

AN ANALYSIS OF SOME FACTORS ACCOUNTING FOR  
DIFFERENCES BETWEEN APTITUDE AND  
ACHIEVEMENT IN MUSIC

by

ROBERT BALDWIN SMITH

B. A., St. Norbert College,  
DePere, Wisconsin, 1940

---

A THESIS

submitted in partial fulfillment of the  
requirements for the degree

MASTER OF SCIENCE

Department of Music

KANSAS STATE COLLEGE  
OF AGRICULTURE AND APPLIED SCIENCE

1949

Docu-  
ment  
LD  
2668  
T4  
1949  
SG  
C.2

## TABLE OF CONTENTS

INTRODUCTION . . . . .	1
Purpose of the Study . . . . .	1
Need for the Study . . . . .	1
Limits of the Study . . . . .	3
DESCRIPTION OF MATERIALS AND METHODS . . . . .	4
The Shipley-Hartford Retreat Scale . . . . .	4
The Minnesota Multiphasic Personality Inventory . . . . .	6
The Keystone Visual Survey Telebinocular . . . . .	9
The Seashore Measures of Musical Talent . . . . .	11
The Kwalwasser-Ruch Test of Musical Accomplish- ment . . . . .	14
CASE STUDIES . . . . .	16
SUMMARY AND CONCLUSIONS . . . . .	59
ACKNOWLEDGMENT . . . . .	64
BIBLIOGRAPHY . . . . .	65

## INTRODUCTION

### Purpose of the Study

It is the purpose of this thesis to make an analysis of some factors which account for the difference between Aptitude and Achievement in Music. These factors are as follows: Musical ability, Musical achievement, General visual acuity, and the Personality and intelligence quotient of the student. Through the use of tests, it has been possible to determine the amount of the student's aptitude in music with a high degree of certainty. It has also been possible to measure his achievement in this same field, and it is upon the manner in which these two basic measurements correlate that this thesis is based. The factors of general visual acuity, personality, and intelligence quotient will, in varying degrees, tend to influence both Aptitude and Achievement in the case of each student. It shall be the purpose of the body of this work to show these co-existing relationships.

### Need for the Study

The files of student Personnel and Counseling Bureaus are full of cases in which the student is in some sort of scholastic difficulty. In these files are the scores of the student in several broad fields of activity. Usually there is an intelligence score, then follow the usual battery of percentile rank achievement and aptitude tests. The problem with which the counselor is usually faced, is the reconciling

of the aptitude test scores with achievement scores and intelligence quotients. This is true in many cases where students are referred to counseling bureaus because of scholastic inefficiency or failure.

The tests which will be used in this study measure both aptitude and achievement. The first test is the Seashore Measures of Musical Talent, which will show the natural ability or aptitude of the student. Then the Kwalwasser-Ruch Test of Musical Accomplishment will show the amount which the individual is capable of performing. It may be expected that there will be differences between the scores of aptitude and achievement in many cases and it is the purpose of this study to analyze some of the factors which may account for this difference. One of these tests is the Minnesota Multiphasic Personality Inventory which will tend to reflect the importance of personality disturbances on the rate of achievement. Also of importance is the Shipley-Hartford Retreat Scale which in its conceptual quotient will tend to show if there is any appreciable loss of mental ability from the normal. The Keystone Telebinocular will serve as a gross screening device to indicate whether there is a visual problem involved.

In the case of music students particularly, where there is a concise terminology involving description of terms and symbols and a definite application involved in the performance of learned skills and material, there is more of a chance that there will be a difference between aptitude and achievement, since the efficiency in reproducing this knowledge tends to be

dependent upon the frequent use to which it is put.

#### Need for the Study (Additions)

In the Education Records Bulletin No. 23 "The use of tests and rating devices in the appraisal of Personality" by Arthur E. Traxler, the following statement appears:

There is a growing conviction that personality factors are fully as important on one's academic and out-of-school adjustment as are those more easily measured factors of intelligence and achievement concerning which schools have long kept records for their pupils. Studies have repeatedly shown that the correlation between academic aptitude and school success is only about .5 and the correlation between achievement tests and success in school is not very much higher; consequently there is an increasing demand for valid and reliable records of personality development to assist the school in its guidance of the pupil and to be sent on to the college when the student has graduated.<sup>1</sup>

#### Limits of the Study

It is to be understood that this is a descriptive rather than statistical analysis of some factors accounting for differences between aptitude and achievement in music. The number of cases is limited to a group of thirty-one, sixteen male and fifteen female, all of whom volunteered to participate in the study. The number of tests has been limited to five; two music tests, two psychological tests, and one visual test. The majority of students were freshmen and sophomores in the Department of Music, and the contacts with each individual have been limited to the time necessary for the completion of the test battery. No case histories or records of previous training are included since the analysis is based entirely

---

<sup>1</sup>Traxler, Arthur E. (32).

upon measurable factors which appear in this study.

#### DESCRIPTION OF MATERIALS AND METHODS

The test group was composed of thirty-one students currently enrolled in Kansas State College, the majority of whom were Freshmen and Sophomores in the Department of Music. All students in this test group participated voluntarily and without remuneration or gratuities of any kind. The test materials and equipment used in Testing were made available through the Music Department and the Counseling Bureau. The administration and scoring of the psychological tests was done by the staff of the Counseling Bureau without remuneration. This writer administered and scored the Musical ability and Achievement tests. Below is a description and explanation of testing materials used.

#### The Shipley-Hartford Retreat Scale

The Shipley-Hartford Retreat Scale is a short test consisting of two parts, each requiring ten minutes for completion. This test shows the scores of the subject on four separate scales which are: Vocabulary IQ, Abstraction IQ, Total IQ, and Conceptual Quotient.

The vocabulary IQ is determined from the score of the subject on a list of words which cover a wide range of difficulty and frequency of use. It is of the multiple-choice variety in which the subject is instructed to select the proper meaning for each word. The abstraction IQ is determined from

the score of the subject on an abstract thinking type of test which consists of completion items of various types. The total IQ is determined by combining the scores on the two scales mentioned above. The conceptual quotient is based upon the clinico-experimental observation that in mild degrees of mental deterioration, and other conditions involving intellectual impairment, vocabulary is relatively unaffected, but the capacity for abstract (conceptual) thinking declines rapidly. This impairment is measured then by the extent to which the individual's abstract thinking falls short of his vocabulary.

The Shipley-Hartford Retreat Scale was designed as an aid in detecting mild degrees of intellectual impairment in individuals of normal original intelligence. It is also useful as a test of intelligence and it is used frequently on large groups for this purpose. It is particularly useful in this respect due to the ease of administering and scoring the test, and the short period of time required for its completion.

The scores on the vocabulary and abstraction tests have been transferred into mental age equivalents and IQ scores whose meanings are familiar. However, there needs to be some additional explanation of the conceptual quotient. The degrees of deterioration as represented by it are as follows: above 90, normal; 85-90, slightly suspicious; 80-85, moderately suspicious; 75-80, quite suspicious; 70-75, very suspicious; below 70, probably pathological. Scores above 90 do not necessarily signify mental normality; they simply indicate that the subject's ability to think abstractly in the testing situation has not

yet become seriously impaired.

The scale was standardized on 1,046 individuals. This normative group was composed of students ranging in continuous gradation from the fourth grammar grade through college and from this group, all of whom had had intelligence tests, mental-age equivalents were established for vocabulary and abstraction scores, and for the two combined. While no actual validity coefficients are available, reliability coefficients were obtained from 322 army recruits: .87 for the vocabulary test, .89 for the abstraction test, and .92 for the two combined or the total IQ.

#### The Minnesota Multiphasic Personality Inventory

This is a psychometric instrument designed to ultimately provide in a single test scores on all the more important phases of personality. The test was prepared on WPA Project No. 665-71-3-69, sub-project No. 262. It was supplemented partly by a research grant from the University of Minnesota. It is recommended that this test be used only with persons sixteen years of age or older. The test is made up of five hundred and fifty statements.

The Criterion of Excellence is established by the validity of prediction of clinical cases against neuro-psychopathic staff diagnoses. High scores are obtained on the proper scales in sixty per cent of new psychiatric admissions.

Normative Data: This was obtained from 700 persons who were considered to be a cross-section of the Minnesota pop-



ulation as obtained from visitors to the University hospitals. This includes persons from sixteen to fifty-five years of age of both sexes. In addition, two hundred and fifty college and pre-college students were used, and were considered as a cross-section of college entrants.

There are two forms of this test--the card and the booklet. The booklet form is self-instructive and thus easy to administer. The card form consists of a box of cards containing questions which the individual divides into three piles as to False, True, or Cannot Say. It requires only a simple explanation and is more often used clinically because it is contended that persons are more likely to give a frank answer on the card form (6). The test requires approximately an hour to take, and the card form was used on our test group. This test makes possible the reflection of the factor of personality in a general profile which includes the following keys: Hypochondriasis, Depression, Hysteria, Psychopathic Deviate, Masculinity-Femininity, Paranoia, Psychasthenia, Schizophrenia, Hypomania, and the Introversiion-Extroversiion Scale. Any disturbance from a normal profile would tend to reflect upon the efficiency with which an individual could meet the learning or achievement situation.

The scoring of the card form is quite a complicated procedure requiring at least one-half hour when done by hand. Full instructions are given in the manual. The raw scores are converted into T-scores for the thirteen different scales. In addition to the keys mentioned in the paragraph above there

is the Question score which is determined by the number of cards placed in the Cannot Say group, the Lie score which measures the degree of attempts to falsify scores by choosing the answer that places the individual in the most acceptable light socially, the F score or validity scale on which a high score would make us tend to believe that the test was invalid because of carelessness or lack of comprehension of questions, and the last added scale, the K scale. A high K score is said to indicate a defensive attitude, and a low K score indicates unusual frankness and possible self-criticality.

The Hs score or hypochondriasis scale is designed to measure the amount of abnormal concern about bodily functions.

The D score or depression scale is designed to measure the depth of the clinically recognized symptoms or symptom complex of depression.

The Hy score is the hysteria scale. It is designed to indicate the degree of likeness to persons having conversion-type hysteria symptoms.

The Pd or psychopathic deviate scale attempts to measure the similarity to persons whose main difficulties lie in the absence of deep emotional responses, inability to profit from experience, and their disregard of social mores.

The MF score is the interest scale. It attempts to differentiate between masculinity and femininity of interests and is scored by different scales for each sex.

The Pa score is that of the paranoid scale and indicates the degree of likeness to persons characterized by suspicious-

ness, oversensitivity, and delusions of persecution, with or without expansive egotism.

The Pt or psychasthenic scale indicates the degree of similarity to persons having phobias or compulsive behavior.

The Sc score or the schizophrenic scale measures the similarity of the individual to persons having bizarre or unusual thoughts or behavior. There is a splitting of the subjective life of the schizophrenic person from reality so that the observer cannot follow rationally the shifts in mood or behavior.

The Ma score or hypomania scale measures tendencies toward marked over-productivity in thought and action. Frequently this individual takes on more jobs than he can handle.

The scoring plates were constructed on a basis of item analysis of the responses of known clinical groups. A reliability coefficient of from .71 to .83 was obtained by the test-retest method.

The Keystone Visual Survey Teleginocular

This test was designed for binocular tests of visual functions. The testing instrument is known as the Keystone Ophthalmic Telbinocular. With this instrument and the accompanying slides the vision of each eye can be studied while both eyes function simultaneously. These simple tests provide practically the only rational means of measuring the binocular relationship.

The simple construction of this instrument separates the fields of vision and permits the left eye to see only

its half of the slide and the right eye to see only its half. Through the process called "fusion " the left eye and the right eye images are combined into one. The distance between the eyes of the subject (i.e. P. D., or inter-pupillary distance) is compensated for by the optical construction of the instrument. This construction provides an artificial set-up whereby measurements can be made at reading distance equivalents ranging from twelve inches to infinity (ordinarily infinity is considered twenty feet or beyond). The placing of the slide holder at the distance equivalent marks on the top of the shaft provided for this purpose accomplishes this result.

It is imperative that this test be considered first of all merely as a gross screening device to determine whether or not there is a visual problem involved. The subject is seated at the telebinocular machine and is given a series of cards with symbols on them and asked to tell the examiner what he sees. The replies are then charted on an answer sheet. When all replies are checked within the "Expected" column visual performance is considered to be satisfactory insofar as this test is concerned. When all replies are checked within the "Expected" and "Doubtful" columns, with not too many replies outside the "Expected" column, further examination is probably unnecessary. However, retests should be given within sixty days for more complete results. When one or more replies are checked in the "Underconvergence" or "Overconvergence" columns, a more complete examination by an eye specialist is recommended.

The test provides information on simultaneous vision, vertical imbalance, lateral imbalance, fusion, left and right eye visual efficiency, stereopsis, and color perception at far point; lateral imbalance, fusion, visual acuity for both left and right eyes at near point.

#### The Seashore Measures of Musical Talent

This test in its present edition is designed to accurately measure six basic capacities in the hearing of music. These capacities are measured in terms of sensitivity to Pitch, Loudness, Rhythm, Time, Timbre, and Tonal Memory. These tests are based upon a scientific analysis of musical appreciation and performance; they deal with elements which function in all music; they are standardized for content, and since they are aptitude tests they can be applied to the musically trained or untrained alike. They give quantitative results which may be verified with a high degree of certainty; (they may be used with any language or at any race or cultural level); they are simple and as nearly self-operative as possible; they are designed for group measurements; and they are interpreted in terms of group norms.

They are called measures to distinguish them from achievement tests. They are patterned on the principle of accurate measurement of minute pitch and rhythmic differences which are produced with scientific instruments. They are based upon two fundamental laws of scientific measurement: the first law is that the factor under observation must be isolated in order to

know exactly what is being measured. This factor is kept under control while all other factors are kept constant. Thus in measuring the sense of time, only duration is varied, thereby avoiding a complex situation. The second law demands that the conclusions must be limited to the particular factor which has been isolated and measured. Thus, if the capacity for rhythm is measured, and it is found to be high, the conclusion is not that the person measured is necessarily musical, rather, it merely indicates that the individual has a superior sense of rhythm.

These measures are adapted primarily for use in the regular music class, or for special surveys. They may be used effectively for measuring the musical capacity of fifth grade students. They may be repeated in the eighth grade where different norms are used. Beyond this point, they may be used with any age groups and for a variety of purposes. They are of diagnostic value in screening candidates for musical organizations, for admission to music schools, and for similar purposes. While they are especially designed for group measurement, they can also be used for a more careful diagnosis of the individual.

These tests do not measure training or achievement in music. Excellence in these is not a condition for artistic appreciation and skills in performance; and it does not in itself guarantee such achievements. They do not measure intelligence, feeling, or the will to work. They do not furnish a single, all-inclusive index to musical ability. They should

not be averaged; each score is but an item in the musical profile. They are not foolproof but as measuring instruments they are fully adequate.

The following quotation is from MUSICAL ASPECTS OF THE MEASURES by Carl Seashore:

The measures should not be averaged, each measure in the profile must stand upon its own merits. If the ranks in a fair sampling of capacities which are essential to success are all low, and have been verified, a general negative prediction may be safe. If some or all are high, reservation must be made for the determination of other factors which may be equally crucial signs of success, such as resources, conflicting interests, the will to achieve, and especially, the power of application and hard and continuous work. The laboratory point of view does not assume that the mere existence of good capacities makes a good musician, or that low ratings in one or more capacities is discouraging.

The procedure for basing the evaluation of each profile has been taken from the work of Dr. Hazel M. Stanton, who is responsible for the validation of the measures. For a given test a centile scale was adopted as follows: the highest ten per cent, A or superior; the next twenty per cent, B or very good; the next twenty per cent, C plus or high average; the next twenty per cent, C minus or low average; the next twenty per cent, D or poor; and the lowest ten per cent, E or very poor. For each individual, a chart of his musical profile was made in terms of centile rank. However, since a single classification had to be made for the purpose of prediction, a cumulative key was adopted, grouping various types of profiles under five heads: Discouraged, Doubtful, Possible, Probably, and Safe (2).

According to the analysis of the numerical profile on the centile basis, the following would be true: an 'A' profile would consist of a predominance or average of scores of 90 or above; a 'B' profile would mean a predominance or average of scores of 80 or above; a 'B' profile would mean a predominance or average of scores of 80 or above; a 'C plus' profile would mean a predominance or average of 67 or above; a 'C minus' profile--45 or above; a 'D' profile--30 or above; and an E profile--less than 30. This establishes a basis for the scoring and rating of musical capacity. For convenience, these profiles are referred to in this Thesis as the "Stanton average".

#### The Kwalwasser-Ruch Test of Musical Accomplishment

The Kwalwasser-Ruch Test of Musical Accomplishment is designed to measure the achievement of pupils in the typical Public School music course in the elementary and high school grades. Every item in the test has been subject to repeated experimentation, and the items finally included represent materials which public school pupils can reasonably be expected to master in the course of the first twelve grades of instruction in music.

The validity of this test rests primarily upon the specifications drawn up in a committee report adopted by the Educational Council of the Music Supervisors' National Conference in 1929. The course outlined in the report contains the aims, materials, procedures, and attainments for each of the first



eight grades. The test was revised in 1934, and still remains standard.

Listed below are the sub-tests: Test one--Knowledge of musical terms and symbols, Test two--Recognition of syllable names, Test three--Detection of pitch errors in a familiar melody, Test four--Detection of time errors in a familiar melody, Test five--Recognition of pitch names, Test six--Knowledge of time signatures, Test seven--Knowledge of key signatures, Test eight--Knowledge of note values, Test nine--Knowledge of rest values, Test ten--Recognition of familiar melodies from notation.

The norms are based upon scores earned by five thousand four hundred and fourteen pupils in grades IV to XII. The following cities are represented: Evanston, Illinois; Oakland, California; Rochester, New York; Mason City, Iowa; Pittsburgh, Pennsylvania; Denver, Colorado; and South Bend, Indiana.

The correlations were figured by the method of splitting the test items into chance halves, i.e., correlating the sum of the points earned on the even-numbered items with the points earned on the odd-numbered items. The correlation, (reliability coefficient), for the tests as a whole was found to be .97 for the group studied. Obviously, a pupil's achievement in music is measured by this test in a much more reliable manner than by the ordinary final examinations whose reliability seldom exceeds .50 to .75 in comparison with the .97 of the Kwalwasser-Ruch test.

## CASE STUDIES

Case I -- Female

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	108
Abstraction IQ	--	115
Total IQ	--	114
Conceptual Quotient	--	105

Minnesota Multiphasic Personality Inventory

Essentially normal profile; a slight elevation in Hs and Hy; low Ie score.

Keystone Visual Survey Telebinocular

All scores being in the "Expected" column show excellent vision. One deviation gives the right eye a visual efficiency of 105 per cent showing overconvergence and high visual acuity at both near and far point.

Seashore Measures of Musical Talent

All scores in the average category.

Kwalwasser-Ruch Test of Musical Accomplishment

"C" scores on all sections of the test.

Interpretation and Summary of Test Scores

The abstraction IQ score is higher than the vocabulary score. The total IQ of 115 is slightly under average for the college level student. Since the Keystone scores eliminate all possibility for any visual deficiencies, and an essentially normal profile is observed on the MMPI, it is logical to assume that the Seashore with its "C" profile and the Kwalwasser-Ruch with its "C" profile are faithful representations of ability and achievement.

## Case II -- Female

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	116
Abstraction IQ	--	115
Total IQ	--	118
Conceptual Quotient	--	99

Minnesota Multiphasic Personality Inventory

Essentially normal profile; slight elevations on the Pa and Pt scales. While the Ie score is not lower than fifty, it is considerably lower than the mean of the entire profile.

Keystone Visual Survey Telebinocular

Hegged scores showing deviations from the "Expected" column. Right eye visual efficiency of 80 per cent with the subject wearing glasses.

Seashore Measures of Musical Talent

Very irregular scores running from superior to poor. Three scores appear in the excellent and superior columns: loudness, timbre, and tonal memory. The three other scores, pitch, time, and rhythm, are in the low-average to poor group.

Kwalwasser-Ruch Test of Musical Accomplishment

All scores show an achievement of "B plus" for this test.

Interpretation and Summary of Test Scores

The total IQ score on the Shipley-Hartford is higher than all other scores but not significantly so. The slight elevations of the Pa and Pt scores on the MMPI indicate a mild tendency to resemble people who have a somewhat hostile attitude toward others, and those who are characterized by slight

over concern. These disturbances do not seem to be disabling to any extent. The irregular Keystone pattern indicates that a more complete examination by an eye specialist is in order. While the Seashore gives excellent support on three items of the profile, the scores on the three remaining items are so low as to give no more than a doubtful picture. In more extreme cases, where the scores seem to be quite unmatched, further retesting is desirable. The Kwalwasser-Ruch test shows a "B plus" average in all categories thereby indicating a slight overachievement which may be due to other factors than those measured by this paradigm.

Case III -- Female

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	103
Abstraction IQ	--	121
Total IQ	--	114
Conceptual Quotient	--	115

Minnesota Multiphasic Personality Inventory

Generally normal profile; slight elevation on D, extremely low Mf, with extremely high Pt, Sc, and Ie. The Ma score is only slightly below these last three. The presence of a high F score in the validation key will tend to lower all of the high scores considerably.

Keystone Visual Survey Telebinocular

Majority of replies checked within the "expected" column indicating satisfactory visual performance insofar as this test is concerned. The exceptions are as follows: right eye

visual efficiency at the far point 60 per cent, left eye 105 per cent.

#### Seeshore Measures of Musical Talent

Scores range from excellent to low average with a general profile of "C minus". Pitch and tonal memory rank highest.

#### Kwalwasser-Ruch Test of Musical Accomplishment

Scores indicate an achievement of "B" on all sections.

#### Interpretation and Summary of Test Scores

The abstract score of the Shipley-Hartford is very high in comparison to the vocabulary score. The presence of an elevated D in the MMPI profile indicates a tendency to resemble persons who tend to regard the future pessimistically, and those who tend to worry slightly and seem a bit withdrawn. The Ia score is as high as the Pt indicating a tendency toward introversion. As was mentioned above the presence of a high F score would tend to reduce the peaks on the items receiving the high scores. The general visual acuity of the subject is good, with the possibility of a small amount of eye strain. Although the pitch score on the Seeshore is excellent, the presence of other considerably lower scores have reduced the entire profile to approximately a "C".<sup>1</sup> The Kwalwasser-Ruch test shows an achievement of "B" on all sections. This is apparently in contradiction to the scores of the Seeshore which it supports on pitch and tonal memory only. It would appear that the overachievement in this case is well supported

---

<sup>1</sup>To avoid misunderstanding concerning the procedure used in grouping the profiles under the headings of A,B,C, etc., the reader is referred to the introduction, pages 3-4.

by the high scores on the psychotic end of the MMPI profile particularly the Ma.

Case IV -- Male

Shipley-Hartford Retest Scale

Vocabulary IQ	--	113
Abstraction IQ	--	121
Total IQ	--	119
Conceptual Quotient	--	106

Minnesota Multiphasic Personality Inventory

Essentially a normal profile; slight elevations present in Mf, Hs, and Pa. Ie score low.

Keystone Visual Survey Telebinocular

All replies checked in the "Expected" column.

Seashore Measures of Musical Talent

Pitch, loudness, timbre, and rhythm--superior; time--good, with a perfect score on tonal memory.

Kwalwasser-Ruch Test of Musical Accomplishment

All correct.

Interpretation and Summary of Test Scores

Total IQ score is approximately the average for a college level student. However the perfect score on the Kwalwasser and the extremely high scores on the Seashore manifest both unusual aptitude and even better achievement in music. The presence of the slightly elevated Hs is apparently of no consequence and the elevated Mf is present in practically all male musicians. A slight tendency to resemble those persons who have a suspicious attitude towards the motives of others

as characterized by the elevated Pa is also of a non-disabling nature. The low Ie tends to show that the subject is slightly extroverted. The unusual achievement of this subject is apparently well-supported by the Seashore.

Case V -- Male

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	121
Abstraction IQ	--	110
Total IQ	--	117
Conceptual Quotient	--	93

Minnesota Multiphasic Personality Inventory

Very normal profile with slight Pt elevation and low Ie. Slight elevation on the K validation key.

Keystone Visual Survey Telebinocular

Irregular profile; right and left eye visual efficiency at 90 per cent at the far point. Fusion at near point indicating underconvergence and low visual acuity. Visual acuity for the right eye at near point only 70 per cent and for the left eye, 80 per cent. Since the subject was tested with glasses, further examination by a competent eye specialist is desirable.

Seashore Measures of Musical Talent

Irregular profile ranging from high average to superior. The Stanton average for the entire profile is "B minus".

Kwelwasser-Ruch Test of Musical Accomplishment

Achievement of "C" on all sections of the test.

Interpretation and Summary of Test Scores

There are problematic signs of undersachievement since there is considerable difference between the scores of the Seashore and the Kweilwasser-Ruch. While the Keystone indicates difficulty in fusion to a slight degree, it would not influence these scores to such a great extent, but would rather tend to produce eye strain and a more deliberate manner of reading. The elevation of the Pt score on the MMPI again is not high enough to influence the divergence between aptitude and achievement which is present. In the Shipley-Hartford there is a change of pattern, namely that the vocabulary score is higher than the abstract and the total IQ score is also higher than the abstract. This significant difference along with the high tonal memory score on the Seashore test, may mean that the subject has made an auditory compensation for his visual deficiency.

Case VI -- Male

Shipley-Hartford Retest Scale

Vocabulary IQ	--	103
Abstraction IQ	--	99
Total IQ	--	103
Conceptual Quotient	--	95

Minnesota Multiphasic Personality Inventory

Essentially normal; slight Hy and Pt elevation with a low Ie.



Keystone Visual Survey Telebinocular

Irregular profile; fusion at far point doubtful indicating slight overconvergence. Left eye visual deficiency at far point doubtful also indicating overconvergence. Visual acuity for both right and left eye at near point doubtful indicating overconvergence. Subject wearing glasses.

Seashore Measures of Musical Talent

A Stanton average of "C minus". All items in approximately the same grouping.

Kwelwasser-Ruch Test of Musical Accomplishment

Irregular but consistently low on all sections. "C" average.

Interpretation and Summary of Test Scores

All scores on the Shipley-Hartford are considerably below those of the average successful college student. The conceptual quotient which measures mental deterioration is low but does not seem to warrant clinical investigation. The presence of slight Hy and Pt elevations indicates a tendency for the subject to resemble persons who have a dependence upon home and family along with tendencies towards repeating random performances. The presence of a slightly elevated K in the validation key indicates a defensive attitude and a desire to be considered in the most acceptable light socially. The low Ie score is similar to patterns of individuals of the outgoing or extroverted type. Since the scores of the Seashore and Kwelwasser-Ruch are in approximately the same grouping there is apparently no question of over or under-achievement.

Case VII -- Female

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	111
Abstraction IQ	--	126
Total IQ	--	119
Conceptual Quotient	--	113

Minnesota Multiphasic Personality Inventory

Essentially normal profile; slight elevation on D, Ma, and a lowered Ie score.

Keystone Visual Survey Telebinocular

Majority of replies in the "Expected" column. Slight underconvergence in fusion at far point.

Seashore Measures of Musical Talent

Very irregular. Loudness, timbre, and tonal memory in superior column; rhythm--excellent, pitch--average, and time--poor; a Stanton average of C plus.

Kwalwasser-Ruch Test of Musical Accomplishment

"B" scores on all sections.

Interpretation and Summary of Test Scores

The Abstraction score on the Shipley-Hartford is again high. The total IQ is approximately average for the successful college student. The slight elevation of the D and a corresponding elevation on the Ma in the MMPI profile are the two peaks in an essentially normal profile. Since there are no serious handicaps on the Keystone, there seem to be no other limiting factors.

Case VIII -- Female

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	106
Abstraction IQ	--	126
Total IQ	--	118
Conceptual Quotient	--	118

Minnesota Multiphasic Personality Inventory

Normal profile with the exception of high Pt and Ie scores.

Keystone Visual Survey Telebinocular

Majority of replies in the "Expected" column; right eye visual efficiency 80 per cent at the far point, left eye 100 per cent at the far point.

Seashore Measures of Musical Talent

Pitch--superior; the remaining scores ranging from good to poor. A Stanton average of "C minus".

Kwalwasser-Ruch Test of Musical Accomplishment

"C" profile on all sections.

Interpretation and Summary of Test Scores

The abstract score of the Shipley-Hartford is higher than the vocabulary score. The total IQ score is approximately average for the successful college student. An essentially normal profile exists for the MMPI with the exception of a high Pt score which is matched by an equally high Ie. Since the majority of scores on the other keys are very normal, this peak stands out sharply. This, with a tendency to resemble the scores of those who tend to be introverted, may be a related factor to the low scores on both the Seashore and the

Kwalwasser-Ruch. It is quite rare that pitch alone receives the highest score on the Seashore without a high accompanying score on either tonal memory, timbre, or loudness. We may hypothesize that if the Pt score were reduced, a higher score on both the Seashore and the Kwalwasser might result.

Case IX -- Female

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	113
Abstraction IQ	--	110
Total IQ	--	114
Conceptual Quotient	--	97

Minnesota Multiphasic Personality Inventory

Essentially a normal profile with an elevation on the Pt scale.

Keystone Visual Survey Telebinocular

Replies four out of thirteen in the "Expected" column. Low simultaneous vision, lateral imbalance, and low fusion at far point. This is repeated in replies in the doubtful column indicating underconvergence in the same categories at near point.

Seashore Measures of Musical Talent

Stenton average of "C plus". Fairly even throughout the profile.

Kwalwasser-Ruch Test of Musical Accomplishment

Achievement of "A" on all sections of this test.

Interpretation and Summary of Test Scores

A slight deviation from the usual female pattern on the Shipley-Hartford in that the Vocabulary score runs higher than the Abstraction score, and also the Total IQ score is slightly higher than the other scores. This is mentioned from the standpoint of the change in what may be called the beginnings of a pattern, and not from the significance of the scores themselves. The slight peak on the Pt scale of the MMPI does not seem to have any significance, since the difference is so small. Since the Keystone shows several visual disturbances, a more comprehensive examination by an eye specialist is in order. The Seashore does not support the high score of achievement in the Kwalwasser-Ruch, and a general trend toward over-achievement seems to exist.

Case X -- Female

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	111
Abstraction IQ	--	105
Total IQ	--	110
Conceptual Quotient	--	94

Minnesota Multiphasic Personality Inventory

Very normal profile. No elevations of any consequence.

Keystone Visual Survey Telebinocular

Majority of replies checked in the "Expected" column.

Seashore Measures of Musical Talent

Stanton average of "B minus".

Kwalwasser-Ruch Test of Musical Accomplishment

Achievement of "B plus".

Interpretation and Summary of Test Scores

The scores of the Sesshore and the Kwalwasser-Ruch test run almost a perfect correlation between aptitude and achievement. The only scores that are of any consequence are those of the Shipley-Hartford, and seem to be quite low in comparison with the high scores of the others. The total IQ score is slightly below the average of college-level students, and the Abstraction score considerably so. In this case, the Keystone has no particular significance other than its indicating normal vision.

Case XI -- Female

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	121
Abstraction IQ	--	105
Total IQ	--	115
Conceptual Quotient	--	88

Minnesota Multiphasic Personality Inventory

This is essentially a normal profile. There is a slight elevation on the K in the Validation Key; a slight Hy and Ma. The Ie is fairly low.

Keystone Visual Survey Telebinocular

Replies not altogether in the "Expected" column. There is a pattern however, for most of the digressions are on the overconvergence side, with the exception of Stereopsis at far

point. This received an entirely negative reading.

Seashore Measures of Musical Talent

Stanton average of "C minus". Very irregular profile. Loudness and Timbre were the two highest items in the profile, and were in the Excellent column. The rest of the scores were from Good to Low-Average.

Kwalwasser-Ruch Test of Musical Accomplishment

"C average", with some highs in several sections.

Interpretation and Summary of Test Scores

The Shipley-Hartford scores on vocabulary are high for this particular group of scores, and the Total IQ is approximately normal for the college level student. While the Conceptual Quotient is low, it does not appear to be suspiciously so. Scores above ninety do not necessarily mean mental normality. They simply indicate that the subject's ability to think abstractly in the testing situation is not seriously impaired (29). Thus, a score below ninety would not indicate a negative interpretation of the above statement without other qualifying data, such as a very low score on Vocabulary and particularly on Abstraction. The slight elevation on the K in the Validation key indicates a probable desire to assume as many desirable social traits as possible. The Seashore and the Kwalwasser-Ruch were quite closely matched, and since no scores on the Keystone indicate any visual disturbances it is logical to assume that Aptitude and Achievement have correlated quite closely.

Case XII -- Female

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	106
Abstraction IQ	--	110
Total IQ	--	110
Conceptual Quotient	--	103

Minnesota Multiphasic Personality Inventory

Elevation on Hy, Pa, Pt, Sc, with a low Ie score.

Validation key shows slightly elevated P.

Keystone Visual Survey Telebinocular

Few items checked in "Expected" column. Simultaneous vision at far point "doubtful"; lateral imbalance at far point also "doubtful". Right and left eye visual efficiency only 60 per cent. Fusion at both near and far points indicating overconvergence.

Seashore Measures of Musical Talent

Stanton average of "C minus". Pitch and tonal memory scores both low. Only one score high rating, timbre--excellent.

Kwalwasser-Ruch Test of Musical Accomplishment

This test shows an achievement of "B".

Interpretation and Summary of Test Scores

The abstract score of the Shipley-Hartford exceeds that of vocabulary and the total IQ is the same score. While the MMPI points essentially to a normal profile, the elevation on Pt is particularly high. These scores might indicate that this person is emotionally disturbed. These scores however may be



somewhat higher than normal since the F score is slightly elevated. This means that the individual did not fully understand some of the questions or was rather careless in their interpretation. The Keystone indicates that a reading problem exists. While fusion at both near and far points is on the overconvergence or high visual acuity side, there may be difficulty in immediate fusion. With visual efficiency down to sixty per cent in both eyes and lateral imbalance at both near and far points doubtful, there is ample reason to believe that this individual should consult an eye specialist so that these conditions may be relieved. The Seashore scores falling in the "C minus" bracket do not support the high "B" score on the Kwalwasser-Ruch test. There seems to be an indication of a slight overachievement since all of the accompanying scores of this subject point to disturbances of some kind. There appears to be a strong relationship between this individual's overachieving and his emotional state.

Case XIII -- Male

Shipley-Hartford Retest Scale

Vocabulary IQ	--	137
Abstraction IQ	--	137
Total IQ	--	137
Conceptual Quotient	--	115

Minnesota Multiphasic Personality Inventory

Elevated K, slightly elevated D, Mf, and a high Ie.

Keystone Visual Survey Telebinocular

Subject cannot fuse. Right and left eyes focus separately

at 100 per cent visual efficiency at both near and far points.

#### Seashore Measures of Musical Talent

Stanton average of "B". Scores on time and rhythm the only deviation from "Superior" column.

#### Fwalwasser-Ruch Test of Musical Accomplishment

Achievement of "A".

#### Interpretation and Summary of Test Scores

The Shipley-Hartford points to an exceptional capacity in vocabulary and abstraction. The total IQ comes very close to being the top score of the test. The Keystone test which shows that there is no fusion, depth perception, or simultaneous vision, should be considered in the light of the fact that the student has apparently made a satisfactory adjustment to this obvious handicap. In persons of less native capacity it might have proved to be disabling. When questioned, the subject informed this writer that glasses had been prescribed to help overcome these visual deficiencies, but since they had not resulted in a satisfactory adjustment, the glasses had been discarded. The scores of all the tests excluding the MMPI seem to point to the fact that adjustment to this visual problem have taken place. The elevated K score on the MMPI indicates a tendency toward defensiveness. Often the attitude develops from motivational sources not recognized by the testee. The D is of little consequence in the profile in this case, and the MF indicates a highly verbal type of personality which is found in many male musicians. The Ic score, which is the highest of any of the keys on the

profile, indicates a similarity to persons who tend to have introverted personalities. The Seashore is high with the Stanton average of "B", and points the way for the high achievement on the Kwalwasser-Ruch. It can hardly be said that overschivement is present due to the fact that the reliability coefficients on rhythm and time, as separate sections of the Seashore test, are lower than any other items, and it is in these two categories that this student failed to make a grade of "Superior".<sup>1</sup>

Case XIV -- Female

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	135
Abstraction IQ	--	110
Total IQ	--	123
Conceptual Quotient	--	90

Minnesota Multiphasic Personality Inventory

Slight K elevation; elevated D; lesser peaks on Pa and Pt; high Ie.

Keystone Visual Survey Telebinocular

All replies checked within the "Expected" column.

Seashore Measures of Musical Talent

Stanton average of "B plus", with perfect score on tonal memory.

---

<sup>1</sup>The reliability of the time test Farnsworth considers to be low, one of its disadvantages being that its unmusical manner of judging time is decidedly disturbing to many students who have had musical training. It is also sometimes difficult to make the directions clear. The rhythm test is found by Farnsworth to be the poorest in standardization and to be very low in reliability--should be used with caution. Reliability coefficients of time and rhythm are 0.51, and 0.47 respectively." (24)

Kwalwasser-Ruch Test of Musical Accomplishment

Achievement of A, near the highest of the test series.

Interpretation and Summary of Test Scores

The extremely high vocabulary score on the Shipley-Hartford is in contrast to the rather low abstract score. The total IQ is slightly more than average for college-level students. The slight elevation of the K in the MMPI seems to indicate a somewhat defensive attitude in the testee and the D score shows a mild tendency of the subject to resemble persons who do not regard the future with a normal amount of optimism. The Pt score is slightly less than the D score and a closely following Pa score shows a similarity in pattern to those who have a slightly suspicious attitude toward the motives of others. The elevated Ie evidences tendencies toward introversion. All of the Keystone scores are good, with no evidence of any visual problems. The Seashore, with a slightly uneven profile, rates both pitch and loudness slightly below "Excellent" while the rest of the items are "Excellent" and "Superior". Tonal memory, with its perfect score, is evidence of unusually high ability in musical memory.<sup>1</sup>

---

"The most striking result of this test", Seashore writes, "is that a span of six is difficult enough for practically all of a normal community. A person who, in an extended series of trials, is able to get all records right would have an extraordinary capacity for this kind of memory. Other things being equal, the child in the fifth-grade room who ranks eighty-five gives promise of a memory for as extensive a repertory as any musician may need, and persons who now play programs of several hours entirely from memory may not rank higher than ninety on this scale." (25)

The Kwalwasser-Ruch test with its score of four under perfect indicates exceptional achievement in music. This leaves scarcely any room for a greater amount of achievement, and since the native capacity of an individual at maturity seldom changes, it seems unlikely that the physiological basis for discrimination (so necessary for getting a high score on the Seashore) could be improved. However, the high scores on the MMPI profile may have had some influence in the attitude with which the testee approached the testing situation.

Case XV -- Male

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	115
Abstraction IQ	--	115
Total IQ	--	117
Conceptual Quotient	--	102

Minnesota Multiphasic Personality Inventory

Mild elevations on Hs, Hy, Mf, and Ma. Low Ie.

Keystone Visual Survey Telebinocular

Majority of replies checked in "Expected" column.

Seashore Measures of Musical Talent

Extremely irregular profile; scores running from low average to an almost perfect score on rhythm. Pitch, loudness, and tonal memory in the low average to average group; time, timbre, and rhythm in the superior and excellent group. Entire profile erratic. A Stanton average of "C plus".

Kwalwasser-Ruch Test of Musical Accomplishment.

An achievement of "B plus" on all sections.

Interpretation and Summary of Test Scores

Shipley-Hartford scores are grouped at the same general level, except the CQ which is slightly lower but not suspiciously low. The four peaks in the MMPI tend to indicate that the subject resembles people who are slightly immature, not yet completely divorced from family dependence, with the typical traits of masculine musicians and slightly overproductive in thought and action. The rather low Ie indicates the subject somewhat resembles the out-going, extroverted type. The Key-stone shows no disturbing visual characteristics. The extremely erratic profile of the Seashore, which is rated a "C plus" according to the Stanton average, gives evidence of slightly less ability than achievement. This test, adequate measuring instrument that it is, does not measure training, or the will to work. Motivation, or hyper-activity such as is indicated by the elevated Ma score, may account for some of the difference between aptitude and achievement in this case.

Case XVI -- Male

Shipley-Hartford Retreat Scale

Vocabulary Iq	--	101
Abstraction Iq	--	126
Total Iq	--	115
Conceptual Quotient	--	123

Minnesota Multiphasic Personality Inventory

Extremely high "L" score; "K" is somewhat elevated but about half of the "L". Elevations in the main profile are

observed on Hy and Sc with a very low Ie.

#### Keystone Visual Survey Telebinocular

Subject tested both with glasses and without. All scores deviate widely from the "Expected" column. Further examination is indicated. A competent eye specialist should be consulted.

#### Seashore Measures of Musical Talent

A Stanton average of "B plus". All scores from good to superior.

#### Kwalwasser-Ruch Test of Musical Accomplishment

This test indicates an achievement of "D".

#### Interpretation and Summary of Test Scores

There is considerable deviation between the abstract and vocabulary scores on the Shipley-Hartford. The abstract is relatively high indicating that the subject is more capable of doing abstract thinking in this particular testing situation. The vocabulary score is quite low, and although a general pattern of this nature has been observed in the male subjects on this test, these scores have not been quite so significantly separated. The MMPI, in its validation key, shows an extremely high "L" score. This records the degree to which the subject may be attempting to falsify his scores by always choosing the response that places him in the most acceptable light socially. This high L score does not completely invalidate the other scores but indicates that the true values are probably higher than those actually obtained (14). Therefore it would be expected that the peaks on Hy and Sc might be somewhat higher, and also that the Ie score might be raised.

The Keystone test, which was administered to the subject both with glasses and without, shows that further examination by a competent eye specialist would be recommended. While a few of the responses tended to catalog the subject's vision on the "Doubtful" or overconvergence side, the majority of responses were on the underconvergence or low visual acuity side. The general profile and the following check points were not improved even when the subject wore glasses; these check points were vertical imbalance, lateral imbalance, fusion, all at far point, and lateral imbalance and fusion at near point. Visual efficiency at both near and far points was improved slightly when the subject wore glasses. It is significant to note that the test of stereopsis, which measures depth perception, showed the lowest reply possible but was brought into the "Expected" column when the subject wore glasses. The importance of this point should not be overlooked in view of the fact that it deals with manual dexterity and "hand-to-eye" coordination. The Seashore test gives the subject a very high rating, although pitch and tonal memory upon which the highest coefficients of reliability have been obtained, were not as high as the rest of the test items. The Kwalwasser-Ruch test indicates a surprisingly low achievement score in view of the apparent aptitude. Low scores were obtained on the sub-test for recognition of syllable names and recognition of familiar melodies from notation. This tends to reflect the Seashore profile, although achievement is still lower than one would expect. There are signs according to the MMPT, that this



subject may be severely emotionally disturbed although additional testing should be done to determine the exact nature and extent of this adjustment. Usually, this pattern runs an extremely high vocabulary score and is not of the outgoing or extroverted type of personality. The apparent underachievement in music may be closely related to this fact.

Case XVII -- Male

Shipley-Hartford Retest Scale

Vocabulary IQ	--	111
Abstraction IQ	--	87
Total IQ	--	99
Conceptual Quotient	--	78

Minnesota Multiphasic Personality Inventory

Hy slightly elevated, Mf very high; Ie slightly low.

Keystone Visual Survey Telebinocular

All in the "Expected" column.

Seashore Measures of Musical Talent

Very irregular pattern. Pitch--low average; loudness and time--superior; timbre, rhythm, and tonal memory--good to excellent. A Stanton average of "C plus".

Kwelwasser-Ruch Test of Musical Accomplishment

Achievement of "F" (low). Low scores obtained in all categories of the test.

Interpretation and Summary of Test Scores

The entire group of scores on the Shipley-Hartford are low including the conceptual quotient. The low CQ score is

classified by the manual as "quite suspicious" which may be interpreted as meaning possible deterioration in mental efficiency. The total IQ score is considerably lower than that of the average college student. The extremely high Mf score in the MMPI may be interpreted as indicating a tendency toward a highly verbal or artistic temperament with strong interests in those directions. The lesser elevation of the Hy suggests the possibility of a slight family dependence. The Keystone shows no visual disturbances. The Seashore scores although very irregular are still above the achievement of the Kwalwasser. There is, however, a slight discrepancy in these two tests since the Seashore score on tonal memory is "Excellent" and the "Recognition of Familiar Melodies and Notations" on the Kwalwasser-Ruch is very poor. The score on "Detection of Pitch Errors in a Familiar Melody" is also quite low. This apparent tendency toward underachievement may be traced to the generally low scores of the Shipley-Hartford which suggest a somewhat impaired mental efficiency, difficulty in thinking at abstract level, somewhat low intelligence quotient, and a limited vocabulary.

Case XVIII -- Male

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	111
Abstraction IQ	--	87
Total IQ	--	99
Conceptual Quotient	--	78

Minnesota Multiphasic Personality Inventory

Slight elevation on the L and K scales, with slight peaks occurring on the Hs, Hy, and Pt.

Keystone Visual Survey Telebinocular

Majority of replies checked in the "Expected" column.

Seashore Measures of Musical Talent

Extremely irregular and low. Stanton average of "D". Fitch, highest of entire group, rated at good, with loudness and tonal memory almost completely negative.

Kwalwasser-Ruch Test of Musical Accomplishment

Achievement of "F". Extremely low in all categories.

Interpretation and Summary of Test Scores

The entire battery of Shipley-Hartford scores are extremely low. The conceptual quotient is classified as "quite suspicious" showing the possibility of a slight amount of mental deterioration. The total IQ score is extremely low for college level work, and the low abstract score reflects a seeming inability of the subject to think well in an abstract testing situation. While the MMPI profile is essentially normal, the slight elevations of the L and K indicate that the peaks existing in the profile might be slightly higher had the subject probably not attempted to control the test. Even these elevations would appear within the normal range however. The Keystone reveals no visual disturbances. The Seashore indicates a slightly higher aptitude in music than the Kwalwasser-Ruch reveals in achievement, although both are quite low. Since there are no qualifying disturbances in personality, or visually, the slight underachievement may be

attributed to the predominance of the low scores throughout the battery of tests.

Case XIX -- Male

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	103
Abstraction IQ	--	99
Total IQ	--	103
Conceptual Quotient	--	95

Minnesota Multiphasic Personality Inventory

Slight elevations of the L and K; slight elevations on D, Hs, Pt, Sc compared to the low scores on the rest of the scale.

Keystone Visual Survey Telebinocular

No visual disturbances, majority of replies checked within the "Expected" column.

Seashore Measures of Musical Talent

Irregular profile with two items in the poor group, two in the excellent group, and two in the low-average group. A Stanton average of "D plus".

Kwalwasser-Ruch Test of Musical Accomplishment

Achievement of "P". Extremely low on "Recognition of Familiar Melodies from Notation", "Knowledge of Key Signatures", -spotty, and low scores on the remainder of the sub-tests.

Summary and Interpretation of Test Scores

All the Shipley-Hartford scores are low for college-level work, but the conceptual quotient has not fallen to a suspicious

low. Slight elevations on the L and K tend to show attempts by the individual to appear in a favorable light. While the profile is essentially normal, the presence of these elevations would tend to make the existing peaks slightly higher. No visual disturbances were noted in the Keystone. The Seashore, having two items each on three widely separated scoring levels, indicates not only a divergence of traits in the musical profile, but also an irregular grouping of aptitudes. The Kwalwasser-Ruch with its extremely low achievement of "F" gives evidence of either very little training, or inability to apply the training to the testing situation. The latter case is probably true, and would tend to be related to the low scores of the Shipley-Hartford. Since no visual skills seem to be impaired, and there are apparently no disabling personality traits, this underachievement tends to limit itself to characteristics which can be measured by the Shipley-Hartford Retreat Scale.

Case XX -- Male

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	121
Abstraction IQ	--	110
Total IQ	--	118
Conceptual Quotient	--	95

Minnesota Multiphasic Personality Inventory

High "K" score on the validation key; peaks at Hs and Hy with a general leveling-off of the profile to a rather low Ie.

### Keystone Visual Survey Telebinocular

Very few replies checked in the "Expected" column. Subject checked without glasses. Shows almost a complete absence of depth perception. Right eye visual efficiency at both near and far point registers at 70 per cent. Fusion at both far and near point doubtful on overconvergence side.

### Seashore Measures of Musical Talent

Slightly irregular with scores from low average to perfect. Stanton average of "B minus".

### Kwalwasser-Ruch Test of Musical Accomplishment

Achievement of "C".

### Summary and Interpretation of Test Scores

There is a normal pattern of scores on the Shipley-Hartford, although the conceptual quotient is slightly low. The extremely high K score on the validation key of the MMPI indicates somewhat of a defensive attitude. Slight elevations on the Hs and Hy indicate a similarity to the profiles of persons who have a somewhat immature attitude as well as somewhat of a feeling of family dependence. The Ie being considerably lower than the rest of the test scores indicates that the subject tends to be of the outgoing or slightly extroverted type of personality. However, the high K score may tend to raise the scores of the entire profile. The replies checked on the Keystone are so widely scattered that an eye specialist should be consulted. The Seashore, though somewhat irregular, shows a perfect tonal memory score and items on the test which received low scores are among those whose reliability coefficients are

not as high as either pitch or tonal memory. The Kwalwasser-Ruch shows an achievement of slightly less than that which would be expected from the Seashore test but since they are so close there is little reason to believe that there is a question of over or underachievement. However, it is to be expected that persons of college level accomplish more in music than is indicated by their aptitude tests, since there is an element of training involved. There can be no doubt that the Keystone shows a marked visual handicap, and it might be reasonable to expect that all the scores would be somewhat improved if this condition were either eliminated or alleviated.

Case XXI -- Male

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	116
Abstraction IQ	--	131
Total IQ	--	124
Conceptual Quotient	--	113

Minnesota Multiphasic Personality Inventory

Slight elevations on D and Mf; low Ie.

Keystone Visual Survey Telebinocular

All replies checked within the "Expected" column.

Seashore Measures of Musical Talent

Irregular profile with majority of scores in excellent and superior column; loudness and time--poor. Stanton average of "B".

Kwalwasser-Ruch Test of Musical Accomplishment

Achievement of "A".

Interpretation and Summary of Test Results

The abstract score of the Shipley-Hartford is considerably higher than the vocabulary score. The total IQ is slightly above average for students at the college level. The MMPI shows an essentially normal profile with no disabling personality tendencies. The rather low Ie tends to characterize the subject as having a somewhat outgoing or extroverted type of personality. The Keystone test shows a complete absence of any visual disturbance, and while the Seashore is slightly irregular its average is extremely high. The Kwalwasser-Ruch with its "A" rating places the subject's achievement proportionate to his aptitude.

Case XXII -- Male

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	113
Abstraction IQ	--	110
Total IQ	--	114
Conceptual Quotient	--	97

Minnesota Multiphasic Personality Inventory

Slight elevation of the F score on the validation key. Two well-defined peaks appear on D and Pt with an accompanying elevation on Hy, Pa, and Sc. Ie is relatively low.

Keystone Visual Survey Telebinocular

All responses checked within the "Expected" column.

Seashore Measures of Musical Talent

Slightly irregular profile; all scores in the excellent and superior column except loudness which is rated average.



The Stanton average is "3".

Kwalswasser-Ruch Test of Musical Accomplishment

An achievement score of "7". A very significant low score was made on subtest number ten which is "Recognition of Familiar Melodies from Notation". Of the ten melodies only the national anthem was marked correctly and apparently there was some indecision on this since there was an erasure. Eight other melodies were not marked at all and the one remaining which was marked was incorrect.

Interpretation and Summary of Test Scores

The scores of the Shipley-Hartford are so close together that very little significance can be attached to one over another. While the CQ is slightly low, it is still within the normal range. It is, however, of slight significance to note that the total IQ is higher than the rest of the scores. The MMPI, with the slightly elevated F, indicates that the subject may have misinterpreted some of the questions or have been slightly careless in sorting his answer cards. The peaks appearing on D and Pt seem to be within the limits of the normal profile although they are slightly high. The high D score indicates a tendency of the subject to resemble persons with profiles who have a somewhat pessimistic point of view with regard to the future. The elevated Pt indicates a similarity toward persons with profiles showing a tendency toward repeat performances and worry. There is some tendency for dejected feelings to accompany abnormally high scores. The presence of a Pa score only slightly lower than the Pt indicates a

similarity to persons who tend to be somewhat sensitive. The Keystone shows no visual disturbances of any kind. The Seashore with a Stanton average of "B" is not well reflected by the low score of the Kwalwasser-Ruch. Even though the tonal memory score is perfect, there seems to be a marked inability to recognize familiar melodies from notation. The personality area seems to be the only particular point where some disturbance is noticeable. It is logical to assume that this may be strongly related to the apparent differences between aptitude and achievement.

Case XXIII -- Female

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	127
Abstraction IQ	--	126
Total IQ	--	127
Conceptual Quotient	--	106

Minnesota Multiphasic Personality Inventory

A slightly elevated K on the validation key; Pd and Sc highest of the entire profile; low Ie.

Keystone Visual Survey Telebinocular

All replies checked within the "Expected" column.

Seashore Measures of Musical Talent

A Stanton average of "C plus".

Kwalwasser-Ruch Test of Musical Accomplishment

An achievement of "B plus".

Summary and Interpretation of Test Scores

All scores on the Shipley-Hartford are well above the average for college-level students. While the slightly elevated K shows a mildly defensive attitude, the profile is essentially normal. The presence of the elevated Pd and Sc do not appear to be disabling. The low Ie tends to characterize the subject as somewhat extroverted. The Keystone shows a complete absence of visual difficulties. The Seashore test, with its Stanton average of "C plus", is fairly regular in all categories but is slightly below the achievement level indicated by the Kwalwasser-Ruch. This should not be interpreted too strongly as a case of overschievement because of the variable factor of training. It is to be expected that in most cases achievement will tend to exceed attitude slightly. The high scores on the Shipley-Hartford also tend to strengthen this observation in this particular case.

Case XXIV -- Female

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	108
Abstraction IQ	--	115
Total IQ	--	114
Conceptual Quotient	--	105

Minnesota Multiphasic Personality Inventory

Essentially a normal profile; two slight elevations occurring--Iy and Ef.

Keystone Visual Survey Telebinocular

All replies checked within the "Expected" column.

Seashore Measures of Musical Talent

A Stanton average of "C plus". All items fairly regular.

Kwawasser-Ruch Test of Musical Accomplishment

An achievement of "C".

Interpretation and Summary of Test Scores

The scores on the Shipley-Hartford are all slightly lower than average for success at college level. The MMPI with its essentially normal profile registers a slight tendency for the subject to resemble persons with profiles that show a slight family dependency. The Keystone indicates a complete absence of any visual problems, and the Seashore with its Stanton average of "C plus" is quite closely reflected by the achievement of "C" on the Kwawasser-Ruch. Again, the Shipley-Hartford scores seem to bear out the measure of achievement which in this case happens to be a little below average corresponding to the IQ scores.

Case XXV -- Female

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	121
Abstraction IQ	--	131
Total IQ	--	127
Conceptual Quotient	--	111

Minnesota Multiphasic Personality Inventory

Essentially a normal profile; slight elevations present

on D, Hy, and Pd. The Ie score is low.

Keystone Visual Survey Telebinocular

All items checked within the "Expected" column.

Seashore Measures of Musical Talent

A Stanton average of "B". All items of the test fairly equal.

Kwalwasser-Ruch Test of Musical Accomplishment

Achievement of "A".

Interpretation and Summary of Test Results

All the Shipley-Hartford scores are slightly above average for the college level student. Although the MMPI shows a slight elevation on D, Hy and Pd, these traits do not seem to be disabling to any marked extent. The Keystone shows that there are no visual difficulties, and the Kwalwasser, being higher than the Seashore, again shows a relationship to the rather high IQ scores of the Shipley-Hartford.

Case XXVI -- Male

Shipley-Hartford Retrest Scale

Vocabulary IQ	--	111
Abstraction IQ	--	77
Total IQ	--	91
Conceptual Quotient	--	69

Minnesota Multiphasic Personality Inventory

Essentially a normal profile; slight elevations observed on the Hy and Hf scales. Ie is extremely low.

Keystone Visual Survey Telebinocular

Majority of replies checked in "Expected" column; right

eye visual efficiency sixty per cent at far point.

Seashore Measures of Musical Talent

A Stanton average of "C plus", all items forming a fairly regular profile.

Kwalwasser-Ruch Test of Musical Accomplishment

An achievement of "D", consistently low throughout all sections.

Interpretation and Summary of Test Scores

All scores on the Shipley-Hartford are extremely low. This is particularly true of the Abstract IQ and the Total IQ scores. The conceptual quotient is low enough to warrant additional testing before diagnosing the subject as having slight deterioration of mental efficiency. The MMPI profile is quite normal but shows elevations on Hy and Kf. The extremely low Ie characterizes the subject as having the extroverted, outgoing type of personality. The Keystone shows complete absence of any serious visual disturbances. The Seashore, with its Stanton average of "C plus", is not well reflected by the Kwalwasser-Ruch with an achievement of "D". Since the achievement is low, there is a possibility that the extremely low IQ scores as shown by the Shipley-Hartford have contributed to the inability of the subject to use his natural musical ability in a testing situation. There is also the possibility of loss of mental efficiency, which might have some influence on achievement in this case.

Case XXVII -- Male

Shipley-Hartford Retreat Scale

Vocabulary IQ

--

113 .

Abstraction IQ	--	115
Total IQ	--	117
Conceptual Quotient	--	102

Minnesota Multiphasic Personality Inventory

High K; elevations occurring on Hy, Kf, and Ma, a lesser peak existing on D.

Keystone Visual Survey Telebinocular

Approximately half of the replies checked in the "Expected" column. Fusion doubtful on underconvergence side at both near and far point. Right eye visual efficiency forty per cent.

Seashore Measures of Musical Talent

Stanton average of "A". All items in the superior column.

Kwawessner-Ruch Test of Musical Accomplishment

Achievement of "B".

Interpretation and Summary of Test Results

The entire group of Shipley-Hartford scores are slightly under average for the college level student. The elevated K on the validation key of the MMPI tends to show a somewhat defensive attitude on the part of the subject. An elevation occurs in Hy and the Kf score is indicative of persons who are artistically inclined. The lesser elevation of D is similar to the patterns of those individuals who are unable to assume a normal amount of optimism with regard to the future. The low Ie score is indicative of persons who tend toward an extroverted personality. The disturbances noted on the Keystone test are not disabling to the point that the subject is aware of a visual deficiency at all times. However, under the pres-

sure of constant reading, fatigue and eye strain would probably result. A competent eye specialist should be consulted for the further examination of this case. The Seashore profile here recorded is the only one in this entire series of case examinations in which all the items appear in the superior group. This indicates a most unusual aptitude and shows the highest discrimination in all phases of this test. The Kwalwasser-Ruch with its "B" score shows an achievement slightly under that of the Seashore. The disturbances noted on the Keystone and the MMPI may account somewhat for this lower achievement. In many cases, more disturbing elements have been noted in both tests without apparently having decreased the subject's efficiency. However with the alleviation of some of the visual difficulties, better scores might be obtained on achievement.

Case XXIII -- Male

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	119
Abstraction IQ	--	126
Total IQ	--	123
Conceptual Quotient	--	106

Minnesota Multiphasic Personality Inventory

Slight elevation of K score; lesser elevation of L.  
Peaks appearing on D and Ie.

Keystone Visual Survey Telebinocular

All replies checked within the "Expected" column.

Seashore Measures of Musical Talent

A Stanton average of "B". Profile regular on all items.



Kwalwasser-Ruch Test of Musical Accomplishment

Achievement of "A".

Interpretation and Summary of Test Results

The Shipley-Hartford scores are slightly above average for the college level student. The elevation of the K on the validation key of the MMPI tends to show a slight defensive attitude. A lesser elevation of the L indicates probable attempts by the individual to falsify scores by choosing items which place him in the most acceptable light socially. The elevation which appears on D, while not extremely high, is considerably higher than any of the rest of the scores. The Keystone reveals no visual disturbances. The Stanton average of "B" on the Seashore shows that the subject possesses better than average talent in music. The Kwalwasser-Ruch, which shows an achievement of "A", reflects the Seashore score, and as in cases before where there have been no qualifying disturbances, the Shipley-Hartford scores agree.

Case XXIX -- Female

Shipley-Hartford Retreat Scale

Vocabulary IQ	--	108
Abstraction IQ	--	105
Total IQ	--	100
Conceptual Quotient	--	96

Minnesota Multiphasic Personality Inventory

Extremely normal profile. No peaks of any kind.

Keystone Visual Survey Telebinocular

All replies checked within the "Expected" column.

Seashore Measures of Musical Talent

Stanton average of "C plus"; fairly scattered profile; Pitch--low average, loudness and time--good; timbre, rhythm and tonal memory excellent to superior.

Kwalwasser-Ruch Test of Musical Accomplishment

An achievement of "C".

Interpretation and Summary of Test Results

The entire group of Shipley-Hartford scores are under the average for college level students. The profile of the WPI is extremely normal, and the Keystone shows no visual disturbances. The Seashore profile is quite irregular, and its Stanton average of "C plus" is fairly well substantiated by the achievement of "C" on the Kwalwasser-Ruch.

Case XXX -- Female

Shipley-Hartford Retest Scale

Vocabulary IQ	--	116
Abstraction IQ	--	126
Total IQ	--	121
Conceptual Quotient	--	103

Minnesota Multiphasic Personality Inventory

Essentially normal profile with one fairly high elevation appearing on Ma.

Keystone Visual Survey Telebinocular

Approximately half the items checked within the "Expected"

column. Fusion at far point doubtful indicating overconvergence, left and right eye visual efficiency at far point ninety per cent. Right and left eye visual acuity at near point eighty per cent.

Seashore Measures of Musical Talent

Stanton average of "C minus"; fairly regular profile.

Kwalwasser-Ruch Test of Musical Accomplishment

Achievement of "C".

Interpretation and Summary of Test Results

The Shipley-Hartford are grouped around the average for the college level student. The WPMI is quite normal and shows an elevation on the Ms which tends to place the subject in the category with those who are somewhat overproductive in thought and action. The Keystone, while having only half of the responses in the "Expected" column, does not show any serious visual impairment. In cases where so many items appear in other than the "Expected" column, an eye specialist should be consulted for further examination. The Seashore, with a Stanton average of "C minus", appears to be well substantiated by the score of "C" on the Kwalwasser-Ruch.

Case XXXI -- Male

Shipley-Hartford Retest Scale

Vocabulary IQ	--	113
Abstraction IQ	--	105
Total IQ	--	111
Conceptual Quotient	--	92

Minnesota Multiphasic Personality Inventory

Fairly high elevation on the K; profile very normal.

Keystone Visual Survey Telebinocular

All replies checked in "Expected" column.

Seashore Measures of Musical Talent

Very irregular profile; Stanton average of "C plus".

Kwalwasser-Ruch Test of Musical Accomplishment

Achievement of "D".

Interpretation and Summary of Test Scores

All the scores of the Shipley-Hartford are somewhat low. The MMPI shows a very normal profile and a tendency toward the outgoing or extroverted personality. The elevation of K in the validation key indicates somewhat of a defensive attitude. The Keystone shows no visual deficiencies. The Seashore, with its Stanton average of "C plus", is quite irregular, and the majority of scores are in the average to good category. "Rhythm", which is rated the highest, is superior; "Loudness" is low average. The Kwalwasser-Ruch test appears to be slightly under the level of the Seashore and as such, tends to show some underachievement. Low scores on the sub-tests of the Kwalwasser were obtained on the more technical and less musical phases.

## SUMMARY AND CONCLUSIONS

The study of these foregoing cases showed a grouping of all individuals into one of three distinct groups; the over-achievers, the normal achievers and the underachievers. This gave the cue for the analysis of the case results. In an investigation of the research which has taken place in related fields, the following has been presented to show the relationship that exists between two groups of over and underachievers.

According to a study conducted by William A. Owen and Wilma C. Johnson at Iowa State College, typical underachievers uniformly and without exception gave better adjusted and more extroverted responses than did the typical normal or achiever. The underachievers were characterized by good adjustment in all areas tapped save those of family relationships, and neuro-psychopathic tendency. The most obvious hypothesis would seem to be that these students were too well socially oriented, and possibly too socially active to spend large amounts of time in the solitary study essential to academic achievement on the college level. Their good adjustment in other areas would constitute evidence congruent with this point of view; and their slight tendencies to worry, depression, and psychic tension might then be thought of as consequences of poor achievement rather than causes contributing to it. Such an assigning of cause and effect relationships, however, is purely conjectural, and goes too far perhaps beyond data which shows only the presence or absence of such association (1).

A roughly parallel investigation of overachievement conducted by Dr. J. C. Heston of De Pauw University, and reported to the 1947 meeting of the Midwestern Psychological Association affords some interesting evidence of a confirmatory character. Heston found that his overachievers were characterized by social introversion and lack of confidence, good family adjustment, and emotional instability (2).

It is fairly apparent then, that in spite of the application of different measuring instruments to a different student body, that the underachievers of Owen and Johnson at Iowa State College seem to be near the opposite end of a continuum from the overachievers of Heston at De Pauw University; and that is exactly what one would expect.

In this present study however, there seems to be no such clearly discernible pattern, even though there is a basic agreement with the two above mentioned studies. A relationship with achievement as shown by the Shipley-Hartford seems to be present to a marked degree. In the case of eleven overachievers in this group, the Shipley-Hartford showed seven of these Total IQ scores to be extremely high, and four to be better than average. In the case of the underachievers, of which there were nine, five had extremely low scores on Total IQ and four were lower than average. The Keystone Test showed almost a negative correlation between the two groups. In the MMPI, the differences do not seem quite as clearly defined as in the Shipley-Hartford. The overachievers in this group tend to resemble persons whose profiles indicate that they have some-

what of a defensive attitude, tend toward repeat performances and worry, are somewhat suspicious of the motives of others, tend to be somewhat withdrawn and slightly introverted. The underachievers seem to be somewhat opposite, and their scores tend to show that they resemble persons who seem to be more normal in all phases measured, except that of family adjustment.

The following is based upon the use of the Stanton Average:

Stanton Average of "A" - two cases:

Kwalwasser-Ruch	- one "A" and one "B"
Shipley-Hartford	- "A" rated higher on all phases than "B"
Keystone	- "A"- no disturbances, "B" - several
MMPI	- "A"- elevations on Hy, Pd "B"- elevations on Hy, D

Stanton Average of "B" - six cases:

Kwalwasser-Ruch	- four "A" - one "B"-one "D"
Shipley-Hartford	- four "A"s higher on all phases, "D" higher on Abstraction
Keystone	- one "A" with serious disturbance, "B"- four mild disturbances, "D"- nine disturbances, most of them serious
MMPI	- four "A"s had elevations on D, three on Ia, three on K "B"- normal "D"- elevations on L, K, Es, My, Pd, Sc

Stanton Average of "C" - twenty-one cases:

Kwalwasser-Ruch	- one "A", six "B"s, nine "C"s, three "D"s, and two "F"s.
Shipley-Hartford	- "A"-scores slightly higher than average - "B"s, two higher than average, one average, three lower than average - "C"s, one with high scores, five normal and three low. - "D"s, one high, one average, one slightly lower than average

- Keystone
- "A", five serious disturbances
  - "B", four with slight disturbances and two with excellent vision
  - "C"s, one with slight visual disturbance, nine with excellent vision
  - "D"s, no visual disturbances
  - "F"s, no visual disturbances
- MMPI
- "A", normal profile
  - "B"s, five had elevations on one or more categories which might be slightly disturbing, one free of elevations
  - "C"s, five with normal profiles, five with slight elevations
  - "D"s, two with minor elevations, one free of elevations
  - "F"s, one normal profile, one with eight disturbances

Stanton Average of "D" - one case:

- Kwalwasser-Ruch - "F"  
 Shipley-Hartford - extremely low on all sections  
 Keystone - excellent vision  
 MMPI - normal profile

Stanton Average of "B" - one case:

- Kwalwasser-Ruch - "F"  
 Shipley-Hartford - low on all sections  
 Keystone - excellent vision  
 MMPI - very normal profile

All of the data seems to point to the fact that an individual's achievement correlates well with his aptitude, unless there are disturbing factors. The ability, or lack of ability of the individual to cope with, or adjust to these disturbing factors, will tend to be reflected in his achievement. Where the intelligence quotient was high, there seemed to be a greater capacity for adjustment, and in the majority of cases achievement was highest where aptitude and Iq were also high. In many cases, the Keystone and MMPI recorded disturbances which tended to be somewhat disabling, and achievement was generally low where no other qualifying factors were present. These same



disturbances, recorded in other cases, did not seem to be disabling, where for the most part, IQ was generally high.

The evidence points up the fact that each case must be judged upon its own merits. While factors of personality and general visual acuity seem to have been qualifying factors the preponderance of data points to the fact that Shipley-Hartford in its measurement of IQ seems to correlate more closely with achievement in Music than the MMPI or the Key-stone. In this series of case studies, it was not possible to isolate and measure all factors which enter into the differences existing between aptitude and achievement in music. However, enough factors have been measured to prove that in a majority of cases, taken individually, or by achievement groups, insight into the major cause and effect of these differences can be gained.

ACKNOWLEDGMENT

The writer wishes to acknowledge his indebtedness to the following people who have given him encouragement and advice concerning the study: Professor Thomas B. Steunenberg and Dr. Maurice D. Woolf, his co-advisers; Professor Charles Stratton and Professor David Geppert of the Music Department; Professor Ira J. Gordon and Mr. Robert Wilson of the Counseling Bureau; and to the entire staff of the Counseling Bureau for their cooperation in making the testing facilities available. He wishes to thank all of the students who participated in the testing program. Finally, grateful acknowledgment is made to Professor Luther Leavengood, Head of the Department of Music, for his reading and criticism of the tentative copy of this thesis.

## BIBLIOGRAPHY

1. Bender, Irving E., and others.  
Motivation and visual factors. Hanover, New Hampshire:  
Dartmouth College Publications, 1942.
2. Betts, Emmett A.  
Bibliography on problems related to the prevention and  
correction of reading difficulties. Meadville, Penn.:  
Keystone View Co., 1936.
3. Betts, Emmett A.  
The prevention and correction of reading difficulties.  
Evanston: Row, Peterson and Co., 1936.
4. Bingham, Walter Van Dyke.  
Aptitudes and aptitude testing. New York and London:  
Harper and Bros., Pub. 1937.
5. Brennan, Flora Mercer.  
The relation between musical capacity and performance.  
U. of Iowa Studies in Psychology, No. 9. 1926.
6. Chalfen, L.  
Practical suggestions for improving testing procedures.  
Edu. and Psychological Measurements. 8(1):49-56. 1948.
7. Claremont College Reading Conference--Thirteenth Yearbook.  
Claremont, Cal. 1948.
8. Edmiston, R. W., and Lewis A. Jackson.  
The relationship of persistence to achievement. J. of  
Ed. Psych. p. 47-51. Jan. 1949.
9. Fernsworth, P. R.  
Further notes on the Seashore music tests. J. Gen.  
Psych. 18:429-431. 1936.
10. Fendrick, Paul.  
Visual characteristics of poor readers. New York:  
Teachers College Columbia Univ. No. 656. 1935.
11. Garfield, S. L.  
Shipley-Hartford retreat scale as a quick measurement  
of mental status. J. Consult Psych. 11:148-50. May  
1947.
12. Gough, Harrison G.  
Simulated patterns on the Minn. Mult. Pers. Inv. J. of  
Ab. and Soc. Psych. 42(2):215-225. April 1947.
13. Gray, William S.  
Summary of investigations relating to reading. Supple-  
mentary educational monographs. No. 28. June 1925.

14. Hathaway, Starke R. and J. Charnley McKinley.  
Manual for the Minnesota Multiphasic Personality Inventory. New York: The Psychological Corporation. 1943.
15. Hathaway, Starke R. and J. Charnley McKinley.  
Supplementary Manual for the Minnesota Multiphasic Personality Inventory. New York: The Psychological Corporation. 1946.
16. Imus, Henry A., John Wm. Rothney, Robert M. Bear.  
An evaluation of visual factors in reading. Hanover, N. H.: Dartmouth College Publications. 1938.
17. Kwalwasser, Jacob.  
Tests and measurements in music. Boston-New York: C. C. Birchard and Co. 1927.
18. Meehl, P. E. and S. R. Hathaway.  
The K factor as a suppressor variable in the Minnesota Multiphasic Personality Inventory. J. of App. Psych. 30. Oct. 1946.
19. McKinley, J. C., S. R. Hathaway, and P. E. Meehl.  
The MMPI: VI. The K scale. J. of Consult. Psych. 12(1):20-31. Jan-Feb. 1948.
20. Morris, Woodrow W.  
A preliminary evaluation of the Minnesota Multiphasic Personality Inventory. J. of Cl. Psych. 3(4):370-374. Oct. 1947.
21. Mursell, J. I.  
Growth gradient in music. Mus. Ed. J. 34:18-19. Nov. 1947.
22. National Society for the Study of Education-Twenty-Fourth Yearbook.  
Report of the national committee on reading. Part I. Bloomington, Ill: Public School Pub. Co.
23. Owens, William A. and Wilma C. Johnson.  
Some measured personality traits of college underachievers. J. of Ed. Psych. p. 41-47. Jan. 1949.
24. Schoen, Max.  
The psychology of music. New York: Ronald Press Co. 1940.
25. Seashore, Carl E.  
Psychology of music. New York and London: McGraw-Hill Book Co., Inc. 1938.
26. Seashore, Carl E.  
The psychology of musical talent. New York: Silver, Burdett, 1919.

- 27. Seashore, Carl E., Lewis, Don and Joseph G. Sæetveit.  
Manual of instructions and interpretations for the  
Seashore Measures of Musical Talents. Camden, N. J.:  
Radio Corp. of America. 1939 Revision.
- 28. Shipley, W. C.  
A self-administering scale for measuring intellectual  
impairment and deterioration. J. of Psych. p. 371-377.  
1940.
- 29. Shipley-Hartford Retreat Scale Manual of Directions.  
Developed in the Research Division of the Neuro-  
Psychiatric Institute of the Hartford Retreat.  
Hartford, Conn. 1940.
- 30. Stanton, Hazel M.  
Measurement of musical talent. Iowa St. Mus. II, 1935.
- 31. Travis, Lee Edward, and Mildred G. Davis.  
The relation between faulty speech and lack of certain  
musical talents. U. of Iowa Studies in Psych. Vol. 10.  
p. 71-81. 1926.
- 32. Traxler, Arthur E.  
The use of tests and rating devices in the appraisal of  
personality. Educational Records Bulletin No. 23.  
New York: Educational Records Bureau. p. 1. 1938.