

PHYSICAL GROWTH OF TWO GENERATIONS OF ONE FAMILY

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THE FAMILY OF EIGHT CHILDREN

Figure 6

From left to right, top row: No. 1, No. 3, No. 2; middle row. John, No. 7, No. 4, No. 8, and Fanny; bottom row: No. 5 and No. 6. The family lived in China until the youngest child was two years old. In spite of the unfavorable conditions Fanny and John were able to raise their family with very few serious illnesses, and at the same time they kept a remarkably complete record of the growth of the children.

ABOUT thirty-six years ago, a young mother interested in the development of her first baby began to keep record of her children's progress in the form of a journal. Her primary purposes were to keep the records for comparison, for her own information, and to present the record to the child on his eighteenth birthday. The children's journals were more com-

plete than the usual Baby Book. They were kept over a period of almost twenty years from the birth of the eldest child in January, 1886, until the eighteenth birthday of the second child in July, 1905. From 1886 to 1900 the family were in China, during which period the records were carefully kept in detail. From 1900 to 1905, they are less detailed, having been recorded

*The writers are indebted to Mrs. F. M. Smith and to Mrs. C. L. Foster for assistance in securing the original data.

somewhat irregularly. In each journal is recorded the child's weight, taken usually at monthly intervals from the child's birth; the height, measured once or twice a year from birth, supplemented by notes as to illness, progress in lessons, general development, events of importance to the child, and observations in regard to his character and training.

Not only the mother kept this record but the two daughters who have married kept similar ones for their own children. Two of the three daughters-in-law have also recorded some data about their children which have been supplemented by more data collected by an aunt, one of the authors of this report. There are eleven grandchildren from over eight months to nine years of age. The data vary from some scattered records concerning one boy to the careful, frequent records kept by the eldest daughter of her five children.

Parentage

The father, John, was born June 4, 1854, on a farm near Moro, Illinois. His father was of Scotch-Irish descent, and was born in Pennsylvania, as were both his parents. His mother was of French, Welsh and Scotch descent and was born in Ohio. Her father was born in the Isle of Jersey and was a sailor. Soon after John's birth his parents moved to the small town of Moro, where John's father became a prosperous country merchant. John graduated from college in 1875 and from theological seminary in 1879. Years afterward his classmates remembered him as an unusually able student.

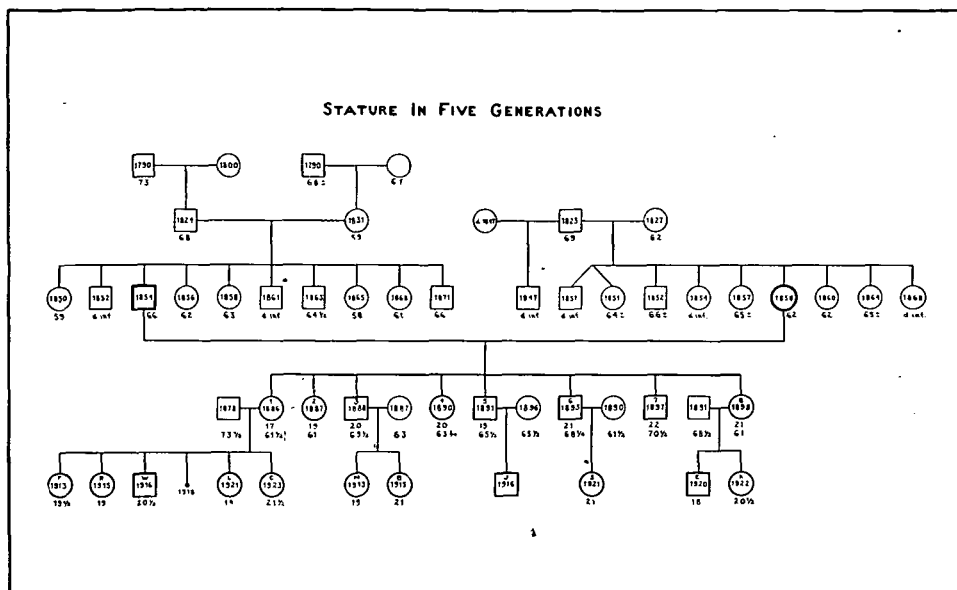
In personal appearance, John was five feet six inches tall and weighed about 150 pounds. His sitting-height was tall relatively to his standing height, perhaps due to his French heredity. This peculiarity is found in three of his daughters and one son. He had brown hair and gray eyes as had all his four sons. His eyes were crossed from infancy due, according to his mother, to a fall from the bed

when he was a few months old. This defect was not corrected until after his marriage. From 1881 to 1900, he lived in China. During that time he was engaged in pastoral, educational, or literary work. He did some translation into Chinese and wrote frequently for his church papers. His avocations were reading and carpentry, at which he was quite skillful.

The mother, Fanny, was born in Monroe, Michigan, November 14, 1858. Her father, a Presbyterian minister, and the eldest of three sons, was born in New York State, and was of English descent. Fanny's mother was the fourth of five daughters and her husband's second wife. They were married less than two years after the death of his first wife and her little son. Fanny was her mother's sixth child.

Physically, Fanny had much to contend with. Infantile paralysis when quite young left her slightly lame and left-handed, owing to the fact that her right side did not grow for some time. An operation for cataract was necessary at fourteen years, and an attack of spinal meningitis following a fall confined her to her bed for five months when she was seventeen years old. After nineteen years of age, she enjoyed good health and was vigorous and energetic. Before the birth of the youngest child she became very much run down, suffering with many boils, and soon after was seriously ill with sprue. Since then attacks of rheumatism and trouble with varicose veins have been practically her only ailments. At sixty-three she is still engaged in active work as a city missionary and is in fair health. At marriage Fanny was five feet, two inches tall and weighed about 120 pounds. She has brown eyes, as have all of her daughters, and brown hair which turned quite white in her thirties. Her second and third children in the early thirties already had not a little white hair.

At school, Fanny always stood high in her classes. She taught school for



STATURE IN FIVE GENERATIONS

Figure 7

Height at birth and adult height (in inches) is given for the eight children, and the height at birth of the grandchildren. The similar stature of parents and children at birth is apparent in the last two generations.

a term in America and two years in China, where she went as a missionary in 1882.

March 14, 1885, John and Fanny were married. After marriage, Fanny did some translation into Chinese, considerable visiting in the Chinese homes and other missionary work, and, with the exception of two autumn school terms, educated her children until their departure from China.

John and Fanny had eight children (Figures 6 and 8):

- No. 1, girl, born January 23, 1886
- No. 2, girl, born July 2, 1887
- No. 3, boy, born November 12, 1888
- No. 4, girl, born June 14, 1890
- No. 5, boy, born November 27, 1891
- No. 6, boy, born November 3, 1893
- No. 7, boy, born February 15, 1897
- No. 8, girl, born July 26, 1898

Early Environment of the Children

John and Fanny made their home in Shanghai, China, until 1894, with

the exception of the year July, 1890, to August, 1891, spent on furlough in the United States. In 1894, the family moved to Ningpo, about 130 miles to the south, where, with the exception of six months in 1897, they lived until March, 1900, when they left China to live in the United States. After a few months spent in visiting relatives in Colorado and in Tennessee, and a year in Illinois, they settled in North Dakota, where they lived until they moved to Iowa in 1905. The six older children were all born in Shanghai; the two youngest in Ningpo, China.

Shanghai and Ningpo are at latitudes 31 and 30, respectively, approximately that of New Orleans. Both are within twelve miles of the sea coast. The climate is damp with long hot summers and winters chilly rather than cold. Very little snow is seen. At Shanghai, the average humidity is 80, yearly rainfall 43.6 and mean temperature 58.8*. Shanghai, even then, had

*Data from Chinese Year Book.

quite a modern European settlement, but the family lived in the native city.

Peculiar hygienic difficulties surround a family in a Chinese city. Fresh milk was hard to obtain. It and the drinking water had to be boiled. Meat of animals dying a natural death was sold in the markets. Raw fruits and vegetables were unsafe to eat owing to the method of fertilization. The streets were dirty and sewage was not carefully disposed of. There was no quarantine of contagious diseases. The climate of the cities where the family lived added to the unhealthy conditions. The summers, which are much damper than the winters, are very oppressive and malaria is prevalent. All these facts result in a high death rate for both Chinese and foreign children.

Yet Fanny and John were able to raise all of their eight children, and with very few serious illnesses, although all had most of the usual children's diseases and all but one had to undergo tonsilectomy. Particular care was taken as to regularity of sleeping and eating and exposure to the sun during the hot summer. Two summers, 1888 and 1896, were spent in Japan and four, 1887, 1894, 1895, and 1899, at the hills near Ningpo. Every child was vaccinated within a few months after birth, and again at six years, and also whenever exposed to smallpox, which was often. The children were permitted to play with but few Chinese children without supervision and their foreign playmates were few, though cosmopolitan, so they depended mainly upon each other for companionship.

Physical Growth of Eight Children

1. Weight

The custom of the family was to weigh each baby at birth and thereafter (except for the two eldest who were weighed monthly) at weekly or semi-monthly intervals, until one or two years old, on the weekly or monthly anniversary of his birth. After his second birthday, the baby was weighed

with the whole group of children in the evening between supper and bedtime every month, about the first or last of the month. The child was weighed either nude or else as soon as weighed, his clothing was removed and weighed separately and the net weight recorded. When traveling in the United States in 1890-91, this was not possible and the weights for that year include clothing. In the accompanying tables such weights are given in brackets.

2. Height

Height was measured at birth, at one year, and after that usually on some child's birthday or New Year's day. The average number of separate height measures per child is twenty-one. The heights were measured without shoes. As soon as the baby could stand, he was placed against a doorpost and the father, using his carpenter's square and measure, carefully marked the height on the post and measured the distance. In referring to the different children the custom observed by their Chinese servants and friends of calling them No. 1, No. 2, and so forth, will be followed.

3.—Seasonal Variation in Growth of Weight and Height

Fanny's children, when taken together or grouped as babies under two years and above six months, as girls and as boys, all show the same variations in gain in weight. From September through January the gain is most rapid, October being the month of greatest gain in weight. In February there is a marked drop. From March through April there is a moderate gain, and from May through August there are slight gains or losses, especially in June.

In height the period of greatest growth is from May to November, especially in July and August.

4. Dentition

The record is quite complete for first dentition, but very few data were preserved regarding second dentition.



THREE GENERATIONS

Figure 8

From left to right, Fanny, No. 8, and No. 3's elder daughter (M), all at about ten years.

The curves show that the children beginning dentition early also finished early and those beginning late also finished late. Thus, No. 3 and No. 6, who cut their first teeth at six and seven months, respectively, cut the twentieth at twenty-four months. No. 4, No. 5, and No. 7, who began at eight, eight, and nine months, respectively, finished at twenty-eight months. No. 1 and No. 8, who began at eleven and thirteen months, respectively, did not finish until thirty-two and thirty-four months old. Number 8's slowness may have been due to rickets; but her son did not cut his first tooth until thirteen months old either. Number 2 is the exception. She cut her first tooth at six months and, according to rule, should have finished about the same age as 3 and 6 but did not until twenty-nine months old. Just why is not very clear. However, she had measles and whooping cough during this time and was quite sick with some digestive disorder at about one year and with fever at two years. During the interval from fifteen to twenty-one months that she cut no teeth she was treated by the doctor for bow legs. She cut her teeth hard. Perhaps she was rickety. Number 6's curve falls back during the time he was ill with malarial scurvy, but he recovered his rank when

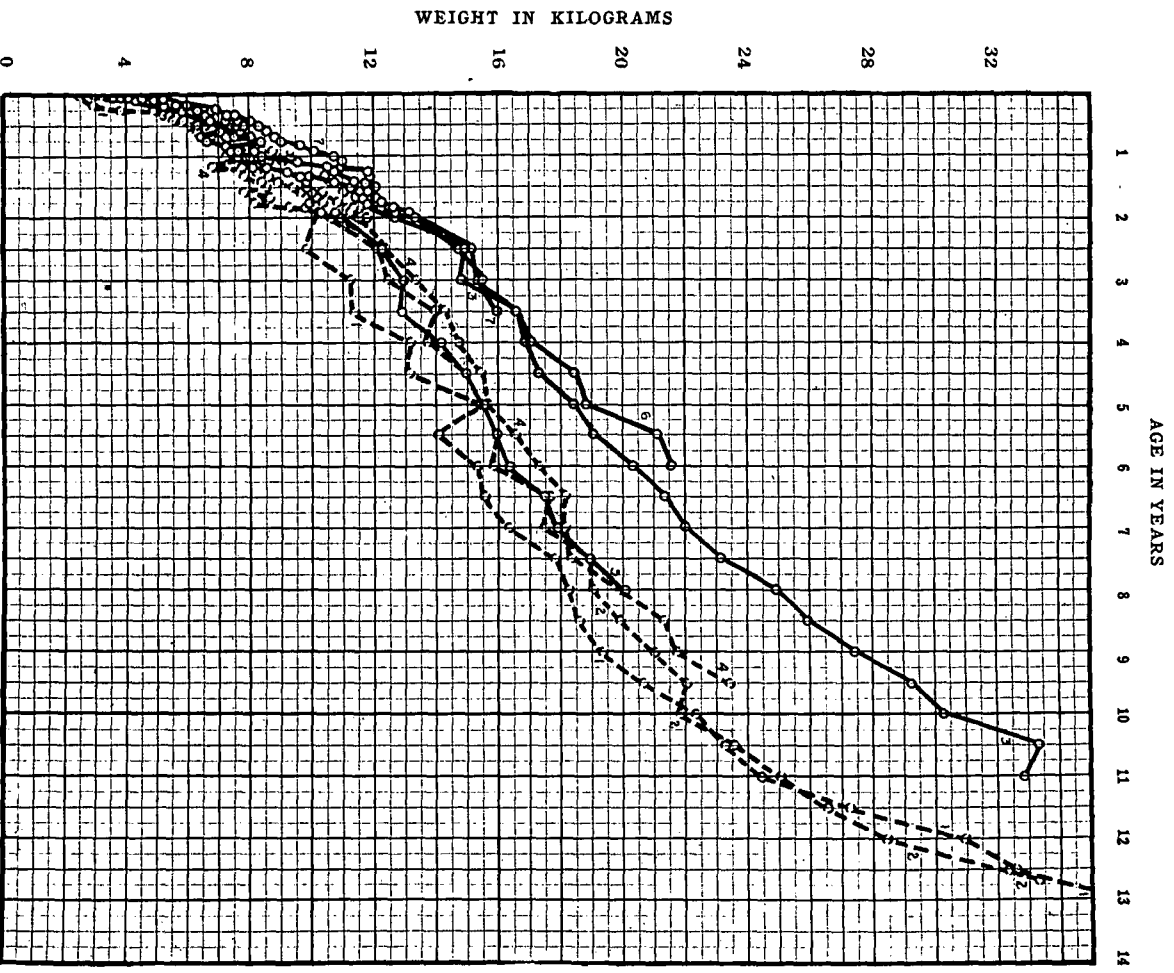
he was well. He always possessed unusual recuperative powers after illness.

5. *Apparent Influence of Sex and Order of Birth*

In height we find a steady increase of birth height for the girls according to order of birth, seventeen, nineteen, twenty, twenty-one inches, and the same increase for boys except for No. 5, who is shorter than his predecessor, No. 3. In weight the girls follow the same rule of increase of size according to order of birth except that No. 8, who was born when her mother was not well, is three ounces lighter than her next elder sister. Each boy is heavier than the last.

The boys were longer and heavier than the girls at birth and the shortest man is taller than the tallest woman. The four younger children were longer and heavier than the four elder at birth, this difference being greater than that between the sexes. As three of the boys belong in the younger group and only one is in the elder it is only by comparing the individuals separately that we see that both sex and order of birth apparently have a share in determining the difference.

In cutting teeth, the boys were in advance of the girls as to time of eruption of both first and last tooth, and



INDIVIDUAL GROWTH CURVES IN WEIGHT OF THE EIGHT CHILDREN

Figure 9

The curves of the sisters are more variable than those of normal healthy girls under favorable living conditions. The life of the family in China no doubt adversely affected the weight of the children. (Boys, —; girls, - - -.)

the four older preceded the four the boys talked first, but very little younger ones in cutting the first tooth, earlier.

and walking it is the younger ones 6. Comparative Ranking at Different Ages

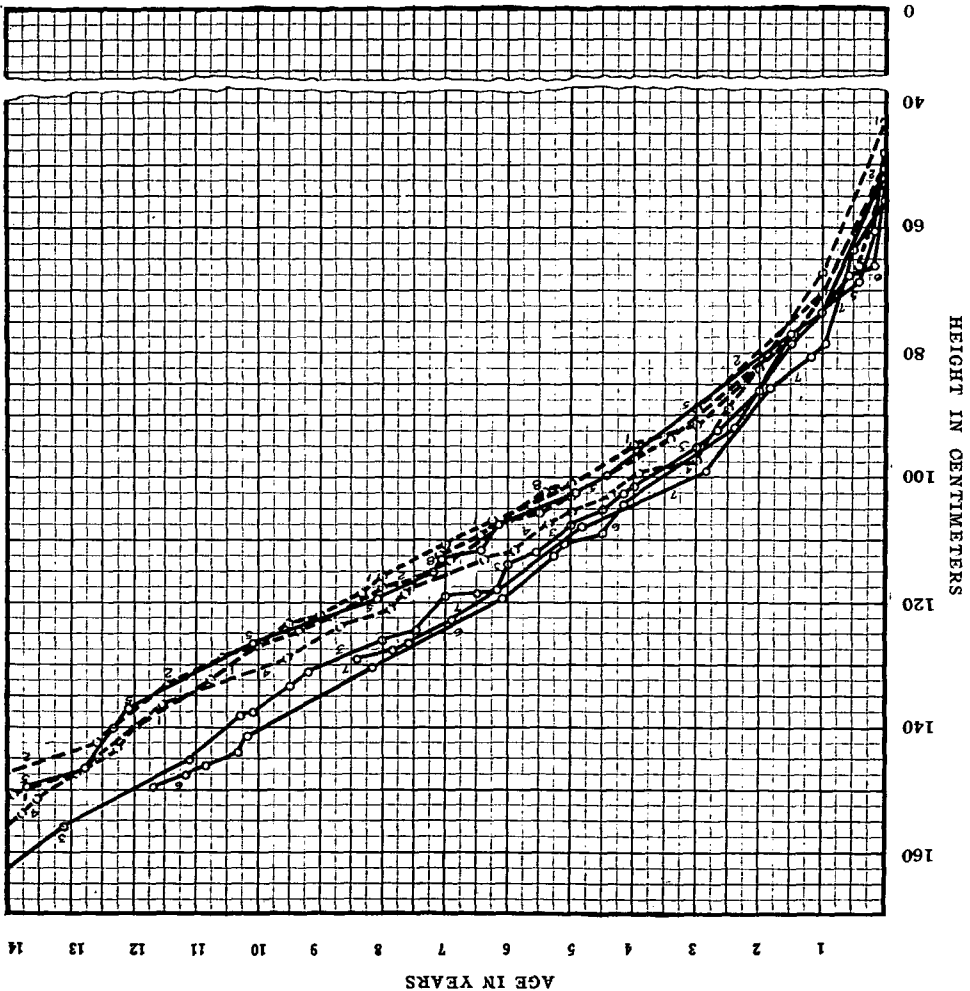
to the example of their older brothers The girls hold the same order of and sisters. The girls walked first and height at six years and when adult,

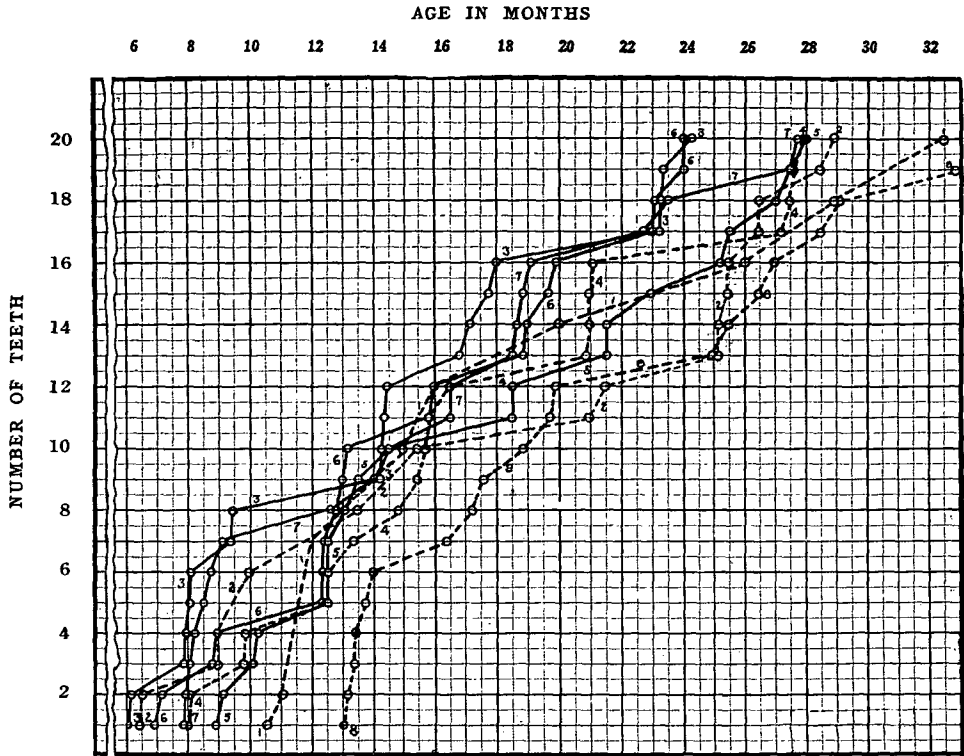
except that No. 8, who was the longest at birth, falls back almost as low as No. 2. Comparisons of their heights at three and a half years show that the change in rank took place before then. Possible causes may be found in the conditions of No. 8's birth and infancy. She was born not long before the furlough of her over-tired parents was due. About a year previous to her birth her father had been refused life insurance on account of suspicion of Bright's disease. Her mother was in comparatively poor health, in much poorer condition than previous to the birth of the other seven. At the time of No. 8's birth, Fanny was a rival of Job in the number of boils—at one time 160 were counted on her body. When No. 8 was two months old, Fanny was attacked by sprue, an oriental disease very difficult to cure. She was ill for some time and had to wean No. 8 earlier than any other of her children. When No. 8 was weaned at three and

These curves are noticeably uniform, in general trend. The boys are taller than the girls. No. 5 was the shortest boy at birth. He maintains this comparative rank in stature among his brothers in all later records. (Boys, —; girls, — — — —.)

Figure 10

INDIVIDUAL GROWTH CURVES IN HEIGHT OF FOUR BROTHERS AND FOUR SISTERS





DENTITION OF FOUR BROTHERS AND FOUR SISTERS

Figure 11

In this family two of the girls had a tendency to late dentition, which was apparent in their children also. (Boys, —; girls, — — —.)

a half months she had fever, and during her first year suffered several times from indigestion and cried a good deal even when apparently well. At seven and a half months, she had whooping-cough. Although the youngest of all the children to talk and walk, she was abnormally slow at teething, cut her first tooth the day after she was thirteen months old and the 20th at thirty-four months. During her first summer, ten to twelve months, she was very fretful and had an abscess on her head. At fifteen months, she had a fever for three weeks. At twenty months, the family started on their journey to America. During the journey, she kept fairly well, but her appetite was capricious and easily upset. Then at twenty-six months she had measles. At four and a half years she had pneumonia and was very ill. Like all her sisters she

had enlarged tonsils, which with adenoids were not removed until she was thirteen, a later age than that at which her sisters underwent the operation. Her sisters have a better disease history. Before four years old, No. 1 had diarrhoea in her second summer, measles at three years, and whooping cough six months later. No. 2 had measles at twenty-one months, whooping cough at two years and occasionally fever or a cold. No. 4 had cholera infantum at fifteen months and no other serious illness. It would appear that the physical condition of her parents at birth and her own illnesses, among them possibly rickets, during the first two years of her life stunted No. 8's growth.

No. 2 always exceeded No. 1 in height, except between eleven and fourteen years; at eighteen years No. 1's height was one inch less. Her tem-

porary superiority in this trait was no doubt due to her adolescent acceleration with early maturity, since she matured two years younger than No. 2.

The failure of No. 6 to keep the same relative rank is more difficult to explain. Some time after he was eleven years old, he gave his place to No. 3, now the next tallest of the brothers. Comparison of the disease history of the two shows No. 6 had many more severe illnesses than No. 3.

No. 6 was also troubled with indigestion from two and a half to three years of age. Both had tonsilitis frequently, but whereas clipping No. 3's tonsils at eight and a half years cured his trouble, No. 6 had his removed at seven, nine and a half, and at twenty-eight years. Evidently his trouble was never properly corrected. It is possible that these diseases checked his growth. Comparison of his weight and height curves with those of his daughter also indicate that his growth was checked during his illness in his first and second years. Another cause, perhaps, was the change in climate. No. 6 was brought to America early, as the family moved to North Dakota when he was six and a half years old, while No. 3 was eleven years. Boas found that Italian children moved to the United States from a warmer climate when quite young were shorter than those born in the United States or those born in Italy and remaining there. When we compare the percentage of norms in height of the children of our family at birth and as adults, we find that the younger children brought to the United States from a warmer climate at an early age attain a lower percentage of the adult norm in comparison to the birth norm than the older children.

The Eleven Grandchildren of Fanny and John

The children discussed in Part I are grown and Numbers 1, 3, 5, 6, and 8, have married and have families of

their own. Numbers 1, 8, and the wife of 6 are keeping records more or less complete of their children and we have also some scattered data concerning the children of 3 and 5.

1. Family of No. 1

No. 1, F, born January 23, 1886

No. 1, after teaching three years in America, returned to China as a missionary in 1910, where she was married, April 18, 1912, to C. F., a Baptist missionary. Her family of four girls and one boy is growing up in China at the same latitude but further inland than she did.

C. F. is a professor, was a Phi Beta Kappa at college, and holds the degrees of B. A. and M. A. He was born February 5, 1878, in New York State. Most of his relatives were farmers. He is now six feet, one and five-eighths inches tall, and weighs about 176 pounds. He has blue eyes and light brown hair. His mother died during his boyhood and his two sisters died in their teens of tuberculosis. His father died in 1910.

In studying the records of No. 1's children, we find a tendency for the younger children to learn more rapidly to talk than the elder with the exception that the boy, third in order of birth, is slower than the second child. The same tendency for those cutting teeth earlier to finish earlier noted in Fanny's children is seen here. All are slow in teething, however, not finishing until over two and a half years old, as did their mother. The taller of the two eldest girls has cut her teeth, both temporary and permanent, earlier than did the shorter girl, but the shorter girl was quicker at learning to walk, and talk, and is reported to be quicker at school work, except for music, than the taller girl. The three older children have had tonsils and adenoids removed, as have both their parents. They seem rather subject to respiratory diseases.

In height and weight the girls are holding their relative position. The boy does not. His curves of height and

weight follow more closely his mother's and he looks more like her than do his sisters. All are taller than their mother at the same age. So were they at birth, and their father is tall.

No. 1's children do not show quite the same seasonal variations that Fanny's children showed. They grow in height most rapidly from May through November, the most rapid growth being, however, in May and June, October and November. This excludes their growth during the first year.

No. 1's children are not affected by the hot summer so much as Fanny's. That is probably due to the fact that they have spent two of the total nine summers in the United States and the others all at the hills, and for longer times than Fanny's children did. Note the improvement in July, the earliest month Fanny's family ever left for the hills. October's phenomenal gains may be due to reaction from the loss felt during the summer. The children of No. 1 usually left the latter part of June for their vacation.

Family of No. 3

No. 3, M, born November 12, 1888

No. 3 went into engineering work after graduation from college, but left that and entered business after his marriage, which took place December twenty-eighth, 1912. His wife, C, was born September third, 1887, in Illinois. She is about five feet, three inches in height and is inclined to be stout. She has brown hair. She was her mother's only child, but her father, who was considerably older than her mother, had, by a previous marriage, another daughter several years C's senior. C graduated from college in the same class with No. 3, ranking high in the class and for one year previous to their marriage taught school. Her health was for the most part good, except for an operation for appendicitis in 1912, until some time after the birth of her first child, after which she nursed not only her own baby but also a neighbor's child. Since that time, she has

not been in such good health, has been quite nervous and has undergone two operations, the last one for goiter in 1922.

They have had two children, both daughters, and both born in Seattle, Washington. M, the elder, was born October nineteenth, 1913. She was an eight months child. She has had no serious illness except influenza two or three times; the first time she was very ill with double pneumonia. Both she and the younger child have, like their father, undergone tonsilectomy. B was born September second, 1915. For the first three years of her life she was quite sickly, and much difficulty was found in finding food that would agree with her. She still has some stomach trouble, and is rather nervous. She has had influenza three times, which has affected her heart.

In studying their growth curves in comparison with their father's, we note that M was slightly shorter and lighter than her father at first, but at five years her weight line crossed his and at about eight years her height line. Doubtless her better environment accounts for her greater weight and the earlier adolescent growth in height in girls for the crossing of the height lines; for this last year she has gained much more rapidly in both height and weight than before. B's early ill health shows up plainly in her weight curve, which is below her sister's, although she is the taller of the two, until about three and a half years, which is the time improvement took place in her health. The two sisters' height curves parallel each other throughout, B at all times being the taller, as she was at birth. The two sisters' intelligence quotients at five and seven years are almost identical; M's was 122, and B's 123.

Family of No. 5

No. 5, M, born November 27, 1891

For No. 5's family we have very little data. He left college in his freshman year and after a time became a building contractor and settled in a

small town in Iowa. He was married October twentieth, 1914, to A.

A was born January seventeenth, 1896, in Iowa, and has spent practically her whole life in a small town in that state. She has dark brown eyes and hair; is about five feet, five and a half inches in height and is slender. She was the fourth of a family of three boys and three girls and is of German descent. She graduated from high school.

Their son and only child, Junior, was born January thirteenth, 1916. Junior's height and weight measurements have not been regularly kept. He is taller than his father at the same age. At five years, eight months, Junior was forty-three and a half inches tall, at six years forty-five inches, and at seven years, three months, forty-eight inches, while his father at six years, two months, was forty-two and a half inches tall, and at seven years, three months, forty-five and three-eighths inches. Junior's intelligence quotient by the Stanford-Binet scale at two years was 113; at three years seven months, 101; at five years eleven and one-half months, 101; at six years seven months, 104. His vocabulary at two years numbered seventy-eight words and at three years five months approximately 600 words (counted during one week and checked up with dictionary). At seven he is in the second grade at school, but shows much more ability and liking for work with his father's tools or paint brush than for reading. He has red hair and grey eyes. His mother, whose hair is nearly black, has a nephew who also has red hair.

Family of No. 6

No. 6, M, born November 13, 1893

No. 6 easily passed the physical examination for the army in 1917, and, entering as a private, became a second lieutenant in the engineers before the war was over. He was married October eighteenth, 1919, to R and is now teaching in a Michigan high school.

R was born April seventeenth, 1890. She had a twin brother; and there were

three other girls and one other boy in the family. She was a capable stenographer before her marriage. She is five feet one and one-half inches tall, weighs about 136 pounds, has blue eyes and light hair.

Their daughter, S, was born May eighth, 1921. Her birth was difficult, instruments being necessary. As her mother had not enough milk for her, she did not gain well at first. Her height and weight curves in comparison with her father's are shown in Figures 12 and 13. It will be seen that starting at near the same point in weight he gained much more rapidly at first, during the period corresponding to that in which S was underfed, than when he was weaned and his long serious illness began. S's weight curve then crossed his, but now it is at about the same point below his that it was at birth. The crossing of her height curve above his seems to corroborate our theory that No. 6 lost his birth rank in height among his brothers, owing in part to his serious illness in early life.

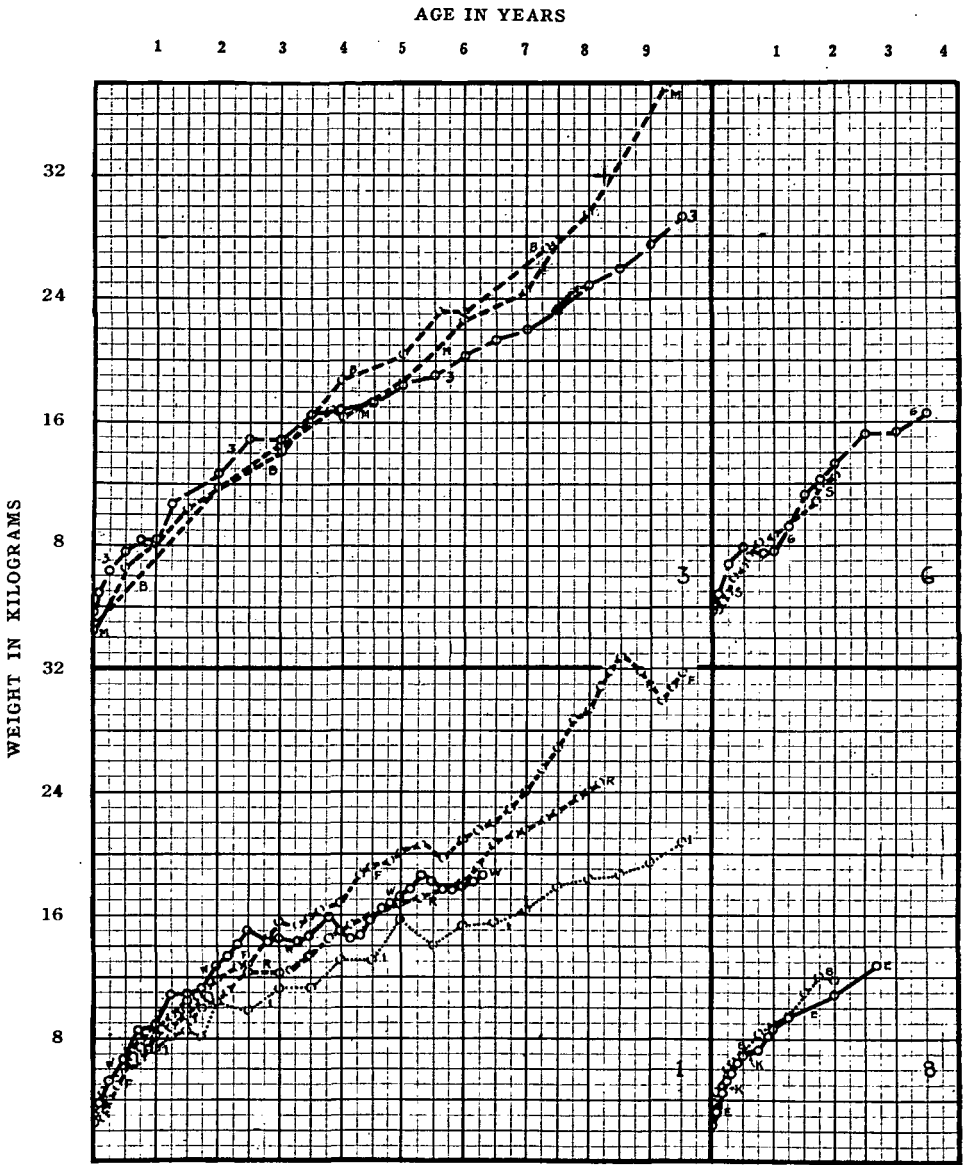
She first walked with support at eight months, her father at nine, and she walked alone at eleven and a half months, he not until sixteen months, the delay being due to his illness. At eighteen months her vocabulary numbered fourteen words and the next month twenty-two words. Her first tooth was cut at seven months twenty-seven days, twenty-five days later than her father's and her twelfth tooth was cut at nineteen months, three months later than his.

S has dark blue eyes and dark hair. At two years, three months, S's intelligence quotient was 111.

Family of No. 8

No. 3, F, born July 26, 1898

No. 8 left school after her sophomore year at college and was married August twenty-seventh, 1919, to C. I., a Canadian draftsman just returned from five years overseas in France. C. I. is five feet eight and a half inches



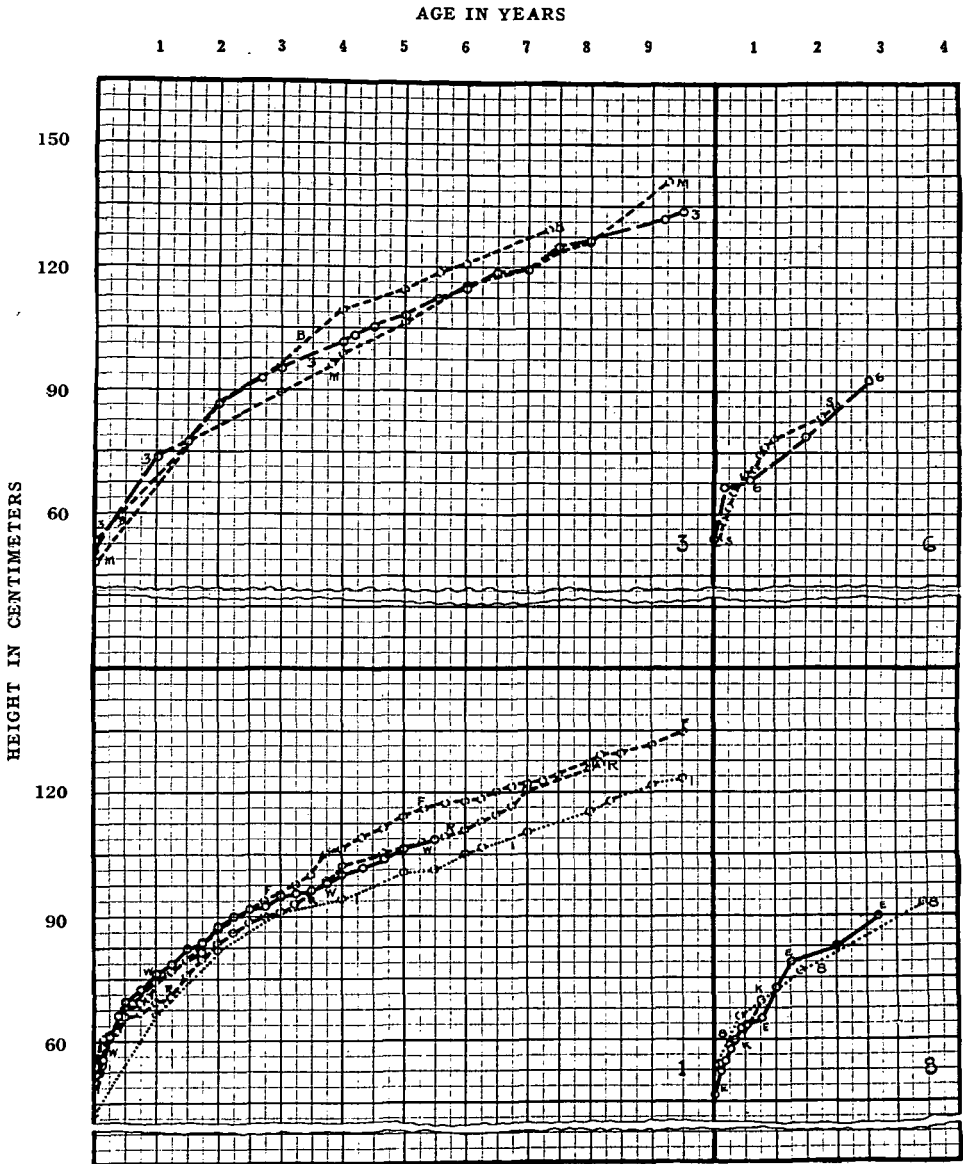
INDIVIDUAL GROWTH CURVES IN WEIGHT IN TWO GENERATIONS

Figure 12

No. 1 has the most irregular curve. The first thirteen years of her life were spent under poor health conditions in China. Her children are also living in China, but under better conditions. Their weight curves are more erratic, however, than those of their cousins who live in the United States. (Male parent, — — — — —; female parent,; boys, —————; girls, - - - - -.)

tall, weighs between 135 and 140 pounds. He has grey eyes and dark brown hair. He is of English descent, the eldest in a family of seven boys and one girl, and was born October fifth, 1891.

They have two children, a boy, E, born September fifteenth, 1920, and a girl, K, born August eighth, 1922, both in Iowa. As E was an eight months child, and from eighteen to twenty-two months was ill with influenza, pneu-



INDIVIDUAL GROWTH CURVES IN HEIGHT IN TWO GENERATIONS

Figure 13

The parents, except No. 8, are surpassed by their respective children at corresponding ages. (Male parent, — — — —; female parent,; boys, ———; girls, - - - -.)

monia, mastoiditis, and later whooping cough, comparisons are not of much value. However, graphs of the babies' height and weight compared with those of their mother are given in Figures 12 and 13. We note a close correspondence in the curves. K, the girl, is just

the height and is slightly heavier than her brother, but she was the second child, was born at full term, and has enjoyed good health.

E cut his first tooth late, as did his mother, at thirteen months. He spoke his first word and took his first steps

alone at fifteen months, and at sixteen months walked freely. His illness intervened, and at twenty-three months he had but six teeth and used only sixteen words, but at twenty-seven months his vocabulary had increased to ninety words, with a beginning made at combining words, and at twenty-five months he had twelve teeth. He cut his last tooth a few months after his third birthday. His tonsils were removed at two years, nine months. His intelligence quotient before tonsilectomy was 86; at three years, nine months, it had risen to 93.

E has blue eyes and light hair and resembles his father at that age. K has dark eyes and brown hair and looks more like her mother.

K at nine months had four teeth, all cut within the month, walked with support, and stood alone for a few seconds. Before she was twenty months old she had twelve teeth. She has had much better health than her brother and has developed more rapidly than he.

Comparative Ranking in Height of Children and Grandchildren

The height curves of the third generation children, except No. 8's children, are all above those of their parents. In the case of No. 1's children this is probably due to their tall father. In the case of No. 3 and No. 6, whose consorts are of similar stature, when sex is taken into consideration, the children's greater height may be due in part to a more favorable environment. The shorter stature of No. 8's children may be partly explained by the fact that as the eighth child she was the tallest for her sex, 21 inches at birth; her first child, a boy, was premature; her second child, a girl, was 20½ inches at birth, very slightly less than her own height at birth.

Summary and Conclusions

The findings with regard to the eight children and eleven grandchildren that seem of some significance in the study of hereditary and familial characteristics are:

1. The later born children were heavier than the earlier born children except for No. 8, who was born during her mother's ill health.

2. The later born children were taller than the earlier born children, boys and girls respectively, except for No. 5, the shortest of the boys.

3. At birth the boys were heavier and taller than the girls; they have maintained this superiority.

4. There was a strong tendency for the children to hold until maturity the rank in height that they held at birth. Prolonged serious illness in infancy seemed to affect the adult height of No. 6 and No. 8.

5. May to November were the best months for gain in height of the eight children and they are the best for the eleven grandchildren.

6. The summer months were the poorest for gain in weight for the eight children. One family of five grandchildren shows the best gains during June and July; the conditions under which the children and the various families of the grandchildren live are so different, however, that comparative conclusions can not be drawn with regard to seasonal variations.

7. There was a tendency for children who began dentition early to finish early and those who began late to finish late. The children of two of the sisters who began dentition late have repeated the order of dental development of their mothers.

8. The height curves of the third generation children, except No. 8's children, are all above those of their parents.

Table I. Consecutive Weights of Boys and Girls, with Notes on Influencing Factors from Birth to 22 Months.

Order of Birth	Girls				Boys			
	1	2	4	8	3	6	6	7
Date of Birth	Jan. 23, '86	July 2, '87	June 14, '90	July 2, '98	Nov. 12, '88	Nov. 27, '91	Nov. 3, '93	Feb. 14 '97
Birth Weight	5 lbs. 8oz.	7 lbs. 8oz.	8 lbs. 8 oz.	8 lbs. 5oz.	8 lbs. 0 oz.	8 lbs. 7 oz.	8 lbs. 14oz.	10 lbs 3 oz
1 wk.		7-7	8-8	8-0	8-8	8-6	8-6	9-13
2 "		8-0	9-0	8-3	9-0	8-6½	9-2½	10-5
3 "		8-4		8-11½	10-0	8-15	9-12	10-14
1 mo.	5-8	4 wks. 8-8	5 wks. 10-0	9-10	11-0	9-10	10-12	11-8
2 "	6-8	10-0	10-12	11-6	12-8	11-10½ chicken pox	13-4	12-2
3 "	8-8	11-0	11-4	13-0	14-0	12-15	15-0	15-6
4 "	11-8	13-0	12-0	13-8 fever, weaned	14-8 measles	14-2	16-1½	16-11
5 "	12-4	13-8	13-0	14-4 indigestion	16-0	15-1	16-14 weaned	17-12
6 "	13-4	14-8	14-0	15-8	16-12 weaned	15-13	17-5	18-5 abscesses
7 "	14-0	14-12 weaned	14-4	16-9 whooping C.	17-0	15-10½ fever	16-13 7½ mos	18-15 weaned
8 "	15-0 weaned	16-0	16-0	17-8	17-12	14-5 weaned	16-11	19-7 fever
9 "	15-8	16-8	16-8 weaned	18-2	18-8 whooping C.	14-12		19-14
10 "	16-0	17-0	17-8	18-5½	16-0	16-2	diarrhoea 16-11½	21-4
11 "	16-0	17+	18-8	19-6	18-0	16-15	16-0	22-4
12 "	16-0	18-8 diarrhoea	18-8	19-7	18-8	17-12	16-15½	23-10
13 "	17-0	17-8	19-0 cholera infan.	19-14	21-0	18-11	18-8	24-4
14 "	17-2		15-0	21-0	23-4	18-14	malerial scurvy 17-14	24-
15 "	18	18-4	18-0	21-0	23-12	20-5½	chicken pox 20-5	28-
16 "	17-4 17½ mos.	19-0 15½ mos.	19-0	23-0		21-5½	bronchitis 22-0	28- fever
17 "	18-8	21-12	19-12 18½ mos.	23-8	25-2	21-11 whooping C.	23-12	26-4 indigestion
18 "	18-12	21-8	20-12	24-4		21-12	24-15	25-15
19 "	17-4	22-12	21-4	24-4	18½ mos. 26-8	22-1	26-1	26-8 teething
20 "	19-0		22-0	(28)	26-4	22-6	26-10	25-2 1½ mos.
21 "	18-0	measles 22-12	24-0	(28) 28½		teething, diarrh- 21-15	21½ mos. 27-0	25-8 diarrhoea 25-12

TABLE 2—Data on the Physical Characteristics and Development of the Eight Children and Five Grandchildren (No. 1's Children).

No.	Period of Pregnancy	Sex	Date of Birth	Place of Birth	Color of Hair	Color of Eyes		Eyesight	Age Weaned	Sits Alone	Creeps	Stands	
						In Infancy	Adult					With Support	Alone
1.	275 days	F	1-23-'88	Shanghai	Med. Br.	brown	brown	glasses 18 yrs.	9 mos.	6 mos.	9 mos.	9½ mos.	13 mos
2.	279 "	F	7-2-'87	"	"	grey	brown	glasses 28 yrs.	7½ mos.	6 "	9½ mos.	9½ "	12 "
3.	280 "	M	11-12-'88	"	"	blue	grey	glasses 13 yrs.	7½ "	6½ "	6 "	7 "	
4.	280 "	F	6-14-'90	"	dark "	brown	dark-brown	glasses 14 yrs.	10 "	6 "	10 "	10½ "	
5.	280 "	M	11-27-'91	"	"	blue	grey	glasses 9 yrs.	8½ "	5½ "	10½ "	11½ "	15½ "
6.	280 "	M	11-3-'93	"	light "	blue	grey		5½ "	5 "	never	9 "	11 "
7.	280 "	M	2-15-'97	Ningpo	med. "	blue	grey	excellent	8 "	6 "	8½ mos.	10½ "	12 "
8.	281 "	F	7-28-'98	"	dark "	brown	dark brown	glasses 16 yrs.	3½ "	5½ "	9 "	9 "	11 "
F.	274 "	F	2-7-'13	Sui'ü, China	brown	blue			artificial feeding		11 "	7 "	12 "
R.	272 "	F	2-10-'15	"	low	blue			6 mos.		6½ "		12 "
W.	273 "	M	12-28-'16	Iowa City	brown	brown			2 "		7 "	7½ "	12 "
L.	271 "	F	8-25-'21	Mt. Omei, China	light Br.								
C.		F	3-17-'23	Chengtu, China									

No.	Walks		Dentition				First Mammation	Sitting Height (adult)	Stature Index (adult)	Vocabulary			
	with support	Alone	Cut 1st Tooth	Cut 20th Tooth	1st 6-yr. Molar	Lost 1st Tooth				First Word	Combined Words	Twelve Months	Twenty-one Months
1.	10 mos.	14 mos	11m. 12d.	32½ mos.		6y. 7m.	13y 4m.			11 mos.			
2.	11 "	14 "	6½ mos.	29 "	5y 11½ m.	6" 2"	14y 4m.	34½ in.	.561	10 "			
3.	8½ "	15½ "	6 m. 5d.	24m. 17d	6y-	6" 2"		36½ "	.522	11½ "	18½ mos.		
4.	12½ "	16½ "	8 m. 1d	26m.	6y 6½ m		14y 4m.	34 "	.533	12 "	21 "		
5.	12 "	14½ "	9 " 5"	26m.				36½ "	.557	10 "	20 "		
6.	11½ "	16½ "	7 " 2"	24m.		6y 2m.		35 "	.513	8½ "	17 "		
7.	10½ "	13½ "	8 " 4"	28m. 8d				38 "	.539	10½ "	16 "		
8.	10½ "	12½ "	13 " 1"	34m.			13y 11m.	35½ "	.549	8½ "	10½ "		
F.	8 "	14½ "	7 " 14"	32m. 9d.	6y. 2 m.	6y 2d				9 "	18 "	4 Eng.	45 Eng-16C
R.	8½ "	14 "	10 " 7"	35m. 8d.	6y. 10m	6y. 6m.				8 "	16 "	4 Eng.	124 Eng.
W.	8 "	14½ "	10 " 15"	34m.						8 "	16 "	7 Eng.	41 Eng-61C (18 mos.)
L.		15 "	10½ "								14 "	9 Eng. 1 C.	37 Eng-26 C
C.													

(Eng. = English words)
(C = Chinese words)