

THE CHINESE MIND
A STUDY IN RACE PSYCHOLOGY.

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I. INTRODUCTION.

No problem in race psychology is of more interest than the study of the mental equipment of the largest of the world's people. China is looking to America and other western nations for her educational ideals and methods; she is calling educators from these lands to come and help in the solution of the mighty problem of educating her sons and daughters; she is sending her best sons to the western nations that they may get the best that these lands offer and bring that best back to their own people; but who can say that this best from occidental lands is best for the Chinese?

Western peoples have worked out certain plans for the training of youth. Of the many considerations affecting the development of this training and the subject matter to be taught, two would seem to be most important- the environment and the nature of the child. China has worked out certain methods of instruction and certain well defined parts of subject matter, both of which have differed from the subject matter and the methods in western lands. One can only suppose that in China the consideration of environment and the nature of her children have also played an important part in this development.

China has new problems in her educational situation arising from the changed environment that has been brought about through new political situations. Because of a new environment she is seeking a new education, and is endeavoring to superimpose the educational systems of the West upon the

children of her centuries-old civilization. The system that she covets did not develop in an environment like that of her own system nor did it develop in an environment such as that of China to-day.

The suitability of the western systems of education to the present day environment in the West has been seriously questioned and who dares say, then, that western systems shall suit the needs of the Chinese— needs that grow out of her peculiar past as well as her peculiar present?

China has assumed that there is no difference in the nature of her children and those in lands to the west, and so has sought to take over the educational systems from these lands almost in their entirety with little or no question of their suitability to her needs, but this is a fundamental question and should receive consideration. We must not assume, we must know whether such systems suit her environment and whether or not they suit the nature of her children. We have admitted that China has developed a peculiar kind of school and that this school has reached a very high grade of development. The things taught and the methods of teaching have a uniformity throughout the land that is really remarkable. We have been content to explain all this by saying that it has been because of an intellectual closed door, because of isolation, because of the environment. With a changed environment, a new system of education is demanded, but before the change is made, let us examine the question of the nature of the child in China, and let us find out about the mental ability of the Chinese race.

A curious lack of agreement exists among foreigners on the subject of the ability of the Chinese. All would rate him superior to the other races in Asia both in character and in intelligence, but any further evaluation of his mental equipment is very vague and uncertain. Here we have only opinion and conjecture, opinion that is sometimes based upon close observation, and sometimes on the worst sort of race prejudice. On the one hand we find observers pacifying the Chinese race in the light of the records of certain brilliant students in America and Europe, while others classify them in the light of the mental ability of the coolie and laundryman. What are the real facts in the case and what sort of a man do we really find?

Race psychology should contribute to a better understanding and fuller sympathy among the races and, because of this, the study of the Chinese mind should promote the friendship of the two nations lying on either side of the Pacific. Especially should such a study contribute much to the solution of China's educational problem-- a problem that she is asking us to share.

If the Chinese are men and women of like passions and abilities as ourselves, we are free to develop Chinese education on lines similar to those in the West, always being able to use the results of western progress in the solutions of the problems of the East. If, on the other hand, there are wide racial differences, it is incumbent upon educators to study these differences and evaluate them carefully as a preliminary step in the great work of education in China. Before a course of study is adopted, before a system of schools built after a foreign model is organized, it would seem wise to attack the problem at the very bottom and seek to find out all we can of the native ability

of the Chinese himself. Such is the purpose of this study, and with such a purpose it seeks to contribute something toward the practical solution of some of the great problems of Chinese education.

II. THE PLAN OF PROCEDURE.

The only way we have of judging mentality is by its output; our measure is the measure of achievement, but here arises the question of what particular form of achievement we shall measure. Totality of achievement is usually the basis on which a person judges the ability of a man or race, but it at once appears that this depends on many things in addition to native ability. Ideals and environment are potent for good or ill and no one can at present furnish methods of measuring the influence of nurture as opposed to nature. It would seem unwise, then, to judge the Chinese race by Chinese achievement alone. A study of what China has done as compared to Western national standards does not furnish a teacher with a true estimate of the native ability of the Chinese student.

The attainments of a race have meaning only in reference to national ideals and purposes and so it is impossible to judge fairly of the ability of a race whose ideals have not been the same as our own. For this reason studies in race psychology such as that by Le Bon (6) and the one by Letourneau (7) do not furnish us with any adequate appraisal of the real ability of the Chinese. On the one hand, the influence of environment has not been properly considered and evaluated and there has been no proper appreciation and criticism of the racial ideals and national purposes of the Chinese.

We find also that nations are ranked high or low at different periods of history, if our measure be that of mere national achievement, but the real or potential ability of the race has probably remained constant all the while. As one reviews the history of China and Japan, one finds that at different periods these two nations have been given different ranks in the light

of national achievement, but we must suppose that the real ability of the sons and daughters of the two nations remain constant. In short, if the Chinese people was equal or superior to the Japanese in ability at the time of China's glory, it is also fair to assume that it was not inferior at the time of China's eclipse.

It is impossible for us to judge accurately if our only measure is that of national or racial achievement as determined by outside standards. Our only recourse is to so set the stage that differences in environment will be eliminated. It is necessary to find an artificial measure for this purpose just as it is necessary to use the yard stick or the pound weight in the ordinary transactions of the day. This brings in the mental test as a means of measuring intellectual ability. This method is being used in all western lands in the study of individual differences within the same race; it seems capable of being used to measure individual differences among different races. Prof. Terman (14) says, "I believe that social and racial psychology in particular will soon have to be rewritten in the light of results which will be secured by the use of intelligence tests". It is obvious that if such a method is necessary and valuable in measurements within a race where the same environment and ideals obtain, it is much more necessary and equally valuable where differences in environment exist.

No studies in Chinese psychology have been made and so we have none to guide us in our procedure and no results to check us in our mistakes. The only advantage coming from the examination of studies of other races is one of procedure. Two methods have been employed in measuring racial

differences, physiological and mental measurements.

Racial differences have been studied by means of such physiological tests as hearing, vision, reaction time, and so forth. (18) (2) The results have no special meaning to us here except to indicate the possibility of such comparison between Americans and Chinese.

Methods of measuring mentality have more significance for us as they indicate possible methods of procedure. We find that three methods have been used.

The first is by judging racial differences by school rank as the measure. Such a study has been conducted by Maye (8) in comparing the mental capacity of the American negro student with white students of the same school grades. In this way he sought to measure the abilities of students of two races living side by side in supposedly the same environment and speaking the same language. Such a plan is impossible in measuring Chinese and American abilities, because of the difference in language and school standards.

Another method is that of using the Binet-Simon Measuring Scale of Intelligence. Morse (10) used this method in comparing white and black children. It seems adaptable for use in comparing Chinese and Americans.

The third method is the using of approved and standardized mental tests. Pyle (11) has used this method in extensive comparisons of white and negro children in several Missouri cities.

The present study has consisted in making physical measurements and in testing the mental ability of approximately five hundred Chinese boys and girls and comparing the results

with the norms for children of the same ages in America. No effort has been made to compare children of the same grade in school. Different systems of grading obtain in the two countries and different educational advantages have been enjoyed. For reasons to be given later mental tests have not been given to children under eleven years of age.

The comparison according to age sounds easy, but it is a matter of considerable difficulty. In the first place Chinese have a custom of gauging age from their New Year. If a child is born on the second day of their first month, he is reckoned on the next New Year as "having two years". If a child is born on the last day of the last month of the year, he is also reckoned as "having two years" on the following morning. Most of the children do not know the exact date of birth, their only knowledge is in reference to the New Year. Others are able to find out from their parents the month in the year in which they were born, while still others can know the month and the day of birth. This third class comes from homes of the well-to-do, of the official class, and from homes where there has been contact with westerners. Another difficulty lies in the fact that the Chinese boy for some reason frequently tells you an age younger than his actual age. The fact that in certain schools there is a maximum age limit may account for this to a certain extent, but it is probably because of a certain inaccuracy in his make-up. By considerable maneuvering, the actual ages of about one hundred and fifty boys were found and there is reason to believe that in the other cases there are only a few mistakes.

The tests were all given near the New Year season-- within a month and a half of it-- and so the ages can be fairly well calculated. In cases tested just before the New year, one year

was subtracted from the age as given by the student in order to make it conform to the western age, and in cases tested immediately after the New Year, two years were subtracted. This means, probably, that according to the law of chance the boys are more than half a year older than the age given.

This fact of looseness in giving age prevents including in this study the results from the Binet-Simon tests. The tests, as revised by Prof. Ferman (14), were translated and adapted to Chinese, but it was impossible to be sure enough of the ages of a sufficient number of children to make the records of any real value in this study.

Another difficulty lies in the difference in the age and the rate of development. Puberty would seem to be reached by Chinese children approximately two years earlier than by Americans. Is it altogether suitable to compare a Chinese boy of fifteen (Western count), whose pubertal changes in height and weight are largely passed with an American boy of fifteen who has as yet not reached the height of accelerated change? There seems no way of avoiding the difficulty, no way of estimating the importance of this fact and the measure of its influence on the results of the tests both mental and physical. After several years work in getting norms for all the ages up to and including adults we may be able to evaluate these comparisons more accurately. In the meantime we can only remember this fact and keep it in mind in our interpretation of the meaning of the results secured.

Our first method of comparison is by means of the results from certain physical tests with the norms for American children. The second method is the comparison of the results from certain approved mental tests. Most of the tests used have been given

extensively in America and the standard results are given in Pyle's "Examination of School Children" (11). . All the mental tests were given by the writer to the pupils of the Fulton, Missouri, Public Schools.

The tests have been given to the students in the preparatory department and first year middle school of the government middle school of Yeung Keng, Kwangtung Province; to the students of the Ching Kwong school for boys of yeung Keng; to the boys of the Canton Christian College Grammar school, Canton; and to the boys of the Noyes Memorial School, Canton. The tests have been given to two schools for girls in Canton, the Ruth School and the Truelight Seminary.

No tests are reported from schools other than the new style schools. Some tests were given in old style schools but the results were so unsatisfactory that they are not included here. The students whose records in the mental tests are herein included are all in what corresponds roughly to our fifth grade and the grades above. The majority of those tested are from the sixth, seventh, and eighth grades. The inability of students of lower grades to use their own written language is the reason for limiting the tests to the upper grades in school. There seem to be good reasons for thinking that language hindrances play a comparatively small part in these grades. To speak more accurately, disproportionate language hindrances disappear largely by the time the fifth and sixth grades are reached.

A comparison, to be fair, must include the results secured from testing unselected groups. The American children are entirely from schools where the whole school was tested, and schools attended by the whole student population of the community served. In China we cannot be sure of the relative ability of

those tested as compared with those of other children; our groups are not unselected. It is estimated that at present four^{out} of every ten children of South China are to be found in school; of those in school, some are attending the new style schools and some the old style memory schools. The students in the new style schools are certainly from the most progressive element in China, and I am inclined to think that this represents the better intelligence, but there is no way of proving it now. Also we are totally without proof that the children in school are from a more intelligent stock than those outside, but we believe such to be the case just the same.

Of the schools herein reported five are in some way connected with foreign supervision, but I feel sure that any fair-minded Chinese will readily grant that they are as good, at least, as the average school and that their students represent a stock equal to, or superior to, the average in China. At least it is worth while to record that in the one government school tested did not exceed the averages for the different ages, and this in spite of the fact that this school is so organized that it is almost exclusively attended by the children from the upper classes.

In spite of the fact that a superficial examination of the facts would lead one to think that these results indicate a sampling, there is reason to believe that the children tested represent fairly well an unselected group. This conclusion is based on a study of the results and on the democratic mixture of the Chinese race. Not giving up any belief in the doctrine of hereditary ability and the consequent belief that the better classes would produce better results, yet one is forced to believe that in China native ability is much more mixed than in any other land.

III. PHYSICAL MEASUREMENTS.

Any comparison of the mental ability of children of the two races should be preceded by some statement of their physical similarities and differences. With this end in view the following measurements were made: Standing height, Sitting height, weight, Lung Capacity, Strength of Grip, Size of head, and Reaction time.

Anthropometric measurements of the Chinese are just now claiming the attention of a number of workers in the medical profession. In some tables prepared by Dr. White (17) and soon to be published by the China Medical Journal, measurements are given of several hundred Chinese. The Chinese boys and girls of school age are so far neglected, however, that we find little help from these tables.

Table I. shows the average standing height for boys of the ages of ten to sixteen, also the percentage expression in comparison with norms for American boys as given by Smedley (13). This table indicates that for these ages Chinese boys are only slightly smaller than Americans, their grade being 97.3 %. It must be frankly admitted, however, that the earlier maturity of Chinese boys and the earlier pubertal changes in height give an advantage in these ages that will probably be lost later.

In the case of girls we find that for the ages of ten to eighteen there is an average grade of 93.5 % of the height of American girls. The addition of records for two more years, taken with the fact of earlier maturity on the part of girls, makes this table much more reliable than the one for boys.

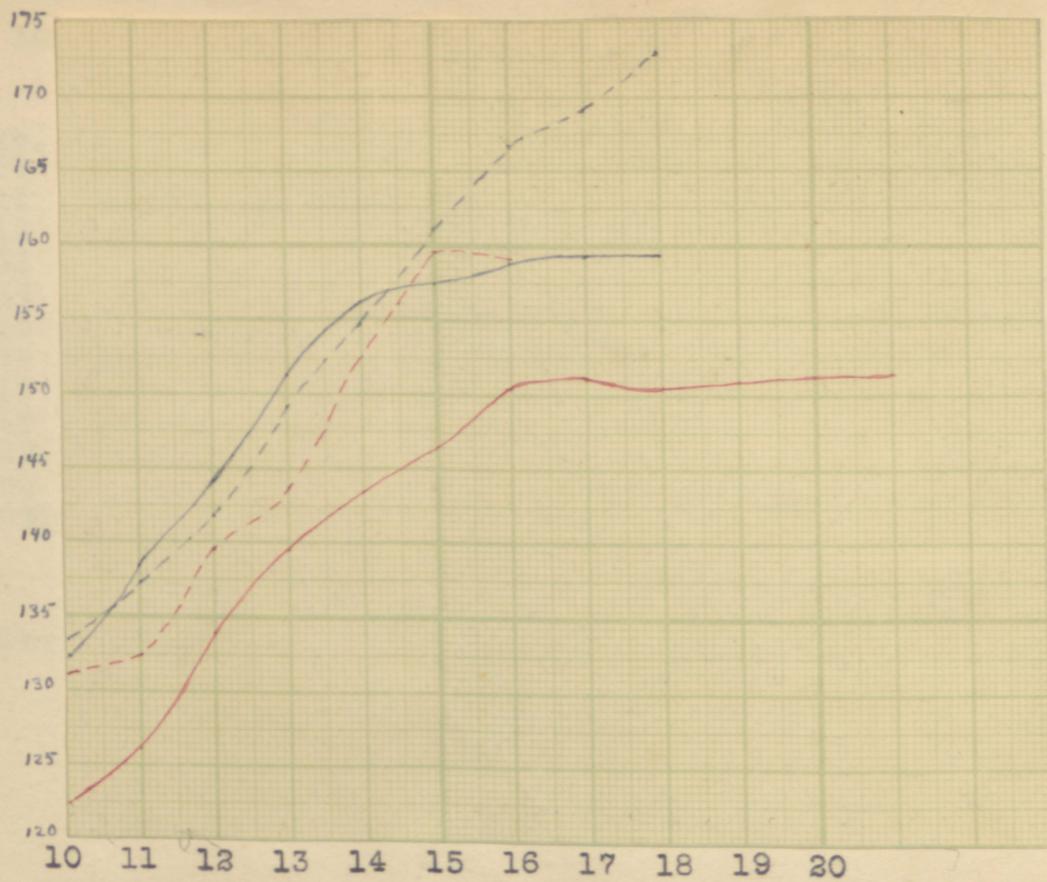


FIGURE I. Standing Height. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

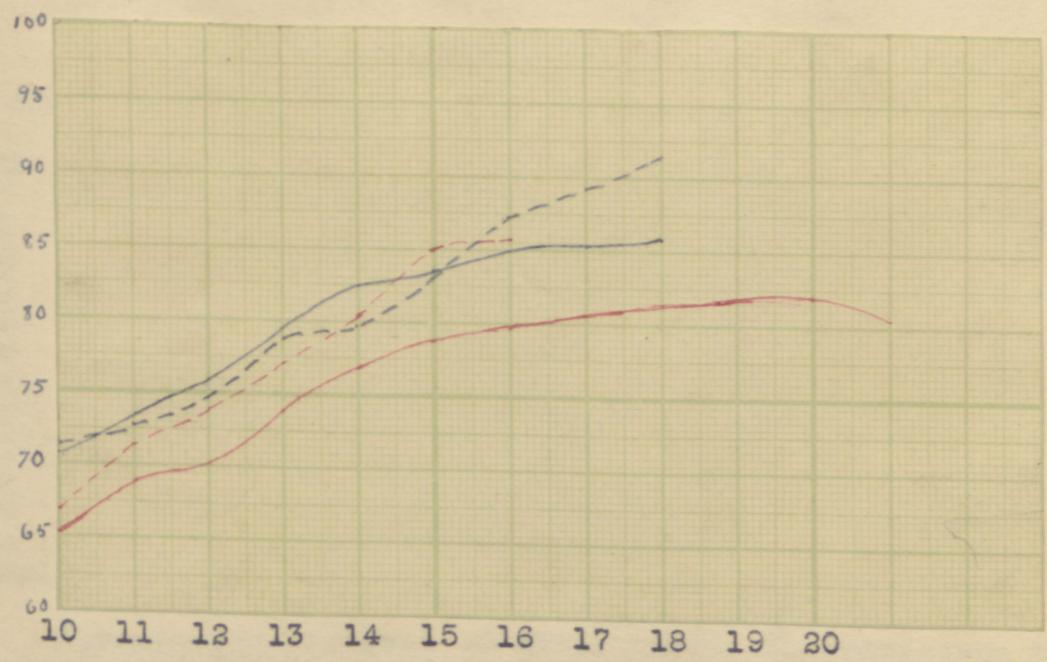


FIGURE II. Sitting Height. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

TABLE I.

NORMS OF STANDING HEIGHT FOR CHINESE BOYS AND GIRLS.

Age.	Boys.		Girls.	
	No. Tested.	Height in cm.	No. Tested.	Height in cm.
10	14	130.96	11	122.1
11	23	132.58	12	126.2
12	57	139.54	16	134.3
13	62	143.80	32	139.5
14	55	152.70	24	143.3
15	40	159.60	34	146.4
16	19	159.10	41	150.6
17			35	150.7
18			25	150.5
19			16	151.0
20			15	151.1
Adults.			25	151.5

The average percent of these norms, in comparison with American standards, is 97.3 % for boys and 93.5 % for girls.

TABLE II.

NORMS OF SITTING HEIGHT FOR CHINESE BOYS AND GIRLS.

Age	Boys		Girls.	
	No. Tested.	Height in cm.	No. Tested	Height in cm.
10	14	67.0	11	65.2
11	23	71.2	12	68.7
12	57	74.0	16	70.2
13	62	77.3	32	73.9
14	55	80.8	24	76.8
15	40	85.2	34	78.6
16	19	86.0	41	79.6
17			35	80.7
18			25	81.5
19			16	81.8
20			15	81.9
Adults.			25	80.4

The average per cent of these norms, in comparison with American standards, is 98.3 % for boys and 92.5 % for girls.

In Table II the sitting height for Chinese girls and boys is given with the norms for the several ages. These norms are compared with those worked out for American Children from Smedley's Tables, (13) and the percentage given. The same results are expressed in graph form in Figure II.

Chinese boys are proportionately longer in body than Americans of the same age, while girls are shorter in body than their American sisters. The differences are so slight, however, that with the numbers compared, it is unwise to draw too many conclusions. The strange thing is that the two races are so similar in their physical make-up.

We need to bear in mind that these measurements for height are for boys and girls living in southern China, just in the edge of the tropics. Were we to measure the height and weight of the Chinese farther north in the temperate zone, we should probably get entirely different results. In all the discussions that follow of physical differences between Chinese and Americans we need to remember that the Americans are from a very uniform stock, but that the Chinese are the Cantonese people of southern China.

Table III. shows the weights for different ages, also the percentages of similar norms for Americans as worked out from Smedley's Tables (13). The two hundred and seventy Chinese boys approached very nearly to the American norms for the different ages, the average grades being 99.3 % . It would, of course, be a mistake to assume from this that the Chinese is almost as large as the American, but we can assume that he grows faster and that the age of puberty, with its bodily changes in weight comes sooner. This table would indicate that the pubertal increase in weight comes about two years earlier in the life of the Chinese boy than in the American. The average weight in the fourteenth and fifteenth year exceeds that of his American brother, but, at the age of sixteen, he falls below again where he probably remains.

In the case of girls the percentage remains almost constant through the various ages, averaging 85.6 % . It is probable that approximately this grade continues throughout life.

TABLE III.

NORMS FOR WEIGHT OF CHINESE BOYS AND GIRLS.

Age.	Boys.		Girls.	
	No. Tested.	Weight in kg.	No. Tested.	Weight in kg.
10	14	28.33	11	22.82
11	23	30.39	13	25.19
12	57	32.24	16	30.46
13	62	37.85	32	34.60
14	55	44.69	24	37.53
15	40	49.40	34	39.63
16	19	51.92	41	43.67
17			35	45.24
18			25	47.02
19			16	47.29
20			15	49.22
Adults.			25	50.77

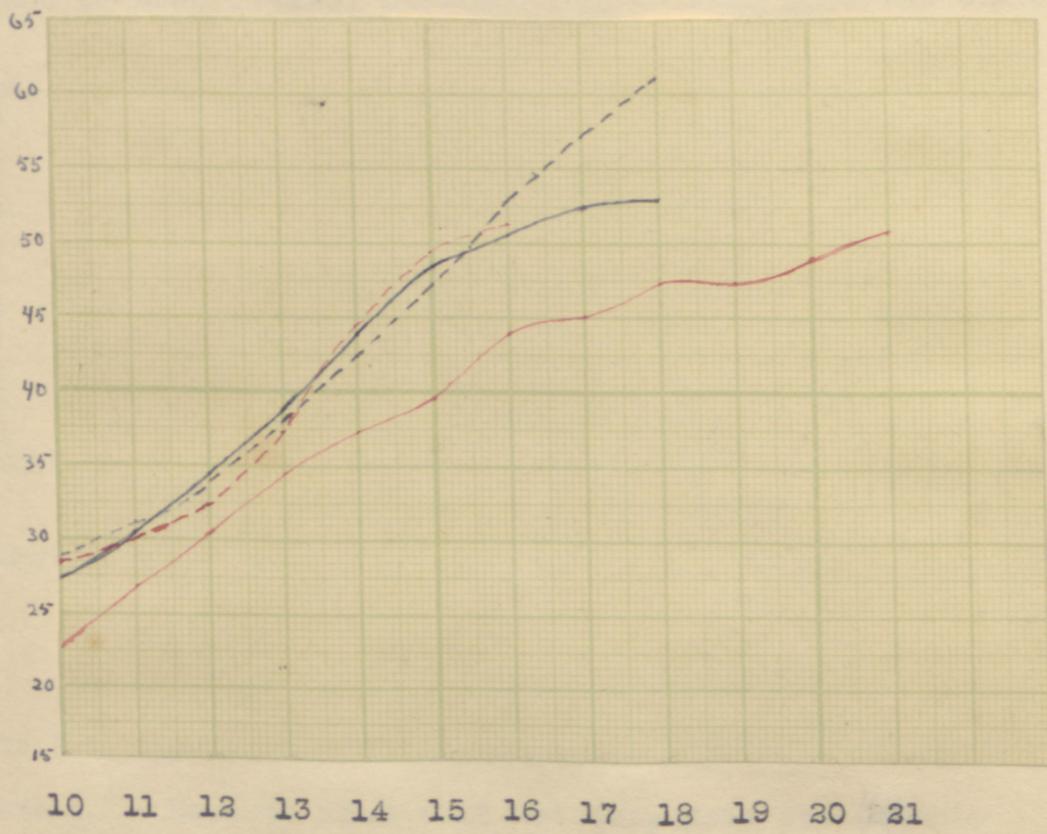


FIGURE III. Weight. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

In Lung Capacity, the Chinese youth is at a decided disadvantage, being outclassed consistently through the years. Table IV. and Figure IV. show this. In the case of boys the relative grade is 89.9 % while with girls it is only 87.5 % .

TABLE IV.

NORMS OF LUNG (VITAL) CAPACITY FOR CHINESE BOYS AND GIRLS.

Age.	Boys.		Girls.	
	No. Tested.	Capacity in cc.	No. Tested.	Capacity in cc.
10	14	1444	11	1165
11	23	1464	12	1137
12	57	1671	16	1358
13	62	1989	32	1539
14	55	2252	23	1669
15	40	2517	34	1805
16	19	2627	41	1902
17			35	1911
18			25	1946
19			16	1974
20			15	1914
Adults.			25	2048

The average per cent of these norms, in comparison with American standards, is 89.9 % for boys and 82.5 % for girls.

Of course, we need to remember that bodily size has its bearing and so we turn to the study of the vital index. Here we find that not only does the Chinese boy and girl breathe a smaller amount of air, but also that amount is less proportionately than that of the American youth. The graph representing this index (Fig.V) shows the Chinese boy far below the American, his relative grade being only 90.8 % . This means that for every pound of weight he has only 90 % of the oxygen that furnishes the fuel for the American.

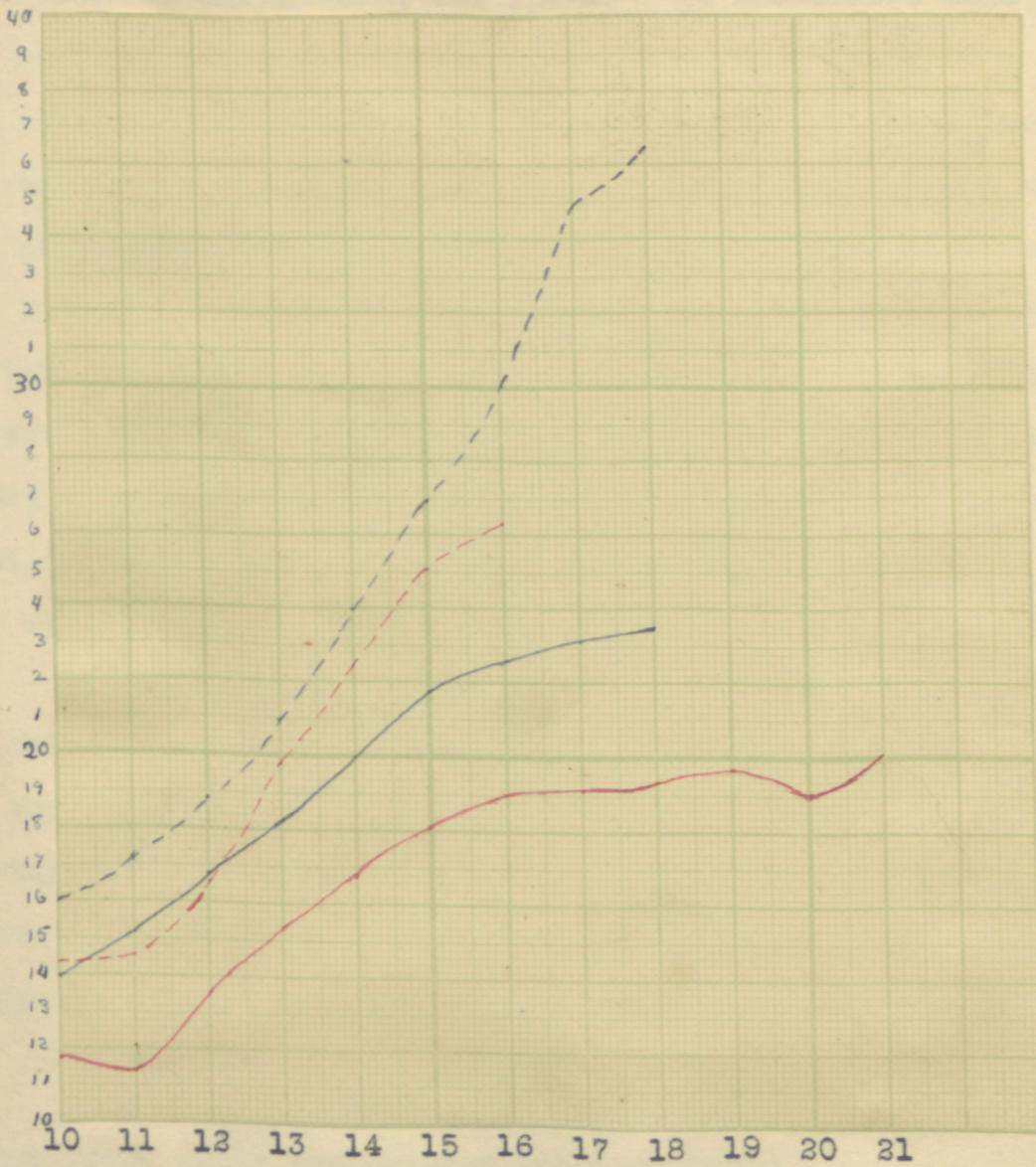


FIGURE IV. Lung Capacity. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

There has been much speculation over the rapid fall in the curve for the vital index for girls. It has seemed hard to believe the physical changes in her body would account for all of it. And so in America we have been saying that enforced idleness may have had some effect, and especially that clothing worn by the girl in Western lands tends to accentuate this decline. The results in Table V show that the girls of the two races follow almost a parallel road in the decline of the supply of oxygen in proportion to the weight of the body. The graph shows a fairly consistent difference throughout the different ages, American girls having the advantage here again. The relative grade of the Chinese girl is 96.3 % .

This study cannot show what the reasons are for this decline in the curve, but it indicates that the cause is not to be found in the clothing of the American girl. The Chinese girl is perhaps the most sensibly dressed girl of any girl on earth, and there is nothing about her clothing that would hinder full development of the respiratory organs.

TABLE V.

THE VITAL INDEX FOR CHINESE BOYS AND GIRLS.

Age.	Boys.		Girls.	
	No. Tested.	Norm.	No. Tested.	Norm.
10	14	51.19	11	50.98
11	23	48.53	12	45.24
12	57	52.41	16	45.24
13	62	52.54	32	44.79
14	55	50.42	23	44.49
15	40	50.95	34	46.11
16	19	50.57	41	43.91
17			35	42.70
18			25	41.56
19			16	41.95
20			15	39.50
Adults.			25	40.67

The average per cent of these norms, in comparison with American standards, is 90.8 % for boys and 96.3 % for girls.

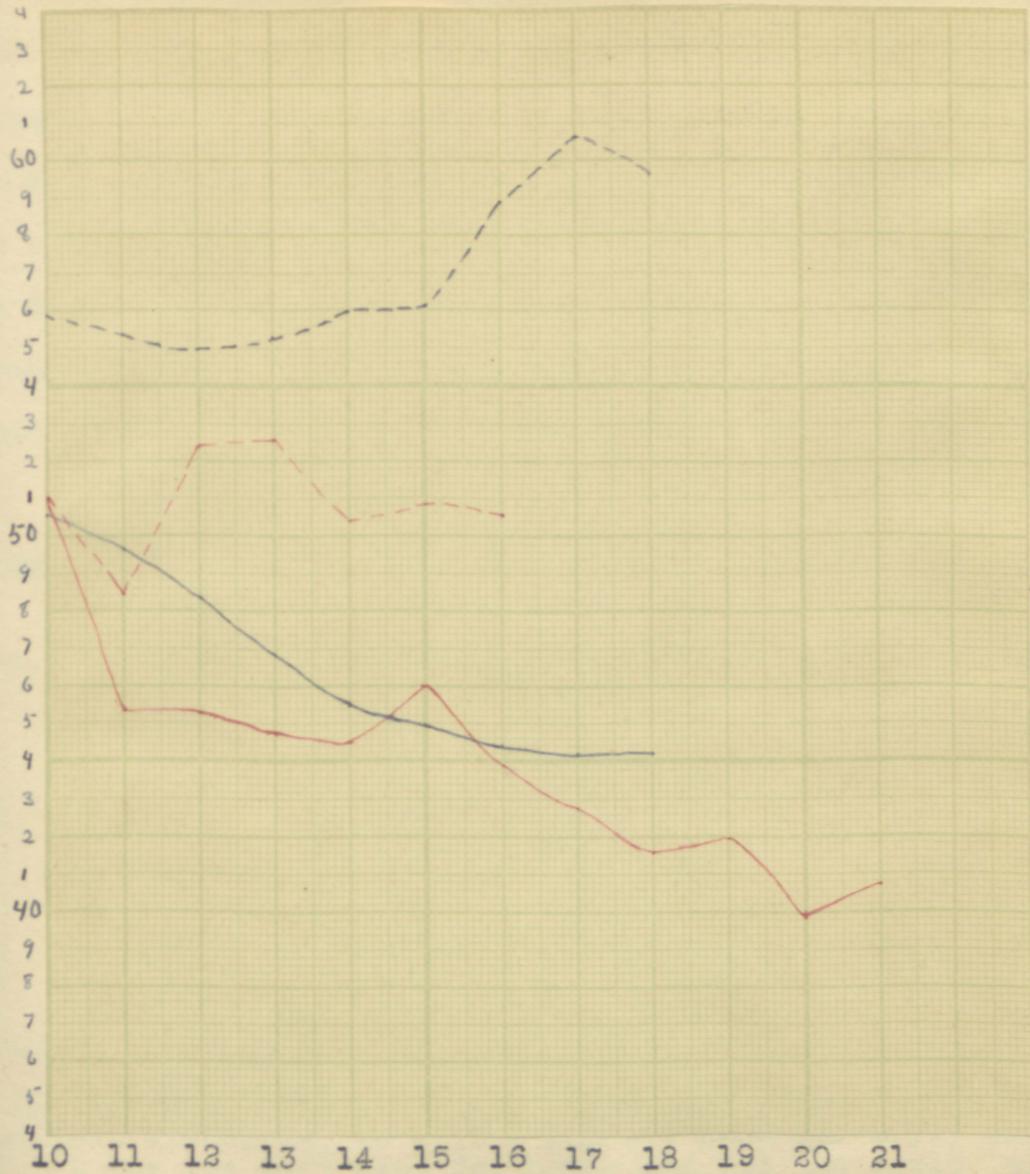


FIGURE V. Vital Index. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

In the tests for muscular strength, we find that American boys have a better grip than the Chinese, the grade of the latter being 87.5 % for the right hand, and 86.1 % for the left hand. The most significant difference, however, is found with the girls. The relative grade of the Chinese girl is 72.% for the right hand and 69.5 % for the left hand. This means that in muscular strength, that three American girls have the combined strength of four Chinese girls and something to spare.

TABLE VI.

NORMS OF STRENGTH OF GRIP FOR CHINESE BOYS AND GIRLS.

Age.	No. Tested.	BOYS.		GIRLS.		
		Rt. hd. in	kg. L. Hd.	No. tested.	Rt. hd in	kg. L. Hd.
10	14	13.57	11.57	11.	8.45	8.54
11	23	15.43	13.33	12	10.58	9.33
12	57	17.20	15.18	16	13.19	11.44
13	62	20.40	18.28	32	15.97	13.97
14	55	26.51	25.44	34	18.67	17.21
15	40	31.93	29.89	34	18.94	16.33
16	19	33.56	31.96	41	22.32	20.97
17				35	22.40	19.89
18				24	22.12	20.50
19				16	23.81	20.06
20				13	24.39	22.00
Adults.				25	21.72	21.20

The average percent of these norms, in comparison with American standards, is 87.5 % for rt. hand for boys, and 86.1 % for the left hand for boys; and for the girls, right hand per cent is 72 % and the left hand is 69.5 %.

In measuring the width and the length of head the results are not strictly comparable if size is to be considered. Anthropometric tables showing the size of the Chinese head have not been worked out sufficiently. Scientific charts are not available and so there has been no attempt to evaluate the results herein recorded in reference to size and cranial capacity.

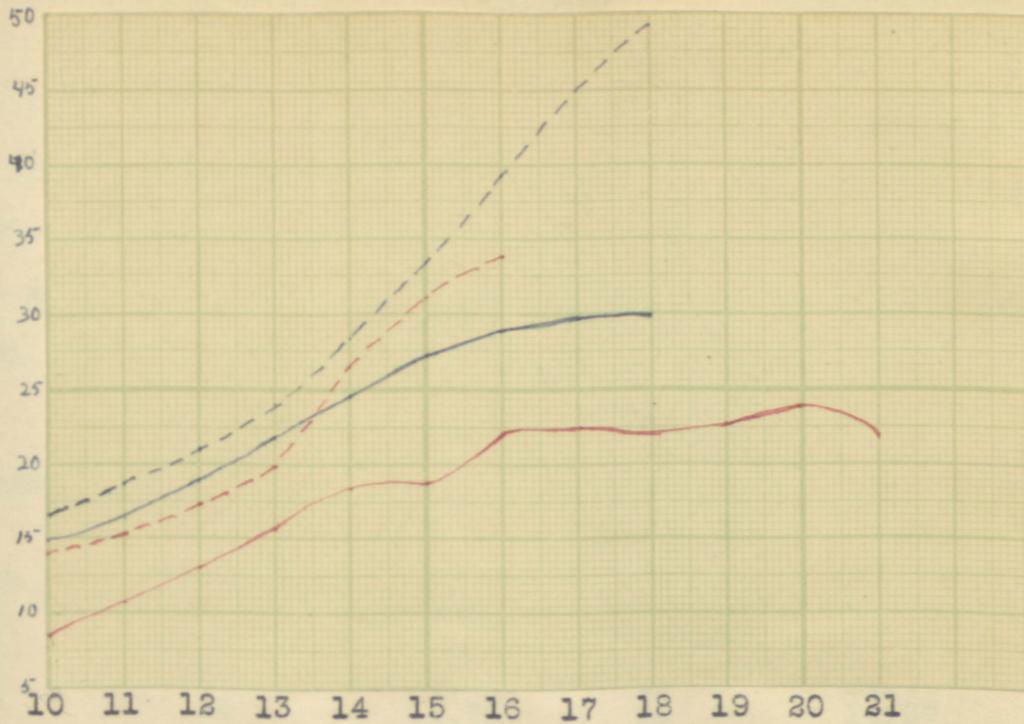


FIGURE VI. Grip test, Right hand. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for girls.

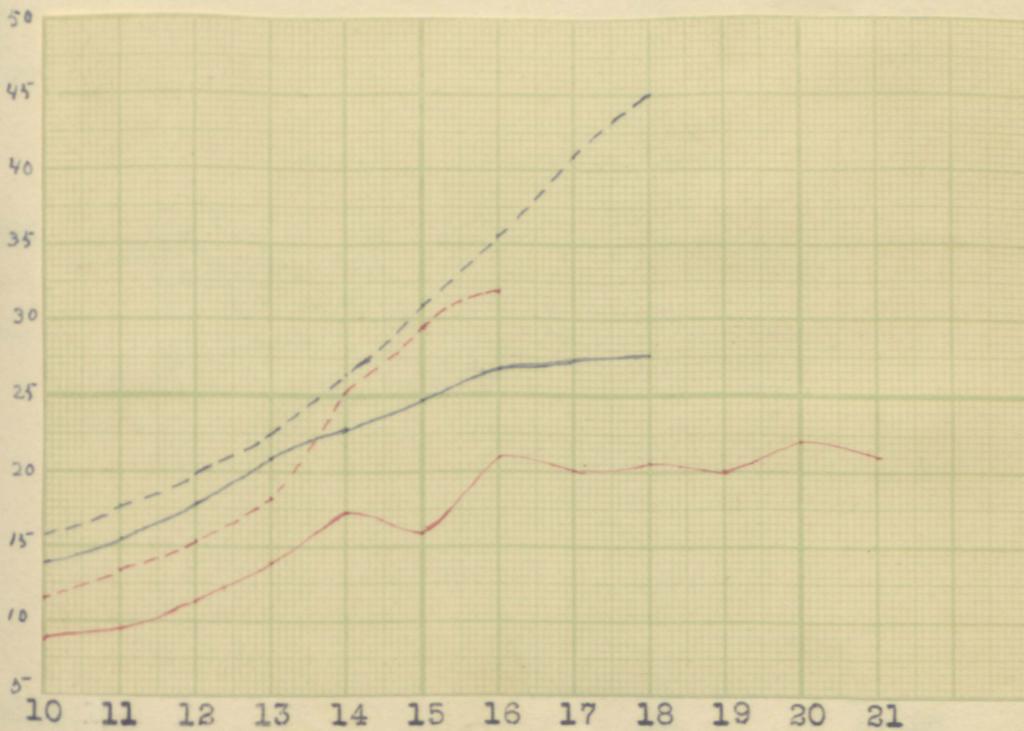


FIGURE VII. Grip test, left hand. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

The purpose of the study was to find whether or not a difference in type would appear. Table VI shows the norms for width of head for the different ages as worked out from the results, while Table VII shows the length of head. These results can be compared with the results as given by Smedley (13) for Americans.

TABLE VII.

NORMS FOR WIDTH OF HEAD OF CHINESE BOYS AND GIRLS.

Age.	Boys.		Girls.	
	No. Tested.	Norm.	No. Tested.	Norm.
10	14	14.43	11	13.79
11	23	14.63	12	13.97
12	57	14.42	16	14.09
13	62	14.73	32	14.37
14	55	14.85	24	14.40
15	39	15.21	34	14.44
16	19	15.08	41	14.61
17			35	14.71
18			25	14.74
19			16	14.75
20			15	14.85
Adults.			25	15.12

TABLE VIII.

NORMS FOR LENGTH OF HEAD OF CHINESE BOYS AND GIRLS.

Age.	Boys,		Girls.	
	No. Tested.	Norm.	No. Tested.	Norm.
10	14	17.76	11	17.06
11	23	17.52	12	17.15
12	57	17.73	16	17.18
13	62	17.79	32	17.35
14	55	18.12	24	17.26
15	39	18.31	34	17.02
16	19	18.40	41	17.53
17			35	17.57
18			25	17.72
19			16	17.80
20			15	17.63
Adults.			25	17.96

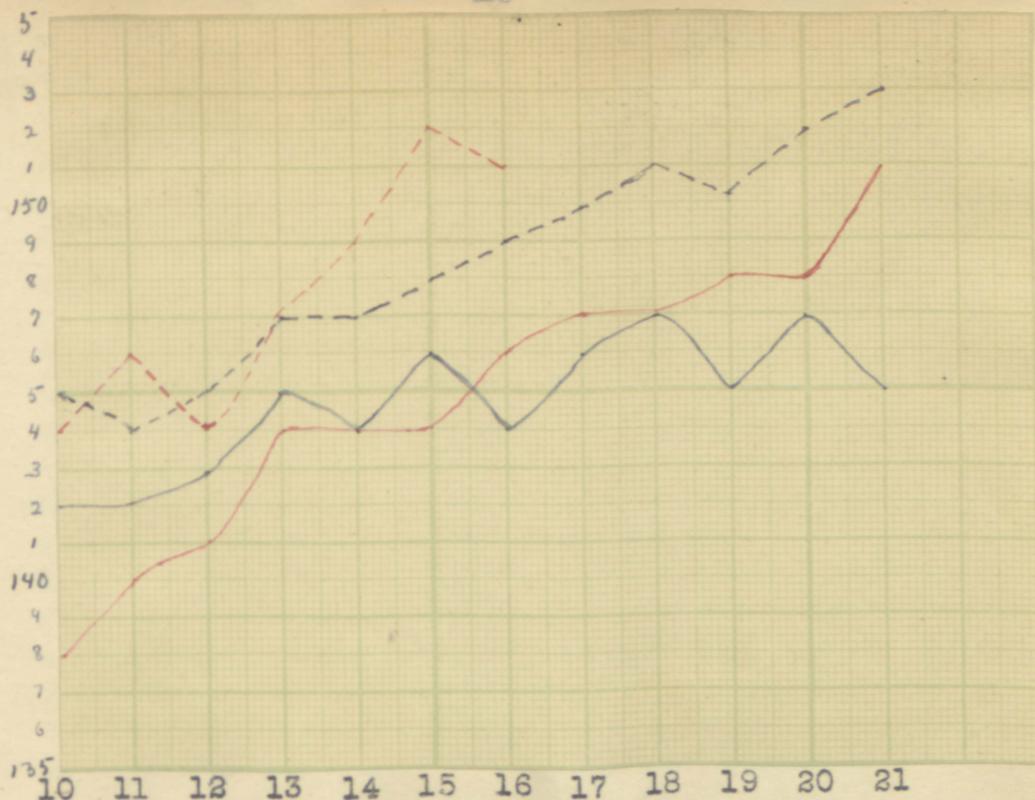


FIGURE VIII. Head Width. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.



FIGURE X. Cephalic Index. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

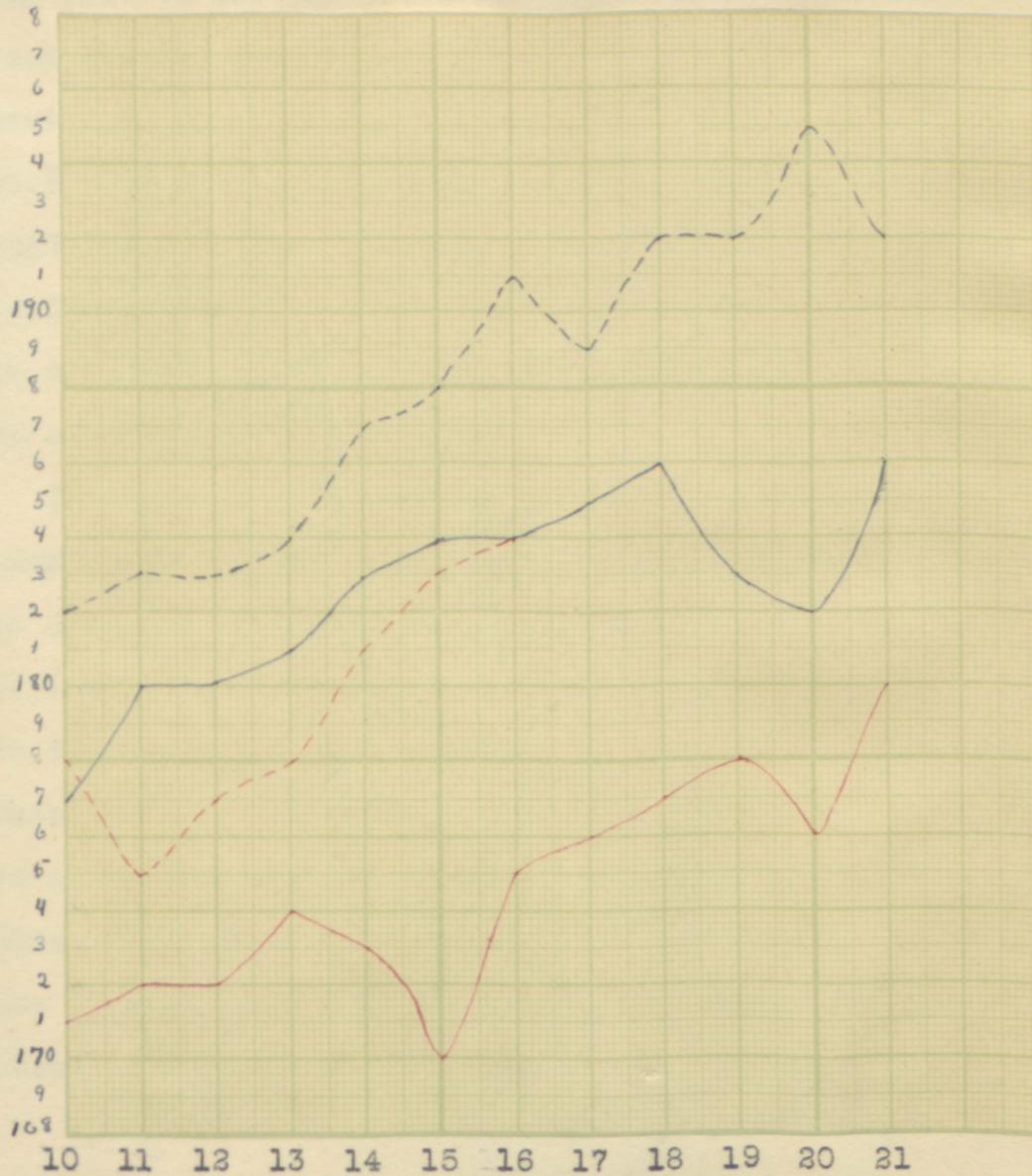


FIGURE IX. Head Length. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

In Table VIII the cephalic index is shown for the different ages. By comparing these norms with Smedley's (13) results, we find that in all the years the norms show the Chinese to be a broad headed type. Chinese boys have a grade as compared to American boys of 104.2 % , while the grade of Chinese is 104.9 % of that of American girls. Chinese girls are more broad headed than Chinese boys, just as American girls are more breadheaded than American boys. As between races we find that the results indicate a rather different type and so the results are not strictly comparable.

In muscular strength, the Chinese youth was much below the standard of the American but in muscular speed he excels. The curve here shows some curious features. In all the other results we have found pairs; sometimes we found the boys of the two lands paired, in that they were superior to girls; at other times the boys and girls of the same race were paired and clearly set apart from the other race. The division has been on race lines or on sex lines, but here we find the best results from Chinese boys and the poorest from Chinese girls. One is at a loss to explain this.

Table IX shows the number of taps per thirty seconds for Chinese boys and girls, using the tapping board and electric counter as described in Whipple's Manual (16). An examination of the table shows the relative grade of the Chinese boy as compared with the American to be 103.1 % for the right hand and 108.3 % for the left hand. If we combine the grades for the separate hands we get a combined grade of 105.7 % of the American average.

The results for girls give the Chinese a grade of 89.3 % that of American girls. The results for girls are somewhat open to question, and need to be verified.

TABLE IX.

NORMS FOR CEPHALIC INDEX FOR CHINESE BOYS AND GIRLS.

Age.	Boys.		Girls.	
	No. Tested.	Norm.	No. Tested.	Norm.
10	14	81.44	11	80.90
11	23	83.77	12	81.60
12	57	82.53	16	82.28
13	62	82.37	32	82.70
14	55	82.25	24	83.35
15	39	80.66	34	83.28
16	19	82.18	41	83.66
17			35	84.02
18			25	82.04
19			13	83.15
20			15	84.51
Adults.			25	84.20

The average per cent of these norms, in comparison with American standards, is 104.2 % for boys and 104.9% for girls.

TABLE X.

NORMS OF TAPPING RATE FOR CHINESE BOYS AND GIRLS.

Age.	No. Tested.	Boys.		No. Tested	Girls.	
		Rt.Hd.	Lf.Hd.		Rt. Hd.	Lt.Hd.
10	14	159.36	148.29	11	145.63	128.18
11	27	173.88	152.44	12	144.92	127.58
12	50	185.26	166.64	16	153.12	136.19
13	54	182.33	165.63	32	150.72	130.72
14	50	194.18	172.70	24	151.75	139.08
15	42	199.40	178.28	34	155.00	136.91
16	33	199.64	182.82	41	165.34	144.39
17	17	198.20	181.70	35	160.28	145.94
18	15	210.30	188.50	24	177.00	151.75
19	20	207.30	189.10	16	169.69	158.06
20				15	153.20	148.80
Adults.				25	164.32	151.68

The average per cent of these norms, in comparison with American standards, is 103.1 % for rt. hand, and 108.3 for the lf. hand, with a combined grade of 105.7 % for boys. For girls, the combined grade is 89.2 %

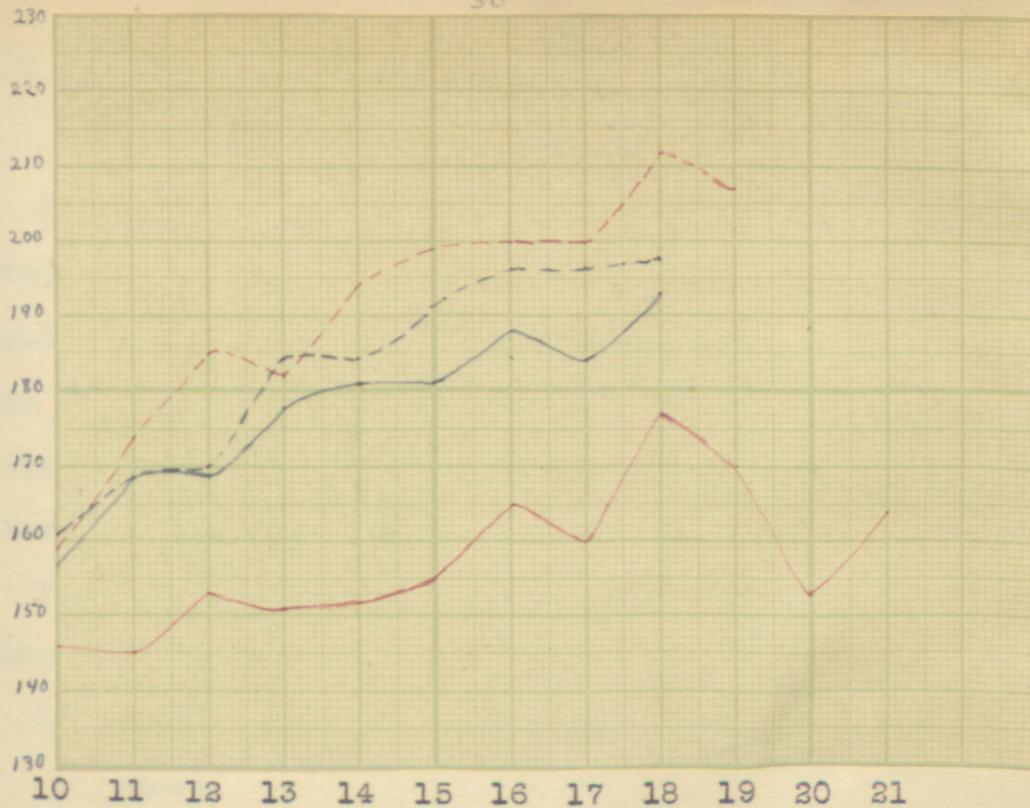


FIGURE XI. Tapping (30") Right Hand. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

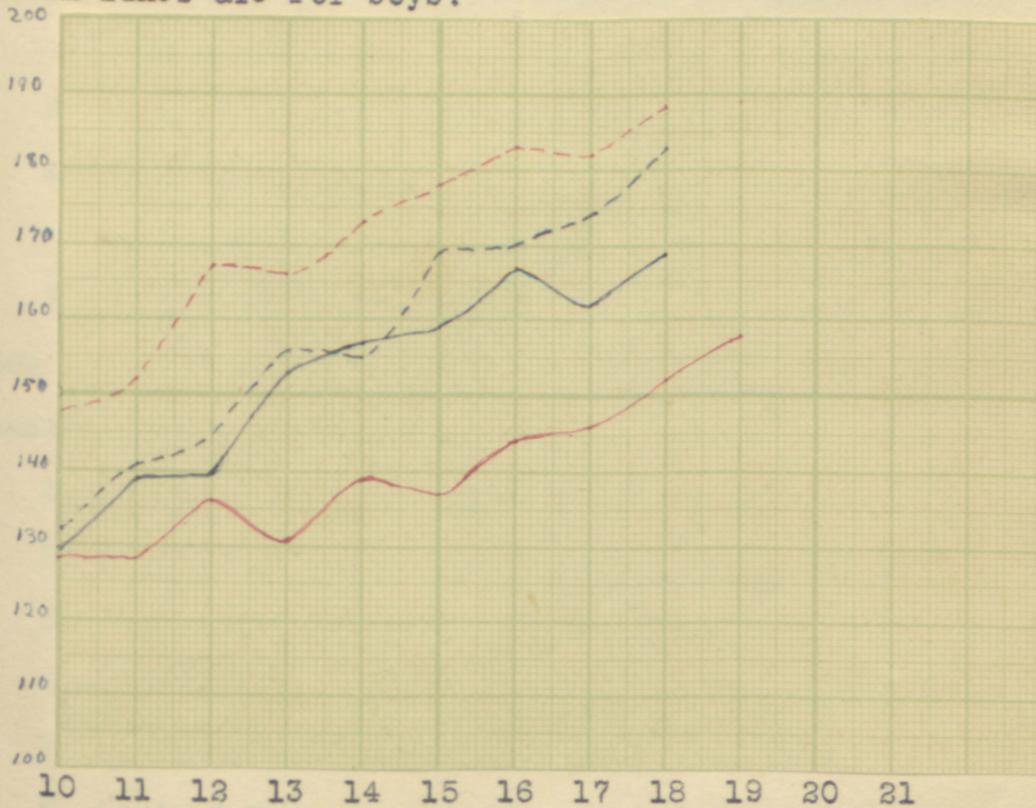


FIGURE XII. Tapping (30") Left Hand. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

IV. THE MENTAL TESTS.

The selection of suitable mental tests has been a matter of great difficulty. Thorndike (15) quotes Woodworth as saying, "Equitable tests of the distinctly intellectual processes are hard to devise; since so much depends on the familiarity of the material used. Few tests of this nature have as yet been attempted on the different races".

Four guiding principles have been kept in mind in the selection of the tests to be used.

1. The test must be equally understood by the children of both races.
2. The test must yield itself to the same standardization and quantitative treatment of results in both languages.
3. Tests must have a minimum of language difficulty.
4. Tests used in the comparison of mental ability of two races should have a high correlation with intelligence.

It is exceedingly difficult to find many tests that can pass these four requirements satisfactorily, but after considerable trial the following tests were decided upon:

1. Speed in Writing, used as a control test.
2. Free Association, two tests of three minutes each.
3. Controlled Association, three lists of fifty opposites.
4. Rote Memory, concrete words.
5. Rote Memory, abstract words.
6. Logical Memory, reproduction of two standardized stories.
7. Substitution, Symbol-Digit and Digit-Symbol tests.
8. Analogues.
9. Spot Patterns.

These tests do not fulfil the requirements as laid down above but they approach a fulfilment¹ sufficiently to be of use in a study of this kind. They seem to be the most valuable of all the material available. The material used and the manner in which the tests were given will be described in detail in the discussion of the several tests.

Great pains were taken to secure the proper conditions. In every case a Chinese assistant read the instructions in Chinese and the memory material. The tests were preceded by remarks showing the importance of such tests in the new educational development. The students were told that the tests had already been given in certain other schools and that we wished very much for them to excel the records already made. After each test time was taken to appear to examine the records of the students and to tell them that they were doing well, but to please remember to keep up their good work.

The instructions for the several tests were worked out with the aid of a Chinese teacher. First, the instructions were translated from those given to American children, then, the tests were given to two young Chinese assistants. After each test was finished these two young men were questioned as to any part not clear to them and the instructions were revised accordingly. Practically no objection can be raised to the instructions not being understood in any of the tests, though of course some children said they did not understand, just as stupid children everywhere excuse themselves.

In every test great care was exercised in making it perfectly clear what was expected of the student. Wherever possible the blackboard was used to reinforce the oral instruction and explanations. Much more time was given than in testing American

children as Chinese students have an unfortunate habit of never trying to understand directions the first time. The procedure followed was to read the instructions that had been carefully prepared and then to give whatever explanations were necessary, after which the blackboard was used to illustrate what was wanted. Then the students were given opportunity to ask any questions. When all understood, the test material was passed around, the instructions were read again, and the signal was given to begin. The signals were given by the use of a whistle. The suggestion was made by my Chinese assistant who said that the children in the new schools were quite familiar with the whistle for starting contests of any kind and that it would be open to fewer objections than a spoken word would be. The procedure followed was to say, "Prepare", and then after the proper interval, blow the whistle. In every case, the signal was understood and the response uniform.

There can be no doubt that in all but a very few cases complete rapport was established with the students. The Chinese teachers were in full sympathy with the tests, and their interest and enthusiasm worked down to the students. It was something new, something to break the monotony, yet something that was being done in other schools, and most important of all, it was something in which to excel.

V. ASSOCIATION TESTS.

So much has been said concerning the insuperable character of language difficulties and of the immense disadvantage to the Chinese on account of their language that it was thought advisable to give a control test in speed in writing to both American and Chinese children. The purpose was of course not to find out primarily which race can write the faster but to enable us to more properly evaluate the results in the tests where writing is a factor. If, for example, in association tests, we find that one group can actually write fifty per cent faster than the other group, then poorer results from the second group must be interpreted in the light of that fact.

To the American children was given a familiar sentence and they were told to write it over and over again until the signal to stop was given. The sentence, "With freedom's holy light" was written in plain view upon the blackboard. The children were told that they could omit the apostrophe in "Freedom's" and to write the sentence over and over again as fast as they could.

The letters in the words of the three lists of "Opposites" were counted and the average taken and found to be 5, and a small fraction. Next, the number of strokes was counted in the characters of the three Chinese lists of opposites, and the average taken and found to be 10 and a very small fraction. The control sentence had contained twenty-one letters, and so taking the ratio of five and twenty-one as a standard, a control sentence in Chinese was constructed containing forty-two strokes. The Chinese sentence meant, "River city school" and was easily remembered. It was written on the blackboard and the students told to write it over and over again in order to see who could

write the fastest.

It is interesting to note that they were instructed to write in "half-grass characters." There are two extremes in Chinese penmanship, the "Upright" and the "Grass" characters, the former corresponding roughly to our printed letters when made with a pen, while the latter is much more like our "running hand". An expert Chinese penman will tell you that between these two extremes there are a number of different styles of writing. And so it becomes necessary to prescribe the sort of writing desired. The "Half-Grass" was selected as the best. It is much faster than the "Upright" but not nearly so fast as the "Grass", but it seems most comparable to our western writing. It is well to bear in mind however, in the consideration of these results that the Chinese children could have written faster than they did, if we had allowed a different style of penmanship.

TABLE XIII.

SPEED IN WRITING.

Age.	No.	Boys.				Girls.							
		Chinese		Americans		Chinese		Americans					
	Td.	Norm.	A.D.	No.	Td.	Norm.	No.	Td.	Norm.	A.D.	No.	Td.	Norm.
11	12	24.98	4.7	14	14.53						8	14.71	
12	22	27.33	6.3	17	17.90	6	22.48	2.8	12	15.58			
13	41	29.95	5.4	15	20.37	16	22.56	2.3	19	17.75			
14	65	27.92	4.3	8	13.87	13	22.87	3.4	12	15.97			
15	69	30.86	5.3	13	17.80	12	21.58	2.3	5	18.46			
16	51	29.33	6.5	9	17.78	16	23.41	2.9	9	17.18			
17	34	32.44	4.8	7	16.38	14	25.16	2.8	7	17.38			
18	18	23.95	7.2	8	16.97	5	19.93	1.9	13	18.84			

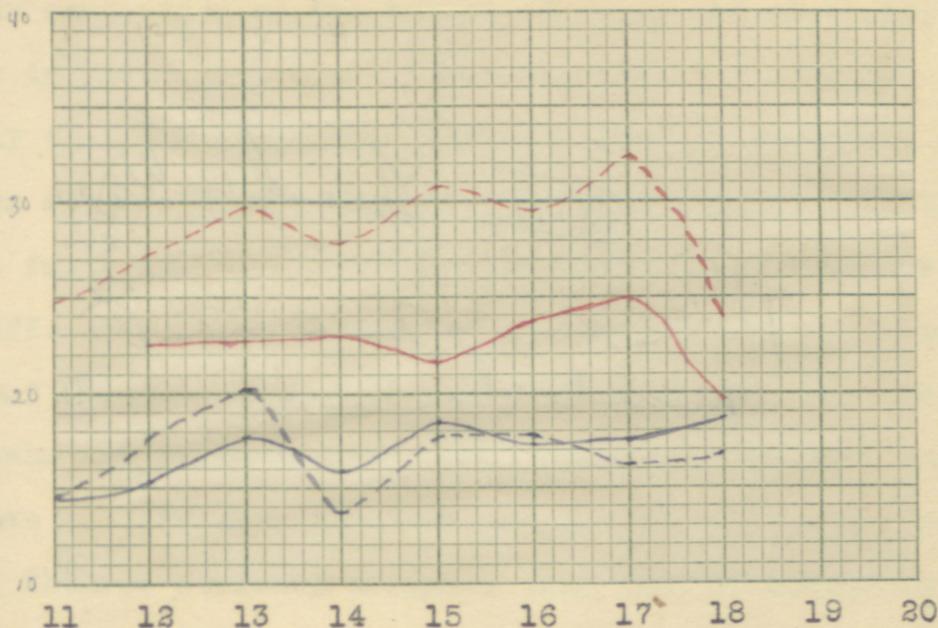


FIGURE XIII. Speed in Writing. Three minute test reduced to one minute standard. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

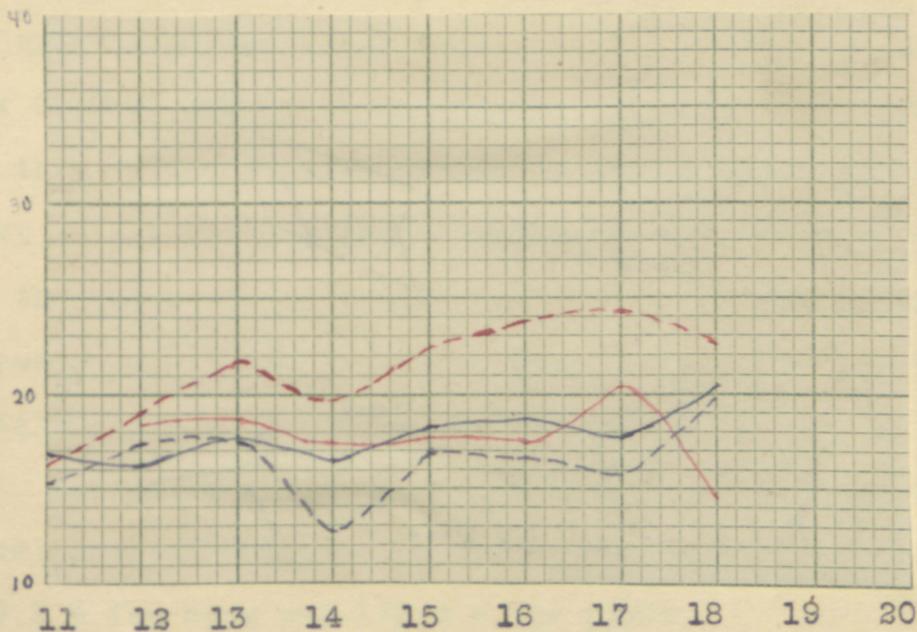


FIGURE XIV. Free Association. Three minute test reduced to one minute standard. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

Table XIII gives the results from this test. If we base our comparison on the number of words and characters written it is plain that the Chinese far exceed Americans. One cannot say that the mechanical work involved in writing a character of ten strokes is the same as writing a word of five letters. In fact, the five letter words would seem to be the more difficult. The results of this test do not, of course, prove that Chinese are capable of writing faster than American when the tasks are mechanically equal, though it supports such a view. When we take into consideration the fact that the reaction time of Chinese students is faster than that of Americans, it gives rise to the belief that in spite of our hereditary notions on the subject the Chinese write faster than we do.

When we consider the further fact that the Chinese character or ideograph contains more meaning than the average word, and consequently that fewer are required to express thought, there is open to us the great question of a proper use of writing in the Chinese system of education. At present little use is made of this in the class-room, there is a slavish devotion to the text in all its miserable exactness, and there is a faithfulness to the words of the master that makes the use of note-taking impossible. The result is that instruction is stilted and originality on the part of the student is killed.

The graph shown in Figure XIII indicates the degree of excellence of Chinese boys and girls, a degree averaging 167.2 % for boys and 132.9 % for girls.

The main purpose of this test, however, was in reference to the other tests in general and to the association test in particular. Directly after the test in speed in writing was given, a test in free association was tried. The children were

told to see how many words of their own they could write, the purpose of the test being, "to test the quickness of the associative processes." No very high correlation with estimated intelligence has been found either in America or China for this test.

The method is indicated by the instructions, as prescribed by Pyle (11), given to the American children as follows: "I wish to see how many words you can think of and write down in three minutes. I shall name a word; you may write it down and then write all the other words that come to your mind. Work as fast as you can". In testing Chinese children, it became necessary to supplement the instructions with statements showing that words of the same sound and tone were admissible, but not the same word repeated. It was also necessary to advise that the words need not be from the same radical or root.

Two tests were given, in one the initial word was "water" and in the other, "man". After the instructions had been given and explained to the satisfaction of all, the word was given in the following manner:- "The word that I shall give you... is "water".

Table XIV shows the results of the tests when reduced to the number of words per minute. Only one test is reported here, inasmuch as no significant changes in rank emerged from the second test. The superiority of the Chinese is clearly indicated. The girls of the two races are practically equal, but the Chinese boys have a relative grade of 128 %.

TABLE XIV.

FREE ASSOCIATION.

Age.	No.	Td.	Boys.				Girls.							
			Chinese		Americans		Chinese		Americans.					
			Norm.	A.D.	No.	Td.	Norm.	No.	Td.	Norm.	A.D.	No.	Td.	Norm.
11	13		16.37	3.3	14		15.23					8		16.78
12	24		19.15	5.4	17		17.36	12		18.33	4.7	12		16.28
13	42		21.88	5.4	16		17.81	23		18.45	4.1	19		17.75
14	70		19.80	4.5	13		13.64	22		17.49	4.8	22		16.38
15	75		22.32	4.6	21		17.14	19		17.80	4.6	24		18.28
16	57		23.57	3.7	22		16.99	29		17.21	4.6	20		18.48
17	35		24.13	3.6	8		15.99	20		20.06	4.1	6		17.38
18	20		22.15	4.0	10		19.99	9		14.07	3.6	6		20.22

It is out of the question to make comparisons of the qualitative aspects of the case, but there is one outstanding feature from the Chinese results that is exceedingly interesting; the association seems to be largely mechanical. The Chinese character^{is} an arbitrary method of representing thought— at least it is so practically for the average school boy, no matter what the racial significance may be. It may be that this is the explanation of the fact that the student seems influenced by similarity of form rather than similarity of meaning in determining his next character. In Figure (A), there is produced a series of samples taken from the papers of the student. This merely indicates what may be found in any of the papers and shows the mechanical character of the associative process. It would not be possible to say that meaning never influences the choice, but it is possible to say that in the great majority of cases it is the thought of how to write the character that determines. Many characters that are almost identical in form have no connection in meaning. It is as though an American boy in writing the word "ged" would think of "dog" or when writing the word "loud" he would think of "load". It may be well to add here that the sound of the

character seems to play no part in this associative process. We are not confronted with series similar to "rag", "tag", "bag", "sag", and "Rat", "cat", "bat", "sat", that we sometimes find in the American lists.

It is well to add that there may be a meaning for the student in these connections, though there is no real connection in meaning between the words. He has learned what characters are, and how to write them, largely from what they are not. The Chinese teacher explains the meaning of a character by its opposite, he teaches how to write the character by distinguishing it from the characters which it resembles.

CONTROLLED ASSOCIATION.

We next turn to the examination of the results in the tests of controlled association. The only test that promised proper standardization in both languages was the "Opposites Tests". It differs from the Free Association Test in that one must judge one's thinking. It calls for "ability to appreciate relationships and to control association".

The test has a very high correlation with general intelligence. Simpson, (13), estimates the true correlation to be as high as .82 for easy words, and .96 for hard words. Whipple (16) reports that all other experimenters agree in giving this test a high rank in dependence on intelligence.

This test is very fair for the Chinese, inasmuch as it is quite common for a teacher to explain the meaning of a character in terms of the word of the opposite meaning. So popular has this method become that little pamphlets have recently been published giving lists of words and their opposites. These pamphlets are designed for use as text books in the lower grades, but it

is only fair to say that no such books have been used in the training of the pupils tested.

Three lists of fifty words each were used. For each list there was allowed two and one half minutes in the grammar school grades and two minutes in the high school grades. The results as recorded in the tables have been reduced to a one minute standard.

It should be remembered here that the control test in speed has direct reference to the words in the opposites test. The result here should be interpreted with the result of the control test in mind. There we found that the speed in writing characters whose mechanical difficulty averaged the same as in the present test, the Chinese boys far exceeded the American. We found also that in free association, where speed in writing plays a prominent part, the Chinese boys were well ahead. In the opposites test, we get entirely different results. American girls are the best in this test, with the American boys following, then come the Chinese boys and last of all the Chinese girls. The grade of Chinese boys as compared with the average grade of Americans is 88.1 % and that of Chinese girls as compared to Americans is 75.6 % .

This means that after coming to the test with an advantage of 167.2 %, due to the ability of speed in writing, the Chinese fall far below the Americans in actual accomplishment. Were we to take as our standard of comparison the grades Chinese boys should make in comparison with Americans in the light of their greater speed, we find that Chinese boys and girls have an exceedingly poor record.

OPPOSITES--List No. 1.

- | | |
|-------------|------------|
| 1. strong | 26. hot |
| 2. deep | 27. long |
| 3. lazy | 28. wet |
| 4. seldom | 29. fierce |
| 5. thin | 30. great |
| 6. soft | 31. dead |
| 7. many | 32. cloudy |
| 8. valuable | 33. hard |
| 9. gloomy | 34. bright |
| 10. rude | 35. fine |
| 11. dark | 36. plain |
| 12. rough | 37. sharp |
| 13. pretty | 38. late |
| 14. high | 39. sour |
| 15. foolish | 40. wide |
| 16. present | 41. drunk |
| 17. glad | 42. tight |
| 18. strange | 43. empty |
| 19. wrong | 44. sick |
| 20. quickly | 45. friend |
| 21. black | 46. above |
| 22. good | 47. loud |
| 23. fast | 48. war |
| 24. clear. | 49. in |
| 25. tall | 50. yes |

OPPOSITES--List No. 2.

- | | |
|--------------|--------------|
| 1. delicate | 26. strength |
| 2. thick | 27. humble |
| 3. expensive | 28. smallest |
| 4. freeze | 29. idle |
| 5. kind | 30. many |
| 6. death | 31. increase |
| 7. man | 32. neat |
| 8. bashful | 33. lend |
| 9. true | 34. prudent |
| 10. ugly | 35. before |
| 11. reap | 36. over |
| 12. sweet | 37. up |
| 13. come | 38. swift |
| 14. tough | 39. here |
| 15. future | 40. winter |
| 16. honest | 41. can't |
| 17. gay | 42. went |
| 18. easy | 43. brave |
| 19. high | 44. believe |
| 20. near | 45. forget |
| 21. rich | 46. old |
| 22. laugh | 47. like |
| 23. love | 48. little |
| 24. ripe | 49. failure |
| 25. poverty | 50. far |

OPPOSITES--List No. 3.

- | | |
|-----------------|----------------|
| 1. night | 26. include |
| 2. definite | 27. plaintiff |
| 3. near | 28. hope |
| 4. absent | 29. just |
| 5. buy | 30. useful |
| 6. forward | 31. inhalation |
| 7. back | 32. wise |
| 8. equal | 33. insane |
| 9. ascend | 34. fertile |
| 10. wild | 35. first |
| 11. positive | 36. top |
| 12. yea | 37. unknown |
| 13. off | 38. faithful |
| 14. synonym | 39. expand |
| 15. clear | 40. graceful |
| 16. advance | 41. soluble |
| 17. obedient | 42. going |
| 18. live | 43. rigid |
| 19. open | 44. abundance |
| 20. locked | 45. include |
| 21. quick | 46. concave |
| 22. interesting | 47. dwarf |
| 23. north | 48. regular |
| 24. east | 49. happy |
| 25. inlet | 50. add |

TABLE XV.

CONTROLLED ASSOCIATION.
First List Of Opposites.

Boys.						Girls.								
Chinese			Americans			Chinese			Americans.					
Age.	No.	Td.	Norm.	A.D.	No.	Td.	Norm.	No.	Td.	Norm.	A.D.	No.	Td.	Norm.
11	13		5.82	1.3	14		6.43					8		7.04
12	24		7.09	1.7	17		9.33	12		5.16	2.0	12		7.72
13	42		6.84	2.1	16		8.68	22		6.29	1.8	20		8.74
14	70		7.39	2.1	13		8.10	22		6.50	2.7	22		10.64
15	75		8.07	2.5	21		10.01	19		7.12	2.2	24		11.19
16	53		8.76	2.5	22		10.94	28		6.30	2.3	20		12.61
17	35		9.63	2.1	8		11.02	20		6.95	1.9	8		12.83
18	20		9.95	3.4	10		13.60	9		5.72	2.4	14		14.26

Second List Of Opposites.

Boys.						Girls.								
Chinese			Americans			Chinese			Americans.					
Age.	No.	Td.	Norm.	A.D.	No.	Td.	Norm.	No.	Td.	Norm.	A.D.	No.	Td.	Norm.
11	13		5.33	1.4	14		6.52					8		7.34
12	24		6.57	1.9	17		7.72	12		5.38	2.2	12		7.36
13	42		6.65	1.9	16		8.79	22		6.54	1.7	20		8.37
14	70		7.08	1.7	13		8.19	22		6.37	2.8	22		10.43
15	65		7.62	2.2	21		8.79	19		6.67	2.3	24		10.81
16	57		8.36	2.2	22		10.04	29		6.34	2.1	20		12.06
17	35		8.93	2.1	9		11.55	20		7.73	2.7	8		12.01
18	20		8.45	3.3	10		12.35	9		5.16	1.8	13		14.03
19														

Third List Of Opposites.

Boys.						Girls.								
Chinese			Americans			Chinese			Americans.					
Age.	No.	Td.	Norm.	A.D.	No.	Td.	Norm.	No.	Td.	Norm.	A.D.	No.	Td.	Norm.
11	13		7.02	1.5	14		6.26					8		6.66
12	23		8.23	1.5	17		6.45	12		9.10	1.8	12		7.22
13	42		8.47	2.0	16		7.97	22		9.74	2.1	20		7.97
14	70		8.85	1.8	12		7.57	22		9.45	2.6	22		9.03
15	75		9.36	2.0	21		7.88	19		10.00	2.4	24		9.17
16	57		9.93	1.9	22		9.29	29		9.95	3.2	20		10.24
17	35		10.72	2.0	9		11.70	20		11.80	2.1	6		9.82
18	20		9.99	2.3	10		10.96	9		7.24	3.0	6		10.66



FIGURE XV. Controlled Association. Three lists of opposites combined and reduced to a one minute standard. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

VI. MEMORY.

We now pass to the determination of individual differences in memory efficiency as related to the age, training, and the native ability of the two races. The Memory of a Chinese scholar is proverbial. The story is told^{of} a Chinese student in trouble who was advised to read something to distract his attention and who replied, that he had already committed to memory all the books in the world that were worth anything. It is common indeed for men to be able to quote whole books from the Chinese Classics. And now we have cases in which Chinese girls have memorized the entire New Testament. What shall we find when we compare the two races?

ROTE MEMORY.

First we shall record the results from two tests in rote memory. There was given a series of discreet impressions which were to be reproduced "in the correct order and exactly as presented". The test consisted in two lists of one syllable words, one list containing concrete and the other abstract words. The method was that prescribed by Pyle (11) and is as follows: "I shall pronounce to you a number of words, one group at a time. There are three in the first group, but more in the others. As soon as I have pronounced a group of words, you may write them down. Try to write them in the order given. If you cannot remember some of the words, leave their places vacant and write in the proper places ^{the words} you do remember."

This test shows positive correlation with the better tests of intelligence and is valuable in estimating general ability. "The more careful correlation of work of the past few years demonstrates at least a fairly good degree of correspondence between immediate memory and either school standing or estimated general intelligence" (16)

In grading the method prescribed by Pyle (11) was followed and one point given for each word remembered and one point for each word properly placed.

The list of concrete words given to the American children is as follows:

1. Cat, tree, coat.
2. Mule, bird, cart, glass.
3. Star, horse, dress, fence, man.
4. Fish, sun, head, door, shoe, block.
5. Train, mill, box, desk, oil, pup, bill.
6. Fleas, car, pipe, bridge, hand, dirt, cow, crank.

The abstract list was as follows:

1. Good, black, fast.
2. Clean, tall, round, hot.
3. Long, wet, fierce, white, cold,
4. Deep, soft, quick, dark, great, dead.
5. Sad, strong, hard, bright, fine, glad, plain.
6. Sharp, late, sour, wide, rough, thick, red, tight.

These words are taken from Pyle (11) and have the advantage that all have but one syllable and so are comparable to the Chinese words. The Chinese lists were for the most part translations of these words, though the main idea in the preparation was not a reproduction ^{of} the American lists, as

much as lists familiar to the Chinese students.

In giving the test the students were given the right to put down any word of the same sound. The reason for this lies in the fact that there are many words of the same sound and of the same tonal inflection. The students were made to understand that they were to write the words they heard rather than the particular words spoken by the reader. To some extent, this broke down the distinction between concrete and abstract words, inasmuch as the sounds overlapped, and the objection may be made that this renders the test of less value. It can only be said that the objection has more value in theory than in actual practice, inasmuch as the main purpose is not to compare memory for abstract words with that for concrete, but is "to determine the immediate memory of the pupil for unrelated impressions". It must further be added that actual examination of the papers reveals the fact that the great majority of words written in the concrete test are concrete and the majority in the abstract test are abstract. The Chinese students may have had a slight advantage in the light of these considerations, but the attendant confusion of choosing between words of the same tone would tend to inhibit the best response. It is probable, however, that the advantages and disadvantages are exceedingly small.

The results as recorded in Table XVI show the excellence of the Chinese in this test. In all ages, except one, Chinese excel in their recall of concrete words, and for the majority of ages, Chinese surpass American girls. Figure XVII shows that the four classes are divided into pairs of ability, Chinese boys and girls clearly excelling American children of both sexes. We find however, that for Chinese

TABLE XVI.

ROTE MEMORY FOR CONCRETE WORDS.

Boys.						Girls								
Chinese				Americans		Chinese			Americans					
Age.	No.	Td.	Norm.	A.D.	No.	Td.	Norm.	No.	Td.	Norm.	A.D.	No.	Td.	Norm.
11	13		39.83	6.7	69		38.50					60		38.60
12	16		45.87	6.5	77		39.20	12	44.10	6.9		82		39.60
13	32		45.78	8.1	76		40.60	22	45.59	7.2		71		42.00
14	62		49.08	8.1	47		40.52	22	43.86	6.9		56		44.10
15	66		49.08	7.3	46		42.02	19	44.79	4.9		37		45.40
16	49		53.55	6.5	36		45.60	28	41.46	7.6		37		44.70
17	35		51.40	6.2	16		46.50	20	46.45	6.7		16		43.80
18	12		44.58	9.8	15		47.50	9	40.66	9.1		15		47.30

TABLE XVII.

ROTE MEMORY FOR ABSTRACT WORDS.

Boys.						Girls.								
Chinese				Americans		Chinese			Americans					
Age.	No.	Td.	Norm.	A.D.	No.	Td.	Norm.	No.	Td.	Norm.	A.D.	No.	Td.	Norm.
11	11		38.09	6.8	69		33.90					60		33.90
12	16		44.35	5.4	77		32.60	12	46.30	7.7		81		34.90
13	32		44.28	7.0	76		36.00	22	45.86	5.3		72		38.40
14	62		46.97	6.8	47		38.50	22	45.95	5.9		56		42.90
15	66		45.140	7.9	46		39.70	19	46.79	5.8		37		45.10
16	50		48.08	6.6	36		45.00	30	45.87	7.5		37		45.50
17	35		49.31	6.5	16		46.80	20	49.35	6.3		17		42.50
18	12		44.00	8.0	15		50.40	9	37.44	7.4		16		52.60

TABLE XVIII.

LOGICAL MEMORY .

Boys.						Girls.								
Chinese				Americans.		Chinese			Americans.					
Age.	No.	Td.	Norm.	A.D.	No.	Td.	Norm.	No.	Td.	Norm.	A.D.	No.	Td.	Norm.
11	13		26.33	6.7	163		32.81					164		36.21
12	22		28.77	6.3	173		35.01	12	37.00	5.9		203		37.79
13	42		28.38	7.6	179		36.71	22	37.27	5.2		184		38.55
14	69		30.43	6.7	141		35.70	20	34.70	6.6		168		38.71
15	75		32.16	7.3	110		36.08	18	35.83	6.7		123		38.31
16	57		31.42	7.9	82		34.86	22	35.27	5.7		114		37.15
17	35		34.66	5.2	53		34.80	18	35.00	6.6		89		36.73
18	20		26.30	9.2	42		36.80	8	30.50	4.4		62		38.12

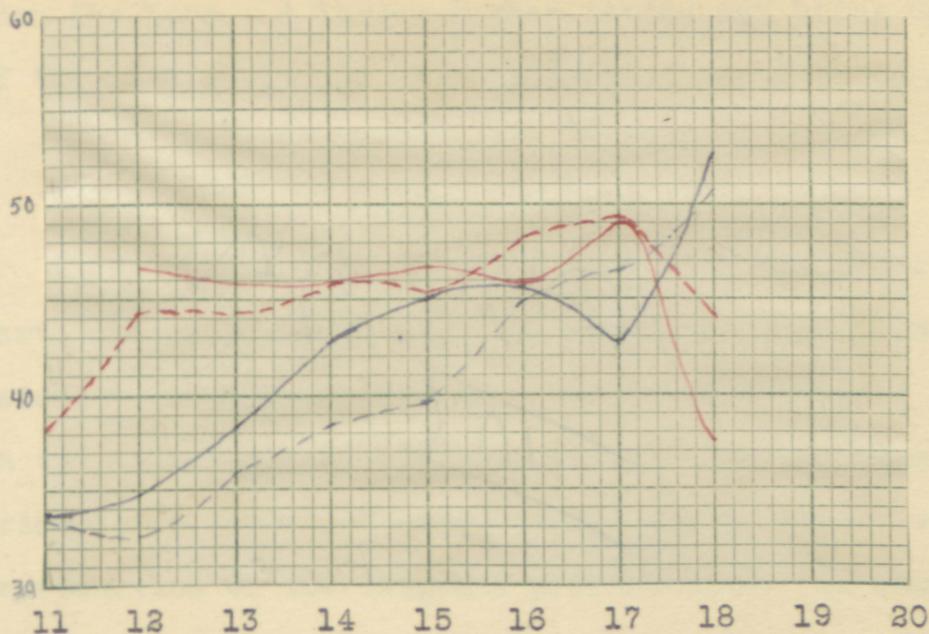


FIGURE XVI. Rote Memory. Concrete words. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

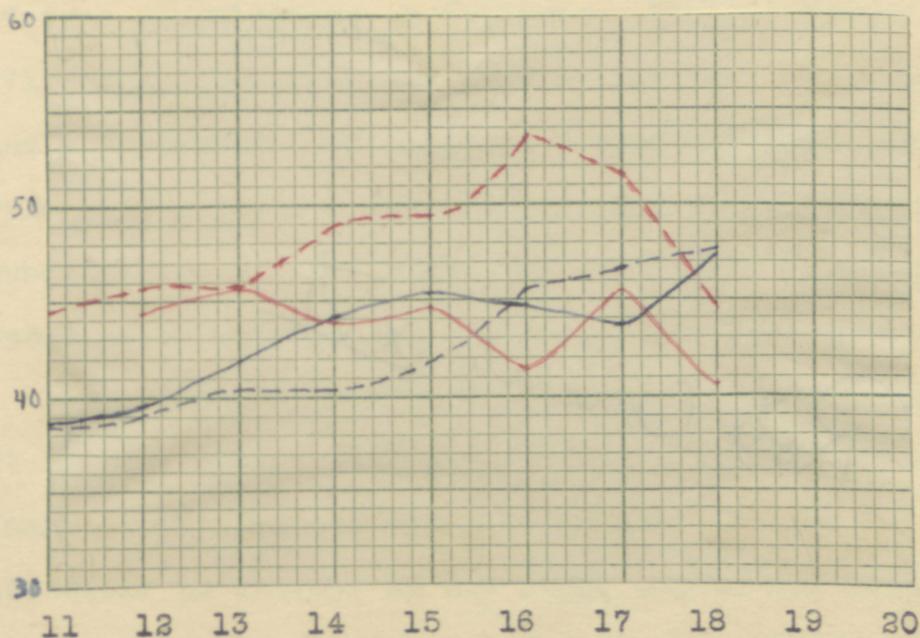


FIGURE XVII. Rote Memory. Abstract words. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

children, the boys excel, but for Americans the girls are better than the boys. A larger number tested may bring up the standard of the Chinese girls, But at present there is no good explanation.

LOGICAL MEMORY.

Tests for logical memory differ from the above in two main particulars. "In the first place, connected, meaningful material is used instead of a series of disparate impressions. In the second place, the reproduction that is demanded is primarily a reproduction of ideas, not an exact, verbatim, reproduction of the original presentation. In other words, this test, to use current phraseology, measures 'logical' or 'substance' memory, instead of 'rote' or 'mechanical' memory" (16).

Logical memory has a very high correlation with the better of the approved mental tests. Simpson (12) reports a series of true correlations as follows:- Logical Memory and Completion .71 , Logical Memory and Hard Opposites .70 , Logical Memory and Rote Memory .80, Logical Memory and Easy Opposites .50. Pyle (11) reports a true correlation for Logical Memory and Substitution of .63, while the writer has found the raw correlation between Logical Memory and Analogues to be .45

The results from just one story are given here.

It is exceedingly difficult to find a story that will be equally familiar and fair to students of the two races. It was thought advisable to attempt no new story but to use stories that had had an extensive use in America and had been thoroughly standardized in the treatment of results. Two stories were selected, "The Marble Statue" as given by Whipple (16) , and "The Boy who would not drink", as given by Pyle (11).

These two stories seem to adapt themselves fairly satisfactorily to Chinese idiom and Chinese thought, but after considerable use it was found that the results from, "The Boy who would not drink" were not satisfactory and so this story was discarded.

"The Marble Statue" never failed to hold the interest and the attention of the students. In fact, it seems a better story in Chinese than in English. The genius of the Chinese language, carrying as it does its ideas in ideographic characters seems better suited for memory stories where separation into units is demanded for purposes of grading than the English language.

The translation was made with the aid of a young Chinese teacher who understood the necessity of using only terms that were familiar to the ordinary Chinese student. It is worth while to add that this story is similar in certain ways to many Chinese fables.

The instructions were, "I shall read you a story entitled, "The Marble Statue", After I have read it, you may write down what you remember of the story. You need not use the exact words that I read, unless you wish, but you may write it down in your own words. Try to remember as much as possible and write down all you remember. "

The question of Chinese style must come in for a brief statement. The written language differs from the spoken language in that more attention is given to composition and form. The classical is always held distinct from the colloquial but of course there are various grades of classical and colloquial. It would be a mistake to suppose that the Classical is spoken by the educated and the colloquial by the ignorant man.

As a matter of fact, all speak the colloquial, though of course there are different grades, and some are much influenced by classical expressions.

The story was read in the best colloquial speech and the students were given the privilege any form of expression and any style they chose in reproducing it. There can be no objection offered against this test on the grounds of mixing two kinds of style. It is plain that the story was read to the students by one of their own race in a language that they could not mistake and they were given the privilege of reporting it in the language and style which they preferred.

The results in Table XVIII show some very significant facts. The first is that in China as well as in America, girls have better memory for ideas than boys. Chinese boys attain to only 83.5 of the excellence of their sisters, while American boys have a grade as compared to American girls of 93.7 %

The second significant fact is that American girls excel Chinese girls and American boys excel Chinese boys. The girls in China attain to a relative grade of but 93 % of the excellence of Americans and Chinese boys have a relative grade of 84.2 % of the standard for American boys. This means that for every fifty ideas remembered and reproduced by an American girl, the Chinese girl gets but forty-six or forty-seven, and for every fifty ideas reproduced by the American boy just forty-two come from his brother in China.

The third significant fact is the closeness of the grade between Chinese girls and American boys. The graph in Figure XVIII shows that for most of the ages Chinese girls and American boys approximate the same rank. Comparing all the individuals tested instead of using a comparison of the various age norms would give the Chinese girls a slight advantage.

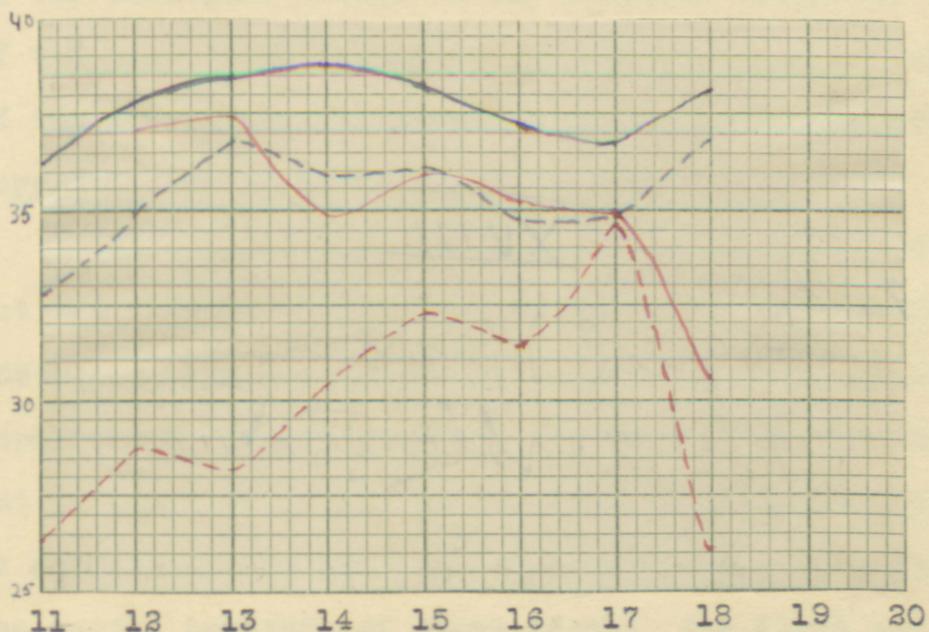


FIGURE XVIII. Logical Memory. "The Marble Statue". Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

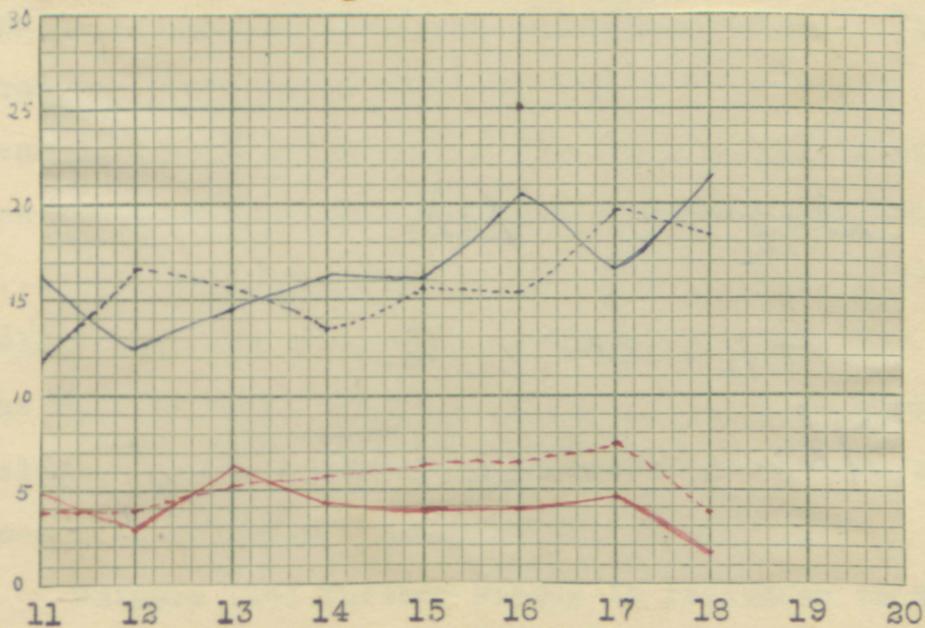


FIGURE XIX. Analogues. Three minute standard. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

VII. ANALOGUES.

This test consists in having the students supply the fourth term of each of twenty-five analogies or word ratios. As the analogues differ in the relation involved, the object of the test is to determine the accuracy and the speed of the student in apprehending the relation demanded and in supplying the term that expresses that relation.

"In the analogies test there exists restriction, but the kind of restriction varies from one stimulus to another within the series of terms. The kind of restriction, moreover, is not indicated to the subject in the instructions but is supplied to him by the test material itself, and must be apprehended by him from that material. Each stimulus in the series consists of three terms; the first and second terms illustrate the relation in question; the third term is the first of a pair which are to stand in the same relation one to another as the first and second terms. The subject's problem, then, is to find the appropriate fourth term. Because the relation varies from stimulus to stimulus, the test is sometimes referred to as the 'mixed relations test' it tests 'flexibility of mental performance' and also 'skill in handling associations'. Burt (3) holds that the test involves 'perception implicit or explicit, of the relation and reconstruction of the analogous one by the so-called relative suggestion' ". (16)

Whipple (16) further states in reference to dependence on intelligence that, "Wyatt (19), working with the time limit method on groups, found that the analogies test afforded the highest correlation with intelligence of any that he tried save the completion tests. His correlations amount to 0.62

in one, and 0.80 in another group. Burt's tests at the Holt School gave a correlation between the results of the analogies and intelligence of 0.150 in the individual test and 0.52 in the group test; his tests at the Wallasey School gave again a correlation of 0.50 ". Chassell (2) in tests for "Originality" in which twelve tests were used reports "analogues ranks first among the tests". The writer has found that this test has a very high correlation with intelligence as estimated by the teachers in the schools in which the tests were given both in America and China, also a positive correlation with logical memory of 0.45

This test is plainly the most difficult of all the tests given and seems to have been especially difficult for the Chinese. The writer has found it interesting to ask several experienced foreigners in China which one of the tests would probably prove most difficult to the Chinese both actually and in comparison with American students. The answers have always specified analogues.

The test consists in giving a list of twenty-five analogues with a few sample analogues at the top of the page. Two minutes and a half were allowed for pupils in the grades and two minutes for high school students. The instructions were given very carefully and in considerable detail. The procedure in the case of American children was to say, " Now I am going to give you something new and something I am sure you will like. On the papers that we shall give you will be found twenty-five word ratios. Some of you know about number ratios, but these are ratios in words. What I wish you to do, is to give the fourth term in each twenty-five in order to make it complete."

ANALOGUES

Cold	is to	Hot	as	Black	is to	White
Stairs	is to	Step	as	Ladder	is to	Rung
Conductor	is to	Train	as	Captain	is to	Boat
Hand	is to	Finger	as	Foot	is to	Toe
Baby	is to	Man	as	Lamb	is to	Sheep

1. Ring is to Finger as Bracelet is to _____
 2. Bird is to Wing as Fish is to _____
 3. Coal is to Stove as Oil is to _____
 4. Arm is to Elbow as Leg is to _____
 5. Fish is to Scales as Bird is to _____
 6. Time is to Clock as Temperature is to _____
 7. Water is to Gallon as Wheat is to _____
 8. Table is to Wood as Coat is to _____
 9. Purse is to Money as Bucket is to _____
 10. Water is to Boat as Air is to _____
 11. Storm is to Calm as War is to _____
 12. Shoe is to Foot as Glove is to _____
 13. Man is to Home as Bird is to _____
 14. Dog is to Bark as Cat is to _____
 15. Day is to Sun as Night is to _____
 16. Horse is to Puggy as Engine is to _____
 17. Apple is to Tree as Tomato is to _____
 18. Chicken is to Coop as Horse is to _____
 19. Kitten is to Cat as Gosling is to _____
 20. Pie is to Pan as Coffee is to _____
 21. Sweet is to Sugar as Sour is to _____
 22. Coal is to Black as Crank is to _____
 23. Silk is to Silkworm as Wool is to _____
 24. Sheep is to Flock as Cow is to _____
 25. Uncle is to Aunt as Nephew is to _____
-

Name _____

Grade _____

On the blackboard an arithmetical ratio would be written with the fourth term omitted and the class would be asked to supply the fourth term. This was done at once. Then one of the sample analogues would be written on the blackboard from the test sheet, with the fourth term omitted and the class asked to supply it. This would be done at once by some bright pupil. All the sample analogues were worked out the same way, then it was explained to the class that the different analogues represented different relations and that in finding the fourth term, one must always look first at the first pair to see what relation existed there, and then, keeping that relation in mind, supply a term that held that same relation to the third term. The students were then told that the samples as given them on top of their test sheets were to be disregarded. With the Chinese students almost ~~the~~ exactly the same procedure was adopted except that the instructions were a little more detailed.

In this test the American children clearly surpassed. Figure XIX shows a wide separation between the abilities of the two races. Inth case of American children, the girls are slightly better than the boys, but in China the boys are better than the girls. We find that Chinese boys are only about one third as good as American boys and that Chinese girls attain to less than one fourth of the excellence of their American sisters.

TABLE XIX.
ANALOGUES.

Boys.				Girls.						
Age.	No.	Chinese		Americans.		Chinese		Americans		
		Norm.	A.D.	No.	Td.	No.	Td.	Norm.	A.D.	
11	13	3.84	3.3	14	11.90			8	16.25	
12	24	3.83	3.1	17	16.53	9	2.66	2.5	12	12.40
13	42	5.28	4.2	16	15.96	21	6.03	2.4	20	14.41
14	69	5.65	3.4	12	13.30	22	4.20	4.0	23	16.15
15	74	6.15	3.1	20	15.71	19	3.92	3.3	24	16.09
16	57	6.24	4.0	22	15.45	29	3.97	2.9	20	20.47
17	35	7.51	4.9	9	19.86	19	4.67	2.6	7	16.86
18	18	3.80	3.6	10	13.24	9	1.70	1.1	14	21.17

VIII. SUBSTITUTION.

The purpose of this test is to "measure the rapidity with which new associations are formed by repetition". It has been used by Baldwin (1) and Pyle (11) to study racial difference and has long been one of the standard tests in the psychology of learning .

Heretofore we have used tests that have been adapted from one language to another. It has meant that all the testing material has had to be changed to suit the needs of the Chinese. We now report a test in which the material used underwent no change whatever. The two tests in substitution are the Symbol -Digit, and the Digit-Symbol, as described in "The Examination of School Children" (11). Two of each were given but inasmuch as the coefficient of reliability is very high only one test is herein reported.

Pyle (11) reports a true correlation with logical memory of 0.63 and Miss Weidensall (20) reports a correlation with general ability of 0.48 . Whipple (26) reports high correlations with intelligence as determined by school standing.

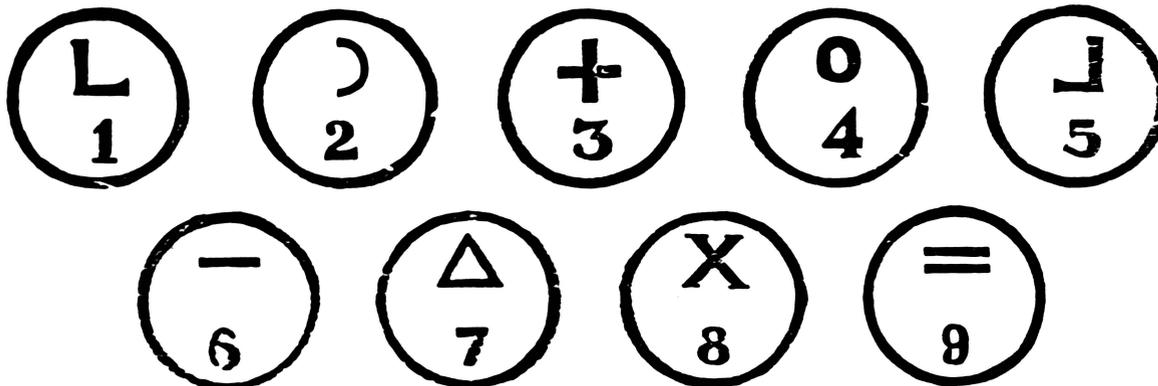
The sheets of symbols and digits are the same as used by Pyle (11) and are identical for Americans and Chinese. Instructions used are as follows: " In the circles in the top of the sheet before you, are written the nine digits and symbols which are to be written in the blank squares below for the digits to which they correspond. work as fast as you can and try to fill as many of the squares as possible without making mistakes." The instructions for the symbol digit tests were as follows: "In the blank squares below, you are to write the digits which correspond to the symbols".

Grading consists in counting the squares correctly filled. No fines for mistakes are imposed. In the tables the results are reduced to a one minute standard.

The question will perhaps be raised as to whether Chinese boys and girls are at a disadvantage in being called to use a foreign system of numerals. There may be some slight handicap, but it needs to be born in mind that these Arabic numerals are the only numerals that these students have used in their school work. The average Chinese, whether of school training or not who has learned the Arabic numerals, will always use them easily and freely. The writer is inclined to believe that in the test concerned the children actually tested of the two races have an equal chance.

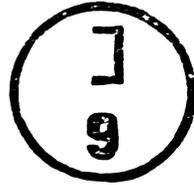
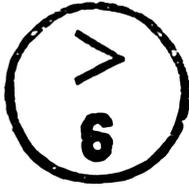
Table XX gives the results in the Digit Symbol test, and it will be noted at once that American girls lead in this test easily. American boys attain a grade of comparison to with American girls of approximately 85 % and Chinese boys excel Chinese girls by a wide margin. In the Symbol Digit test however the Chinese girls have a better grade than their brothers. In the two tests the Chinese girls attain to a grade of 79.5 %, when compared to Americans, in the one and a grade of 73.1 % in the other. Chinese boys attain a grade of 76.8 % in one test and 93.9 % in the other.

Substitution. Digit-Symbol Sheet.



84,976						27,516					
79,821						33,821					
63,442						97,473					
21,629						62,978					
57,183						31,542					
32,761						17,143					
95,146						26,981					
28,349						35,724					
73,862						16,315					
91,563						14,923					
37,628						34,762					
42,916						28,543					
23,729						83,936					
85,652						75,314					
35,486						56,283					
29,635						19,175					
72,518						36,293					
24,631						85,746					
19,852						15,283					
76,431						24,976					

Substitution. Symbol-Digit Sheet.



< [v □						□] > < ÷					
/ v ÷ [>						/ < ° v]					
] < □ / °						÷ [/] <					
v □ / [÷] < ° > ÷					
□] v ° >						/ ÷ □ [v					
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TABLE XX.

SUBSTITUTION *** DIGIT-SYMBOL

Age.	Boys				Girls					
	Chinese		Americans		Chinese		Americans			
No.	Td.	Norm.	A.D.	No.	Td.	Norm.	A.D.	No.	Td.	Norm.
11	13	17.18	3.4	63	16.49			57	18.60	
12	25	17.95	5.4	73	18.90	19	18.19 5.9	80	22.00	
13	42	20.36	5.3	77	22.10	22	18.98 4.8	68	23.30	
14	70	21.68	3.9	56	20.67	22	18.91 4.8	58	25.90	
15	76	22.28	4.7	48	24.15	19	19.81 6.5	39	26.51	
16	57	23.89	6.0	40	24.65	27	18.06 7.4	55	27.60	
17	35	25.96	4.5	22	24.30	20	21.26 5.8	45	28.10	
18	20	20.18	5.6	25	28.20	8	13.50 7.3	42	31.20	

TABLE XXI.

SUBSTITUTION SYMBOL-DIGIT.

Age.	Boys.				Girls.					
	Chinese		Americans		Chinese		Americans.			
No.	Td.	Norm.	A.D.	No.	Td.	Norm.	A.D.	No.	Td.	Norm.
11	13	12.54	7.0	76	16.84			71	19.30	
12	24	14.64	3.9	92	18.79	9	19.73 7.1	101	22.59	
13	43	16.04	6.2	93	20.40	22	21.53 3.6	85	25.00	
14	70	18.39	4.3	67	22.40	22	20.88 6.3	77	26.84	
15	76	17.87	6.4	62	24.90	19	22.85 6.7	56	28.77	
16	57	18.29	6.4	56	25.90	28	19.88 8.2	67	29.44	
17	35	23.12	3.8	22	26.50	20	23.96 5.7	50	28.80	
18	20	19.32	5.9	27	26.90	7	21.21 4.9	42	32.68	

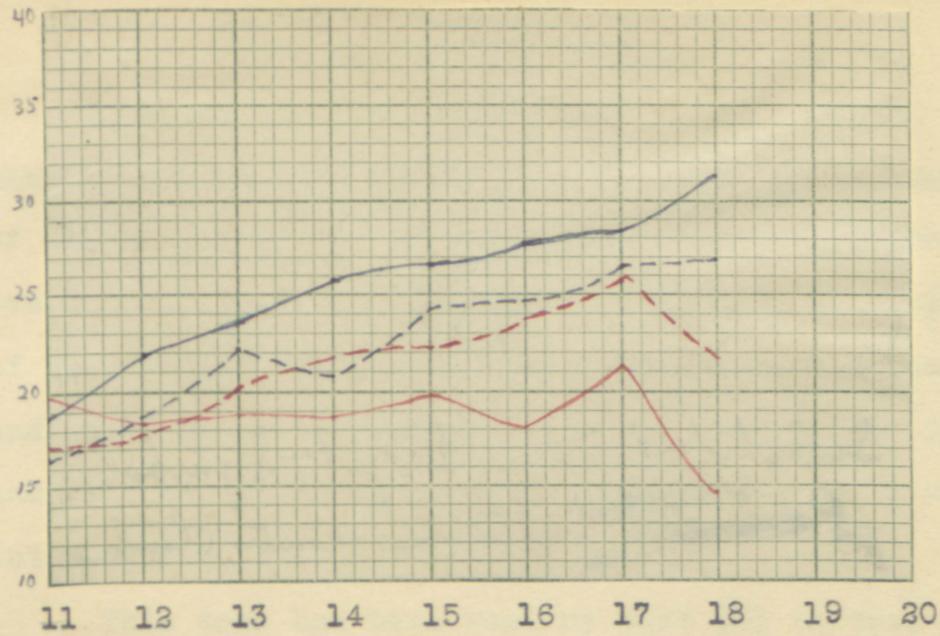


FIGURE XX. Substitution. Digit-Symbol. Reduced to one minute standard. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

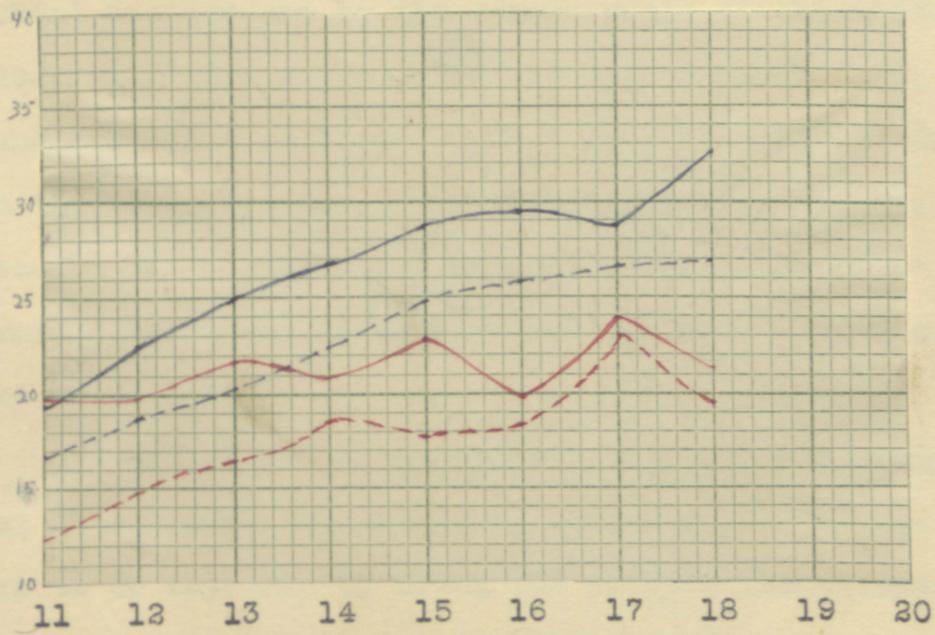


FIGURE XXI. Substitution. Symbol-Digit. Reduced to one minute standard. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

IX. SPOT PATTERNS TEST.

One test has been found that seems to fulfil the four requirements laid down for suitable measures of the abilities of the two races. The spot patterns test can be understood equally and perfectly by the children of both races; it yields itself to perfect standardization and quantitative treatment; it has no language difficulties; and finally, it seems to have a high correlation with intelligence.

This test has been used by Burt (3) to test general intelligence. He regards it as an association test and thinks its special activity is in the "formation of associations during perceptual activity". His method of procedure was first to estimate the general intelligence of the pupils by means of a combination of the rankings given by the school masters and by the school mates of the different students. The correlation between these two sets of rankings was very high, being 0.88 in one school and 0.91 in the other school. The raw correlation between the results of the tests and with general intelligence as determined above was found in one school to be 0.76 and in the other 0.75.

His method of giving the test was very complex, but Miss Goudge (5) has found that practically the same results are to be obtained by using the Whipple Tachistoscope. The writer has also secured very satisfactory results with this method in testing students at the Univ. of Missouri.

The test consists in showing a series of patterns made by placing spots on the intersections of lines on cross-section paper, Each pattern is given an exposure of two

seconds, after which the subject tries to reproduce the pattern on the blank squares already provided him. Exposures are repeated until the pattern is correctly reproduced.

The tests reported in the present study were given by means of a special "note-book" tachistoscope, devised by the writer for the purpose of testing groups. First a series of tests were given in the same laboratory to individuals and groups and the results compared. The records of these students in other tests were available and this served to check up the value of this test, which proved to have a fairly high correlation with the average of other tests, yielding a positive raw correlation of 0.43 with the average of a series of tests.

The individual tests were made with the Whipple tachistoscope, the patterns being on cross-section paper an inch and a half square with the cross lines a quarter of an inch apart. In the group tests the patterns were placed on similar squares, but it became necessary to make the patterns much larger. Patterns six inches by six inches with cross lines an inch apart proved to be satisfactory. These larger patterns were exposed by means of a large loose leaf note-book in which the pattern cards were fastened. This note-book was securely mounted on a small table, and the exposure was made by lifting a flap and showing the pattern for two seconds. After considerable practice with a stop-watch, it became possible to secure a uniform exposure.

The results obtained by the latter method used with university students in the Psychological laboratory of the Univ. of Missouri were so closely related to the results obtained

in the same laboratory with the Whipple tachistoscope, that the use of this method of giving group tests seemed justified. In both methods the instructions to the subjects were as follows: "I shall say "Ready now". Almost immediately after there will appear before you for the brief period of two seconds a pattern containing seven spots. The spots are always on the intersections of the lines. They are never on the marginal lines. Try to reproduce the patterns on the squares of the cross section paper that I have given you. If you do not get the pattern right the first time the exposure will be repeated until you do. Take all the time you need as the element of speed does not concern us." In giving the test to school children they were told to try to get as many patterns right as possible in a given number of exposures.

Grading consists in estimating the number of spots correctly placed for each exposure. This method is adopted merely to have excellence denoted by a high mark rather than by a low mark, as would obtain if the number of exposures necessary for the correct reproduction of the pattern be used as the grading principle. As the five patterns had a total of thirty-five spots, a student's grade would be found by dividing thirty-five by the number of exposures. In order to avoid fractions and otherwise facilitate the work, the following formula was adopted : $\frac{35}{n} \times 10 = X$, in which 'n' is the number of exposures and 'x' the value of the grade.

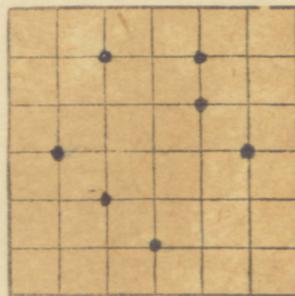
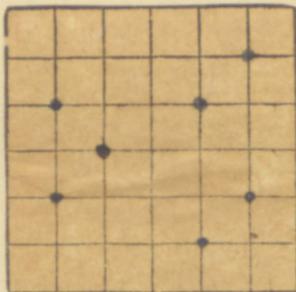
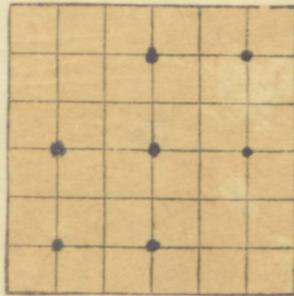
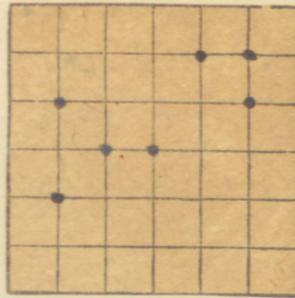
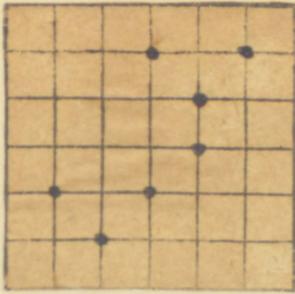
The test is one that takes a great deal of time both in the giving and the tabulating of results. During the period of this testing the writer has examined between twenty and thirty thousand reproductions of spot patterns.

Because of the immense time taken to give the test accurately, the writer found some difficulty in arranging for this test to be given in the schools, and because of this, it was not possible to give the test in any of the schools for girls.

Table XXII shows the standing, grades, etc., of the three groups. It appears that American boys have the best standing. Burt (3) and Moore found boys superior to girls, but sought to explain it on the grounds of technique. In the test given here there is no difficulty in the technique and yet the boys are superior. It would seem that this test is easier for boys. Additional reasons for believing that this test shows sex differences lie in the fact that we find Chinese boys exceeding American girls. This is the first time that we find such a result except in the tests wherein race differences appeared very marked.

Taking the results from American boys as unity we find that Chinese boys have an average grade of 94.7 % and American girls a grade of but 91.1 % . It must be frankly stated that the curve of the Chinese boys is much more regular and we have reason to think that in more extensive testing of children, fewer differences in the two races would appear. The graph in Figure XXII shows that for most ages the difference is very slight. We seem justified in regarding the performance of the two races as almost equal.

Spot Patterns given to American and Chinese students.



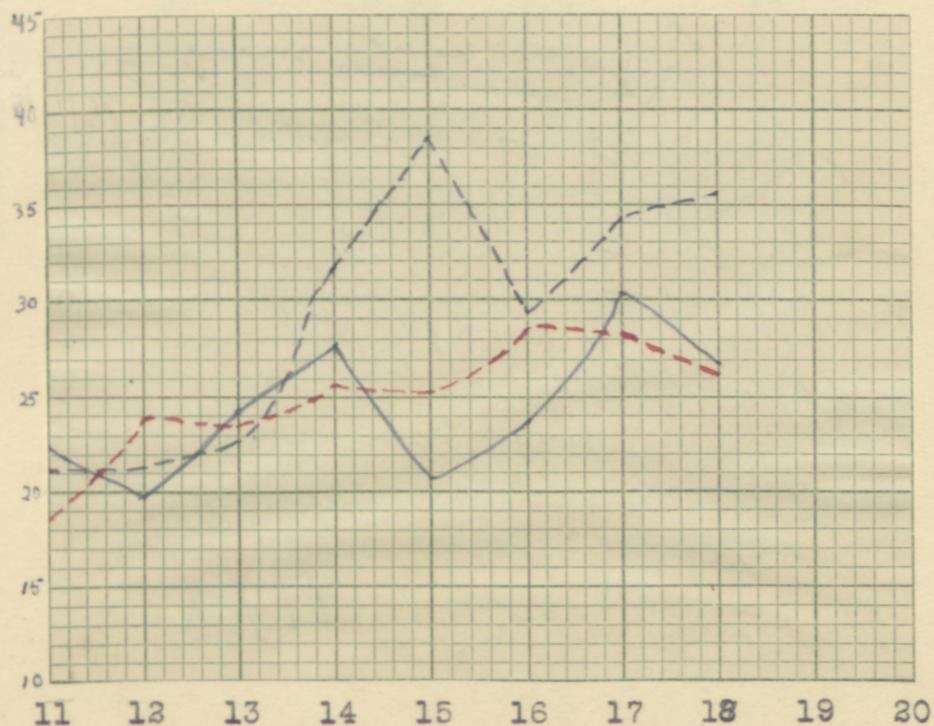


FIGURE XXII. Spot Patterns. Patterns of seven spots each. Black lines are for Americans. Red lines are for Chinese. Solid lines are for girls. Broken lines are for boys.

TABLE XXII.

SPOT PATTERNS.

Age.	Boys.				Girls		
	Chinese		Americans.		Americans		
	No. Test.	Norm.	A.D.	No. Tested.	Norm.	No. Td.	Norm
11	13	18.54	5.5	14	20.11	8	23.07
12	23	24.81	4.8	17	21.34	12	19.81
13	34	23.06	6.5	15	22.99	19	24.17
14	54	25.63	7.1	8	31.82	12	27.60
15	53	25.25	6.3	13	38.72	5	20.72
16	35	28.48	10.7	9	29.02	9	23.72
17	22	28.16	6.2	8	34.16	5	30.34
18	8	26.05	9.8	8	35.69	5	26.80

X. SUMMARY AND CONCLUSION.

What then are the differences between the two races compared, between children of a fairly uniform stock from the central part of the United States of America and Chinese children living just below the twenty-third parallel of latitude? How much do those Chinese who are called Cantonese differ from Americans? The facts that have been brought out have significance for only one section of China, both geographically and ethnically, for the children tested have been the Chinese of South China.

Physical Differences.

We find then that the Chinese boy is shorter when he stands but has a slightly longer body in proportion to his total height than the American boy. He is lighter actually but heavier in proportion to his height; he is sturdier and stockier. Chinese boys seem spared to a large extent the spindling stage of life.

He breathes less air both actually and in proportion to his weight. He is weaker than his American brother in muscular strength, as shown by the grip tests, age for age, and this in spite of the fact that he matures earlier.

In muscular speed he is well in advance of the American youth as shown in the results of tapping, so that while the American boy might carry a heavier load, the Chinese boy could travel faster and do more muscular work. Whether this excellence in speed can be satisfactorily explained on the basis of earlier maturity without ascribing any other race differences is a question that must be left to future investigations. The only thing that we can be sure of now

is that , age for age the Chinese boy is quicker than the American.

In size of head, he is just a trifle smaller, actually, but no smaller in proportion to bodily size than the American boy. In shape of head, however, the two boys differ radically, the Chinese boy being of a distinctly broad-headed type.

Girls differ in about the same ways that the boys of the two races differ, and in a greater degree. The Chinese girl is much behind the American in strength, and contrary to her brother's achievement she falls behind in speed. She exhibits the same sex characteristic in the decline of her vital index from the age of puberty onward that marks the girls in western lands.

There are no great outstanding differences to separate one race from the other and nothing that indicates any special characteristics leading to a belief in wide differences in mentality.

Mental Differences.

The comparison of the psychological traits of the two races has revealed one feature that may influence the results of some of our mental tests. Chinese children have a faster reaction time and this is probably one reason for their great capacity for turning out written work. Fortunately in the medium through which he expresses his thought, he is also fortunate in those mental and physical gifts that enable him to write his language with great speed.

We find also that the youth in China is gifted with profusion of speech, his associative processes working very rapidly. With girls we find the two races almost equal in

the quickness of their associative processes, but during the time that it takes an American boy to think of four words and write them down, the Chinese boy has finished his fifth word and is already started on the sixth.

In restricted thinking, however, the Chinese boy slows down. In fast writing he excelled and in fast thinking when that thinking was unrestricted, but when he is held down to just one thought from among many, just one word from among a score, and that word the one with a precise meaning, he falls behind the American boy, who going more slowly has gone more carefully. In words demanding opposite meanings the Chinese boy is only beginning his eighty-ninth word when the American lad has finished his hundred. In fast writing the Chinese girl was far ahead, in quickness of unrestrained associative processes, the girls of the two races were even, but in singling out just the right idea and putting it down the Chinese girl is far behind the American girl and is just beginning her fourth word when the American girl is finishing it.

What do we find concerning the memories of Chinese children? In memory for unrelated impressions as found in the list of words, both concrete and abstract, we find that the Chinese surpass. Both sexes in China surpass both sexes in America, but in memory for ideas that are tied together in logical relations such as in continued narrative we find that the races change places again. In verbatim memory the Chinese excelled, but in memory for ideas rather than for words, the Americans excel. The grade of the Chinese girl drops from approximately 105 % in the former to about 93 % in the latter. And the Chinese boy's grade

drops from 111 % in the rote memory test to 84 % in the logical memory test, the American grade being taken as unity.

In the analogues test, the test of the greatest difficulty to the Chinese, the greatest differences were found. American boys are three times better than Chinese boys and American girls are four times better than the Chinese. In this test where relations must first be discovered and then applied, we find the Chinese exceedingly weak. In building up new associations, the Chinese fall behind as shown by the results in the substitution tests. In comparison with Americans the boys have a grade of only 85 % and the girls a grade of but 76 % .

The spot patterns test finds the children of the two races most nearly equal. Chinese girls are not included but we find that in the average of the norms for the different ages, there is a difference of less than 10 % between the best and the poorest. American boys for the first time have a grade better than their sisters, American girls for the first time are the poorest group in a test. The Chinese boys are half way between and not separated very far from either of the other groups. In this test, which seeks to discover mental ability quite apart from any training, we find that differences practically disappear.

What then shall we conclude in reference to our question, the problem of the native ability of the Chinese?

By averaging the norms in the different tests and expressing the relation of Chinese performance to American achievement by means of percentage grade, and then taking the average of the grades for all the tests, we find that Chinese boys have an approximate grade of 99 % and Chinese girls a grade of 89 %.

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If we omit from our calculations the results from the test in Speed in Writing, which is not properly a mental test at all, we find a grade of 91 % for Chinese boys and a grade of 82 % for girls. If in addition to this omission we leave out the results from the test in Free Association, in which differences in the written language play so large a part, the grade of the Chinese boy is reduced to 87 % and that of his sister to 80 % of the American grade.

If we omit still another test, and this time the test in which the Chinese boys and girls have the poorest records, we shall find that the grades are considerably changed. The analogous test, as given, proved exceedingly difficult for Chinese children. Should we assume for some unknown reason that this test was not fairly given and so leave it out of our calculations along with the two tests noted above, the Chinese boys have a grade of 94 % and the girls a grade of 88 %.

Or shall we consider but one test, the test that is not dependent upon language or school training? If we stake all on the Spot Pattern Test, we find that Chinese boys have a grade of approximately 95 % of the standard reached by American boys.

In America it has been found that Negro children (11) fail to approach nearer than to about two-thirds ^{the} White standard and this with no differences in language and with small differences in environment. Chinese, on the other hand, with differences in both language and environment exceed nine-tenths of the performance of Americans.

The Analogous test indicates the weakest point in the mental equipment of the Chinese, if it be that this test measures reasoning ability, and it would seem to point to the possibility of racial differences. It is a question

to which further investigation must address itself and which educators in China should take into account in the consideration of their everyday problems.

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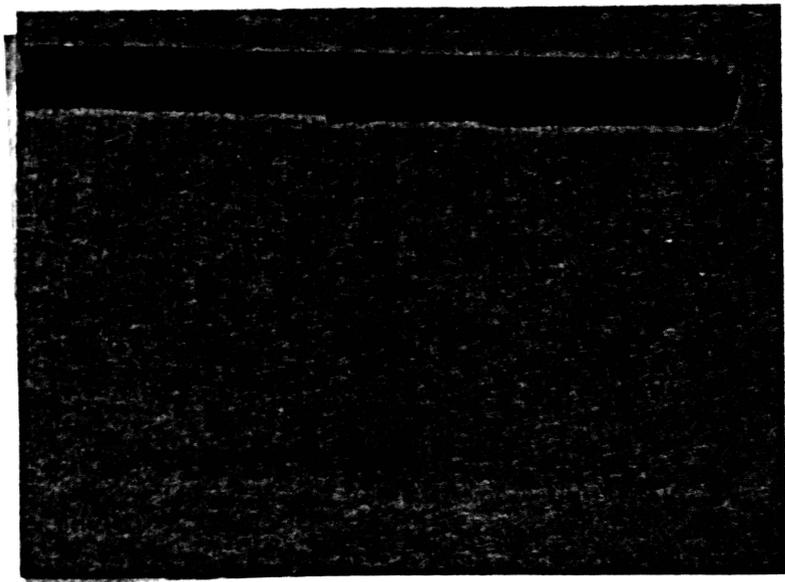


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