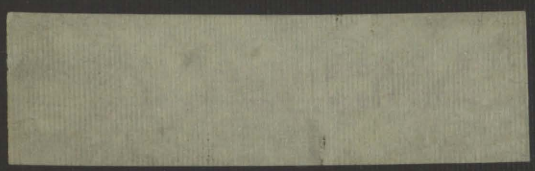

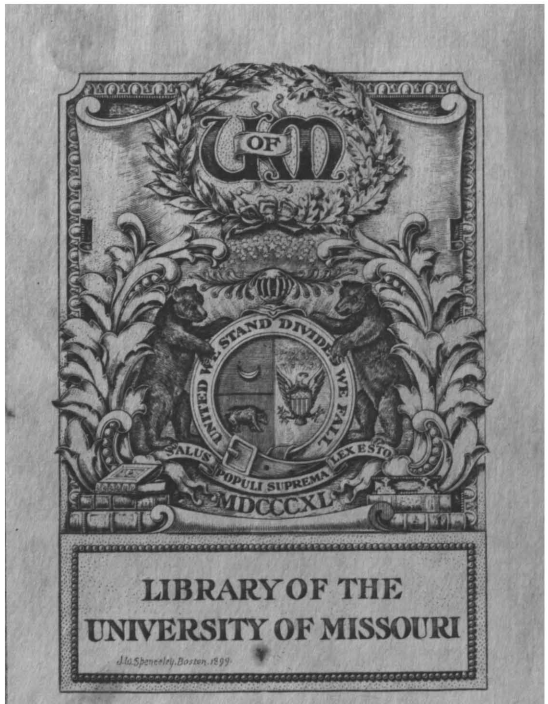

NATURAL INTERESTS OF ADOLESCENTS

By

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INTRODUCTION.

Almost the only method heretofore used in the study of adolescent interests is the Questionnaire. That this method has yielded valuable results no one who is at all familiar with the facts will deny. But that it has numerous limitations will be as readily admitted.

As a method of psychological investigation the questionnaire is inadequate, in the first place, because of the meagerness of the information returned. It would be difficult indeed to formulate a list of questions sufficiently exhaustive to bring out all of the facts needed in the analysis of the mental life of the adolescent. Even the personal interviews conducted in this investigation failed to supply sufficient data to warrant any definite conclusions. Students either did not know the facts or were unwilling to give the information wanted. To a questionnaire sent out by one of the departments of the University of Missouri to one hundred high school students only fifty replies were received. Why the other fifty failed to respond or what the results would have been had they done so can never be known. It often happens that questions which seek information concerning a certain characteristic are answered only by those who possess that characteristic- not by all the persons questioned. Accordingly, no direct information is obtained as to the generality of

the trait involved. All that can be said in such cases is that with those who replied to the questions the facts seem to be thus and so.

It also frequently happens that the answers returned are either conflicting or evasive, or both. In a number of instances in the present study students gave contradictory statements with reference to their attitude toward school subjects. In a number of other cases a tendency to evade the question was noticeable. This was especially true of those questions which were "personal" in character. Complete frankness in revealing the inner or private facts of one's life is hardly to be expected. In every life there are things which the individual is reluctant to make known, notwithstanding any assurance he may have that his secrets will be properly safeguarded. Moreover, questionary returns will vary according to the interpretation placed on the questions by the persons answering them. Conclusive evidence on this point came out in the present investigation.

What is, perhaps, a still more fundamental defect in the questionary method is the inability of those questioned to give the information wanted. Persons untrained in introspection can give only the merest surface indications of mental phenomena, and these indications are usually given with varying degrees of accuracy. It was found in this study that high school students cannot always give clear statements of

the simplest facts of past experience. Some of them do not seem to be able to recall what their past recreations or amusements have been, the names of any books they have read, or how a certain book or literary selection impressed them.

These, then, are some of the respects in which the questionary method seems to be inadequate. The present study is essentially an attempt to employ more adequate methods in the investigation of adolescent interests.

PROBLEM AND METHOD.

The purpose of this investigation was to discover as far as possible, in the limited time available, the capacities of the adolescent mind with special reference to the lines of work represented in the typical high school curriculum. The study was prompted by the desire to find the basis of the strong interest most high school students have in some subjects and their apparent lack of interest in other subjects. It was believed that if such a basis could be found it would probably explain the fact that some students do much more satisfactory work in some branches than in others, and might throw some light on the problem of the content and arrangement of the curriculum itself.

The method consisted of personal questioning and of physical and mental tests of 51 boys and 27 girls in the University High School. By means of a personal interview with each student an effort was made to obtain such information as would in any way throw light on his present attitude toward, and standing in, school work. One series of questions related to the student's home life: the age, nationality and occupation of his parents; his own past life, whether spent in the country, town or city, his recreations, work, reading, number of brothers and sisters, etc. Another group of questions had special reference to the school experiences of stu-

dents. They were asked where they attended grammar school, what subjects they studied, which they liked best, which they disliked most, and whether their attendance was in any way interfered with. Similar questions concerning the high school brought out what is believed to be a fairly accurate account of each student's school life, including a statement of his attitude toward each subject studied. Each student was also questioned concerning his ideals, his choice of a future career, the greatest person known to him, his favorite author, favorite books, the greatest historical character, the things he most likes to do, most dislikes to do, etc.

Early in the school year these students were examined by a specialist for eye, ear and throat defects. The results of this examination were available for use in this investigation. The additional physical tests included measurements of weight standing and sitting height, strength of grip, tapping speed and steadiness.

On the mental side memory for disconnected symbols, memory for connected thought material, and the powers of association were tested. In testing the first type of memory(referred to hereafter as Rote memory) four tests were used: (1) a series of 12 letters presented successively by means of an opening in a screen; (2) the "letter square" test, that is, 12 letters presented simultaneously on a card-board so ruled that each letter occupied a separate small square space; (3)

a series of 12 disconnected words presented as in (1); (4) a list of 12 disconnected words presented aurally. The results of these tests were scored on two points: (1) the number of letters or words correctly reproduced, and (2) the number reproduced in the right order. The average of these two scores was taken as the mark of the student's efficiency in the tests. As a test of the second type of memory (to be known hereafter as Logical memory) the story of the Marble Statue* was read by the experimenter to the students arranged in small groups. The reading was all done during the same class period so that no student had an opportunity to confer with one who had heard the story. These papers were marked on the basis of the number of ideas correctly reproduced. Two tests of association were given, the "opposites" and the "part-wholes" tests.** Here the results were graded as to (1) speed, (2) accuracy, and (3) net efficiency. The net efficiency was found by multiplying the grade made in accuracy by that made in speed.

PHYSICAL DATA.

The examination for eye, ear and throat defects revealed that of the 51 boys and 27 girls included in this study 26 boys and 13 girls, about half in each case, have some abnormal eye condition, and 8 boys and 3 girls some throat de-

* Whipple: Manual of Mental and Physical Tests, p.379
** Whipple: Ibid., pp.319 ff; also 323 ff.

fects. The hearing seemed to be normal in every case. Of those having defective vision quite a number(7 boys and 6 girls) were already provided with glasses while quite a number of others had experienced no discomfort from the defect. In only 7 cases, 5 boys and 2 girls, were symptoms found which seemed to demand immediate attention.

A summary of all other physical data is embodied in the following table.

Table I.

Deviation from the Normal.

	Above Normal		Below Normal	
	Boys	Girls	Boys	Girls
Age.....	76.5%	66.7%	19.6%	33.3%
Weight.....	80.4	59.3	19.6	40.7
Standing height.....	60.8	48.1	39.2	51.9
Sitting height.....	56.9	51.9	43.1	48.1
Grip, right hand.....	76.5	59.3	23.5	40.7
Grip, left hand.....	86.3	55.6	13.7	44.4
Tapping speed, right hand.....	90.1	88.9	9.9	11.1
Tapping speed, left hand.....	78.4	85.2	21.6	14.8

The norms used in the foregoing table, except in the case of age, are those established by F.W.Smedley of the Child Study Department of the Chicago schools. The normal age at which students should enter each of the four high school grades is 14.5, 15.5, 16.5, and 17.5 years, respectively. By actual computation it was found that the boys average 2.16 years over age, while the average for the girls is only .83 years above normal. This excessive retardation on the part of the boys, however, is easily explained in the light of

information at hand. Of the 31 boys who are one year or more below grade 20 come directly from country districts in which practically no high school work is offered or from small towns that do not have accredited high schools. Four others were thrown out of school at an early age by the death of one or both parents, while still another went to work in a factory immediately after graduationg from a ward school in a city. These 25 boys were out of school either from choice or from necessity for periods varying from one to eleven years, but later, having chosen a profession or acting on the advice of friends, decided to re-enter school. Some of them came to Columbia expecting to enter the University at once, others came because of the opportunities here for defraying their own expenses, while still others were influenced in their choice of schools by friends either in the High School or in the University. The wide deviation of the boys from the normal age is therefore due mainly to conditions which made it impossible or impracticable for them to continue their school work on time. In only three cases does inability to do the work seem to enter as a factor in this retardation.

An examination of the above table shows that in every case more than 50% of the boys and in every case, but one, more than 50% of the girls are above the normal. This is probably due to two facts: (1) since 18.5 years is the maximum age for which norms have been established these norms were used for the 18 boys and 5 girls who exceed that age; (2) 53% of the

boys and 48% of the girls come from the free, active life of the farm. It will also be noted that in every case, save one, the percentage of boys above normal is greater than that of girls, a condition due no doubt to the fact that the boys as a group are still in the period of rapid development while the girls are nearer maturity. The average age of the boys is 18.12 years while that of the girls is 16.95 years. Smedley's tables show that girls increase very slowly in height, weight and strength of grip after 17 years of age while boys at 18 are still making rapid increase in all of these respects. It will be observed further that the greatest deviation from the normal in both sexes is in tapping speed. In these tests the rate of tapping was found by taking the average number of taps made in three seconds but the norms were established by tak - ing the average for thirty seconds. In the latter, fatigue becomes a factor tending to lower the rate per second. This accounts in part at least for the high percentage above normal found in this table.

To summarize the results of these physical tests, then, it may be said that the students examined are as a group well developed physically. A study of individual records reveals no case of abnormally low development in <u>all</u> the lines covered by the tests. One boy and one girl are low in all the tests except one but in both cases the deviations are small.

MENTAL TESTS- DATA.

The following table contains a statement of the results of all the mental tests given. In the absence of any norms for the different ages the averages made by the different sexes are used as a basis of comparison. In the first test, for instance, the 51 boys made an average grade of 41.7% while the 27 girls made an average of 42.4%

Table II.

Sex Differences.

	Grade		Averages	
	Boys	Girls	Boys	Girls
Rote Memory:				
Letters successively presented...	41.7%	42.4%		
Letters simultaneously presented..	68.1	72.2		
Words successively presented.....	44.0	49.4		
Words aurally presented.....	41.9	45.7		
Average.....			49.0%	52.3%
Logical Memory:.....	54.2	60.0	54.2	60.0
Association:				
Opposites.....	78.2	80.0		
Part-wholes.....	78.9	79.9		
Average.....			78.5	79.9
Average in all the tests.....			63.8	66.5

The most significant disclosure made by these statistics is the fact that in every case the girls surpass the boys, a fact which is in harmony with the results of various other investigations. In connection with this point attention should be called to Table III in which are given the correlations between mental tests and school standing. There, again, it is found that the higher percentages are in favor of the girls.

This probably indicates that girls work more nearly up to the limit of their capacity than do boys.

Since the results of the mental tests enter very largely into all that follows in this study further consideration of them may be omitted at this point.

ATTITUDE OF STUDENTD TOWARD HIGH SCHOOL SUBJECTS.

Methods of Determining Capacity.

It remains now to investigate the attitude of students toward the various subjects taught in the high school with a view of discovering if possible the cause of their likes and dislikes. It is a reasonable assumption that people like to do best that for which they have the greatest ability, that which can be done with greatest skill. In our search, therefore, for the basis of a student's interest in any subject we shall look first for some natural capacity for that subject. As a test of this capacity two methods are available: (1) The judgment of teachers as expressed in the grades given, and (2) the results of the experimental study of mental functions.

Now, to what extent is either of these tests an adequate measure of mental capacity? Teachers' grades, it must be admitted, are necessarily influenced by considerations which are not essentially elements in capacity. For instance, a student's grade is necessarily affected by absence from class

or by the amount of time he can devote to the preparation of a given lesson, whereas neither of these matters in any indicates the lack of natural ability to do the work. On the other hand, experimental tests can reveal capacity for any given subject only in so far as they reach all of the mental functions involved in the learning of that subject. Now it is believed that each of the functions tested in this investigation is more or less important and that all of them taken together are fundamental in the learning of most of the subjects studied in the high school. The comparative value of these two methods of testing capacity is probably fairly well indicated in the following table of correlations.

computed by what formula ?

Table III.

Correlations Between School Standing and Mental Tests.

	Boys	Girls
School standing and Rote memory.....	29.8%	31.1%
" " " Logical memory.....	44.6	45.5
" " " Association.....	23.2	35.8
" " " average of all the tests....	36.4	49.0

It is well known, of course, that correlations are lowered by those cases in which the standing is above the average in one array and below the average in the other. In computing the above correlations it was found that 16 students rank above the average in the tests but below the average in grades. For each of these cases an explanation is furnished by the facts at hand. In the following accounts the quotations are from the teachers' reports to the principal:

Mr.B.- Works outside to defray expenses.
Mr.Br.- "Inattentive; not a consistent worker."
Mr.C.) Works outside. "Slow"; "lacks previous training."
Mr.D.- Studying five subjects, English, Latin, History, Sol. Geometry, Physics. "Capable of better work."
Mr.K.- "An S or an E student if he would work harder." "Lazy."
Mr.M.- Serious eye symptoms. "An S student until health failed."
Mr.Mo.- Works outside; entered late.
Mr.R.- Entered Nov.11.
Mr.S.- Works outside six hours a day.
Mr.W.- "Fine grasp of subject but careless"; "capable of E work with more effort."
Mr.Wn.- Entered late. "Irregular"."lazy."
Miss L.- "Does not study."
Miss M.- "Absent 15 times."
Miss R.- "Too many distractions."
Miss S.- Serious eye symptoms: "Bad attitude toward the work."
Miss W.- Entered Nov. 29.

It will be noticed that in very few of these cases does the low grade received by the student seem to be due to a lack of capacity for the work. Now, if all of those factors which are not essentially matters of capacity were eliminated from the grading a very high correlation between school standing and mental tests would be found. But since these factors have entered into the grades used in this study, school standing is probably not a very adequate method of determining a student's capacity for any particular line of work. Both school standing and the mental tests are used, however, in the belief that by serving as a check upon each other the possibility of error will be reduced to the minimum.

English.

A student's statement that he likes or dislikes a subject the most of any in the high school curriculum is held to be a stronger evidence of an interest or lack of interest in the subject than the expression of a mere like or dislike for

it. In order to be sure that there is a real interest to account for, only those students are considered in connection with each subject who have expressed a superlative liking or disliking for that subject.

Table IV.

Attitude of Students toward English.

	Boys		Girls	
No. studying Eng. (first semester 1910-11)	50		26	
" who like Eng.....	25	50%	14	53.8%
" " " " best of any H. S. subject.	11	.22	11	42.3
" " dislike Eng.....	9	18	5	19.2
" " " " most of any H.S. subject.	9	18	2	7.7

Table V.

Class Standing of the 11 Boys and 11 Girls Who Like English Best of Any High School Subject.

	Boys	Girls
No. whose grade in Eng. is their highest grade.....	0	2
" " " " " " one of their highest....	2	2
" " " " " " same as in all subjects	1	2
" " " " " "neither highest nor lowest	5	3
" " " " " " as low as in any subject	3	2
" " " " " " their lowest grade.....	0	0

Table VI.

Class Standing of the 9 Boys and 2 Girls Who Dislike English Most of Any High School Subject.

	Boys	Girls
No. whose grade in Eng. is their highest grade.....	0	0
" " " " " " one of their highest	0	0
" " " " " " same as in all subjects..	1	0
" " " " " " neither highest nor lowest	3	1
" " " " " " one of their lowest	2	1
" " " " " " their lowest grade.....	3	0

From Table IV it is seen that of the 50 boys and 26 girls studying English 22% of the boys and 42.3% of the girls or 28.9% of all like this subject better than any other. Using

the grades given by teachers as a test of capacity for this subject we find (Table V) that of these 22 students only 2 or 9.1% make their best grade in English, only 9 or 409% rank as high in it as in any other subject, and that 13 or 59.1% rank higher in some other subject. On the other hand, it is found (Table VI) that of the 9 boys and 2 girls who dislike English most of any study only 3 or 27.3% make their lowest grade in it, 4 or 36.3% rank higher in it than in some other subject, while one makes the same grade in all subjects. It is found, furthermore, that of those students who like English best the average grade in English is 73.8% and in all subjects 73.3%, while of those who dislike the subject most the average in English is 72.3% and in all subjects 76.1%. In the light of these facts it can not be said that as a rule, or to any great extent , students who like English best rank highest in it, or that those who dislike it most rank lowest in it. It appears, therefore, that in so far as class standing can determine the matter, interest in English is not dependent on some special capacity for that subject.

In Tables VII and VIII the experimental results are used as the basis for determining the capacities of these same students.

Table VII.

Standing in Mental Tests of the 11 Boys and 11 Girls Who Like English Best of Any High School Subject

	Above the Av.		Below the A	
	Boys	Girls	Boys	Girls
In Rote memory.....	5	5	6	6
" Logical memory.....	6	8	5	3
" Association.....	7	8	4	3
" the average of all tests.....	7	8	4	3

Table VIII.

Standing in Mental Tests of the 9 Boys and 2 Girls Who Dislike English Most of Any High School Subject.

	Above the Av.		Below the Av.	
	Boys	Girls	Boys	Girls
In Rote memory.....	5	2	4	0
" Logical memory.....	5	2	4	0
" Association.....	5	0	4	2
" the average of all the tests....	5	2	4	0

An examination of Table VII shows that of the 22 students who like English best: (1) 45.4% are above the average in Rote memory; (2) 63.6% are above in Logical memory; (3) 68.1% are above in Association; and (4) 68.1% are above in the average of all the tests. These facts would seem to indicate that those students who are strong in Logical memory and Association prefer English. But from Table VIII it is seen that of the 11 who dislike English most: (1) 63.6% are above the average in Rote memory; (2) 63.6% are above in Logical memory; (3) 45.4% are above in Association; and (4) 63.6% are above in the average of all the tests. Thus it appears that in Logical memory and in the average of all the tests those who dislike English most of any subject are on a par with those who prefer it to all other subjects. While they fall somewhat lower in Association they are correspondingly higher in Rote memory. Therefore about the only conclusion warranted here is that in so far as these experiments test the capacities of students there is no marked difference between those who like English best and those who dislike it most.

History.

Table IX.

Attitude of Students toward History.

	Boys		Girls	
No. study ing Hist. (first semester 1910-11)	45		21	
" who like Hist.....	25	55.6%	7	33.3%
" " " " best of any H. S. subject	8	17.7	2	9.5
" " dislike Hist.....	17	35.6	13	61.9
A " " " most of any H.S. subject	13	28.9	5	23.8
Average greade		74.6		69.5

Table X.

Class Standing of the 8 Boys and 2 Girls Who Like History Best of Any High School Subject.

	Boys	Girls
No. whose grade in Hist. is their lowest grade.....	4	0
" " " " " " one of their highest.....	1	0
" " " " " " same as in all subjects..	0	1
" " " " " " neither highest nor lowest	1	1
" " " " " " one of their lowest.....	2	0
" " " " " " their lowest grade.....	0	0

Table XI.

Class Standing of the 13 Boys and 5 Girls Who Dislike History Most of Any High School Subject.

	Boys	Girls
No. whose grade in Hist. is their highest grade.....	1	0
" " " " " " one of their highest.....	0	0
" " " " " " same as in all subjects..	0	0
" " " " " " neither highest nor lowest	6	1
" " " " " " one of their lowest.....	4	4
" " " " " " their lowest grade.....	2	0

The most important facts revealed by these tables are:

(1) Of the 10 students who like History best of any subject,

(a) 40% make their highest grade in this subject,
(b) 50% do as well or better in some other subject,
(c) 40% do better work in some other subject.

(2) Of the 18 students who dislike History most of any subject,

(a) 11.1% make their lowest grade in it,
(b) 88.9% do as well in it as in some other subjects,
(c) 5.5% make their highest grade in it.

It will be observed that of those students who have a decided preference for History just half do as well or better in some other subject and exactly as many make their highest grade in some other branch as do their best work in History. Furthermore, of those who dislike History most a very large majority (88.9%) do as good work in it, notwithstanding their dislike, as they do in some other lines of study. It does not seem to follow, therefore, that, using school grades as a basis, an expression of interest in History on the part of a student is any indication of special capacity for that type of work, or that lack of interest is evidence of incapacity to any marked degree. Another consideration which lends support to this conclusion is the fact that the average grade of those who like History best of any subject is 71.5% in History and 68.3% in all subjects, while the average of those who dislike it most is 68% and 70%, respectively. Apparently, students of the two groups have about the same capacity for History, and in neither case does this capacity differ materially from the capacity for school work in general.

In the next two tables is embodied the standing of the same two groups of students in the experimental tests of men-

tal functions.

Table XII.

Standing in Mental Tests of the 8 Boys and 2 Girls Who Like History Best of Any High School Subject.

	Above the Av.		Below the Av.	
	Boys	Girls	Boys	Girls
In Rote memory.....	3	0	5	2
" Logical memory.....	5	0	3	2
" Association.....	3	0	4	2
" the average of all the tests....	3	0	5	2

Table XIII.

Standing in Mental Tests of the 13 Boys and 5 Girls Who Dislike History Most of Any High School Subject.

	Above the Av.		Below the Av.	
	Boys	Girls	Boys	Girls
In Rote memory.....	2	1	11	4
" Logical memory.....	5	1	8	4
" Association.....	6	2	7	3
" the average of all the tests....	4	1	9	4

A comparison of the two groups with reference to the mental functions involved shows that:

(a) 30% of the former and 16.7% of the latter rank above the average in Rote memory,
(b) 50% and 33.3%, respectively, are above the average in Logical memory,
(c) 30% of the first and 44.4% of the second group are above the average in Association,
(d) 30% and 27.7%, respectively, outrank the average student in the average of all the tests.

It appears, therefore, that students who prefer History to any other subject are somewhat superior in Rote and Logical memory to those who dislike it most. But to say that their interest in History is due to this superiority does not seem warranted in the light of the fact that in no case does

more than half of the group surpass the average student. Before we can conclude that interest in any subject is due to the strength of any particular function it must be shown that the students having such an interest are especially strong in that function. But such is not the case in the present instance. Therefore, in History as in English, students' interests do not seem to rest upon any special capacity for that subject.

Mathematics.

Table XIV.

Attitude of Students toward Mathematics.

	Boys		Girls	
No. studying Math. (first semester 1910-11)	47		20	
" who like Math.....	30	63.8%	12	60%
" " " " best of any H. S. subject	15	31.9	4	20
" " dislike Math.....	12	25.5	7	35
" " " " most of any H.S. subject	10	21.3	6	30
Average grade.....		72.4		78.7

Table XV.

Class Standing of the 15 Boys and 4 Girls Who Like Mathematics Best of Any High School Subject.

	Boys	Girls
No. whose grade in Math. is their highest grade.....	4	3
" " " " " " one of their highest.....	2	0
" " " " " " same as in all subjects..	2	0
" " " " " " neither highest nor lowest	4	0
" " " " " " one of their lowest.....	2	1
" " " " " " their lowest grade.....	0	0

Table XVI.

Class Standing of the 10 Boys and 6 Girls Who Dislike Mathematics Most of Any High School Subject.

	Boys	Girls
No. whose grade in Math. is their highest grade.....	0	0
" " " " " " one of their highest.....	1	1
" " " " " " same as in all subjects	2	0
" " " " " " neither highest nor lowest	4	0
" " " " " " one of their lowest.....	2	1
" " " " " " their lowest grade.....	1	1

By combining the sexes we get from the above tables the following summaries:

(1) Of the 19 students who like Mathematics best of any subject studied,

(a) 36.8% make their highest grade in this subject,
(b) 47.6% do as well in Mathematics as in any subject,
(c) 57.9% do as well or better in some other subject,
(d) 15.8% do as poorly in Mathematics as in any branch.

(2) Of the 16 students who dislike Mathematics most of any subject studied,

(a) 12.5% make their lowest grade in it,
(b) 87.5% do as well or better in it than in some other subjects,
(c) 25% rank as high in as in any subject studied.

From these summaries it is clear that students who like Mathematics best of any study do not, as a rule, make their highest grade in this subject, nor do those who dislike it most make their lowest grade in it. But a comparison of the average grades of each group in Mathematics and in all the subjects studied seems to point to a different conclusion. The average grade of the first group is 84.5% in Mathematics and 78% in all the subjects, while the corresponding averages of the second group are 70.6% and 74%. This apparent incon-

sistency may be explained, however, by the fact that interest furnishes a strong motive for study and it is to be expected that, other things equal, those students who work under the incentive of the greatest interest will make better grades than those who lack such incentive. But on the basis of this explanation it may be asked why a similar difference in the averages of the two groups is not found in all subjects. As a matter of fact practically the same difference is found in Latin but in both English and History this is not the case. It is a matter of common knowledge that, owing to the very nature of the subject-matter, both Mathematics and Latin lend themselves much more readily to exact grading than do such subjects as English and History. It seems reasonable to assume, therefore, that if the grades were computed with equal accuracy in all the subjects much greater uniformity would be found among the differences in the averages of the two groups of students. The considerations offered in support of this explanation, then, are these: (1) The students who like Mathematics best are, on the average, 13.9% better in that subject than those who dislike it most because their interest in the subject furnishes an incentive for greater effort; (2) A similar difference would probably be found in all subjects if the grades were computed with the same degree of accuracy.

Turning now to the experimental tests Tables XVII and XVIII contain a statement of the results obtained.

Table XVII.

Standing in Mental Tests of the 15 Boys and 4 Girls Who Like Mathematics Best of Any High School Subject.

	Above the Av.		Below the Av.	
	Boys	Girls	Boys	Girls
In Rote memory.....	6	2	9	2
" Logical memory.....	8	2	6	2
" Association.....	7	2	8	2
" the average of all the tests....	7	3	8	1

Table XVIII.

Standing in Mental Tests of the 10 Boys and 6 Girls Who Dislike Mathematics Most of Any High School Subject.

	Above the Av.		Below the Av.	
	Boys	Girls	Boys	Girls
In Rote memory.....	6	2	4	4
" Logical memory.....	4	4	6	2
" Association.....	7	3	3	3
" the average of all the tests....	7	4	3	2

Again combining the sexes and summarizing the results it is found that: (1) 42.1% of those who like Mathematics best and 50% of those who dislike it most are above the average in Rote memory; (2) 52.6% of the former and 50% of the latter are above the average in Logical memory; (3) 47.4% and 62.5%, respectively, rank above the average in Association; and (4) 52.6% and 68.7% , respectively, rank higher than the average student in the average of all the tests.

Here it is apparent without further comment that in so far as these experiments reveal the capacities of students, interest in Mathematics is not due to any special capacity.

Latin.

Table XIX.

Attitude of Students toward Latin.

	Boys		Girls	
No. studying Lat. (first semester 1910-11)	39		13	
" who like Lat.	23	59%	8	61.5%
" " " " best of any H.S. subject..	5	12.8	5	38.5
" " dislike Lat.	14	36	4	30.8
" " " " most of any H.S. subject	7	18	4	30.8
Average grade		71.2		75.8

Table XX.

Class Standing of the 5 Boys and 5 Girls Who Like Latin Best of Any High School Subject.

	Boys	Girls
No. whose grade in Lat. is their highest grade	2	2
" " " " " " one of their highest	0	3
" " " " " " same as in all subjects..	1	0
" " " " " " neither highest nor lowest	0	0
" " " " " " one of their lowest	1	0
" " " " " " their lowest grade	1	0

Table XXI.

Class Standing of the 7 Boys and 4 Girls Who Dislike Latin Most of Any High School Subject.

	Boys	Girls
No. whose grade in Lat. is their highest grade	1	0
" " " " " " one of their highest	1	0
" " " " " " same as in all subjects..	0	1
" " " " " " neither highest nor lowest	0	0
" " " " " " one of their lowest	1	0
" " " " " " their lowest grade	3	1

From these tables it is seen that 40% of those who like Latin best of any subject make their best grade in it, 60% rank as high in some other subject, while 30% rank as

low in it as in any subject studied. Of those who dislike it most 36.3% make their lowest grade in it, 63.7% rank as high in it as in some other subject, while 27.2% make as good grade in it as in any subject. Apparently, then, school standing does not indicate any special capacity on the part of those most interested in Latin. It was found, however, that the average grade in Latin of those who like it best is 15.2% higher than the average of those who dislike it most, an explanation of which was suggested in the discussion of Mathematics.

Table XXII.

Standing in Mental Tests of the 5 Boys and 5 Girls Who Like Latin Best of Any High School Subject.

	Above the Av.		Below the Av.	
	Boys	Girls	Boys	Girls
In Rote memory.....	2	2	3	3
" Logical memory.....	1	1	4	4
" Association.....	3	2	2	3
" the average of all the tests....	2	1	3	4

Table XXIII.

Standing in Mental Tests of the 7 Boys and 4 Girls Who Dislike Latin Most of Any High School Subject.

	Above the Av.		Below the Av.	
	Boys	Girls	Boys	Girls
In Rote memory.....	4	0	3	4
" Logical memory.....	4	2	3	2
" Association.....	5	3	2	1
" the average of all the tests....	5	3	2	1

An examination of the foregoing facts shows that: (1) 40% of those who like Latin best and 36.3% of those who dis-

like it most are above the average in Rote memory; (2) 20% of the former and 54.5% of the latter are above the average in Logical memory; (3) 50% and 72.2%, respectively, are above the average in Association; (4) 30% and 72.2%, respectively, are above the average in the average of all the tests.

These facts make it clear that those who like the subject best have no advantage, in the functions tested, over those who dislike it most.

Table XXIV.

Summary of Students' Interests in Four High School Subjects.

	Liked best by			Disliked most by		
	Boys	Girls	All	Boys	Girls	All
English.....	22.0%	42.3%	28.9%	18.0%	19.2%	18.4%
History.....	17.7	9.5	15.1	28.9	23.8	27.3
Mathematics.....	31.9	20.0	28.4	21.3	30.0	23.9
Latin.....	12.8	38.5	19.2	18.0	30.8	21.2

The above percentages are based on the number of students studying the subject during the first semester, 1910-11. For instance, English is liked best by 22% of the boys, 42.3% of the girls, and 28.9% of all, studying this subject at the time mentioned.

Table XXV.

Correlations between Mental Functions and Standing in the Various School Subjects.

	English		History		Mathematics		Latin	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Rote memory	41.5%	36.4%	30.1%	-0.7%	26.6%	-1.4%	13.9%	55.6%
Log. memory	49.4	53.5	34.7	63.9	21.8	-7.4	38.3	11.7
Association	23.8	43.1	32.0	39.5	7.7	7.7	2.3	32.3
Av. of all	50.9	58.0	39.2	43.6	14.8	1.3	15.1	31.6

THE REAL BASIS OF INTEREST.

It has now been shown that in every one of the four subjects* included in the study the interest which students profess to have in any given branch does not seem to depend on any special capacity for that subject. (General school standing seems to depend to some extent on general capacity, as shown in Table XXV.) What, then, is the real basis of this interest? If a student's like or dislike for a certain subject can not be accounted for on the basis of some greater natural ability, some superior skill in doing that particular kind of work, then, of course his attitude toward the subject must be the result of environment and experience. It follows, therefore, that in order to be able to explain the different tastes found in a group of students one must be familiar with the life history of each student. He must be in possession of all the facts which in any way ~~throw light~~ operate to bring about these individual differences. It may as well be admitted at once that the data collected in this investigation are not sufficient to furnish an adequate solution of the problem. Some facts appear, however, which seem to throw some light on the matter.

It is evident from information at hand that the personality of the teacher and the character of the teaching in any

* English, History, Mathematics and Latin are the only subjects included in any of the tables because of the small number of students pursuing any of the othe subjects taught in the University High School

subject are important factors in determining the attitude of students toward that subject. It was found, for instance, that in a certain English class not one of the students likes the subject best of any in the curriculum, whereas a majority of those who dislike English most are members of this class. "The teacher makes the work so plain" was the reason most frequently given by students for their interest in certain subjects. In one case a boy who had completely changed in his attitude toward Algebra, gave as the cause of this change the fact that his present teacher was clearing up the difficulties he had formerly encountered. Again, it was found that quite a number of those who dislike a subject most of any, also dislike the teacher of that subject most of any of their teachers.

The relation of a subject to a student's present or future needs is another factor in determining his attitude toward the subject. Of the 15 boys who like Mathematics best 5 named Engineering as their choice of a future career. One who is preparing for the ministry dislikes Mathematics because he can not see wherein it will be of any service to him in his life work. "Can't see the use of it" was the reason given by several for their lack of interest in History.

The student's home environment, the attitude of his brothers and sisters toward the various subjects, the influence of his associates, the extent and character of his training in the elementary and grammar school subjects, all these

seem to be more or less important factors in the problem under consideration. On these points, however, the informatin collected is too meager to be more than suggestive.

As previously stated, the foregoing factors do not account for all of the individual differences found. That they do account for some is certain. This fact seems to indicate that if sufficient data were available the real basis of interest in certain high school subjects would be found in environmental factors rather than in inherited special capacities. It is believed that a majority of adolescents have the ability to do, with practically the same degree of proficiency, all of the lines of work represented in the high school curriculum and that their preference for one subject over another is the result of such matters as the influence and methods of the teacher, their own needs and problems, home environment, previous school training, etc., But it ~~is~~ is not denied that a small percentage of children may show unusual ability to do certain kinds of work, work demanding the posession of certain mental functions in a supernormal degree. Our study, however, throws very little light on this point.

CONCLUSIONS - CRITICISM.

The most significant conclusion to which this investigation points is that stated in the preceding section, namely, adolescent interest in a particular branch of study is due, as a rule, not so much to inherited special ability as to factors of in-

dividual experience. It has already been shown that school standing, as determined by the usual methods of grading, can not be considered a reliable measure of natural capacity. It may also be true that the experimental tests used were inadequate for this purpose. Only one test of Logical memory and only two of Association were given. These were probably too few to eliminate accidental variations and errors arising from the temporarily abnormal condition of some students. Furthermore, owing to lack of time, no attempt at all was made to measure other important mental functions, such as attention, imagination, invention, and learning capacity. It might very well be, therefore, that if the school standing had been determined by more accurate methods and the experiments had been more extensive both as to number of functions tested and as to number of tests for each function much higher correlations would be found than those given in Table XXV. The functions which were tested are fundamental and are required in all of the branches considered. To test the peculiar ability required in the different subjects would demand the application of much more refined and extended tests.

The chief significance of this study, therefore, lies, not so much in the conclusion to which it points as in the light it throws on the method by which the truth may be ascertained. In this connection it may be said with a reasonable degree of certainty that for an adequate understanding of adolescent interests recourse must be had in the first place to

experimental tests sufficiently extensive in number and scope to give an index of the learning capacity of each individual. Where this method fails reliance must be placed in a thorough and first hand knowledge of the student's past and present experiences. Careful observations on the entire past life of the student are needed, such a study, for instance, as that made by Katherine Moore,* but covering a much longer period of time.

* The Mental Development of the Child, Psychological Review Monograph Supplement, VoL. I, No. 4, pp. 1-148.