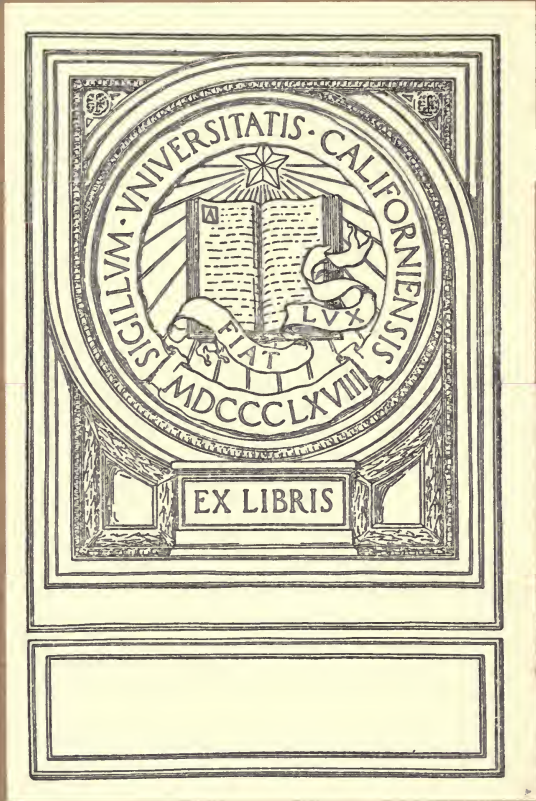


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UNIVERSITY OF CALIFORNIA

THE THORNDIKE COLLEGE
ENTRANCE TESTS

IN THE
UNIVERSITY OF CALIFORNIA

COMPILED BY
J. V. BREITWIESER
Associate Professor of Education

UNIVERSITY OF CALIFORNIA PRESS
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On January 22, 1921, one thousand one hundred and eighty-two students took the Thorndike college entrance examination for high school students. This examination was given under the direction of Dr. Jesse D. Burks, assisted by a special committee consisting of Professors Brown, Tolman, and Breitwieser.

The test required about three and a half hours' time for each student. It consists of a combination of so-called general intelligence tests and a test on high school subject matter information. There has also been an attempt to include tests that will measure the ability of the student to do the kind of study needed for the successful carrying forward of college work, such as the ability to record the important facts in a passage of reading matter and to formulate generalization. A brief analysis of the test is shown herewith. A total score of 639 points is possible if every question is answered correctly and if every exercise is properly done. The possible points are classified according to the nature of the information called for and the manner in which the information is recorded. It is obvious that there will be some difference of opinion as to the accuracy of this classification, but the tables in a general way describe the tests and the distribution of score points.

ANALYSIS OF CONTENT OF THORNDIKE COLLEGE ENTRANCE EXAMINATIONS

Part I	Number points possible
Test 1. Following directions.....	5
Test 2. Sentence arrangement.....	10
Test 3. Arithmetic mechanics.....	8
Test 4. Arithmetic problems.....	20
Test 5. General information.....	10
Test 6. Synonym-antonym.....	20
Test 7. Judgment.....	5
Test 8. Number completion.....	10
Test 9. Association of ideas.....	20
Test 10. Observation (largest and smallest number).....	9
Test 11. Statements—truth or falsity.....	8
Test 12. Syllogisms.....	8
Test 13. Memory of drawings and numbers.....	20
Total	153

NUMBER POINTS POSSIBLE

Part II

	Hist., Civ. Biog- raphy	Physics, Mechan- ics, Chem.	Math.	Botany and Physi- ology	Law	Fine Arts	Miscel- laneous
1A. Comprehension (Reading).....	18						
1B. Comprehension (Reading).....	18						
2. Sentence completion...							36
3. Drawing.....		4					
4. Association of ideas (drawings).....							16
5. Association of ideas (drawings).....							16
6. Algebraic substitut'ns							20
7. General information...		40					
8. General information (truth or falsity of statement).....	48	48	42	27	12	30	3
Total.....	84	92	42	27	12	30	91
Total points for Part II 378							
Part III							
1A. Comprehension (Reading).....	27						
1B. Comprehension (Reading).....		27					
2. Sentence completion...	18						36
Total.....	45	27					36
Total for Part III, 108							
Summary of 3 parts:							
Part I.....							153
Part II.....	84	92	42	27	12	30	91
Part III.....	45	27					36
Total of points.....	129	119	42	27	12	30	280
Per cent of whole test.....	20%	19%	6%	4%	2%	5%	44%

PARTIAL REPORT

A partial report of the gross results of this test was submitted by Dr. Burks. Its chief general points were: (1) the quality of entering students in the University of California is as high as that of other institutions; (2) the test is useless for those who can not use the English language readily; (3) the women made grades slightly lower than those attained by the men; (This difference, however, was not marked). (4) a distribution table of the grades by classes. The present examination was considered as a preliminary experiment to see whether or not examinations of this kind are practical in the University of California.

A test or examination of this kind may be of the greatest value if it makes possible a fairly reliable prediction of the student's success or failure in college work, for if the test is reliable, certain students might be eliminated before a whole term's cost and teaching energy is wasted on them, or special efforts might be made to help them solve their difficulties.

PLAN OF PRESENT STUDY

The final grades in their college courses of those who took the Thorndike tests became available in June, 1921, for the calculation of correlations with the test scores. At the suggestion of Dean H. R. Hatfield, the sub-committee (Brown, Tolman, and Breitwieser) undertook a further study of these more complete data, with a view to getting information on the following points:

1. The general distribution curve of the freshman test scores and the place of failing freshmen in that distribution.
2. A general correlation of freshman test scores and academic grades.
3. Some investigation of the influence of age and sex.
4. The distribution of scores for students registered in the several colleges of the University.
5. The records of students from several high schools compared with the records of those students as summarized by the Recorder for the committee on schools, together with the study of a group of graduates of smaller high schools.
6. A detailed study of the records of a group of freshmen who scored lowest in the tests together with a detailed study of the records of those freshmen who made the poorest record in college. (This would have required a detailed case study and beyond the mere recording of stated cause of withdrawal, the college from which withdrawn, etc., nothing definite was done on this item.)

This plan was submitted to Dean Hatfield, April 30, 1921. Professor Breitwieser is largely responsible for the final form in which this material is presented. He had the clerical services of Frederick J. Adams in the statistical computations. The copying of the records, the calculation of the medians, per cents, and coefficients of correlation required more time and labor than may be obvious from this report.

A review of the earlier report revealed the fact that the student could not be depended on for a statement of his standing in the University. The first partial report accepted the student's statement as to his standing. It was found that some students had classified themselves as "freshmen" just because they were "entering students" in spite of the fact that they often had one or more semester's advanced standing to their credit. The data to be comparable should deal with the "entering freshmen" only as a group.

In the report submitted herewith, all records have been compared with the Recorder's data, ages were checked against the date of birth, in fact every effort was made to use as reliable data as possible. No conclusions are more valid than the reliability of the data upon which they are based. Where the results vary somewhat from those submitted by Dr. Burks, the difference is due to the fact that a more careful selection of data has been made, and that in some cases additional records were available.

THE STUDENTS EXAMINED

Foreign students present certain statistical difficulties, for in a test of this kind they are at a decided disadvantage. It must, however, be remembered that they are also at a disadvantage in our class work, and it may be that this test presents a measure of this disadvantage. This group with their records was segregated and it is not included in the general results. Only those foreign born students who had records of previous successful experience in English-speaking secondary schools were included in the calculations.

The scores for students above the freshman classes are those made by volunteers who came to the examination. Their records are certainly of some value but they do not necessarily represent a fair sampling. Just what the selective factors were that brought these volunteers to take the test is hard to determine, but the results must certainly be considered in terms of these factors.

The major portion of this report deals with the first semester freshmen that entered the University in January, 1921. The results of a test of this kind given to the entering freshmen in August would probably be more uneven and would show a wider dispersion in the curve of distribution. Entering freshmen represent, to a great extent, students who have had certain irregularities in the secondary training, e.g., they required an extra

half-year to complete their high school work, or completed their high school work in three and a half years, or did some additional work in high school, or started into a junior college, etc. Irregularities of this kind are likely to lower the index of correlation.

SCHOLARSHIP TOTALS

The records in the Recorder's Office show the units of credit and the grades 1, 2, 3, 4, and sometimes 5. Very often a student withdraws from a course in which he is failing and the grade 5 is not recorded against him. There are many difficulties involved in evaluating a student's scholarship record. To have taken merely the units of "passing" work would have given too coarse a score for correlations with scores that have their modal point somewhere between 65 and 80. To have used the average grade would have been equally unfair as a student may have had special ability in one course, say language, and may have taken nothing else. After seeking the advice of several educators, it was decided to calculate a scholarship total in the following manner: multiply the number of units or hours of grade 1 by 9; grade 2 by 8; grade 3 by 7; grade 4 by 6; and grade 5 by 0.

The scholarship total as used in the calculations then represents the sum of the points obtained from the above products. Grade 4 was assigned 6 points of value because it can be redeemed by a re-examination or often by further satisfactory work in a higher course. A grade of 5 or less never can be counted toward a degree, and for that reason has no (0) value in scholarship. (There has been no statistical equation of values which might be derived from the study of the records of a large number of students, nor has there been any attempt to weight the records of different departments or instructors.) Doubtless objections can be found to this method of combining quantity and quality of work, but for the purpose of this experiment it seemed to be the simplest and most adequate method. The scholarship total now represents a product of the units of credit and the grade. A special calculation of correlation between the grade average only and the test scores was also made.

A case study of failures has been impossible in the brief time at the committee's disposal. All of the original test blanks have been preserved and these, with the instructor's records of attendance, examinations, recitations, notebooks, etc., will be valuable material for such studies. The case history of the failures should be compared to case histories of those who were highly successful.

The question as to the validity of college grades can always be raised. The assumption is that since college records as they now stand are the only measures of college success that are now accepted, they must be used as the basis of validating the entrance tests.

GENERAL DISTRIBUTION CURVE OF ENTERING FRESHMEN

Thorndike Test Scores

30-34	f fw
35	fwwpp
40	ffwpppppppppp
45	fffffwwpppp
50	fffffpppppppppppppppppppppppppppp
55	fwwwwwpppppppppppppppppppppppppppp
60	fffffwwpppppppppppppppppppppppppppp
65	fffwwpppppppppppppppppppppppppppp
70	fffpppppppppppppppppppppppppppppppp
75	fffwwpppppppppppppppppppppppppppp
80	fpppppppppppppppppppppp
85	pppppppppppp
90	ppppp
95	p
100	pp
105	
110	p

f, failed; w, withdrawn; p, passed.

This curve of distribution shows the scores for 294 non-foreign first semester freshmen. It is obvious that the "failed" and withdrawn students arrange themselves in a group toward the lower score end of the curves. No student with a score of 85 or over either failed or withdrew from the University. Failure throughout this report means that the student was disqualified by the Recorder's ten point rule. Each letter represents a student and locates him in the score range given in the first column.

DISTRIBUTION CURVE OF ENTERING FRESHMEN

Showing Position of Lowest Quartile according to Scholarship Totals

Thorndike Test Scores

30-34	11
35	111
40	11111xxxxxx
45	111111xxxx
50	1111111111111111xxxxxxxxxxxxxxxxxxxx
55	111111xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
60	11111111xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
65	11111111xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
70	111111xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
75	1111xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
80	1111xxxxxxxxxxxxxxxxxxxx
85	xxxxxxxxxxxxxx
90	11xxx
95	x
100	x
105	
110	x

1, Lowest quartile according to scholarship totals.

x, Remainder of students, other three quartiles.

Each letter represents a student. The 25 per cent of the records that represent the lowest scholarship totals (1) have been located in the Thorndike score distribution. The low scholarship records arrange themselves toward the lower end of the test score distributions.

DISTRIBUTION CURVE OF ENTERING FRESHMEN

Showing Position of Highest Quartile according to Scholarship Totals

Thorndike
Test Scores

30-34	xx
35	xxx
40	hxxxxxxxxxxxx
45	hxxxxxxxxxxx
50	hhhhxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
55	hhhxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
60	hhhhhhhhhhxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
65	hhhhhhhhhhxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
70	hhhhhhhhxx
75	hhhhhhhhhhxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
80	hhhhhhhhhhxxxxxxxxxxxx
85	hhhhhhhhhhhhxx
90	xxxxx
95	h
100	hh
105	
110	h

h, Highest quartile according to scholarship totals.

x, Remainder of students, other three quartiles.

Each letter represents a student. The 25 per cent of the scholarship records that represent the highest totals have been located on the Thorndike test score distributions. These cases (h) arrange themselves well toward the higher scores.

DISTRIBUTION TABLE OF SCHOLARSHIP TOTALS

First Semester Freshmen, in Per Cents, Passed and Failed

Scholarship Totals	Passed non-foreign	Failed non-foreign
10-19.9 plus		2.63
20		
30		5.26
40		2.63
50		7.89
60		10.52
70	1.275	18.41
80	3.450	21.04
90	5.950	5.26
100	13.180	18.41
110	26.775	
120	18.695	7.89
130	16.140	
140	11.900	
150	2.125	
160	.425	
Number of persons	235	38
Median scholarship		
Total	119.5	80.75

Scholarship totals mean the sum of the points secured by multiplying the hours of credit by 9, 8, 7, etc., as described in the introduction.

The apparent overlapping is due to this method of calculating scholarship totals as opposed to the Recorder's passed unit system of disqualification. In 29 per cent of the cases there is absolute agreement in both methods of calculation as to disqualification.

DISTRIBUTION TABLE OF SCHOLARSHIP TOTALS
First Semester Freshmen in Per Cents, Passed and Failed
(Non-Foreign)

Scholarship Totals	Failed Men	Passed Men	All Men	Failed Women	Passed Women	All Women
10-19.9+	3.85		.637			
20						
30	7.69		1.274			
40	3.85		.637			
50	7.69		1.274	8.33		.862
60	11.54		1.911	8.33		.862
70	15.39	1.526	3.832	25.00	.962	3.448
80	19.23	3.814	6.370	25.00	2.886	5.172
90		6.860	5.833	16.67	4.810	6.034
100	23.08	14.517	13.925	8.33	11.544	11.206
110		22.890	19.110		31.746	28.446
120	7.69	18.311	16.562	8.33	18.278	18.240
130		16.023	13.377		16.354	14.654
140		11.444	9.555		12.506	11.206
150		3.051	2.548		.962	.862
160		.763	.637			
Number of Persons	26	131	157	12	104	116
Median Scholar- ship Totals	79.5	120	112.5	83.5	119.3	118

The median of the scholarship totals of these first semester freshmen men is 112.5, while that of the women (118) is 5.5 higher. The range of distribution of the men is wider than that of the women, i.e., the additional spread is represented by 2.548 per cent at each end. Of failed men, 15.39 per cent have lower records than any failed women. It is obvious that the scholarship record of the men is much more irregular than that of the women.

FIRST SEMESTER FRESHMEN BY SEXES

Thorndike Test Scores in Per Cents (Non-Foreign)

Thorndike Scores	All Men	Failed Men	Passed Men	All Women	Failed Women	Passed Women
30-39.9 +	4.459	11.54	3.052	.862	8.33	
40	4.459	7.70	3.815	12.930	50.00	8.658
50	21.021	26.93	19.878	22.412	16.67	23.088
60	21.021	23.07	20.620	31.032	16.67	32.078
70	31.213	23.07	32.829	22.412	8.33	24.050
80	12.103	3.85	13.734	9.482		10.582
90	3.822		4.578			
100	1.911	3.85	1.526			
110	.637		.763			
Persons	157	26	131	116	12	104
Median Scores	68	61	70	65	47.5	65

This table shows the sex distributions for the non-foreign group of first semester freshmen. All women with scores below 39.9 failed. All men with scores below 34.9 failed. Of the men, 6.27 per cent made better scores than any woman.

FIRST SEMESTER FRESHMEN

Thorndike Test Scores in Per Cents

Thorndike Scores	Non-Foreign			Foreign		Withdrawals	
	All	Pass	Disqualified	Pass	Disqualified	Non-Foreign	Foreign
10-19.9 +	.954			12.5	22.21		
20	1.054						75
30	6.360	1.700	10.52	50.0	44.42	14.28	25
40	9.222	5.950	21.04	37.5		19.04	
50	20.660	20.250	23.67		22.21	23.80	
60	23.850	24.930	21.04		11.11	23.80	
70	24.794	28.330	18.41			14.26	
80	9.858	12.330	2.63			4.76	
90	1.908	2.550					
100	.954	.850	2.63				
110	.318	.425					
Medians in Scores	64	67	53.5	33	36	59	28
Persons	315	235	38	8	9	21	4

Every non-foreign student receiving a Thorndike score of less than 34.9 has been disqualified. The valuable part of this table is found in the first four columns. The percentages in the foreign group are based on small numbers as shown at the bottom of the table.

CORRELATIONS

First Semester Freshmen, Non-Foreigners

Entire test and average scholarship grade.....	Pearson	.468
Entire test and scholarship totals.....	Spearman	.403
Entire test and scholarship totals.....	Pearson	.376
Part I ¹ and scholarship totals.....	Pearson	.38
Part I ² and scholarship totals.....	Pearson	.35
Part II and scholarship totals.....	Pearson	.39
Part III and scholarship totals.....	Pearson	.25
Part II and Part III.....	Pearson	.48

The Spearman coefficient of correlation is also known as the Rank-Order or Difference method of correlating. The Pearson method is also known as the Products-Moment method.

The above correlations represent 273 cases in which the scholarship total of each individual was correlated to his or her Thorndike test score. All of the correlations are decidedly positive.

NOTE: By a coefficient of correlation is meant a number that indicates the degree of agreement or disagreement of two series of measures, i.e., if the measure of variation from a central tendency in one series of measurements is duplicated by the same proportionate variation from the central tendency by the measurement in the other series and this is continued throughout the series, or if there is perfect agreement, the correlation is +1. If the variations are proportionate but in opposite directions, it is represented by -1. If there is no agreement, the correlation becomes 0. So all relationships can be represented by a value between +1 to 0 to -1. Correlations of coefficients from .15 to .20 are considered as negligible, from .20 to .35 are low, while from .40 to .60 shows that a definite correlation exists, and from .60 to 1.00 indicate very high to perfect correlations.

College Groups	FIRST SEMESTER FRESHMEN				
	Median Grade Total	Median Test Score	Number of Students	Number of Failures	Per cent Failures
Letters and Sciences	113.0	64.0	146	15	10.3
Commerce	119.5	67.0	52	8	15.4
Mechanics	114.5	72.0	19	3	15.8
Agriculture	110.0	66.0	14	2	14.2
Pre-Legal	159.0	78.0	14	2	14.2
Mining	111.3	71.0	10	2	20.0
Pre-Medical	125.5	68.0	9	1	11.1
Chemistry	69.0	69.0	5	4	80.0
Civil Engineering	105.3	59.0	4	1	25.0

In some of the colleges there are not enough cases to make the data reliable, but the table does show the capacity of the students entering the various types of work. These medians, however, are significant for all but the last three groups. The first column shows the medians for the groups in their scholarship record, while the second column shows the medians of the Thorndike scores. The pre-legal group shows both the highest scholarship record and the highest score record, showing them to be a decidedly superior group. This superiority was shown just as graphically by the Thorndike score before they entered the classes as it was by the final June reports. The Thorndike score justifies the high scholarship marks.

FIRST SEMESTER FRESHMEN (Non-Foreign)
Scholarship Totals by Ages

Age	Median for Men	Median for Women
14	124.5	
16	140.8	131.0
17	121.8	123.5
18	122.8	117.5
19	108.5	116.0
20	120.3	112.5
21	114.3	118.0
22	105.0	
23	100.5	
24	105.5	152.0
25	114.5	
26	103.0	
27	106.0	108.0
28	132.0	135.0
29	119.0	
40		96.0
All ages	112.5	118.0

Spearman correlation between the median scholarship totals for each age in which there are three or more representatives in the group, and the ages from youngest to oldest: men, $-.369$; women, $-.657$; the negative correlation indicates that the lower ages agree with the higher grade totals, or that the older students make lower grades.

FIRST SEMESTER FRESHMEN (Non-Foreign)
Test Scores by Ages

Age	Median for Men	Median for Women
14	84.0	
16	66.5	74.0
17	73.5	67.0
18	71.5	64.0
19	63.0	61.0
20	72.0	52.0
21	61.5	71.0
22	56.0	
23	49.5	
24	55.0	85.0
25	74.5	
26	51.5	
27	68.0	66.5
28	80.0	61.0
29	77.0	
50		72.0
All ages	68.0	65.0

Spearman correlation between the median test scores for each age in which there are three or more representatives in the group, and the ages from the youngest to the oldest: men, $-.816$; women, $-.428$. This shows that in terms of the test the younger students make better grades. This agreement with the facts brought out in the previous table again validates the predictive value of the Thorndike test.

FIRST SEMESTER FRESHMEN (Non-Foreign)

High School (5 or more representatives)	Number Students	Failures	Per Cent Failed	Order of Scores	Median Grade
Polytechnical, San Francisco	10	0	0.0	72.5	126.5
Berkeley	44	2	4.6	71.0	118.5
Univ. High School, Oakland	9	4	44.4	69.0	105.0
Oakland High	12	0	0	67.5	127.5
A-Z School	12	3	25.0	67.5	111.5
Los Angeles High	5	1	20.0	67.0	104.0
Oakland Technical	34	4	11.7	65.5	114.3
Lowel, San Francisco	23	2	8.7	65.0	130.0
Mission, San Francisco	12	1	8.3	63.5	112.7
Alameda	6	4	66.7	56.0	96.7
All other high schools of Class A having less than 5 representa- tives	59	13	22.1	60	114
All other private schools of Class A having less than 5 repre- sentatives	7	0	0	68	125
Class B public	5	0	0	69	113
Non-California high schools	34	4	11.7	61	115.3

Spearman correlation between median score and median grade for the above 14 groups = $+.25092$. The upper group is arranged in the order of scores from highest to lowest. The Class B schools are evidently selecting their recommended students very carefully.

CONCLUSIONS

Many errors no doubt, have been made in this first experiment. This committee did not have full control of the situation. The experience in the giving of this test would enable us to do a much better piece of work in future experiments.

The comments accompanying the tables are very brief. The replies to many questions will be found in the various compilations.

If these tests were given to all freshmen and were used under the supervision of an expert officer or committee, the results would be of great service to students and to the University in connection with welfare work.

Terman, in *School and Society*, April 23, 1921, reports correlations for Thorndike tests averaging .51 with a range of from .41 to .60. The correlations of Spearman index $+.403$ and Pearson index $+.3764$ found here are about equal to those found elsewhere. If the test could be given to the freshmen entering in August, the correlations would probably be higher.

The correlations are high enough to show that a test of this kind can be of service.* If more such data can be obtained from our student body, its value will be greatly augmented.

Partial correlations should now be worked out and doubtless, a test can be devised that will take less time and will prove to be just as accurate in determining the ability of the student.

The low scores for the foreign students indicate that many of them are so handicapped by language difficulties that in terms of the test they are not fit to compete with English-speaking students in our college work and that their college grades have often been given to them for apparent effort rather than real accomplishment. Better tests of language ability, which shows definitely in a test of this kind, can be of significant value in the selection of students who are not handicapped in this way. Foreign students probably need special coaching classes to train them to think in English terms and methods of study.

These tests show, in a purely objective way, the relative standings of students from various high schools. These data may be of value to the accrediting and college entrance committees.

If a principal is in doubt as to recommending a graduate to the University, a test of this kind could be called for, and the University would thus be able to determine the ability of students desiring to enter.

It has been suggested that the principals should use tests of this kind. If this is to be done, a committee of the University should have charge of the tests and measurements to assure their being properly administered, scored, and evaluated.

Scores of this kind are comparable with those of other institutions in that the tests are standardized and graded by purely objective methods. It is therefore possible for school authorities in a very short period of time to gather more predictive data than by any other known method.

*Dr. Adam L. Jones, Director of University Admissions, Columbia University, has given us the following preliminary report of the use of the Thorndike college entrance test in that institution. "Among the students admitted by the college entrance examinations a good many doubtful cases were included. The correlation between their examinations and their college records was plus 0.43, which is reasonably satisfactory. The correlation between high school record and college record was plus 0.45. Those entering by regents' examinations were very carefully selected. The correlation between their examination and their college records was plus 0.57, while the correlation between the psychological examination and college record was plus 0.60." This would seem to indicate that in the above institution, the Thorndike test is as reliable an index of the future college record of the student, as the college entrance examinations, regents' examinations, or his high school record; and in all probability a better prediction of his college record than any of these, as is shown by the higher correlation (*Jour. Educ. Research*, vol. 4, no. 2, September, 1921).

RECOMMENDATIONS

The sub-committee makes the following suggestions:

That an officer be appointed, subject to the approval of the faculty, to take charge of a bureau or committee on tests and student welfare.

This officer should be assisted and directed by a committee consisting of representatives of the faculty, especially those who have made a study of tests and social measurements (the Administration, the President, Deans, or Recorder), and one or two representatives from the student body.

This test officer should be either a full-time expert or a member of the faculty who can devote at least half of his academic service to this work.

There would be need for secretarial and statistical assistance.

Care should be exercised in securing a reliable advisor. The work requires a special knowledge of tests, statistics, psychology, and educational methods as well as tact and a genuine interest in welfare work.

The test and welfare committee should give tests to every entering freshman and should give especial personal attention to all students whose scores fall into the upper and lower quartiles of the distribution.

Study methods and plans should be organized with a view to meeting the difficulties discovered.

Tests for special abilities should be made available, e.g., the Seashore musical ability tests for those who wish to study music, tests in color discrimination for those who expect to do blowpipe analysis, etc.

A constant statistical study of all the tests should be made with a view to a higher correlation with standardizing criteria. Study has shown that certain parts of the tests are of more value than others.

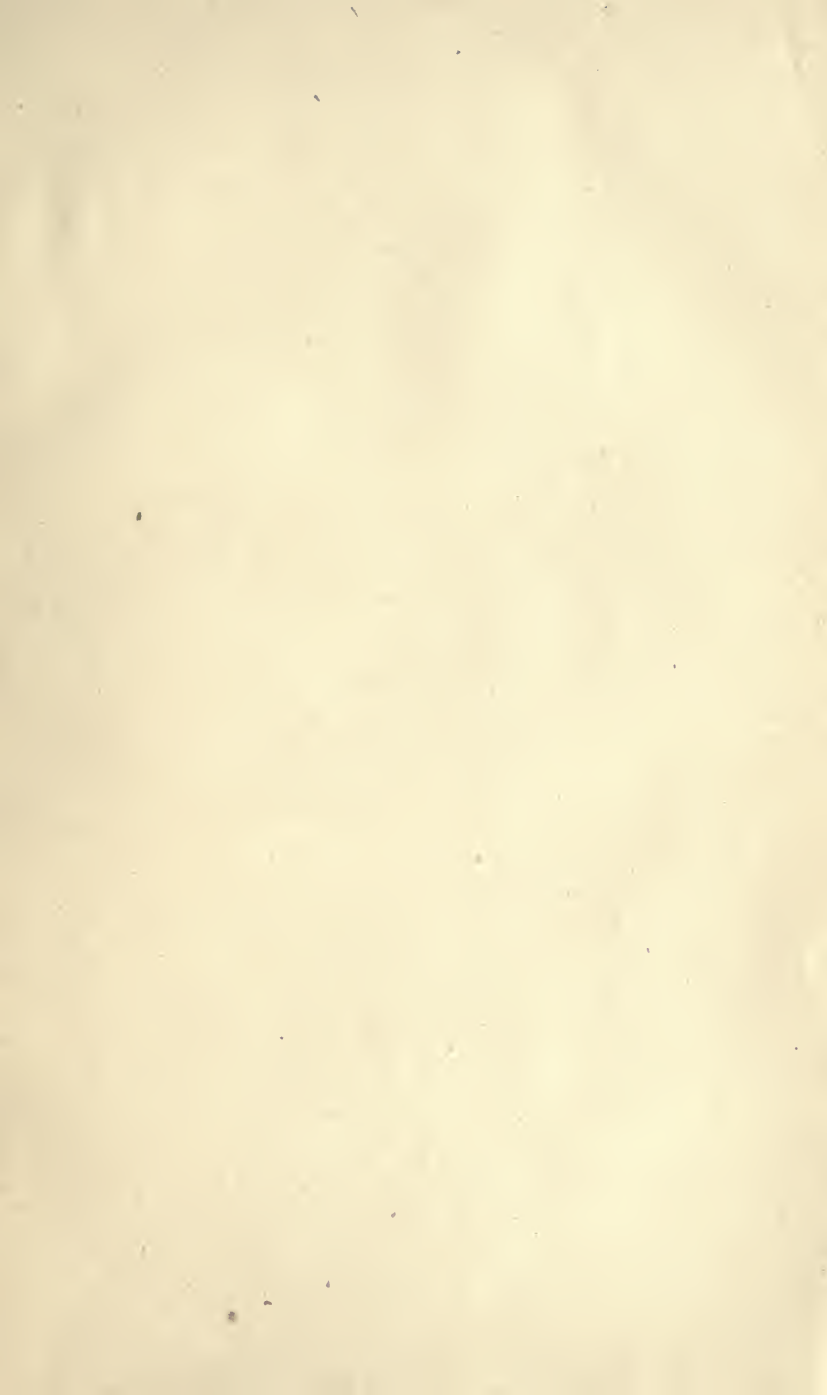
An analysis of individual records should be made to aid students with peculiar powers or weaknesses.

Advice could be given to high schools on the basis of tests, and many other activities would undoubtedly present themselves as the work develops.

If personnel, test, and welfare work in commercial institutions and school systems has proved valuable, it ought to be even more valuable in a large educational institution like the University of California, for in the case of students we need more and more of just the type of service represented in the highest forms of test and personnel work.

If any of these suggestions are to be carried out, steps should be taken immediately to give a test to present freshmen.





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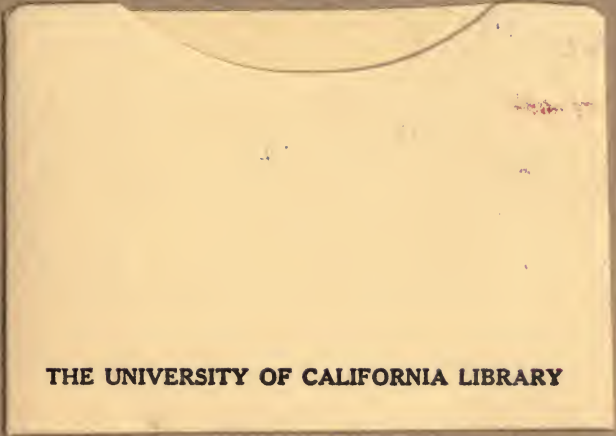
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