

A Study of Children of Incestuous Matings

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Abstract. A group of 161 children from incestuous matings has been examined and compared with 95 of their half-sibs. The parental age distribution showed considerable differences between the groups, and the period of observation was longer in children of incestuous origin

Key Words

Children of incest
Morbidity
Mortality

The educational level of the parents was below average; 20 of the 141 mothers were mentally retarded. Information about the fathers was less complete in both groups, but 8 of 138 fathers in the consanguineous group were known to be mentally subnormal.

Prenatal, neonatal and infant mortality was higher among children from incestuous unions, and mental retardation as well as congenital malformations, single and multiple, were far more frequent among these children than among their half-sibs who were offspring of unrelated parents.

Some knowledge about the latent genetic load in man is indispensable in order to assess the relative importance which such factors as ionizing radiation and treatment of congenital defects as well as differential fertility and assortative mating may have for the genetic endowment. Undoubtedly, more definite conclusions in this respect will be obtained after extensive studies of several consecutive generations. However, estimates of the genetic load, even though they be crude, enable us to get an insight into the genetic variation of human populations, and at the same time they provide a basis for calculation of the increased risk to children of consanguineous matings. REED [1954] suggested the investigation of children arising from incestuous unions as a method for the estimation of the detrimental heterozygosity of man. In 1967, ADAMS and NEEL published data on 18 children of brother-sister unions and 6 children of father-daughter unions. These cases were followed from pregnancy up to the 6th month of age. The effect of incest on mortality and morbidity was manifest: 2 of the children died in the neonatal

period and 1 died at the age of 2 months. Furthermore, 1 child had bilateral cleft lip, 2 were severely mentally retarded and 3 of subnormal intelligence. No child died in a control group of children born to young mothers of similar intelligence, somatotype and socioeconomic conditions, and none of the control children had an IQ below 80; the congenital anomalies found in 4 control children were unimportant.

CARTER [1967] published data concerning 13 children of incest, 7 from brother-sister matings and 6 from father-daughter matings; they were followed from birth to the age of 4 to 6 years. Only 5 of these children were normal. Three died (one at 13 month with cystic fibrosis of the pancreas, one at 21 months with progressive cerebral degeneration with blindness, and one at 7 years from Fallot's tetralogy; one child was severely mentally subnormal). CARTER concluded that his findings were compatible with an average of 1-2 detrimental recessive genes in man's genome.

In the present communication we have tried to contribute to the knowledge about the latent genetic component of infant mortality and congenital defects by studying a series of 161 children resulting from incestuous matings and comparing them with a control sample of children derived from matings between the same mothers and unrelated partners.

Material

By the courtesy of district courts, maternity homes, departments of obstetrics and paediatrics in various hospitals, children's homes and asylums we were, during the period from 1962 until the beginning of 1970, able to collect information about and examine 161 children reported to have resulted from incestuous unions. During this period the above-mentioned institutions were asked to report all such cases known to them, and on the whole 93% responded to the request. All cases had previously been examined by district courts and had been legally confirmed as incestuous unions. Later on, we were informed by the National Health Service about 3 more pregnancies of incestuous origin; one of these ended with spontaneous abortion, the other 2 were terminated by artificial interruption.

The series consists of 88 children from father-daughter unions, 72 children from brother-sister unions and 1 child from a mother-son union. There were 88 males, 72 females and 1 child of indeterminate sex with malformed external genitals; no autopsy was performed in this child. There were 6 unions with 2 children each (one of these a pair of different-sexed twins), 2 with 3, 2 with 4 children, and 1 with 5 children of the same parents. Three sisters had a total of 5 children by their father, and 2 sisters had 1 child each by their father.

With the exception of 1 case of Greek parents and 1 of gipsy parents, all the other parents were of Czech or Slovak nationality. The educational level of the parents was

below average: 4 females and 2 males had attended secondary school, while the remaining had attended elementary school only.

As a control group for comparison we have chosen children born to the incestuous mothers in matings with unrelated partners. The fact that the children of incest are

Table I. Year of birth of children of incest and control children

Year of birth	Children of incest			Control children	
	Male	Female	Sex unknown	Male	Female
1970	2	—		1	—
1969	—	1		2	1
1968	1	—		5	2
1967	6	6		2	2
1966	4	2		—	3
1965	2	2		3	2
1964	1	7		3	3
1963	10	8		2	3
1962	3	3		—	2
1961	5	6		4	1
1960	6	2		—	2
1959	10	3		3	1
1958	3	3		5	3
1957	1	4	1	1	2
1956	6	5		2	2
1955	2	2		2	1
1954	3	2		4	2
1953	4	2		2	1
1952	3	3		1	3
1951	4	2		1	—
1950	—	1		2	3
1949	2	3		—	2
1948	3	1		2	—
1947	2	—		—	—
1946	1	2		—	1
1945	—	—		2	1
1944	1	—		1	—
1943	—	—		—	1
1942	1	—		1	—
1941	—	1			
1939	2	—			
1933	—	1			
Total	88	72	1	51	44

Table II. Placing of the children

	Incest group	Control group
Remained with the family	50	59
Adopted	16	2
Children's homes	46	29
Asylums	26	—
Died	23	5
Total	161	95

Table III. Mean age of parents at the time of the birth of the children

Mating — type	Mean age, years	
Father-daughter	father	48.0
	mother	18.9
Brother-sister	father	23.3
	mother	19.9
Unrelated	father	24.9
	mother	24.0

matched to their half-sibs and that the social status of the families is similar may, in our opinion, compensate for the incompleteness of the control series (the families are not complete because most mothers were very young and no information was available concerning the history of 38 mothers after the birth of the child of incest) and for the difference of parental ages at the time of birth of the children. The control group includes 51 boys and 44 girls; 62 children came from 19 families and 8 children were illegitimate.

The following data were recorded in both groups: the personal data of the parents, their occupation and state of health; the birth-data of the children, their sex, parity, birth weight, development, congenital malformations if any, presence of metabolic errors (examined by biochemical screening), ABO blood groups, present state of health and, in case they had died, the cause of death. The age distribution of the children is given in table I and the placing of the children in table II. The mean ages of the parents appear from table III. Figure 1 shows the age distributions of the parents at the time of the birth of the incestuous children and of the control children.

The parents

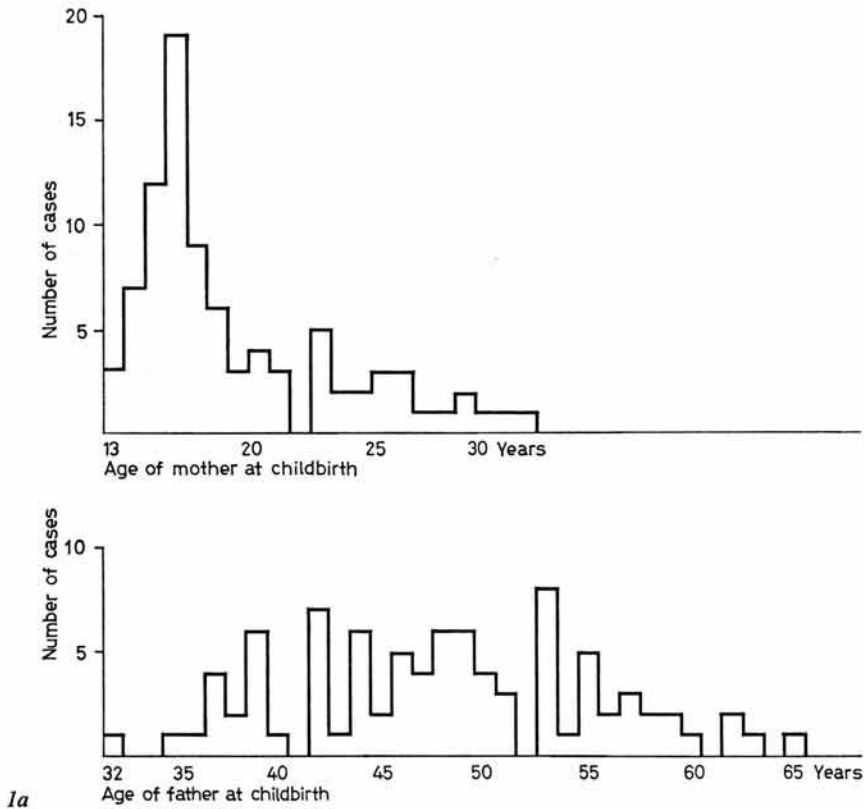
Incestuous unions. Of the 141 mothers, 116 were normal or presumably normal. Twenty were found to be mentally subnormal; of these 2 were also deaf-mute, 2 had congenital lues and 2 had epilepsy. Furthermore, 2 mothers were deaf-mutes and 3 had schizophrenia (one of these had died before the time of examination). It ought to be mentioned that psychological and psychiatric examinations of the mothers had only been performed if

they had presented signs of mental abnormalities or had been unable to attend normal schools.

Information on fathers was less complete; most of them were in prison at the time of examination and could not be contacted. Of 138 fathers, 8 were diagnosed as mentally subnormal, 13 were classified as chronic alcoholics according to the documents of the courts, 4 had committed suicide after the disclosure of their incestuous relations, and 2 were found to have acquired lues.

Control group. The sample of 46 control mothers consists of a subgroup of the incestuous mothers, viz. those who had one or more children with unrelated partners. Two of these mothers were deaf-mutes, 1 was a deaf-mute and mentally subnormal, and 1 was mentally subnormal.

The group of 52 control fathers is entirely different from the fathers of the incestuous unions. The necessity of secrecy made the examination of this group of fathers difficult and in many cases even impossible. None of them were known to be mentally retarded; 1 had polydactyly (the control child was likewise affected), and 2 were stated to be chronic alcoholics. The fathers of 8 control children were unknown.



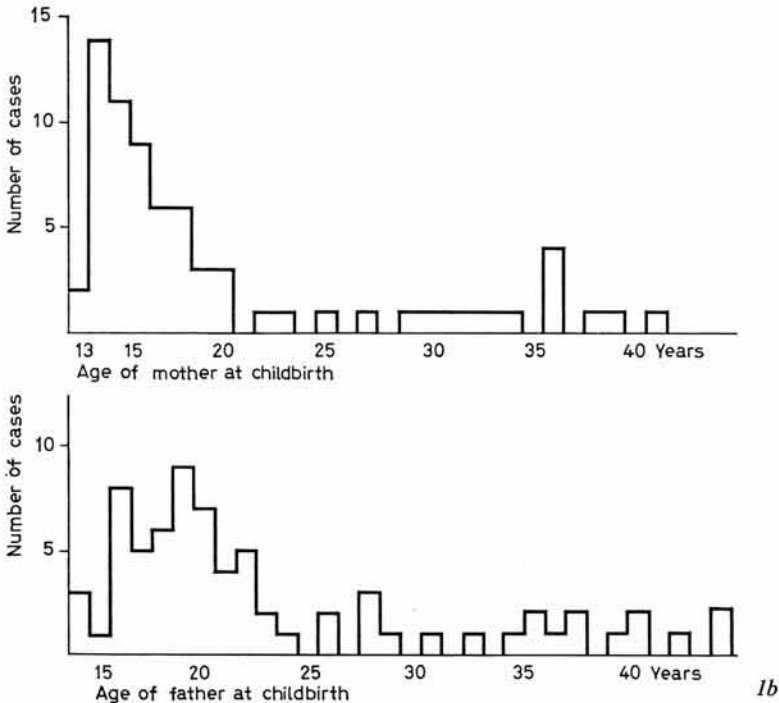
(Legend see page 114)

Results

Mortality

Children of incest. Of 88 boys, 2 were still-born; 3 of 10 born before term, and 6 of 76 born at term had died prior to the time of examination, 2 died after the examination. All 3 prematures who died had malformations of the central nervous system. Among the 8 deceased boys born at term, 1 had congenital hydrocephaly, 1 who died at the age of 4 years was blind and imbecile; and 1 dying at the age of 8 was deaf-mute and imbecile; 1 who died from lymphosarcoma at the age of 3 presented symptoms of cerebral palsy.

The 72 girls were all live-born, 14 were premature and 58 born at term. Three of the prematurely born died (1 had polycystic kidneys, 1 had a meningocele). Of the 58 born at term, 6 had died before the time of examination; 1 at 18 months from congenital heart disease, and 1 at the age of 11 years had congenital myotonia and was severely mentally retarded.



(Legend see page 114)

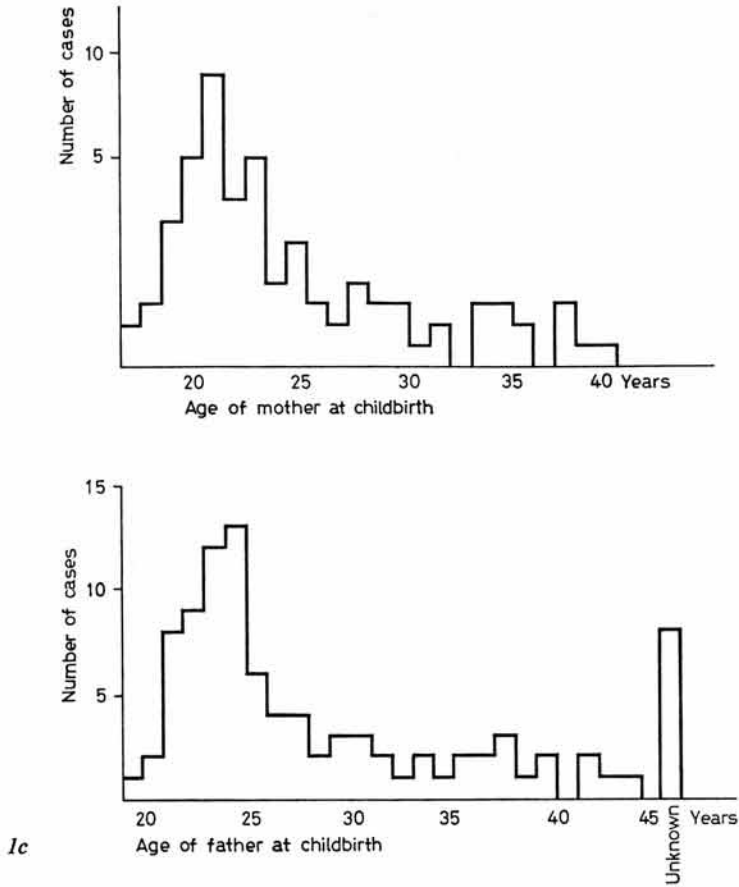


Fig. 1. Distribution of parental ages at the time of birth of their children. *a* Father-daughter unions; *b* brother-sister unions; *c* unions between unrelated partners (control group).

The child of indeterminate sex was prematurely born and died 5 days after birth; no autopsy was performed.

Control children. All 95 children in this group were live-born. Three boys were born before term and 48 at term. One of the prematures who had congenital hydrocephaly died at the age of 3 months, and 3 of those born at term died within the first 6 months; none of them presented congenital malformations. The 44 girls belonging to this group were live-born. Three girls

were born before term and 41 at term. One of the prematures died 10 min after birth.

Congenital Malformations and Other Disorders

In order to assess the consequences of inbreeding, it is unavoidable to adopt some criterion for classifying the individuals under study as normals or abnormals, bearing in mind, however, that any criterion is to some extent arbitrary and open to objections. Taking into consideration the possible unfavourable effect of environment on the mental development of a child, we decided to include in the group of apparently normal children even those who had presented signs of mild mental retardation, but who were able to attend special schools, as this might have been due to the mental subnormality of the parents. We have, furthermore, accepted as normal all children who had only slight abnormalities such as epicanthus, gothic palate or auricular pits, and also 2 boys older than 6 years with cryptorchidism, 1 boy with mild facial scoliosis without torticollis, 1 boy and 1 girl with convergent strabismus, 1 boy with asthma and 1 boy with atopic eczema. Thus, 78 of 138 living children of incest were placed in the normal group.

When comparing the incestuous group with the control group of children we discarded families in which either of the parents was deaf-mute (3 mothers in the control group with 3 normal children and 1 child with hypacusis; 4 mothers in the incestuous group with 4 deaf-mute and no normal children), or suffered from schizophrenia (3 mothers) or epilepsy (2 mothers);

Table IV. Mortality of live-born children within the first year

Period of observation	Children of incest (n = 157)		Control children (n = 93)	
	Deaths within the period	Per cent alive at the end of the period	Deaths within the period	Per cent alive at the end of the period
1st-3rd day	5	96.9	1	99.0
1st-28th day	9	94.3	1	99.0
1st-365th day	13	91.8	5	94.7

Still-births: children of incest, 2 of 161 children = 1.2%; control children: 0 of 95 children.

Note: 2 children of incestuous matings and 2 of the control children were still below the age of 1 year at the time of examination and have been excluded from this table.

all of these 5 were in the incestuous group and had 1 normal and 4 abnormal children. In this way, the group of 86 living control children came to include 4 abnormal, and the group of 130 living incestuous children 53 abnormal. The difference is highly significant, $\chi^2 = 34,77$ (d.f. = 1, $P < 0.001$).

The major abnormalities observed are listed in table V. It is conspicuous that multiple congenital malformations were found only among incestuous children.

It may be of interest to make a separate comparison between the control group of children and their half-sibs; the mothers are the same in both groups, the fathers in the former group are unrelated to the mothers, but in the latter group they were either fathers or brothers of the mothers. Of 46 mothers, 44 were stated to have an intelligence within normal limits and had partners who, according to the information available, were also normal. These 44 mothers had 92 children with unrelated partners; no known case of higher mental deficiency was found among the children. Eighty-seven were alive at the time of examination, 5 had died within the first 5 months: 1 had congenital hydrocephaly, the other 4 presented no congenital malformations. Among the surviving children in this group, 1 was a deaf-mute (both parents had normal hearing) and 1 had polydactyly (as had his father), 1 had congenital luxation of the hip; no malformations had been observed in the remaining. The same mothers had 50 children with related partners. Six of these children had died before the time of examination: 3 died within the 1st week of life, 2 with malformations (microcephaly and malformed external genitals, respectively) and 3 died at the age of 3-4 years (lymphosarcoma, hydrocephaly, and imbecility + blindness, respectively). Twelve of the 44 surviving children were severely mentally retarded; in one of these cases dwarfism was also present, in another congenital cataract, and in a 3rd case deaf-mutism in addition to imbecility. Five had congenital dislocation of the hip, one of these had also Hirschsprung's disease and hypospadias, and microcephaly was present in a 2nd of these cases. One child had congenital heart disease, and in 1 mucopolysaccharidosis Sanfilippo was diagnosed. Finally, 1 child with deaf-mutism and amblyopia occurred in this group of incestuous children.

Comments

Incest is the closest union that can occur in man, and leads to offspring with a coefficient of inbreeding equal to 1/4. Hence the risk due to deleterious recessive genes is expected to be 4 times greater than for the offspring of

Table V. Congenital malformations and other abnormalities

Congenital malformations	Children of incest (n = 161)	Control children (n = 95)
a) Single malformations		
Hydrocephaly	M	M
Meningocele	M, F	
Heart malformation	M, M ¹ , F, F	
Cleft palate	M	
Polydactyly		M
Talipes	M ¹	
Luxation of the hip	M ¹ ² , F, F, F, F	F
Kyphoscoliosis	F, F ¹ ⁴	
Dwarfism	F ¹	
Macro/microcystic kidneys	F	
Hypospadias	M, M	
Malformed external genitals	1 of unknown sex	
Cataract	M ¹	
b) Multiple malformations		
Dwarfism, hydrocephaly, cataract	F ¹	
Microcephaly, int. hydrocephaly	M	
Microcephaly, luxation of the hip	F, F	
Microcephaly, acetabular dysplasia	M ³	
Luxation of the hip, pyloric stenosis	M	
Luxation of the hip, megacolon, hypospadias	M	
Luxation of the hip, torticollis	M ¹	
Luxation of the hip, ichthyosis	F ¹ ⁴	
Other abnormalities		
Imbecility, idiocy, uncomplicated	9 M, 11 F	
Idiocy, hydrocephaly	M	
Imbecility or idiocy, epilepsy	M, F	
Imbecility or idiocy, deaf-mutism	M, M, F, F	
Imbecility, blindness	M	
Deaf-mutism	M, F	M
Deaf-mutism, unilateral blindness	M	
Epilepsy, uncomplicated	M, M, F	F
Congenital myotonia	F ¹	
Haemorrhagic diathesis, unknown etiology	F ¹	
Adiposogenital syndrome	M ¹	
Hyperaminoaciduria (homocystinuria, cystathionuria)	M	
Mucopolysaccharidosis Sanfilippo	M, F	

Table V (continued)

Congenital malformations	Children of incest (n = 161)	Control children (n = 95)
Total number of cases with imbecility or idiocy (congenital hydrocephaly and microcephaly excl.)	40	0
¹ Accompanied by imbecility or idiocy.		
² Accompanied by deaf-mutism, retinitis pigmentosa and epilepsy.		
³ Accompanied by retinitis pigmentosa.		
⁴ Accompanied by epilepsy.		
M = male, F = female.		

first cousin matings. Though no information concerning early foetal losses was available, the data presented here show an unmistakable effect of inbreeding on infant mortality, congenital malformations and intelligence level. However, disregarding the fact that the series is relatively small, a direct comparison with the data from legally permitted consanguineous unions is hardly possible. Undoubtedly, the parents of the children of incest are not a representative sample of the general population, and some cases of mental subnormality in the children may be attributable to the mental subnormality of their parents which probably played a role in the occurrence of incest. In addition, specific adverse factors tend to accompany a pregnancy of incestuous origin in a more severe form (mental stress, attempts at artificial interruption) than what is the case even in an unwanted pregnancy resulting from a union between unrelated individuals.

The sample of incestuous parents is not homogeneous even with respect to the age of the mothers or their mental standard. The mothers in brother-sister unions are on the average younger and their intelligence higher than is the case in father-daughter unions. However, there is no significant difference between these 2 subgroups with respect to infant mortality or morbidity as defined here.

We are also aware of the fact that we have considered some cases of minor defects as being within the range of normal variation which may by others be considered as abnormalities.

Undoubtedly, more children of incest must be assembled before safe comparisons of this unusual kind of data can be made with the results obtained from studies of offspring from consanguineous matings of the legal type.

Table VI

Personal and medical data of parents and children of the incestuous group (columns II-V) and of the control group (columns VI and VII).

Key

Column

I	<i>Serial case number</i>
II	<i>Mothers of incestuous and control children</i> Figures indicate year of birth Abnormalities and diseases: deaf-m. = deaf-mutism ment. subn. = mentally subnormal schiz. = schizophrenia
III	<i>Type of incestuous union</i> b/s = brother/sister f/d = father/daughter m/s = mother/son
IV	<i>Fathers of incestuous children</i> Figures indicate year of birth Abnormalities and diseases: alc. = chronic alcoholism ment. subn. = mentally subnormal suic. = suicide
V	<i>Children of incestuous unions</i> M = male, F = female Figures indicate year of birth and (in brackets) year of latest examination or age at death (+); d = days, m = months, w = weeks, y = years Abnormalities and diseases atop. = atopic brpn. = bronchopneumonia cong. = congenital conv. = convergent d. = disease eq.-v. = equino-varus lux. cox. = congenital luxation of the hip malf. = malformed pigm. = pigmentosa praemat. = praematurity s. = syndrome unkn. etiol. = unknown etiology
VI	<i>Fathers of control children</i> Figures and abbreviations as in column IV
VII	<i>Control children</i> Figures and abbreviations as in column V

Table VI (continued)

Incestuous group					Control group	
I	II	III	IV	V	VI	VII
001	1918	b/s	1914	M 1959 (1968) cryptorchidism	1914	M 1942 (1968) M 1944 (+ 5 m) F 1946 (1968) M 1948 (1968) F 1949 (1968) F 1950 (1968) M 1952 (1968) M 1953 (1968) M 1954 (1968) M 1956 (1968)
002	1918	f/d	1880	F 1933 (1968) alc. idiocy		
003	1920 ment.subn.	b/s	1915 ment.subn.	F 1941 (1969) deaf-m. M 1942 (1969) M 1944 (1969) F 1946 (1969) F 1948 (1969)		
004	1920 epilepsy ment.subn.	b/s	1916 ment.subn.	F 1956 (1969) ichtyosis cong., lux. cox., epilepsy, imbecility		
005	1921	f/d	1895	M 1948 (1968) imbecility	1923 alc.	M 1955 (1969) M 1956 (1969) M 1959 (1969) F 1960 (1969)
006	1921 ment.subn.	b/s	1919	M 1939 (+ 2 d) asphyxia F 1957 (1968) lux. cox., dyslalia		
007	1922	f/d	1900	F 1949 (1968)		
008	1922	m/s	1941	F 1967 (1970) lux. cox.	1920	F 1943 (1970) M 1945 (1970) F 1949 (1970) M 1951 (1970) M 1954 (1970) F 1958 (1970) F 1960 (1970) F 1962 (1970)
009	1923	f/d	1895	F 1953 (1968)	1920 1920	M 1945 (1968) M 1948 (1968) M 1958 (1968)

Table VI (continued)

Incestuous group					Control group	
I	II	III	IV	V	VI	VII
010	1923 schiz.	f/d	1890	M 1939 (1968) imbecility, adiposogenit. s.		
011	1924	f/d	1894	M 1947 (1968) imbecility, cong. cataract M 1949 (1968)	1922	F 1952 (1968) myopia grav. M 1953 (1968)
012	1925	f/d	1900	M 1948 (1968) M 1955 (+3 y) hydrocephaly, idiocy	1915 ?	M 1958 (1965) F 1945 (1966)
013	1926 cong. lues	f/d	1908 lues	M 1952 (1968) imbecility M 1954 (1968) imbecility F 1957 (1968) imbecility	1920	M 1950 (1966) deaf-m.
014	1926 ment. subn.	f/d	1896	F 1955 (+11 y) cong. myotonia, idiocy		
015	1927	f/d	1898	M 1953 (1966) hypacusis	1920	F 1957 (1966)
016	1928	b/s	1922	M 1951 (1965)		
017	1928	f/d	1899	M 1961 (1968)	?	F 1956 (1968)
018	1928	f/d	1899	F 1946 (1968)		
019	1928	b/s	1922	M 1967 (1969)		
020	1928	b/s	1923	M 1960 (1968) imbecility F 1964 (1968) imbecility		
021	1929 deaf-m.	f/d	1908	M 1946 (1968) deaf-m., amblyopia unilat.	1930	F 1950 (1968)
022	1929 ment. subn.	f/d	1907 suic.	F 1961 (1968)		
023	1929	f/d	1898	F 1954 (1968) cong. heart d.	1933	M 1958 (1968)
024	1930	f/d	1900	M 1949 (1968)	? ?	F 1953 (1965) M 1958 (1965)

Table VI (continued)

Incestuous group					Control group	
I	II	III	IV	V	VI	VII
025	1931	f/d	1900 ment.subn.	M 1948 (1968) epilepsy	1925	F 1950 (1968) epilepsy F 1952 (1968) M 1954 (+1 m) asphyxia protr. F 1956 (1968)
026	1931	b/s	1925	M 1947 (1967) strabism	1928	M 1950 (+3 m) brpn. F 1952 (1967) F 1954 (1967) M 1961 (1969)
027	1931 ment.subn.	b/s	1928 ment.subn.	M 1956 (1968)	?	
028	1932	b/s	1925 alc.	F 1961 (1967)	1911	M 1955 (1967)
029	1932	f/d	1913	F 1952 (+2 y) bas. meningitis M 1955 (1968) F 1956 (1968) M 1959 (1968) idiocy, epilepsy M 1956 (1968) deaf-m., idiocy	?	F 1954 (1966)
030	1933 deaf-m. ment.subn.	f/d	1903 alc.		?	F 1959 (1966)
031	1933	f/d	1908	F 1950 (1968)		
032	1933	f/d	1900	F 1949 (1967)	1930	M 1954 (1967) F 1955 (1969)
033	1933 cong. lues	f/d	1896 lues	M 1951 (+6 w) cong. hydrocephaly M 1953 (+1 d) meningocele F 1956 (+1 d) asphyxia, praem. M 1959 (1967)		
034	1933	f/d	1900	M 1951 (1966)		
035	1933	b/s	1934	F 1967 (1970)		
036	1933	b/s	1930	F 1951 (1968) imbecility M 1953 (1966) imbecility	1933	M 1958 (1966)

Table VI (continued)

Incestuous group					Control group	
I	II	III	IV	V	VI	VII
037	1934 deaf-m. ment. subn.	f/d	1900 ment. subn.	F 1958 (1968) deaf-m., idiocy		
038	1934 schiz.	f/d	1898	M 1953 (1968)		
039	1934	f/d	1911	F 1953 (1967)	1935 poly- dactyly	M 1959 (1967) polydactyly
040	1935 ment. subn.	f/d	1902	F 1949 (1967) imbecility, bleeding unkn. etiol.		
041	1935	f/d	1901	M 1951 (1967)		
042	1935	f/d	1900	F 1951 (1967)		
043	1935	b/s	1931	M 1952 (+1 d) F 1952 ((967)	1933	F 1958 (1967)
044	1936 ment. subn.	b/s	1932 ment. subn.	F 1963 (1968) idiocy		
045	1936	b/s	1938	M 1954 (1968)		
046	1936 schiz.	f/d	1910 alc.	F 1957 (1968) mucopoly-saccharidosis		
047	1937 ¹	f/d	1910 ¹ alc.	M 1952 (+4 y) imbecility, blindness	1935	F 1958 (1967)
048	1937 deaf-m.	f/d	1908 suic.	F 1954 (1968) imbecility, deaf-m.	1930 alc.	F 1957 (1968) hypacusis
049	1938	f/d	1905	F 1956 (1967) dwarfism, imbecility, hypacusis	1934	M 1957 (1968) M 1961 (1970) atop. eczema
050	1938	b/s	1933	F 1952 (1968)	1935	M 1959 (1966)
051	1938	f/d	1891	M 1956 (1968) imbecility, cong. heart d.		
052	1939 ment. subn.	b/s	1937	M 1959 (1968)		
053	1939	f/d	1902	F 1955 (1968) imbecility	1935	F 1961 (1969)
054	1939	f/d	1906 alc.	M 1959 (1967) cryptorchidism		
055	1940	f/d	1907	M 1957 (1968) idiocy		

Table VI (continued)

Incestuous group					Control group	
I	II	III	IV	V	VI	VII
056	1940 ³	f/d	1915 ⁴ alc.	◇ 1957 (+5 d) premat., malf. genitalia F 1960 (1968) imbecility M 1961 (+7 d) microcephaly int. hydrocephaly, atelect. pulm. M 1961 (1968)	1940	M 1964 (1968) M 1965 (1970)
057	1940 ment. subn.	f/d	1904 alc.			
058	1941 ment. subn.	b/s	1935	M 1963 (+4 m) pyopneumothorax		
059	1941	b/s	1935 alc.	M 1954 (1966)		
060	1941	b/s	1936	M 1956 (1968) epilepsy	1941	F 1963 (1968) M 1965 (1968) F 1966 (1968)
061	1941	b/s	1939	F 1961 (1968) kyphoscoliosis		
062	1941	f/d	1899	F 1956 (1967)	1938	M 1961 (1969) F 1963 (1969)
063	1942 ⁵	f/d	1910 ⁶ alc.	M 1956 (1968) epilepsy, deaf-m., lux. cox., retinitis pigm., imbecility		
064	1942	b/s	1932	F 1958 (1968)		
065	1942	f/d	1917	M 1956 (1968)	1940	M 1961 (1967)
066	1942	f/d	1909	M 1958 (1968)	1940	M 1963 (1968) M 1964 (1968) F 1965 (1968) lux. cox. F 1968 (+1 d)
067	1943	b/s	1939	F 1957 (+1 d) micro-macrocyst. kidney		
068	1943	b/s	1942 suic.	M 1960 (1968) atop. excema		
069	1943	b/s	1942	M 1959 (1968)	1940	F 1962 (1969) F 1963 (1969) F 1964 (1969)

Table VI (continued)

Incestuous group					Control group	
I	II	III	IV	V	VI	VII
070	1943	b/s	1940	M 1960 (1968)	1940	M 1965 (1968)
071	1943	f/d	1910	F 1958 (1968)		
072	1943 ⁷	f/d	1915 ⁸ alc.	F 1959 (1968) idiocy, kyphoscoliosis, epilepsy	1941	M 1964 (1968)
073	1943 epilepsy, ment. subn.	f/d	1918	M 1960 (+ 8 y) deaf-m., imbecility, sepsis		
074	1943 ment. subn.	b/s	1946	M 1962 (1968) pylorostenosis, lux. cox.		
075	1943	b/s	1942	M 1959 (1968) coeliac s.	1941	M 1967 (1969)
076	1944	f/d	1912	M 1960 (1968) microcephaly, retin. pigm., dysplasia cox. cong.		
077	1944	b/s	1943	M 1958 (1967)		
078	1944	f/d	1919	M 1959 (still-born)		
079	1944	b/s	1940	M 1959 (+ 3 m) dystrophia, pyopneumothorax		
080	1944	b/s	1942	M 1958 (1968) lux. cox., torticollis, bleeding unkn. etiol., imbecility		
081	1944	b/s	1938	M 1959 (1967)		
082	1945	b/s	1942	F 1961 (1968) microcephaly, lux. cox., coeliac. s.	1941	M 1963 (1969) F 1965 (1969) F 1968 (1969)
083	1945	b/s	1940	F 1963 (1966)		
084	1945	b/s	1948 ment. subn.	F 1962 (1968) conv. strabism.		
085	1945	b/s	1939	F 1959 (+ 28 d) dystrophia, brpn., dyspepsia		
086	1945	f/d	1920	F 1959 (1965)		
087	1946	f/d	1918	M 1962 (1967) imbecility		
088	1946	b/s	1942	F 1964 (+ 18 m) defect. subaort. ventricul.		

Table VI (continued)

Incestuous group					Control group	
I	II	III	IV	V	VI	VII
089	1946	b/s	1941	M 1960 (3 y) (1963) cerebral palsy, lymphosarcoma	1942	F 1964 (1966)
090	1946	b/s	1933	M 1961 (1967)		
091	1946	b/s	1941	M 1961 (1970) mucopolysaccharidosis Sanfilippo	1942	F 1964 (1969) F 1966 (1969)
092	1946	b/s	1944	F 1960 (1967)		
093	1946	b/s	1941 alc.	F 1963 (1967) microcephaly, lux. cox., myopia grav.		
094	1946 ment. subn.	f/d	1901 alc.	M 1963 (1968) hypospadias		
095	1947	b/s	1943 alc.	F 1962 (1968) imbecility		
096	1947	b/s	1944	M 1963 (1968)		
097	1947	f/d	1910	M 1963 (1968)		
098	1947	f/d	1918 alc.	F 1963 (1968) lux. cox.	1945	M 1968 (1970)
099	1947 ment. subn.	b/s	1940	F 1961 (1968) imbecility, epilepsy, strabismus conv.		
100	1947	b/s	1944	M 1963 (1968)	1945	M 1967 (1969)
101	1947 ⁹	f/d	1915 ¹⁰ alc.	F 1962 (+10 d) meningocele		
102	1947	b/s	1945	M 1963 (1970) hypospadias, lux. cox., megacolon cong.	1943	M 1970 (1970)
103	1947	b/s	1951	F 1965 (1968) imbecility		
104	1948	b/s	1943	F 1963 (1968) lux. cox., exud. enteropathy, hypoproteinemia	1946	M 1968 (+3 m) premat., cong. hydrocephaly M 1968 (1969)
105	1948	f/d	1911	F 1961 (1968)		
106	1948	f/d	1924	F 1963 (1968)		
107	1948	f/d	1917	M 1965 (1967) facial scoliosis		

Table VI (continued)

Incestuous group					Control group	
I	II	III	IV	V	VI	VII
108	1948	b/s	1951	F 1967 (1969)	?	M 1969 (1970)
	ment. subn.		ment. subn.			
109	1948	b/s	1945	M 1962 (1967)	1944	F 1967 (1969)
				imbecility		M 1968 (1969)
110	1948	f/d	1927	F 1964 (1968)	1944	F 1966 (1969)
				imbecility		
111	1948	b/s	1941	F 1967 (1969)	1945	M 1969 (1969)
112	1948	b/s	1947	F 1963 (1967)		
113	1948	b/s	1945	M 1963 (1968)	1943	F 1967 (1968)
				asthma		
114	1948	f/d	1920	F 1964 (+2 y)		
				medulloblastoma		
				cerebelli		
115	1949	f/d	1915	F 1965 (1968)		
				epilepsy		
116	1949	b/s	1945	F 1963 (+10 m)		
				dystrophy, brpn.		
117	1949	f/d	1925	F 1964 (1968)	1945	M 1968 (1970)
				imbecility		F 1969 (1970)
118	1949	f/d	1908	F 1964 (1968)		
119	1949	b/s	1945	M 1964 (1968)		
120	1949	f/d	1923	M 1965 (1968)		
121	1949	b/s	1945	M 1963 (1968)		
				talipes eq.-v.,		
				imbecility, atop.		
				eczema		
122	1949	f/d	1914	F 1967 (1969)		
123	1950	f/d	1920	F 1964 (1968)		
124	1950	b/s	1947	M 1963 (+) still-born		
125	1950	f/d	1929	M 1966 (1969)		
				deaf-m.		
126	1950	f/d	1924	M 1963 (1969)		
				coeliac s.		
127	1951	b/s	1947	M 1967 (1969)		
				imbecility		
128	1951	f/d	1908	F 1967 (1969)		
129	1951	b/s	1952	M 1966 (1969)		
130	1952	b/s	1945	F 1969 (1970)		
131	1952	f/d	1930	M 1967 (1969)		
				cleft palate		
132	1952	b/s	1950	M 1966 (1968)		

Table VI (continued)

Incestuous group					Control group	
I	II	III	IV	V	VI	VII
133	1952	f/d	1918	F 1966 (1968)		
134	1952	f/d	1922	F 1966 (1968)		
			suic.			
135	1952	f/d	1932	M 1967 (1968)		
136	1952	b/s	1949	M 1966 (1969)		
				hypospadias		
137	1953	b/s	1950	M 1967 (1969)		
138	1953	f/d	1932	M 1968 (1970)		
139	1954	f/d	1935	M 1967 (1969)		
				hyperaminoaciduria (homocystin-cystathionuria)		
140	1954	f/d	1933	M 1970 (1970)		
141	1954	f/d	1932	M 1970 (1970)		
				cong. heart d.		

¹ Sister of mother in case No. 063.

² Also father in case No. 063.

³ Sister of mother in cases No. 072 and 101.

⁴ Also father in cases No. 072 and 101.

⁵ Sister of mother in case No. 047.

⁶ Also father in case No. 047.

⁷ Sister of mother in cases No. 056 and 101.

⁸ Also father in cases No. 056 and 101.

⁹ Sister of mother in cases No. 056 and 072.

¹⁰ Also father in cases No. 056 and 072.

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