	2	0	1	0	8	3	—	—
9	2	11	0	8	0	9	0	8	2	—	—
		3	0	17	0	11	0	2	3	—	+

APPENDIX—continued

I.D.	Sex	Type	Female Sibs		Male Sibs		Mother's Age Status	Father's Age Status	Affected Grandparent	Paternal				Maternal			
			Total	Affected	Total	Affected				Uncles Total	Aunts Total	Affected	Aunts Affected	Uncles Total	Aunts Total	Affected	Aunts Affected
330	M	U	1	0	1	0	21	N		2	0	0	0	3	0	1	
331	M	B	3	0	1	0	21	N		4	0	0	0	7	0	2	
332	M	L	1	0	3	1	22	N		6	0	0	0	3	0	0	
333	M	R	1	0	3	1	32	N		6	0	0	0	3	0	0	
334	M	R	3	0	2	1	28	N		6	0	0	0	4	1	3	
335	F	U	1	1	1	0	25	N		2	0	4	0	3	0	1	
336	M	B	0	0	1	0	24	N		0	0	1	0	2	0	3	
337	M	U	2	0	1	0	29	N		1	0	2	0	2	0	6	
338	M	U	1	0	1	0	22	N		0	0	1	0	1	0	3	
339	M	L	1	0	1	0	27	N		0	0	0	0	3	0	1	
340	M	L	1	0	0	0	28	N		2	0	7	0	2	0	0	
341	M	L	0	0	2	0	40	N		1	0	1	0	6	0	7	
342	M	L	2	0	3	0	35	N		1	0	0	0	2	0	2	
343	F	R	1	0	1	0	33	N		1	0	2	0	4	0	2	
344	M	L	2	0	6	0	—	N		2	0	3	0	3	0	4	
345	F	L	0	0	3	0	29	N		5	0	0	0	4	0	2	
346	M	R	1	0	3	0	38	N		4	0	4	0	1	0	2	
347	M	L	2	0	1	0	25	N		0	0	3	0	0	0	1	
348	M	R	2	0	0	0	24	N		3	0	0	0	3	0	2	
349	M	L	1	0	3	0	23	N		2	0	3	0	2	0	4	
350	M	U	4	0	2	0	44	N		7	0	3	0	4	0	2	
351	F	R	2	0	2	0	37	N		2	0	1	0	2	0	1	
352	M	U	0	0	2	0	22	N		3	0	0	0	0	0	1	
353	F	U	1	0	1	0	37	N		3	0	4	0	2	0	7	
354	M	R	0	0	0	0	19	N		0	0	2	0	0	0	3	
355	F	L	2	0	0	0	22	N		8	0	4	0	1	0	1	
356	F	U	0	0	0	0	18	N		1	0	3	0	3	0	2	
357	F	U	0	0	4	0	32	N		4	0	5	0	3	0	3	
358	M	L	1	0	0	0	28	N		2	0	0	0	2	0	0	
359	M	U	1	0	3	0	26	N		3	0	1	0	3	0	0	
360	M	R	2	0	0	0	24	N		0	0	2	0	2	0	1	
361	F	R	0	0	3	0	29	N		3	0	5	0	3	0	1	
362	M	R	5	0	1	0	43	N		2	0	2	0	3	0	0	
363	M	L	1	0	1	0	33	N		1	0	0	0	2	0	0	
364	M	L	3	0	1	0	21	N		3	0	2	0	3	0	0	
365	F	L	1	0	1	0	37	N		2	0	1	0	4	1	2	
366	M	L	5	0	2	0	35	N		0	0	0	0	1	0	4	
367	M	L	1	0	2	0	20	N		0	0	2	0	1	0	2	
368	F	B	1	1	4	0	30	N		1	0	1	0	1	0	2	
369	F	U	2	0	5	1	33	N		0	0	4	0	5	0	3	
370	F	U	0	0	1	1	23	N		2	0	3	0	1	0	2	
371	F	M	1	0	2	0	33	N		3	0	5	0	1	0	3	
372	M	L	1	0	1	0	19	N		4	0	2	0	2	0	2	
373	F	L	2	0	4	0	29	N		2	0	1	0	1	0	1	
374	F	R	1	0	3	0	36	N		1	0	3	0	1	0	2	
375	F	R	4	0	1	0	25	N		4	0	2	0	3	0	1	
376	F	L	1	0	3	0	31	N		3	0	1	0	5	0	3	
377	F	L	2	0	3	0	26	N		5	0	2	0	2	0	4	
378	M	B	2	0	3	0	35	N		5	0	4	0	5	0	6	
379	M	U	0	0	2	0	32	N		4	0	1	0	0	0	1	
380	M	B	1	0	5	0	31	N		1	0	3	0	2	0	0	
381	M	R	3	0	1	0	34	N		2	0	1	0	2	0	1	
382	M	L	0	0	0	0	41	N		2	0	2	0	3	0	3	
383	F	U	2	0	0	0	25	N		7	0	2	0	2	0	2	
384	M	U	1	0	2	0	24	N		0	0	1	0	1	0	4	
385	M	U	2	0	2	1	23	N		1	0	2	0	5	0	5	
386	M	U	0	0	3	0	33	N		2	0	1	0	3	0	2	
387	M	L	3	0	2	0	24	N		4	0	4	0	2	0	2	
388	M	U	2	0	3	0	30	N		3	0	1	0	2	0	2	
389	F	U	1	0	2	0	35	N		1	0	5	0	1	0	1	
390	M	B	2	0	0	0	33	N		1	0	4	0	2	0	4	
391	F	L	1	1	2	1	28	N		3	0	1	0	4	0	0	
392	F	L	1	0	0	0	22	N		1	0	3	0	2	0	1	
393	M	U	0	0	2	0	27	N		3	0	2	0	5	0	0	
394	F	L	1	0	3	0	28	N		2	0	0	0	6	0	1	
395	M	U	5	0	0	0	34	N		2	0	4	0	1	0	1	
396	M	U	3	1	3	1	22	N		3	0	3	0	3	0	1	
397	F	L	1	0	1	0	34	N	Mat. Gr.F.	2	0	2	0	6	0	3	
398	M	R	0	0	1	0	20	N		2	0	0	0	6	0	4	
399	M	L	1	0	1	0	27	N		2	0	1	0	0	0	0	
400	M	U	2	0	0	0	25	N		1	0	0	0	0	0	2	
401	M	U	2	0	2	0	33	N		4	0	1	0	3	0	5	
402	F	B	6	0	0	0	46	N		2	0	7	0	2	0	3	
403	M	L	0	0	1	0	18	N		4	0	3	0	6	0	7	
404	M	L	0	0	0	0	21	N		1	0	2	0	3	0	0	
405	F	U	0	0	0	0	22	N		0	0	0	0	0	0	0	
406	F	U	0	0	1	0	30	N		0	0	2	0	2	0	2	
407	M	B	3	2	1	0	23	N		1	0	0	0	4	0	3	
408	F	R	2	1	2	1	36	N		3	0	3	0	6	0	5	
409	M	R	3	0	4	0	28	N		3	0	3	0	6	0	5	
410	M	L	0	0	1	0	25	N		3	0	7	0	3	0	3	
411	F	B	2	0	2	0	27	N		4	0	1	0	0	0	1	
412	F	R	0	0	0	0	19	N		2	0	1	0	1	0	2	
413	M	B	5	0	3	1	37	N		4	0	1	0	6	0	3	

Congenital Cleft Lip

APPENDIX—continued

Paternal First Cousins				Maternal First Cousins				Month of Birth of Propositus	Birth Rank of Propositus	Other Malformations	Family History Other than Sibs
Total	Male Affected	Total	Female Affected	Total	Male Affected	Total	Female Affected				
4	0	2	0	8	0	2	0	4	1	-	+
1	0	9	0	15	0	19	0	10	1	+	+
11	0	7	0	7	0	3	0	12	1	+	+
11	0	7	0	7	0	3	0	1	5	-	+
8	0	10	0	8	0	13	0	7	2	-	+
2	0	2	0	4	0	10	0	1	1	-	+
0	0	1	0	4	0	3	0	10	2	-	-
1	0	2	0	15	0	11	0	9	4	-	-
4	0	5	0	0	0	0	0	3	1	-	+
0	0	8	0	9	0	6	0	2	3	-	-
0	0	0	0	0	0	0	0	7	2	+	-
1	0	1	0	19	0	21	0	10	3	-	-
0	0	0	0	0	0	0	0	6	2	+	-
3	0	4	0	6	0	11	0	12	3	-	+
0	0	0	0	0	0	0	0	6	9	-	-
2	0	1	0	8	0	10	0	4	3	-	-
13	0	13	0	3	0	4	0	6	5	-	-
6	0	3	0	1	0	2	0	7	1	-	-
8	0	3	0	8	0	4	0	5	3	-	-
29	0	5	0	20	0	8	0	12	2	-	+
2	0	27	0	8	0	5	0	12	7	-	+
8	0	7	0	6	0	5	0	1	5	-	-
4	0	5	0	0	0	2	0	8	1	-	-
1	0	10	0	9	0	9	0	12	3	-	-
7	0	0	0	0	0	3	0	1	1	+	-
4	0	10	0	2	0	4	0	11	1	-	-
9	0	12	0	14	0	12	0	10	1	-	-
1	0	1	0	6	0	5	0	9	5	-	+
6	0	6	0	1	0	1	0	7	2	-	+
0	0	0	0	8	0	10	0	2	3	-	-
12	0	7	0	0	0	3	0	3	3	-	-
4	0	4	0	3	0	5	0	9	3	-	-
2	0	0	0	8	0	7	0	5	7	-	-
1	0	4	0	2	0	2	0	7	3	-	-
5	0	3	0	9	0	6	0	5	2	-	+
1	0	1	0	6	0	5	0	1	3	-	+
3	0	2	0	8	0	9	0	4	6	+	-
5	0	5	0	5	0	4	0	12	3	-	-
10	0	8	0	3	0	8	0	12	5	-	-
12	0	7	0	26	0	14	0	5	6	-	-
12	0	5	0	1	0	2	0	12	1	-	-
0	0	0	0	6	0	5	0	8	4	-	+
1	0	1	0	3	0	1	0	5	2	-	-
9	0	9	0	5	0	5	0	7	5	-	-
2	0	6	0	13	0	8	0	9	4	-	-
17	0	12	0	2	1	4	0	3	4	-	+
13	0	11	0	13	0	5	0	7	5	-	-
5	0	5	0	4	0	7	0	5	2	-	-
4	0	8	0	0	0	4	0	4	6	-	-
9	0	10	0	0	0	1	0	4	1	-	-
4	0	0	0	4	0	3	0	2	4	-	-
0	0	0	0	2	0	4	0	9	5	-	-
2	0	2	0	5	0	9	0	11	6	+	-
2	0	0	0	1	0	5	0	9	2	-	-
3	0	7	0	15	0	3	0	5	3	+	-
9	0	5	0	4	0	4	0	10	1	-	-
16	0	20	0	0	0	0	0	7	4	-	+
3	0	1	0	4	0	0	0	7	5	-	-
12	0	6	0	0	0	1	0	4	6	-	-
7	0	7	0	3	0	3	0	11	4	-	-
12	0	7	0	7	0	6	0	3	3	-	-
3	0	2	0	2	0	1	0	7	3	-	+
5	0	5	0	0	0	0	0	3	2	-	-
0	0	0	0	9	0	16	0	7	3	-	-
12	0	0	0	8	0	13	0	6	5	-	-
7	0	10	0	3	0	2	0	3	5	-	-
3	0	2	0	4	1	4	0	1	3	-	+
0	0	0	0	12	0	10	0	4	3	-	-
1	0	1	0	0	0	0	0	6	1	-	-
7	0	10	0	0	0	0	0	1	3	-	+
16	0	12	0	4	0	6	0	8	1	-	-
10	0	10	0	6	1	13	1	11	5	-	-
0	0	0	0	17	0	20	0	1	7	+	+
0	0	0	0	0	0	0	0	7	2	-	-
1	0	1	0	0	0	0	0	4	1	-	-
5	0	2	0	0	0	2	0	12	1	+	-
6	0	13	0	7	0	8	0	3	2	-	-
0	0	13	0	27	0	20	0	2	2	-	-
8	0	0	0	27	0	20	0	7	5	-	-
0	0	0	0	5	0	4	0	4	5	-	-
2	0	11	0	2	0	1	0	11	1	-	-
0	0	1	0	5	0	1	0	6	5	+	-
5	0	7	0	0	0	0	0	1	1	-	-
		5	0	8	0	6	0	6	8	-	+

APPENDIX—continued

I.D.	Sex	Type	Female Sibs		Male Sibs		Mother's Age Status		Father's Age Status		Affected Grandparent	Paternal			Maternal		
			Total	Affected	Total	Affected	Total	Status	Total	Status		Uncles Total	Aunts Affected	Total	Aunts Affected		
414	M	U	0	0	1	0	21	N	22	N	Mat. Gr.F.	3	0	5	0	4	0
415	M	L	0	0	0	0	18	N	18	N		2	0	6	0	8	0
416	M	F	0	0	1	0	20	N	38	N		1	0	2	0	1	0
417	M	U	2	0	0	0	29	N	32	N		1	0	1	0	1	0
418	M	L	0	0	2	0	25	N	25	N		2	0	2	0	0	0
419	M	F	0	0	1	0	20	N	24	N		3	0	2	0	0	0
420	F	R	2	0	0	0	22	N	29	N		3	0	4	0	0	0
421	M	B	4	0	2	0	34	N	38	N		2	0	4	0	4	0
422	M	B	0	0	1	0	21	N	22	N		0	0	1	0	4	0
423	F	U	0	0	1	0	17	N	26	N		5	0	2	0	1	0
424	M	U	0	0	1	0	30	N	47	N		1	0	1	0	0	0
425	M	B	1	0	3	0	30	N	34	N		6	0	5	0	1	0
426	F	R	5	0	1	0	35	N	33	N		0	0	2	0	1	0
427	M	R	1	0	1	0	29	N	32	N		1	0	2	0	1	0
428	F	U	2	0	1	0	34	N	35	N		2	0	2	0	0	0
429	F	U	1	0	0	0	20	N	24	N		1	0	1	0	1	0
430	F	U	4	0	1	1	32	N	32	N		2	0	2	0	2	0
431	F	U	3	0	0	0	24	N	29	N		5	0	0	0	1	0
432	F	R	0	0	1	0	22	N	27	N		1	0	1	0	1	0
433	F	L	2	0	0	0	28	N	30	N		1	0	0	0	0	0
434	F	L	0	0	1	0	30	N	34	N		3	0	3	0	3	0
435	F	F	1	0	3	0	25	N	24	N		2	0	1	0	2	0
436	F	B	1	0	2	0	25	N	34	N		1	0	1	0	0	0
437	M	B	0	0	2	0	32	N	36	N		4	0	2	0	1	0
438	M	B	2	0	0	0	26	N	29	N		3	0	1	0	3	1
439	F	U	4	0	2	0	43	N	44	N		3	0	3	0	3	0
440	M	B	1	0	1	0	22	N	23	N		1	0	1	0	0	0
441	M	U	0	0	0	0	18	N	20	N		0	0	0	0	0	0
442	F	U	1	0	1	0	23	N	35	N		0	0	4	0	0	0
443	F	U	0	0	2	0	22	N	32	N		0	0	0	0	2	0
444	F	U	1	0	0	0	19	N	24	A		1	0	2	0	2	0
445	M	U	1	0	4	0	37	N	39	N		3	0	3	0	6	0
446	F	L	0	0	2	0	39	N	38	N		1	0	1	0	6	0
447	F	B	1	0	0	0	31	N	33	N		1	0	5	0	0	0
448	M	B	0	0	2	0	28	N	30	N		3	0	1	0	0	0
449	M	R	1	0	0	0	28	N	26	N		0	0	1	0	0	0
450	M	U	4	0	2	0	28	N	31	N		1	0	0	0	0	0
451	M	B	2	0	4	1	39	N	37	N		2	0	0	0	0	0
452	M	U	1	0	3	0	30	N	33	N		4	0	4	0	5	0
453	M	L	0	0	1	0	28	N	27	N		0	0	0	0	0	0
454	M	U	1	0	0	0	36	N	36	N		0	0	2	0	0	0
455	M	B	2	0	2	0	28	N	30	N		0	0	2	0	3	0
456	M	U	3	0	0	0	31	N	31	N		3	0	6	0	3	0
457	F	U	0	0	2	0	17	N	19	N		0	0	0	0	4	0
458	F	R	1	0	1	0	24	N	26	N		0	0	1	0	5	0
459	F	L	1	0	0	0	25	N	28	N		6	0	6	0	2	0
460	F	U	0	0	0	0	21	N	18	N		0	0	0	0	3	0
461	F	U	1	0	1	0	24	N	26	N		3	0	3	0	2	0
462	F	B	0	0	2	0	30	N	29	N		3	0	2	1	0	0
463	M	U	1	0	2	0	27	N	27	N	3	0	0	0	1	0	
464	M	U	0	0	2	0	19	N	23	N	6	0	5	0	4	0	
465	M	U	1	0	2	0	23	N	24	N	0	0	0	0	0	0	
466	M	B	1	0	0	0	30	N	30	N	4	0	4	0	1	0	
467	M	F	1	0	0	0	23	N	28	N	4	0	1	0	0	0	
468	M	R	1	0	0	0	19	N	26	N	3	0	0	0	0	0	
469	M	B	2	0	0	0	38	N	38	N	3	0	3	0	0	0	
470	F	U	0	0	2	0	29	N	29	N	3	0	1	0	4	0	
471	F	B	3	0	0	0	17	N	21	N	8	0	9	0	4	0	
472	F	U	0	0	0	0	22	N	30	N	1	0	1	0	2	0	
473	F	U	1	0	1	0	20	N	23	N	4	0	1	0	2	0	
474	F	R	1	0	0	0	17	N	19	N	1	0	0	0	1	0	
475	F	U	1	0	1	0	23	N	24	N	1	0	1	0	2	0	
476	F	U	2	0	4	0	35	N	36	N	3	0	6	0	1	0	
477	M	U	0	0	0	0	22	N	30	N	0	0	0	0	0	0	
478	M	L	1	0	0	0	28	N	28	N	0	0	0	0	1	0	
479	M	L	1	0	1	0	28	N	28	N	0	0	1	0	2	0	
480	M	U	2	0	1	0	18	N	24	N	2	0	1	0	3	0	
481	F	U	5	0	5	0	39	N	41	N	3	0	2	0	4	0	
482	M	B	1	0	0	0	24	N	26	N	1	0	0	0	5	0	
483	M	B	3	0	2	0	34	N	38	N	2	0	5	0	0	0	
484	M	U	1	0	5	0	24	N	23	N	5	0	0	0	6	0	
485	M	U	1	0	1	0	33	N	34	N	1	0	0	0	1	0	
486	F	U	7	0	0	0	26	N	35	N	0	0	1	0	1	0	
487	M	U	2	0	1	0	25	N	29	N	1	0	3	0	1	0	
488	M	U	3	0	0	0	31	N	38	N	3	0	3	0	1	0	
489	M	L	0	0	2	0	29	N	30	N	3	0	2	0	3	0	
490	M	R	0	0	1	0	35	N	39	N	1	0	2	0	2	0	
491	F	B	0	0	1	0	18	N	24	N	0	0	1	0	3	0	
492	M	R	1	0	1	0	20	N	25	N	2	0	0	0	3	0	
493	M	L	1	0	1	0	29	N	30	N	0	0	0	0	3	0	
494	M	B	1	0	1	0	30	N	32	N	7	0	0	0	0	0	
495	M	U	2	0	3	0	31	N	31	N	1	0	3	0	2	0	
496	F	R	1	0	1	0	34	N	34	N	0	0	2	0	0	0	

Congenital Cleft Lip

APPENDIX—continued

Paternal First Cousins				Maternal First Cousins				Month of Birth of Propositus	Birth Rank of Propositus	Other Malformations	Family History Other than Sibs
Total	Male Affected	Total	Female Affected	Total	Male Affected	Total	Female Affected				
14	0	12	0	10	0	9	0	12	2	-	-
11	0	4	0	21	0	17	1	3	1	-	+
8	0	5	0	10	0	4	0	3	2	-	-
2	0	1	0	3	0	1	0	1	2	+	-
7	0	5	0	2	0	2	0	10	1	-	-
8	0	5	0	1	0	2	0	8	2	-	-
12	0	6	0	0	0	0	0	4	1	-	+
6	0	6	0	12	0	8	0	11	7	-	-
1	0	0	0	5	0	1	0	3	1	-	-
4	0	11	0	1	0	1	0	7	1	-	+
7	0	8	0	2	0	5	0	3	1	-	-
14	0	17	0	2	0	6	0	4	5	-	-
3	0	0	0	4	0	4	0	12	6	-	+
5	0	3	0	1	0	0	0	4	3	-	-
2	0	6	0	2	0	2	0	1	4	-	-
2	0	1	0	2	0	1	0	5	1	-	-
2	0	4	0	2	0	3	0	1	3	-	+
8	0	5	0	8	0	8	0	9	3	-	-
3	0	2	0	2	0	1	0	9	1	-	-
1	0	1	0	0	0	0	0	5	2	-	-
8	0	8	0	1	0	0	0	10	2	-	-
1	0	1	0	12	0	7	0	8	2	+	-
5	0	4	0	0	0	1	0	5	3	-	-
6	0	3	0	4	0	0	0	8	7	-	-
3	0	1	0	9	0	6	0	7	3	+	+
5	0	6	0	4	0	2	0	11	9	-	-
0	0	0	0	0	0	0	0	9	3	+	-
0	0	3	0	1	0	1	0	2	1	-	-
2	0	0	0	4	0	3	0	6	1	+	-
10	0	9	0	6	0	7	0	12	8	-	+
1	0	7	0	12	0	13	0	4	6	-	-
6	0	5	0	1	0	1	0	1	3	-	-
5	0	7	0	9	0	9	0	12	1	+	-
2	0	1	0	1	0	2	0	12	3	-	-
4	0	0	0	3	0	7	0	6	1	+	-
10	0	3	0	0	0	0	0	3	5	-	-
0	0	12	0	10	0	0	0	8	7	-	-
1	0	0	0	2	0	11	0	8	5	-	-
3	0	1	0	3	0	4	0	3	2	-	-
13	0	2	0	9	0	2	0	3	2	-	-
0	0	7	0	9	0	10	0	4	4	-	-
1	0	0	0	1	0	2	0	3	2	-	-
14	0	2	0	8	0	10	0	6	1	-	-
0	0	16	0	4	0	2	0	8	1	-	-
8	0	0	0	7	0	3	0	9	3	-	-
3	0	8	0	2	0	6	0	7	1	-	-
1	0	3	0	0	0	0	0	12	3	-	+
21	0	2	0	7	0	6	0	7	3	-	-
0	0	14	0	13	0	8	0	8	4	-	+
6	0	0	0	0	0	0	0	8	1	-	-
2	0	0	0	0	0	9	0	1	3	-	-
0	0	11	0	0	0	0	0	7	2	-	-
5	0	3	0	0	0	2	0	4	1	+	-
4	0	0	0	0	0	0	0	3	2	-	-
9	0	5	0	2	0	0	0	9	3	-	-
1	0	2	0	1	0	2	0	6	3	-	-
5	0	12	0	1	0	3	0	10	2	-	+
1	0	1	0	2	0	0	0	2	1	-	-
0	0	3	0	4	0	5	1	5	2	+	+
9	0	0	0	0	0	0	0	12	1	-	-
0	0	2	0	2	0	7	0	9	2	-	-
0	0	10	0	0	0	0	0	5	4	-	+
2	0	0	0	7	0	1	0	8	1	-	-
4	0	1	0	0	0	7	0	4	2	-	-
19	0	4	0	0	0	0	0	10	2	-	-
0	0	18	0	19	0	16	0	4	10	-	+
17	0	0	0	6	0	9	0	7	7	-	-
2	0	24	0	4	0	2	1	12	2	-	+
3	0	5	0	11	0	4	0	1	5	-	-
3	0	2	0	5	0	4	0	6	1	-	-
5	0	7	0	14	0	15	0	1	3	-	-
7	0	3	0	1	0	1	0	1	7	-	-
5	0	7	0	3	0	4	0	9	3	-	-
2	0	1	0	4	0	3	0	6	3	-	-
0	0	2	0	1	0	3	0	3	2	-	+
10	0	1	0	5	0	2	0	12	1	-	-
0	0	3	0	3	0	0	0	4	2	-	-
5	0	0	0	0	0	0	0	3	7	-	+
5	0	10	0	1	0	1	0	7	2	-	-
2	0	5	0	15	0	9	0	9	5	-	-
0	0	1	0	0	0	0	0	3	3	-	-
2	0	1	0	0	0	0	0	2	3	-	-