DOCTORAL DISSERTATION SERIES

TITLE A STUDY OF THE RELATION BETWEE

CERTAIN MENTAL AND PERSONALITY

TRAITS AND RATINGS OF MUSICAL ABILITIES

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UNIVERSITY MICHIGAN STATE COLL. DATE 1952

DEGREE Ed. D. PUBLICATION NO. 4496

UNIVERSITY MICROFILMS

ANN ARBOR · MICHIGAN

A STUDY OF THE RELATION BETWEEN CERTAIN MENTAL AND PERSONALITY TRAITS AND RATINGS OF MUSICAL ABILITIES

By

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A THESIS

Submitted to the School of Graduate Studies of Michigan State College of Agriculture and Applied Science in partial fulfillment of the requirements for the degree of

DOCTOR OF EDUCATION

School of Education

1952

John Christopher Cooley

candidate for the degree of

Doctor of Education

Final examination, July 24, 1952, 10:00 A.M., Room 228b, Morrill Hall.

Dissertation: A Study of the Relation between Certain Mental and Personality Traits and Ratings of Musical Abilities

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ACKNOWLEDGEMENTS

The author wishes to express his sincere appreciation to Dr. Milosh Muntyan, under whose stimulating guidance this investigation was undertaken and completed.

He is also indebted to Dr. William R. Sur for his invaluable suggestions and encouragement throughout the study.

Grateful acknowledgement is also due Dr. C. V. Millard, Dr. Carl Gross, and Dr. Guy Hill for their helpful suggestions in organizing the study and in writing the manuscript.

The writer deeply appreciates the help of Dr. Roy Underwood whose cooperation in the data collection and unfailing interest throughout the study made it possible to undertake and complete this investigation.

Grateful acknowledgement is made to the members of the Music Department Faculty for their suggestions and invaluable cooperation in collecting data for the study.

The author is also indebted to Dr. William A. Mann and Dr. Owen Reed for their suggestions and cooperation in data collection.

The investigator extends his thanks to Mr. Leisenring of the Registrar's Office and to Mr. Robert Jackson of the Board of Examiners for permission to use data contained in the study.

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CHAPTER I

THE BACKGROUND OF THE PROBLEM AND THE TECHNIQUE OF SOLUTION

This chapter consists of (1) a summary statement of the background from which the problem arises, and (2) a summary statement of the method used in the study to solve the problem. The first section, concerned with the background of the problem, points up two ways by which musical talent has been studied. This section includes a brief contrast, drawn between "atomistic" and "gestalt" approaches to the study of musical talent.

The second section of this chapter, concerned with the technique of the study, presents a summary statement indicating the validity of the technique of solution. This section provides information concerning the sources of data utilized in the problem.

I. THE BACKGROUND OF THE PROBLEM

Within the past three decades, research in music education has outlined, broadly, two points of view as to the nature of musical talent. The existence of these two points of view has, in large part, been due to differences in approach and technique of study.

Talent testing. One approach to the study of musical talent has been that of talent testing, and has been concerned mainly with group tests of musical talent. The work of Carl E. Seashore is widely known in this country for (1) its early contribution to musical talent testing and (2) its laboratory research into the nature of musical talent. Seashore selected certain psychological and aural factors of musical talent, and constructed tests designed to measure these factors. His approach to musical talent test construction has been, largely, that of an acoustical analysis of the components of musical sound. Seashore[1] constructed tests based on the following characteristics of musical sound: pitch, loudness, timbre, and time. Other of Seashore's measures were tests of rhythm, tonal memory, and consonance. (Information as to the validity and reliability of the Seashore measures will be found in Chapter Four of this study. Other pertinent information will be found in Chapter Two.)

The Seashore tests have employed a "limenal" type of construction. Utilizing the characteristics of musical sound listed above, these tests have been based on the subject's ability to make various kinds of discriminations between pairs

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[1] Carl E. Seashore, Measures of Musical Talent, NY: Columbia Phonograph Co., 1919 and Carl E. Seashore, Measures of Musical Talents, 1939 revision, Camden, N. Jersey: RCA Victor, 1939.

of sonar stimuli. The purpose of the tests has been to determine the least distinguishable difference that the subject could identify; that is, to determine the threshold of aural sensitivity to these sonar characteristics.

Test items of the Seashore battery are of a "same-different" order, requiring a response to acoustical phenomena. For example, the pitch test presents items consisting of paired tones which have small differences in vibration frequency (pitch). The subject is asked for a response involving his ability to determine which tone is the higher (or lower) in pitch (vibration frequency).

Kwalwasser is also widely known in this country for his work in musical talent test construction. The musical capacity tests of Kwalwasser and Dykema[2] are similar to those of Seashore, and employ a similar approach to the study of musical talent. The technique of study in both the Seashore and Kwalwasser-Dykema tests has been an "atomistic" one. This technique is based on an analysis of musical talent into many independent factors. Seashore comments as follows regarding this point:

> No matter how many members we have in a battery, each member remains a specific measure; that is, the technical validation must be made in terms of the thing measured in each one. The more members of basic significance we have in the battery, the larger command

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[2] Jacob Kwalwasser and Peter Dykema, Kwalwasser-Dykema Music Tests; Manual of Directions. NY: Carl Fischer, Inc., 1930.

> of the situation it should give. This is what we have called the specific theory of measurement as opposed to the omnibus theory which aims to validate the battery against the total situation in musical performance.[3]

It is clear, then, that these tests are based on an analysis of musical talent into discrete elements.

These two tests (those of Seashore and Kwalwasser-Dykema) of musical talent have been widely used in this country (1) in studies of group differences and (2) in correlation studies of mental abilities. Regarding the results of these studies, Bienstock states:

> The status of testing and guidance in music is beginning to emerge as a subject worthy of intensive effort by both psychologists and musicians. The results, however, are far from conclusive at the present time.[4]

This point of view, representative of Seashore, Kwalwasser and others,[5] has tended to show that these aspects of musical talent (measured by these musical talent tests) are independent of other mental abilities, and that the presence of unusual musical talent does not presuppose the coincidence of other specific abilities, or of unusual general ability.

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[3] Joseph Saetveit, Carl Seashore, and Don Lewis, The Revision of the Seashore Measures of Musical Talent. Iowa City: University of Iowa Press, 1939, p. 48.

[4] Sylvia F. Bienstock, "A Review of Recent Studies on Musical Aptitude," Journal of Educational Psychology, 33: 440, 1942.

[5] Ibid., 33: 427-442.

Seashore[6] points out, however, that The Measures of Musical Talent do not furnish a single, all-inclusive index to musical ability, but that each score is an item in the musical profile. (For further evidence and discussion of these points and those to follow, see Chapter Two, "Summary of Research" and Chapter Four, "Sources of Data.")

American studies, concerned with the Seashore and Kwalwasser-Dykema tests, have indicated little correlation between what is termed "musical talent" and such factors as general intelligence and personality facets (traits). These studies have pointed up the relation of these musical talent tests to functional musicality. These studies have not shown that these musical talent tests can separate positively, the musical person from the non-musical person.[7] The musical talent tests of Seashore and of Kwalwasser-Dykema do tend to make this musical-non-musical discrimination negatively, however. It can be stated, then, that these aural abilities are of great importance, as criteria of musical talent, but apparently, do not encompass all important aspects of musical talent.

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[6] Carl E. Seashore, Joseph G. Caetveit, and Don Lewis, Manual of Instructions and Interpretations for the Seashore Measures of Musical Talent. New Jersey: RCA Victor Div., Radio Corp. of America, 1939, 19 pp.

[7] See Chapter Four.

The German studies. An entirely different approach to the study of musical talent has been used by certain German "Gestaltists."[8] In contrast to the atomistic technique, employed in the studies referred to previously, these German studies have employed a "gestalt" approach, thereby taking ". . . much broader, more functional criteria of musicality."[9]

Based on functional criteria of musical talent, these studies found: (1) that the number of people with special talents tends to decrease with intelligence, and (2) that there is a high relationship between general and specific ability. Specifically, it was found:

> . . . (1) that the typical musical person has a high grade mentality and shows versatility, particularly in literary and artistic fields; (2) there is a close and definite correlation between musical and mathematical ability; (3) the musical person is likely to have notable linguistic ability; (4) the musical person is likely to show qualities of effective social leadership; (5) he is emotional, unstable, and not very punctual or scientific; and (6) he is physically healthy and active and endowed with strong neurotic or hysterical tendencies.[10]

As stated previously, the American studies found little correlation between musical talent and other mental abilities. This seeming contradiction of research results is best explained in terms of just what is included in the criteria

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[8] See Chapter Two.

[9] James L. Mursell and Mabell Glenn, Psychology of School Music Teaching. NY: Silver Burdett Company, 1938, p. 20.

[10] Ibid., pp. 19-20.

of musical talent, in each instance. The American research studies are based, for the most part, on the Seashore and Kwalwasser-Dykema tests of musical talent, which attempt to measure limenal reactions to certain elements of musicality. The German research studies have defined musicality in functional terms, and have stressed the importance of ability to deal with musical materials. This ability has included the ability to appreciate music, whether found in isolation or in combination with executant or creative abilities.[11] In commenting on several of the German studies, Mursell says:

> . . . by far the most important conclusion we would draw from the work of Feis, Haecker and Ziehen, and Koch and Mjoen is that distinctive musical ability is a manifestation of a general high level of all-round ability, rather than a specific and specialized musical talent that is inherited from the parents.[12]

When musical talent is defined in functional terms, it is not conceived as a pure ability, clearly distinguishable from other more or less isolated, independent, or specific abilities. Musical talent, then, is defined in its relation to general ability, and to certain fairly specific abilities.

This study has attempted to learn the relation, if any, of certain musical, mental, and personality traits (in terms of test scores) to general musicality and certain other specified musical abilities.

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[11] Ibid., p. 11.

[12] Ibid., p. 18.

II. SUMMARY STATEMENT INDICATING THE VALIDITY OF THE TECHNIQUE OF SOLUTION

It was the purpose of this study to determine the relationship, if any, between certain mental, personality, and musical factors (as measured by standardized test scores) and certain musical ability scores derived from rating scales of certain functional musical abilities. Further, it was the purpose of the problem to determine this relation in a practical college situation, when college music students were studied.

Since the purpose of this study was of a practical nature, it was appropriate to use, for the collection of a major portion of the data required for the study, such standardized tests as are in general use at the college level. The study utilized: (1) a test of scholastic aptitude, (2) a test of reading ability, (3) a test of musical talent, (4) a test of personality, (5) certain ratings of musical abilities, and (6) college applied music grades. The ratings were obtained locally, using a specially constructed rating scale.

The test of scholastic ability. The American Council on Education Psychological Examination was selected as a source of scores designed to indicate expected college academic success. "The purpose of the American Council on

Education Psychological Examination is to appraise what has been called scholastic aptitude or general intelligence, with special reference to the requirements of most college curricula."[1] The test was found further to be useful and appropriate to the study since it yields the following scores; a linguistic score, a quantitative score, and a total score. These scores are designed to measure factors known to correlate highly with general intelligence.

(For further discussion of this test and those to follow see Chapter Four, "Sources of Data." Statements concerning the validity, reliability, and other pertinent information will be found in this chapter.)

The test of reading ability. The test battery used in establishing reading ability was the Cooperative Reading Comprehension Tests.

> The Cooperative Reading Comprehension Tests constitute a part of the new cooperative English Test, which is divided into tests of expression and tests of reading comprehension, involving respectively, the active and passive use of the language. . . . The Cooperative Comprehension Reading Tests provide four separate scores; (1) Vocabulary Score, (2) Speed of Comprehension Score, (3) Level of Comprehension Score, (4) Total Reading Score.[14]

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[13] American Council on Education Psychological Examination: Manual of Instructions for the Psychological Examination. Princeton, New Jersey: Educational Testing Service, Cooperative Test Service, 1940, p. 2.

[14] Cooperative Reading Comprehension Tests, Information Concerning Their Construction, Interpretation, and Use. New York: Cooperative Test Service, 1940, p. 1.

The test of personality. The Personality Inventory[15] of Robert G. Bernreuter was used as a source of scores purporting to give some information as to the personality and emotional make-up of the college student. The test yields the following scores: (1) Neurotic Tendency, (2) Self-Sufficiency, (3) Introversion, (4) Dominance, (5) Confidence, and (6) Sociability. This test was standardized with, and specifically designed for, use with college students.

The test of musical talent. The practical aspect of the study was enhanced by the inclusion in the data of test scores derived from the Seashore Measures of Musical Talent.[16] This test battery is widely used in schools and colleges and attempts to measure acuity of response to certain aspects of musical talent, largely, of an acoustical nature. The 1939 revision of the Seashore measures consists of the following tests: (1) Pitch Discrimination, (2) Loudness Discrimination, (3) Time Discrimination, (4) Timbre Discrimination, (5) Rhythm, and (6) Tonal Memory.

Using the four tests described here, it was possible to make the following comparison: (1) the relation found between

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[15] Robert G. Bernreuter, The Personality Inventory. Stanford, California: Stanford University Press, 1935.

[16] Carl E. Seashore, Don Lewis, and Joseph G. Saetveit, Manual of Instruction and Interpretations for the Seashore Measure of Musical Talents (1939 Revision). Educational Department, Radio Corporation of America, Camden, New Jersey, 1939.

musical ability ratings and these mental and personality test scores with (2) the relation found between the musical ability ratings and the musical talent test scores.

The musical ability ratings. In the organization of the study, it became crucial to select a method to obtain, in quantitative terms, a score purporting to measure certain musical abilities as they occurred in the group of college music students studied. The crux of the matter was to define adequately each musical ability for which a measure was desired. The problem was one of developing adequate criteria or evidence of success as applied to musical abilities. In writing on the development of criteria for use in validity studies of vocational tests, Adkins states:

> Unfortunately there is no universal agreement as to what constitutes vocational success, which is the goal of prediction in the case of civil service tests. What is accepted as evidence is, then, largely a matter of judgment. Best results are obtained by pooling the judgments of a number of competent persons as to what variables to include in the criterion.[17]

This method of pooled judgment was used to arrive at a definition for each musical ability included in the problem. (See Chapter Four for full and explicit discussion of this point.) Published writings of outstanding educators and psychologists in the field of music, including such names as

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[17] Dorothy C. Adkins, Construction and Analysis of Achievement Tests. Washington, D. C.: Government Printing Office, 1947, p. 171.

James L. Mursell, Max Schoen, Carl E. Seashore, and Jacob Kwalwasser, were briefed for definitions of those musical abilities with which the study was concerned. Further, these definitions were submitted to approximately fifty college music teachers for the purpose of arriving at consensus definitions for each of the musical abilities required by the study. These consensus definitions were then used in the study as criteria of those musical abilities.

An actual score, purporting to indicate relative status on these musical abilities, was obtained by the use of a rating scale, set up and administered according to the general procedures outlined by Adkins.[18] Next, the students utilized in the study were rated as to these musical abilities. This rating procedure was carried out by the same faculty group who defined these musical abilities. Average ratings were computed for each student, provided an arbitrarily determined standard of reliability was met. These averaged ratings were then included in the study data.

Applied music grades. In order to have an additional score purporting to measure functional musicality, college grade point averages in applied music were included in the study data. These grade point averages were derived from grades received in three consecutive terms of applied music

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[18] Ibid., p. 232.

study. The questions to be answered were these: are these personality, mental, and musical talent test scores related to grade point averages in applied music? If so, how do these relations compare in magnitude?

Direction of the study. One direction of this study was toward a profile examination of musical talent. To a considerable degree, the study utilizes an atomistic approach to the study of musicality and describes a group of music students in terms of standardized test scores. With these considerations in mind, it appeared that the validity of the technique of solving the problem was enhanced by utilizing several different kinds of tests, each providing several fairly independent scores.

After the above variables were obtained, it was possible to carry forward the purpose of the problem, i.e., to determine the relation, if any, of scores received on these personality, mental, and musical talent tests to musicality ratings and ratings of certain functional musical abilities of college music students. Briefly stated, the problem purported to determine in terms of test scores, the mental and personality profile of the college music student and to determine the relation of these profile items to functional musical abilities. The study was a statistical one involving wide use of the product-moment correlation.

CHAPTER II

SUMMARY OF PERTINENT LITERATURE

The field of music education has been slow to develop sound psychological tenets upon which to base a psychology of music study. Much energy has been expended in research in music education, the results of which have in many instances been inconclusive. This aura of inconclusion has, in large part, been due to differences in point of view, or of approach, on the part of many investigators. The following summaries of research studies have been selected to point up two distinct approaches to the study of the nature of musical talent.

I. THE AMERICAN STUDIES

In the course of the past three decades there has been a great amount of interest in America on the part of many musicians and psychologists in the psychology of musical talent. Consequently, a great many research studies have been concerned with this area. Of considerable importance to this research work have been the published tests of musical talent. The tests most often found in these studies are those of Carl E. Seashore and of Jacob Kwalwasser. These music tests have used an atomistic approach to the problem of musical talent, and have utilized selected elements of

musical talent, primarily of an acoustical nature. The underlying assumptions of this approach are: (1) that musical talent is a composite of many separate abilities and (2) that some of these abilities can be isolated from musical contexts and measured specifically. Mursell states, concerning this position: "It is fair to say that they the Seashore Measures of Musical Talent represent an attempt to apply to the measurement and diagnosis of musical capacity the sensationalistic position in psychology."[1] As later discussion will point out, this approach has been something of a negative one, since research has failed to show that those individuals scoring high on the Seashore and Kwalwasser-Dykema tests will also prove to be musical. Research has pointed out, however, that those individuals scoring high on a criterion of musicality also score high on certain of the tests of the Seashore and Kwalwasser-Dykema test batteries.

Validation studies. Larson,[2] in studying the relation between musical talent and the ability groupings in a well organized high school music program, found that although the

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[1] James L. Mursell, The Psychology of Music. New York: W. W. Norton, 1937, pp. 299-300.

[2] William S. Larson, Measurement of Musical Talent for the Prediction of Success in Instrumental Music. Psychological Monographs, No. 181, University of Iowa Studies in Psychology. Iowa City, Iowa: University of Iowa Press, 40: 33-73, 1930.

beginning instrumental classes had musical talent averages approximating that of an unselected group, the most advanced orchestra group had averages that must admittedly belong to a selected group. In terms of Seashore percentiles, the beginning group had a total score averaging 52.1, while the advanced orchestra group had total scores averaging 73.2. Larson states:

> Since the members of the high school advanced orchestra are selected on the basis of their ability to perform, it is reasonable to conclude, judging from the averages of the beginning instrumental classes, that the capacities of musical talent as measured by the Seashore tests, have been an influence in the selection of the membership of this orchestra; and that groups at intermediate stages of advancement have been correspondingly affected.[3]

Relative to the effect of training on these scores, Larson points out that:

> . . . the above interpretations rest upon the assumption that these measures are elemental in that they are not affected to any great extent by training. This conclusion rests upon experimental facts derived over a period of the last twenty-five years, the cumulative results of which have largely been responsible for furnishing us with a psychology of music.[4]

Gilbert[5] made a somewhat similar study in which he attempted directly to show the relationships between musical

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[3] Ibid., p. 55.

[4] Ibid., p. 62.

[5] J. R. Gilbert, "The Traits of Secondary School Instrumentalists and Their Relationship to Achievement in Instrumental Music." Unpub. M.A. Thesis, Syracuse Univ., 1943.

talent and achievement. In working with one thousand boys and girls of high school age using the Kwalwasser-Dykema Tests, Gilbert found a correlation of .76 for the entire group with teachers' ratings of achievement. Correlations broken down in terms of length of study, follow: one year study, .69; two years, .68; three years, .73; four years, .86; five years, .77; six years, .75. These ratings were arrived at by the use of a linear scale ranging from one to ten.

These studies point up the fact that those who succeed in music possess certain elemental capacities of an acoustical nature. This is not the same as saying that those possessing these elemental acoustical capacities will succeed in music. The next study to be reviewed offers a point of view which is pertinent to a clear understanding of the meaning of the correlation coefficients found in the Gilbert study.

Stanton,[6] in an ambitious validation study covering a ten year period used the Seashore Tests in combination with the Iowa Comprehension Test (a group test of general intelligence). The Seashore Measures for pitch, time, consonance, intensity, and tonal memory, plus the intelligence test, were administered to all entering students. On the basis of this battery, individuals were segregated into five classes as

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[6] Hazel Stanton, Measurement of Musical Talent: The Eastman Experiment. Iowa City, Iowa: University of Iowa Press, 1935, 140 pp.

follows: discouraged, doubtful, possible, probable, and safe. Their later achievement in the conservatory was studied. Annual survival, avoidance of dismissal, attainment of scholarships and honors, recital appearances, and graduation were the most important factors considered. In all of these respects an increasing degree of success was demonstrated in passing from the low to the high groupings. The most typical and directly convincing results were those for graduation. Of the discouraged group, 17 per cent graduated; of the doubtful group, 23 per cent; of the possible group, 33 per cent; of the probable group, 42 per cent; of the safe group, 60 per cent. The students were not informed as to their classification on the tests, so that a low grouping had no unfavorable influence, and the whole machinery of measuring educational success was isolated from any influence by the test classifications.

Mursell says regarding this experiment:

> These findings are undoubtedly significant and of practical value. The wording of the various classifications is open to some objections, for it would seem inappropriate to call individuals whose chance of graduation is 60 per cent 'safe', and a 42 per cent chance of success is not what one ordinarily means by the term 'probable'. But the point is not of major importance, and it is clear that the battery possesses considerable predictive value. But we cannot regard the results as in any way an adequate validation of the Seashore Measures of Musical Talent. It should be clearly understood that the groupings were formed not on the Seashore Tests alone, but on those tests combined with an intelligence test.[7]

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[7] James L. Mursell, The Psychology of Music. NY: W. W. Norton and Company, 1937, pp. 298-299.

Mursell concludes that the results of this experiment ". . . furnish no proof whatever that the Seashore tests given independently of any other measures will yield a valid index of musical capacity."[8]

Musical Aptitude and Mental Traits. There have been many studies of this nature, usually dealing with correlations between scores earned on either the Seashore or Kwalwasser-Dykema music talent tests and personality and intelligence tests.

Gilpin,[9] in working with junior and senior high school students, attempted to find the relation between musical talent and certain mental and personality aspects. From two schools, 258 students in grades seven through twelve were tested. He concluded that musical talent and intelligence are not closely related. This is born out by many other studies of a similar nature, as we shall see. The correlations typically found are positive, but low, usually not above .35. Gilpin also found that musical talent and social and emotional adjustment are not closely related. Here again the correlation coefficient was positive, but low, .378.

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[8] Ibid., p. 299.

[9] G. Noble Gilpin, "A Study Correlating Scores on Kwalwasser-Dykema Tests of Musical Talent, Washburne Thaspic Personality Inventories, Otis Quick Scoring Mental Ability Tests, and an Original Phonophotographic Test." Unpub. M. A. Thesis, Syracuse University, 1941.

Wenaas,[10] in a study having many aspects in common with that of Gilpin, reported above, found correlations between Kwalwasser-Dykema test scores and intelligence test scores ranging from .714 to .211 and tending to decrease with age. Between Kwalwasser-Dykema scores and personality factors, Wenaas found positive, but low non-significant correlations. The personality factors correlated were those of the Case Inventory by J. B. Maller and included controlled association, personal and social adjustment, honesty, and ethical judgment. The Otis and Kuhlmann-Anderson tests of intelligence were used. Groups studied were taken from grades six through twelve.

In another study involving the use of the Kwalwasser-Dykema Tests of Musical Talent, Wagner[11] found a correlation of .402 between musical talent and well adjusted personalities. Wagner points out that all correlations between subtests (Kwalwasser-Dykema Tests of Musical Talent and Washburne Social Adjustment Inventory) favored the musically talented student.

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[10] Sigurd B. Wenaas, "A Study of the Relation Between Musical Ability and Various Intelligence, Scholastic, and Personality Factors." Unpublished M. A. Thesis, University of Idaho, 1940.

[11] Doris Wagner, "A Comparison of Earned Scores by Junior High School Pupils in the Washburne Social Adjustment Inventory and the Kwalwasser-Dykema Tests of Musical Talent." Unpublished M. A. Thesis, Syracuse University, 1946.

In an investigation in which the Seashore tests were used, Immel[12] found no appreciable relationship between emotional status and musical capacity among high school pupils. Measures of emotional status were obtained by use of the Bernreuter Personality Inventory, and the Allport Ascendance-Submission Test, and the Thurstone Personality Schedule.

Musical performance and mental traits. Gilbert,[13] in using teachers' ratings for a measure of performance achievement, found correlations between performance achievement and Kwalwasser-Dykema scores ranging from .761 for the entire group (one thousand) studied, to .866 for a group of 123 students selected on the basis of four years study. For the entire group of one thousand, who had had musical training, Gilbert also found a correlation of .574 between the Otis Intelligence Test scores and the Kwalwasser-Dykema test scores.

Lamp,[14] in a study in which he used an exposure course (a forty period instrumental trial), found that in comparison

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[12] Earle Barnard Immel, "An Experimental Investigation of the Relationship Between Musical Capacity and Emotional Status of High School Seniors." Unpublished M. A. Thesis, University of Southern California, 1939.

[13] J. Richard Gilbert, "The Traits of Secondary School Instrumentalists and Their Relationship to Achievement in Instrumental Music." Unpublished M. A. Thesis, Syracuse University, 1943.

[14] Charles Lamp, "The Determination of Aptitude for Specific Musical Instruments." Unpublished Ph. D. Thesis, University of California, 1935.

to the predictive values of his aptitude test (a performance test given at the termination of the forty period exposure), the mental and physical tests, (Seashore Measures of Musical Talent, and certain physical measurements, such as finger taper for violin, also used in the study as a basis for comparison), offer no valid prediction to serve as a basis for the selection of instruments most suitable for individual students.

II. THE GERMAN STUDIES

Contrasting the work of the American research workers is the work of the German researchers. Here, the approach to the problem of musical talent has been, for the most part, that of the "gestalt" psychologist using musical criteria as a basis for prediction. Here the underlying assumption is: musical talent is expressed by the whole personality and therefore cannot be ascertained by dividing the musical personality into fragments to be measured individually, but must be measured as a unit functioning in a unified situation.

Relation of musicality to other types of ability. Mursell has written an excellent summary of several German studies of particular pertinence.

First of all we have the work of the Pannenborgs[15]

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[15] H. J. and W. A. Pannenborg, "Die Psychologie des Musikers." Zeitschrift fur Psychologie, 73: 91-136, 1915.

and of Miller.[16] The former, in their study, investigated the abilities of 423 musical adults, 21 composers with whom they used the biographical method, and 2757 school children between the ages of 12 and 18. It should be stated that they found a high measure of agreement between their three groups, so that we may conclude that musicality has about the same psychic and cultural characteristics wherever found. The latter (Miller) studied the school records of students in a teacher training institution where music was required, men only being investigated.

The characteristics of the musical personality as revealed by these studies are as follows: (a) the typical musical person has a high grade mentality and shows much versatility, particularly in literary and artistic fields. (b) There is a close and definite correlation between musical and mathematical ability. (c) The musical person is likely to have notable linguistic ability. The work of Feis[17] emphatically confirms this finding. (d) The musical person is likely to show qualities of effective social leadership. (e) He is emotional, unstable, and not very punctual or scientific. (f) He is physically healthy and active and endowed with strong neurotic or hysterical tendencies.

The general picture is that of a high grade, nervously organized and high-strung personality, urgently needing free and varied outlets for personal expression, and capable of great contributions, though these need not be kept in the focus of music education.

Another point to be considered here is the relationship of musical ability to general intelligence. And here we find a sharp cleavage between the German and American studies. Feis, Revecz,[18] the Pannenborgs, Miller, and others are unanimous in finding that musicality and high intelligence go together. Seashore, on the other

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[16] Richard Miller, "Uber Musikalische Begabung und ihre Beziehungen zu sonstigen Anlagen." Zeitschrift fur Psychologie, 97: 191-214, 1925.

[17] Oswald Feis, Studien uber die Genealogie und Psychologie der Musiker. Weisbaden: J. F. Bergman, 1910, 97 pp.

[18] Geza Revecz, The Psychology of a Musical Prodigy. New York: Harcourt, Brace and Company, 1925, 180 pp.

hand, finds comparatively little relationship between these two functions. Hollingworth,[19] again, using the Seashore Tests, finds no special musical sensitivity in children testing above 135 I. Q. which means of course, a group of very high intelligence. How can we explain these seemingly flat contradictions? The answer is not difficult, the American work is all based upon the very special Seashore Tests, while the German work, as is clear from our description of it given above, takes a much broader, more functional criteria of musicality. There may be no relationship between Seashore Test performance and intelligence and still be a very close one between functional musical ability and intelligence. As a matter of fact, this is precisely our own opinion. We feel that there is ample justification for stating that musicality goes with high general intelligence.[20]

Relation of musicality to ability to perform. Mursell says concerning this relation:

> A person may be musical, that is, may possess high musicality, without any great executant ability in music. This is clearly recognized in the research studies and notably by Revecz[21] on the basis of his very careful investigation of the psychology of a musical prodigy. Here we have a conclusion involving the widest educational consequences. Specifically, the following inferences are to be made. (a) We must not judge musicality merely on the basis of ability to perform. A single performance may be no better as an index of musicality than a single coached recitation of a poem would be of literary feeling. (b) Children lacking in executant ability or in creative ability may still be entirely suitable subjects for music education. This is true even with children who never show any signs of becoming good performers or creators

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[19] L. S. Hollingworth, "Musical Sensitivity of Children Who Test Above 135 I. Q.," Journal of Educational Psychology, 17: 95-109, 1926.

[20] James L. Mursell and Mabelle Glenn, Psychology of School Music Teaching, pp. 19 ff.

[21] Revecz, op. cit.

of music. Such children may have a real talent for loving music and a keen sensitiveness to it; and they may reap immense benefit from proper musical opportunities. (c) The main emphasis in music education should be upon appreciation. This emphasis should penetrate the work in performance, which should aim at musical sincerity and feeling rather than technical perfection.[22]

III. SUMMARY

The following points seem to summarize research discussed in this chapter:

(1) Research into musical talent has taken two directions and although these directions are not necessarily at odds, research results have been inconclusive. (a) Musical talent has been studied in this country in an analytical manner. The approach has been to isolate, for study and testing, various factors known to contribute to musical talent. (b) Musical talent has been studied by several German researchers using functional criteria of musicality. The approach has been to study musical talent as a psychological entity.

(2) The American studies have found little evidence that such factors as personality and intelligence go with musicality, as measured by musical talent tests.

(3) The German studies have advanced the theory that the number of people with special talents varies with

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[22] Mursell, op. cit., p. 11.

intelligence, and that there is a high relationship between general and specific ability. Mursell says pointedly: "What is inherited in connection with music is not a highly specialized musical talent which makes its possessor almost a psychological freak. The very musical child inherits a general high grade personality."[23]

(4) The psychometric approach to the study of musical talent has some validity, but apparently has not developed adequate indices of functional musical ability. Validity coefficients for the Seashore measures are low and still the battery is able to tell which individuals could not be successful in music, though it cannot tell which individuals will be successful in music.

(5) There seems to be sufficient reason for stating that not all musical persons will be good performers. This has been pointed up in research studies and is agreed to by such authorities as Mursell and Schoen. Schoen states: "Musical aptitudes are of two kinds, namely, those for musical reception and those for musical production. . . . Thus there are many more very musical persons than good musical performers. . . ."[24]

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[23] Ibid., p. 36.

[24] Max Schoen, The Psychology of Music. NY: Ronald Press Co., 1940, p. 151.

(6) Obviously, there must be some criteria of musicality other than those utilized in musical talent tests. There is evidence that the musical person (measured in broad, functional terms) has a certain "type" of mental and personality organization.

This study has selected (1) several mental and personality traits (as measured by standardized tests) and (2) other specific musical abilities (as measured by a musical talent test) in order to determine the relation, if any, of these traits and abilities to general musicality and to functional musicality (as determined by ratings).

CHAPTER III

THE GROUP STUDIED

The most important considerations in selecting a group for this problem were as follows: (1) the group must be a musical group; (2) the group must be available for gathering several kinds of data under acceptable conditions. This chapter describes the group utilized in the study and attempts to show the extent to which the above considerations were met by using this group in the study.

I. DESCRIPTION OF THE GROUP STUDIED

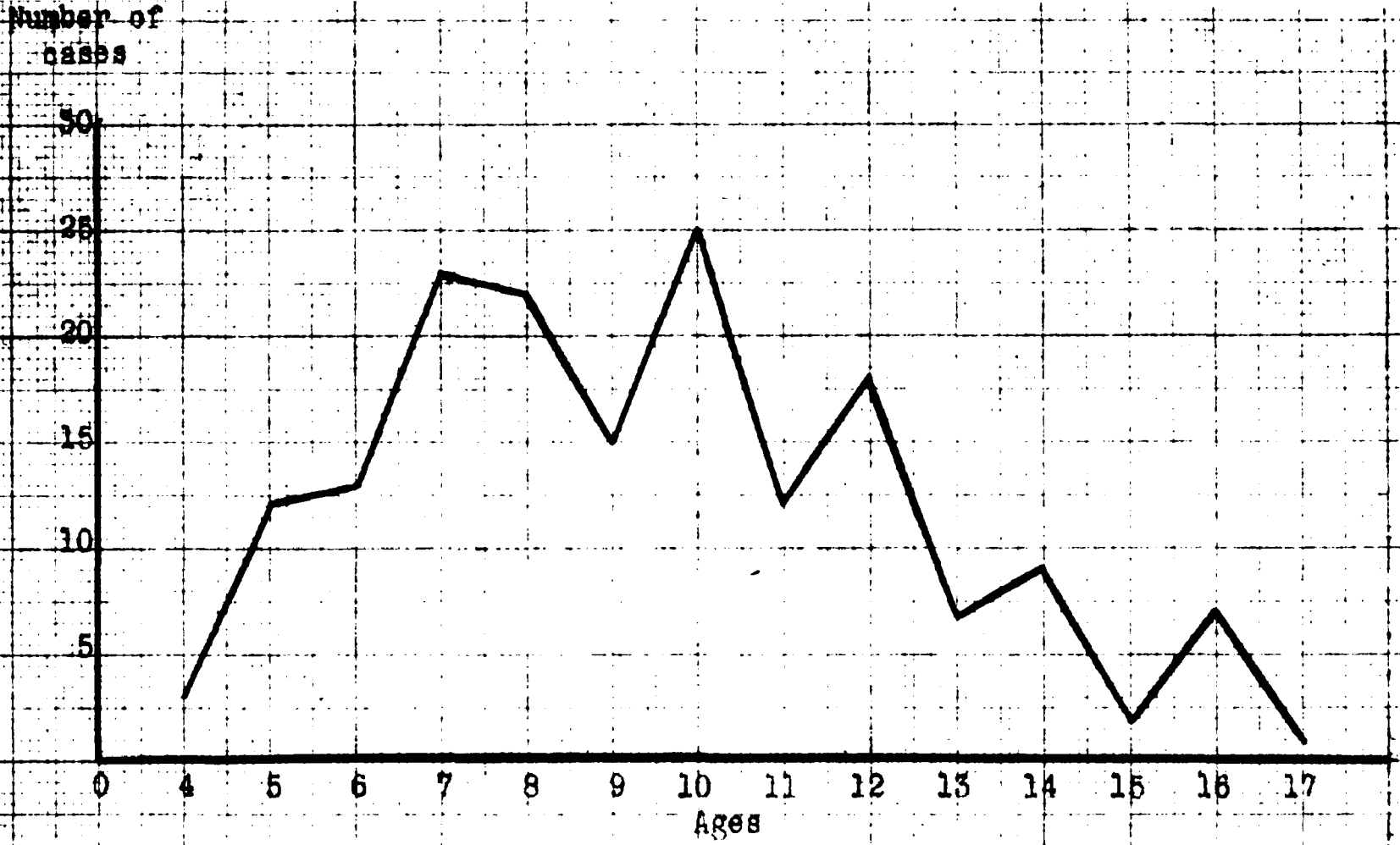
The group used in this study were 180 undergraduate students at Michigan State College who were enrolled as music students at the close of Spring term 1951. This group was chosen for two reasons: (1) the background of the group was suitable to the purposes of the study, and (2) these students were enrolled in college work and could be utilized for data collection under excellent conditions.

This group of students were by their own choice majoring in music. Some of them had begun music study as early as six years of age; some had not begun music study prior to entering college. The average age at which music study began was 9.45 years with a modal age, slightly higher, of ten years.

The standard deviation of the distribution of ages at which music study was begun, was 3.13. An area covering one standard deviation above and one standard deviation below the mean (6.32 to 12.58) included 113 students or 65.6 per cent of the total group. Graph 1 presents this distribution of ages at which music study was begun.

This group of students included individuals from all four undergraduate classes, with 69 freshmen, 28 sophomores, 46 juniors and 37 seniors.

All of these students were doing college work toward the Bachelor of Music degree or the Bachelor of Arts degree with a major in music. It must be noted that although these students were all majoring in music there was considerable variation in curriculum. These students were divided by curriculum as follows: (1) Applied music, thirty students. The unique feature of this curriculum is its emphasis on applied music study and on the performance and theoretical aspects of music. (2) School Music - instrumental, 41 students. The unique feature of this curriculum is its emphasis on proficiency on band and orchestral instruments with a strong emphasis on teaching ability and working with school children in school bands and orchestra. (3) School Music - general supervision, 72 students. This curriculum has strong emphasis on proficiency in vocal music teaching, but includes a general review of band and orchestral instrument



Graph 1

DISTRIBUTION OF AGES AT WHICH MUSIC STUDY WAS BEGUN

teaching. (4) Theory of music, 14 students. The unique feature of this curriculum is its concentration of work in theory and composition beyond that of other curricula. (5) Music Therapy, five students. This curriculum concentrates work in psychology and in the therapeutic uses of music. (6) Science and Arts, major in music, 12 students. The unique feature here is a provision for a large amount of general education work outside the Music Department, with work in applied and theoretical music towards a major in music. There were four students whose curricular choice could not be determined. This curricular division of the group is shown in Graph 2.

All of these students were required to do a minimum of two years work in applied music. The group was divided according to the major instrument studied as follows: piano students, 66; vocal students, 41; students of woodwind instruments, 32; students of brass instruments, 19; students of string instruments, 16; and organ students, four. The division of this group is shown in Graph 3.

At the time of college entrance, each of these students was required to appear for an audition. A successful audition was considered as evidence of musical development beyond an elementary level. A report of the audition was a part of the qualifications submitted by each student prior to acceptance as a music student. The purpose of the audition was to

DISTRIBUTION OF STUDENTS BY CURRICULA

Graph 2

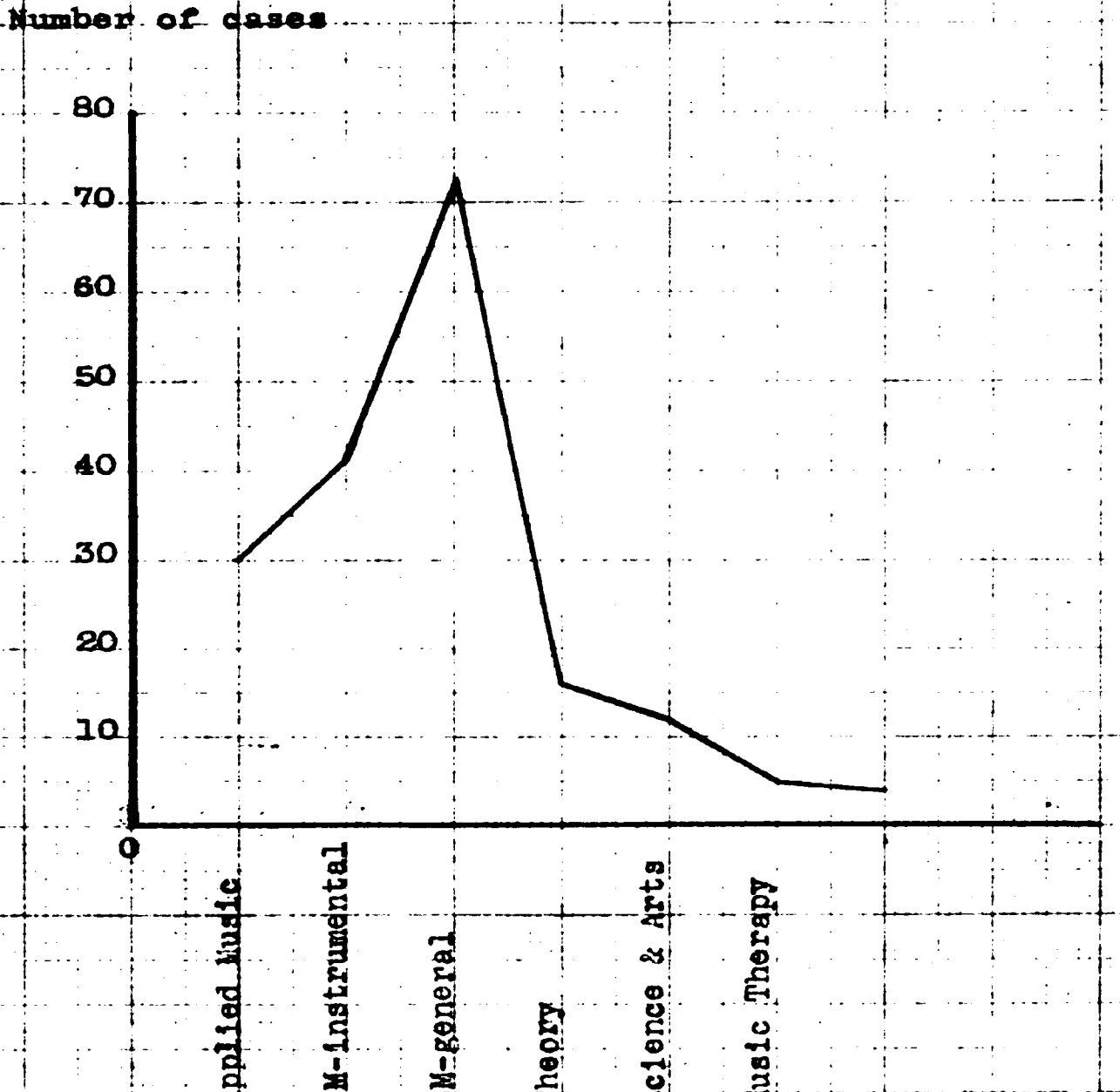
determine readiness for college music study in applied music. One student in the group was allowed to enroll but was not judged ready to earn college applied music credit.

All of these students were required to take two years work in theory. This theory work is designed (1) to acquaint the student with the materials of music, and (2) to encourage the student's responsiveness to music in a variety of activities Final grades achieved by the group in the first year's work in theory were distributed as follows: 21.93 per cent received the grade of "A," 39.37 per cent received the grade of "B," 30.96 per cent received the grade of "C," 3.87 per cent received the grade of "D," and 3.87 per cent received the grade of "F." The grade of "A" is the highest passing grade; the grade of "D" is the lowest passing grade. The grade of "F" is a failing grade. This distribution of first year theory grades is shown on Graph 4.

(For further evidence of the musicality of this group see Chapter Five, Summary of Study Data. Information concerning other music grades and musical abilities will be found in that chapter.)

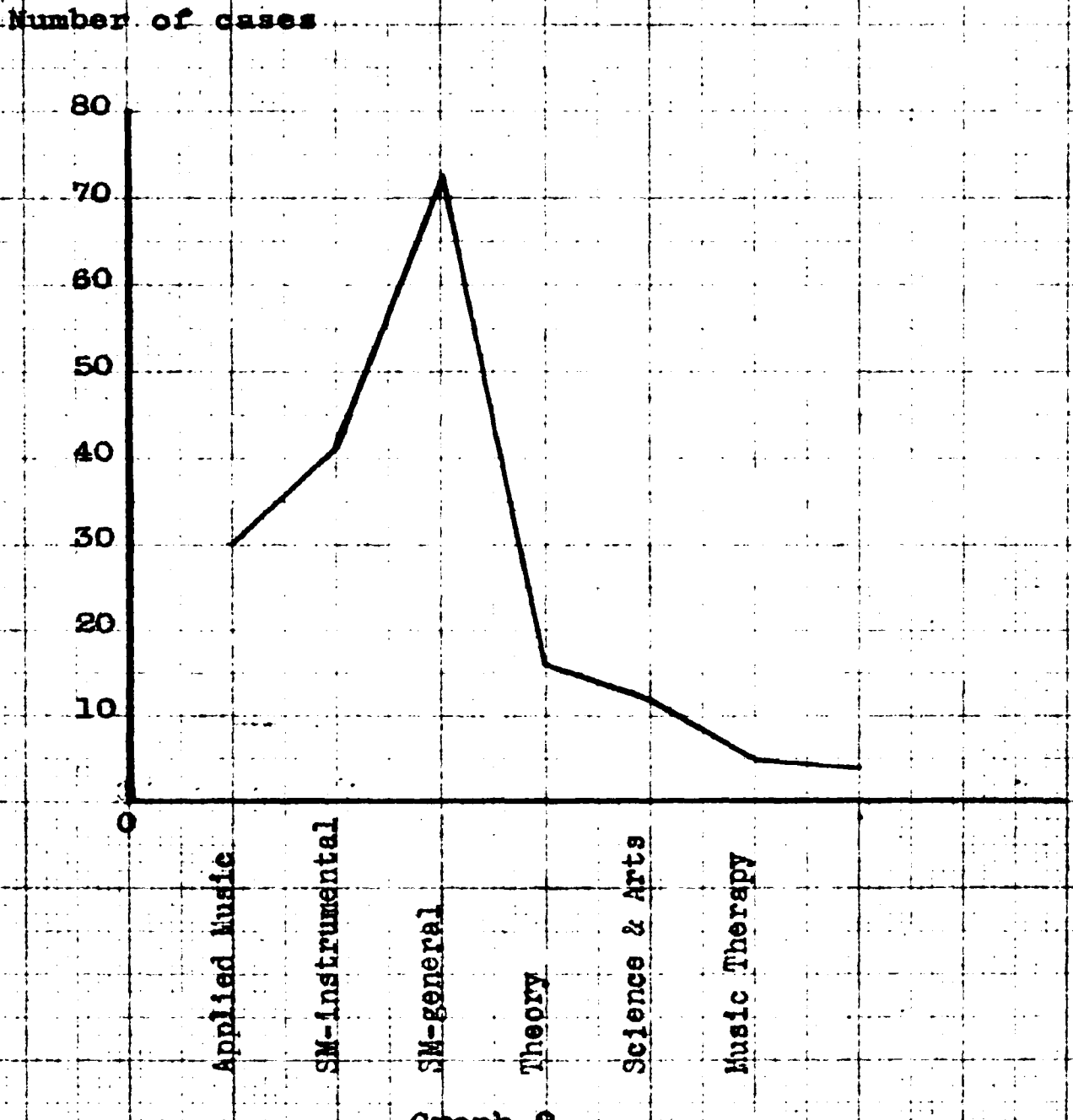
II. CONDITIONS OF DATA COLLECTION

As part of the Michigan State College orientation program, each entering student is required to take several standardized group tests. The group of students used in this study took



Graph 2

DISTRIBUTION OF STUDENTS
BY CURRICULA



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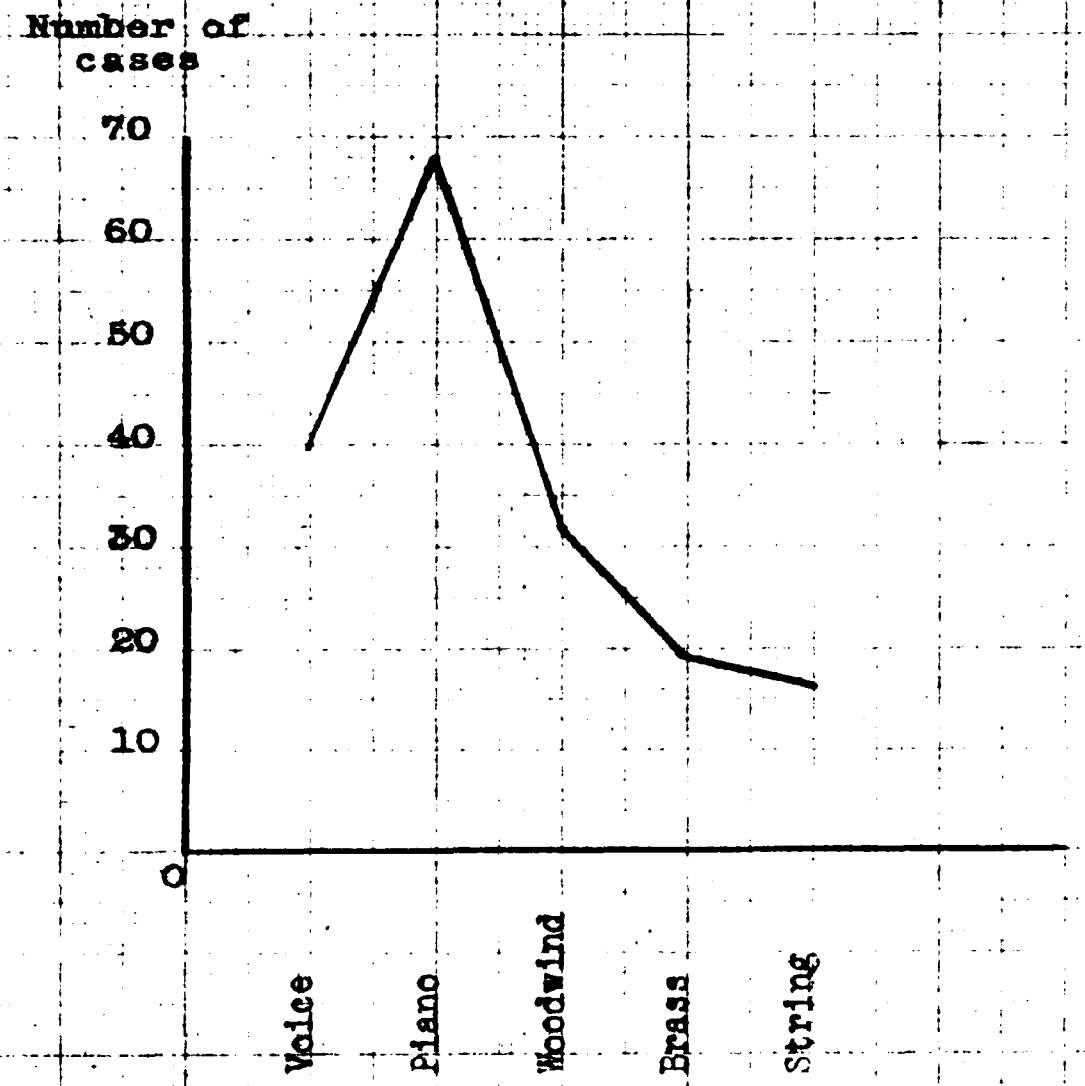

Graph 3

DISTRIBUTION OF STUDENTS BY MAJOR INSTRUMENT GROUPINGS

determine readiness for college music study in applied music. One student in the group was allowed to enroll but was not judged ready to earn college applied music credit.

All of these students were required to take two years work in theory. This theory work is designed (1) to acquaint the student with the materials of music, and (2) to encourage the student's responsiveness to music in a variety of activities. Final grades achieved by the group in the first year's work in theory were distributed as follows: 21.93 per cent received the grade of "A," 39.37 per cent received the grade of "B," 30.96 per cent received the grade of "C," 3.87 per cent received the grade of "D," and 3.87 per cent received the grade of "F." The grade of "A" is the highest passing grade; the grade of "D" is the lowest passing grade. The grade of "F" is a failing grade. This distribution of first year theory grades is shown on Graph 4.

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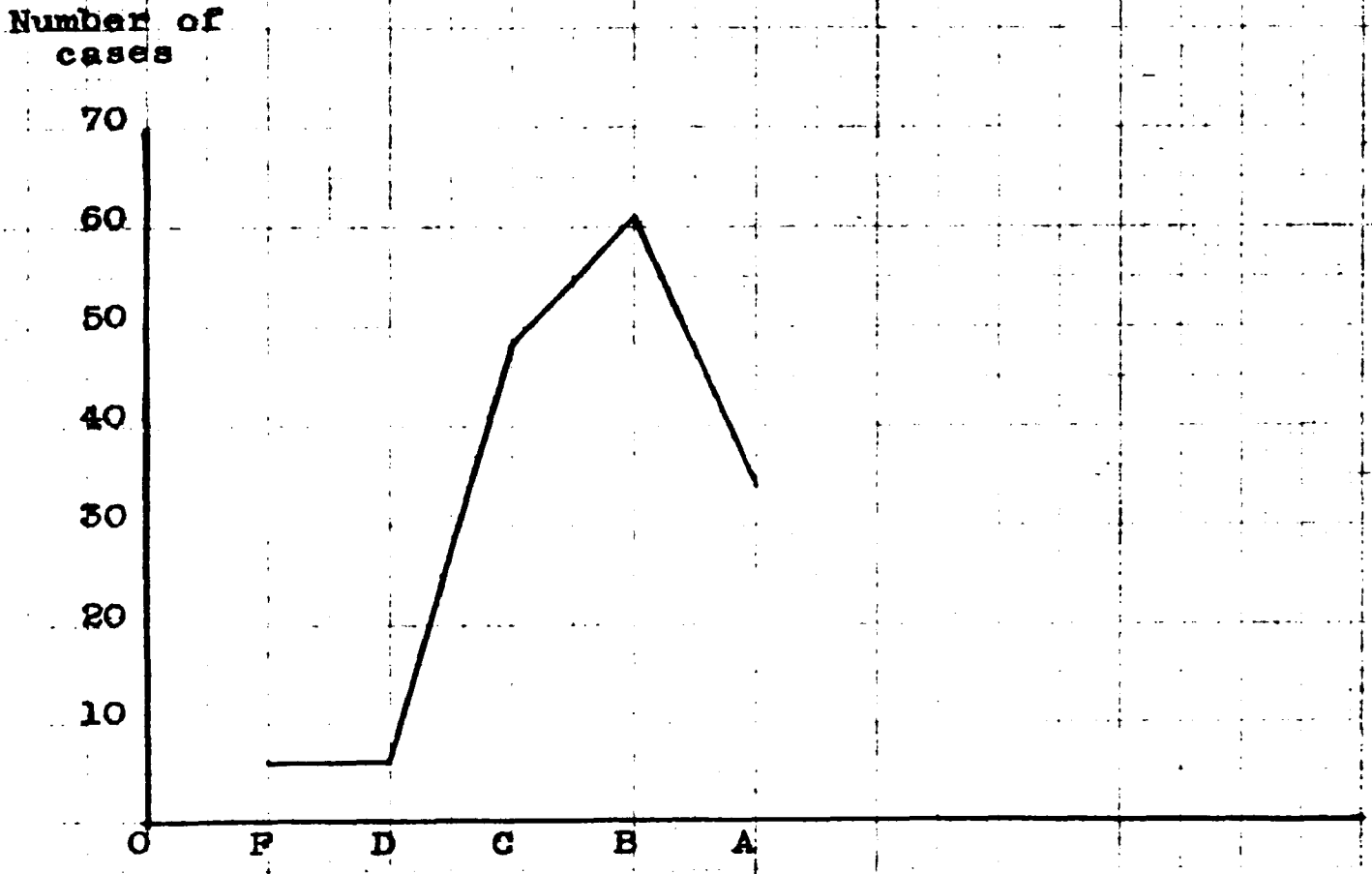

Graph 4

DISTRIBUTION OF THEORY GRADES

such tests either as entering freshmen or as entering transfer students. In most instances, such tests are administered prior to or during the first term of the student's registration.

A second phase of the college orientation program consists of tests, of a less general nature than those referred to above, given by various academic departments in the college. The examiners of the Michigan State College Music Department administered a musical talent test to this group of students.

The College Counseling Center administered an additional test to this group of students for the specific purposes required by this study. This was a test of personality.

Each testing situation referred to above was conducted by experienced examiners. Results were machine scored.

The study required ratings of certain musical abilities as part of the data. These ratings were made by 51 members of the Michigan State College music instructional staff. The ratings were based on the professional judgment of this faculty group, and were secured by the use of a carefully planned rating procedure. (See Chapter Four.)

III. SUMMARY

It appears that the group of students utilized in the study is a musical group of students. There is evidence that these students as a group were interested in music several years prior to entering college. Some individuals

began music study as early as five or six years of age. There is evidence that this group of students had ability in music beyond an elementary level prior to college enrollment and that the group as a whole had sufficient ability to do acceptable college work in music.

It also appears that this group of students was especially suitable to the study since it was possible to utilize these students in a large variety of situations for the purpose of obtaining adequate data. At the same time, by utilizing this group it was possible to gather all data under very favorable conditions.

CHAPTER IV

SOURCES OF DATA

The data collected for use in this study were obtained through the following sources:

(1) Use of the following published standardized psychological tests;

(a) The American Council on Education Psychological Examination, College Level, Cooperative Test Division, Educational Testing Service, Princeton, New Jersey.

(b) The Cooperative Reading Comprehension Tests, Cooperative Test Service, 15 Amsterdam Avenue, New York, New York

(c) The Bernreuter Personality Inventory, Robert G. Bernreuter, Stanford University Press, Stanford University, California, 1935.

(d) The Seashore Measures of Musical Talents, 1939 Revision, Camden, New Jersey: RCA Victor Division, 1939.

(2) Ratings of musical abilities

(a) Musicality.

(b) Ability to sight-read.

(c) Ability to perform.

(3) Grade point averages in applied music.

I. THE AMERICAN COUNCIL ON EDUCATION PSYCHOLOGICAL EXAMINATION

According to the manual of instructions:

The purpose of the American Council on Education Psychological Examination is to appraise what has been called scholastic aptitude or general intelligence, with special reference to the requirements of most college curricula. A large number of different tests have been used for this purpose. It has been found that, in general, linguistic tests give higher correlations with scholarship in the liberal arts colleges than do quantitative tests. This higher correlation is probably, in part, due to the fact that most of the freshman courses in the liberal arts colleges depend more upon linguistic abilities than upon the abilities involved in quantitative thinking. For the scientific and technical curricula the quantitative tests may be more significant.

The test forms should be found useful in handling those problems in which it is advisable to distinguish a student's mental abilities from his high-school preparation and his industry. Faculty action in the case of a student who is failing can be intelligently guided if one has some means of knowing to what extent the student has applied himself to his college work, to what extent his high-school training meets the requirements of his college course, and what his mental abilities are. Very different faculty action can be taken, depending on which of these three factors may be held primarily responsible for a student's failure. It is to be hoped that these psychological test forms may lead to the early discovery of bright students. In those colleges where sectioning of classes in accordance with ability or preparation is customary, these test forms may serve as part of the evidence upon which the sectioning is based.

There is one form of the current edition. All students take the test in exactly the same way, marking their answers on separate answer sheets. The answer sheets are scored by hand or by means of the electric scoring machine. Since the task for the subjects is identical regardless of the way in which the test papers are scored, only one set of norms is required. The same test booklets can be used for several groups of students provided that the students do not make marks in the booklets.

The examination consists of the six tests that have been used for several years. The order of the tests has

been arranged to alternate linguistic and quantitative tests because of the fatigue element. All of the test items have been included in several test experiments with factorial analyses to determine the primary mental abilities. These studies have justified the grouping of the six tests in two general classes as follows:

Quantitative Tests: (Q-score)	Linguistic Tests: (L-score)
Arithmatical Reasoning	Same-Opposite
Number Series	Completion
Figure Analogies	Verbal Analogies

It is not recommended that the six separate test scores be used for any counseling, but there seems to be justification for using the two principal subscores as well as the total or gross score in this manner.[1]

Hereafter, in this study these Psychological Examination scores will be referred to as ACE-L, ACE-Q, and ACE-T. ACE will refer to the test, in general.

A survey of research concerned with the various editions of the ACE revealed much interest on the part of researchers in (1) prediction of academic success and (2) the relationship of intelligence, as measured by this test, to academic success. The following statement of research done with the various editions of the ACE, is based on summaries of some thirty selected studies reported since 1937. Findings that appear to be typical, and in general agreement, have been selected from several studies for quotation here. Hauser states:

> The value of intelligence tests for predicting college success has been widely investigated. Liepold,

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[1] American Council on Education Psychological Examination: Manual of Instructions, 1949 edition. Princeton, N. J.: Educational Testing Service, Cooperative Test Service, p. 2.

> Bovee and Froehlich, Bernreuter and Goodman, Stuit and Hudson, Bryan, Mitchell and others conclude from their research in various subject matter areas with different tests, that intelligence rating alone does not exert a decisive influence on scholastic success. . . . That intelligence is never the sole factor in any real life situation is found in the researches of Burt, Gates, Miller, Madsen, Shewman, Binet and Glenn and many others. Freeman, summing up the prognostic values of intelligence tests, says that most intelligence tests are useful in predicting educational achievement but they are not sufficient in themselves.[2]

In the light of these statements, it is not surprising to find correlations between ACE scores and grade point averages in various subjects occasionally as high as .67 (between "L" scores and so-called "verbal" subjects), and ranging as low as .19 (between "L" scores and so-called "quantitative" subjects).

Schmitz, in a prediction study of the relationship of various test scores and college grade quotients concludes: "The ACE ranks second (to high school quotient) as a criterion of success, having a correlation of .583."[3] The following coefficients are reported:

College quotient:	with high school quotient	.644
	with ACE	.583
	with Army Alpha	.576
	with Purdue Placement Test	.463

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[2] Luellen J. Munn Hauser, "A Comparative Study of the Intelligence of University Freshmen Enrolled in Business and Liberal Art Schools." Journal of Educational Research, 43: 49, 1949.

[3] Sylvester B. Schmitz, "Predicting Success in College." Journal of Educational Psychology, 28: 466, 1937.

Schmitz points out that the ACE ". . . is only slightly better than the Army Alpha as a criterion of success in college."[4]

Lanigan[5] reports the following correlations between selected subject matter areas and ACE-T scores:

	Otis	ACE	Minn.
English	.291	.325	.542
Social Studies	.423	.501	.393
Language	.230	.222	.423
Mathematics	.237	.324	.194
Science	.531	.442	.452
Fine Arts	.381	.364	.317

In reporting critical ratios of the differences between the high and low achievers in each of the six subject matters listed above, Lanigan concludes: "These findings indicate the American Council on Education Psychological Examination is a more usable instrument for predicting a critical score above which groups succeed and below which many tend to fail or to receive low marks."[6]

Somewhat less optimistic findings are reported by Wallace in a study presenting correlation coefficients obtained between the 18 largest and most usual courses of the first semester

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[4] Ibid., p. 466.

[5] Mary A. Lanigan, "The Effectiveness of the Otis, the ACE and the Minnesota subject Speed of Reading Tests for Predicting Success in College." Journal of Educational Research, 41: 290-296, 1947.

[6] Ibid., p. 293.

and Quantitative, Linguistic, and Total scores made by freshmen in the fall of 1947 at the University of Michigan. Wallace summarizes these findings as follows:

> . . . (1) all correlations were small. (2) The highest relationship between test scores was a multiple .49 between English and the combined Quantitative and Linguistic scores. (3) Means and sigmas for the Quantitative and Linguistic scores show little differentiation.[7]

Studies of validity and reliability. In a study of the validity and reliability of the 1938 edition of the Psychological Examination, Seder reports the following reliability coefficients for the Total score, .952; for the Quantitative score, .866; and for the Linguistic score, .953. Seder concludes:

> The 1938 edition of the American Council on Education Psychological Examination, although it has been changed considerably, seems to be similar to earlier editions as far as the total score is concerned. The total score continues to be internally consistent and is highly related to total scores on the 1937 edition of the examination.
>
> The Linguistic scores tend to be more highly correlated with measured achievement in English, for language, history, and science than the Quantitative scores; the reverse is true of correlations in the field of mathematics.[8]

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[7] W. L. Wallace, "Differential Predictive Value of the American Council on Education Psychological Examination." School and Society, 70: 24, 1948.

[8] Margaret Seder, "The Reliability and Validity of the American Council on Education Psychological Examination." Journal of Educational Research, 34: 101, 1940.

Votaw[9] reports a correlation between the ACE-T and the Otis Intelligence test of .76. Lanigan[10] reports a correlation between these tests of .652, and between the Minnesota Speed of Reading Test and ACE-T, reports a coefficient of .394.

A study included in the Wilson College Studies in Psychology makes the following comparative statement:

> The correlation of the American Council on Education tests, Revised Stanford-Binet test and the Wechsler-Bellevue verbal scale with grade point averages are all approximately equal (correlations of about .50 to .55).[11]

Summary. These findings of research (reported above) done with the ACE tend to be typical and tend to support the following statements:

(1) The ACE-T scores tend to predict college scholastic success about as well as, or a little better than other paper and pencil tests of intelligence. This relation between ACE-T scores and college marks can probably be indicated by a product-moment coefficient of .45 or better.

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[9] David F. Votaw, "Regression Lines for Estimating Intelligence Quotients and American Council on Education Examination Scores." Journal of Educational Psychology, 37: 179-181, 1946.

[10] Lanigan, op. cit.

[11] Wilson Studies in Psychology, "A Comparison of the Wechler-Bellevue, Revised Stanford-Binet, and American Council on Education Tests at the College Level." Journal of Psychology, 14: 325, 1942.

(2) The reliability of the ACE scores is acceptable for most uses, being somewhat better in the instances of the Linguistic and Total scores than in the instance of the Quantitative score.

(3) Research findings have not agreed as to the usefulness of the Quantitative and Linguistic scores for differential prediction of college success. Differing approaches to the problem, and differing points of view of investigators, have tended to make for inconclusive findings.

II. THE COOPERATIVE READING COMPREHENSION TESTS

According to the sheet of information concerning the construction, interpretation, and use of these tests:

> The Cooperative Reading Comprehension Tests constitute a part of the new Cooperative English Test, which is divided into tests of expression and tests of reading comprehension, involving respectively, the active and passive use of the language. . . . The Cooperative Reading Comprehension Tests provide four separate scores: (1) Vocabulary Score, (2) Speed of Comprehension Score, (3) Level of Comprehension Score, (4) Total Reading Score.
>
> The reading sections of these tests are based on the belief that reading comprehension is essentially a thinking process, a process which requires mental facility in manipulating verbal concepts, a background of experience, and skill in the mechanics of reading, determine the level of comprehension which an individual may attain and also the maximum speed with which he is able to read and comprehend materials of a given level of difficulty for a specific purpose. Almost all previous reading comprehension tests have measured a combination of vocabulary level, speed of reading, mechanics of reading, and ability to answer questions based on the facts stated in certain passages. Other

components of the ability to read with understanding have largely been neglected. In the Cooperative Reading Comprehension Tests, an effort has been made to include these neglected factors by emphasizing the measurement of the thinking processes in reading, the importance of which has recently been emphasized anew by investigations in the field of semantics.

The validity of a reading test is determined by the extent to which it measures the skills actually involved in the reading process. To establish the validity of the Cooperative Reading Comprehension Tests a thorough analysis of the reading process was made. On the basis of this analysis, the outline for the tests, . . . was developed. Items were then constructed to measure the skills included in the outline. As stated above, the test is designed to measure the thinking processes in reading on the grounds that effective reading is not a mechanical process but an active reasoning and associational process.

Validity and difficulty indices were obtained for each item in the experimental forms of these tests. Items at the proper levels of difficulty having relatively high correlations with the total scores were then selected for inclusion in the final forms, revisions being made on the basis of the item analysis. In the vocabulary sections of both Higher and Lower Level tests the average correlation coefficient between the individual items and the total score is .52. For the reading section of the Lower Level the corresponding value is .45, and for the reading section of the Higher Level it is .40. Because the more discriminative items in the reading sections tend to have been placed first in the tests, those items which actually determine an individual's score tend to have an average validity index greater than the average values presented above. This is a desirable feature of the tests which operates to increase their accuracy of measurement.

A study of the intercorrelations between the three part scores of the Cooperative Reading Comprehension Tests indicates that they measure closely related abilities. An effort was made to reduce the effect of word knowledge on the comprehension scores by controlling the vocabulary level of the reading sections. That this effort was fairly successful is indicated by the only moderately high correlations between Vocabulary and Speed of Comprehension (.75 at both Lower and Higher Levels). The correlations

between Level of Comprehension and Speed of Comprehension are .89 at the Lower Level and .87 at the Higher Level.

The Vocabulary Score indicates the extensiveness of the individual's word knowledge. The time limit for this section is long enough so that, except for a few individuals whose mechanics of reading are extraordinarily poor, speed of word recognition plays little part in determining the Vocabulary Score.

The Speed of Comprehension Score represents the product of the rate at which an individual has attempted to comprehend the test material and his success in comprehending it. It is not, like many speed of reading scores, merely a measure of the number of words read without regard to the thought content.

The Level of Comprehension Score provides a measure of the ability of the student to comprehend materials of increasing difficulty at the rate at which he chooses to work. It is a measure of "power" or "depth" of comprehension, indicating the extent to which a pupil is able to grasp the full import of what he reads.

The Total Reading Score is a composite score in which each of the other three scores has equal weight. It may be regarded as an measure of linguistic ability and should prove to be an excellent index of scholastic aptitude.[12]

Hereafter, in this study the Cooperative Reading Comprehension Tests will be referred to as CRCT-V, CRCT-R, CRCT-C, and CRCT-T. CRCT will be used to designate this group of tests in general.

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[12] Cooperative Reading Comprehension Tests, Information Concerning Their Construction, Interpretation, and Use. New York: Cooperative Test Service, 1940.

III. THE BERNREUTER PERSONALITY INVENTORY

The Bernreuter Personality Inventory is a paper and pencil test of personality. It is a multi-trait test and ". . . was constructed to determine the feasibility of estimating more than a single personality trait at a time. It assumes that the integrated behavior of an individual in any situation may be interpreted from various points of view . . ."[13] The test uses a test sheet and an answer sheet which can be machine scored. Bernreuter scores for this study were scored by machine.

The test is intended for use with high school, college, and adult populations and provides norms for these groups, both male and female. Raw scores are converted to percentile rankings according to a conversion table.

The test consists of 125 questions to which the subject may answer Yes, No. or ?. Credit for each trait is given according to Bernreuter's scoring system. Flanagan[14] has also provided the Bernreuter test with additional scoring keys. These several scales are described by Bernreuter as follow

High B1-N. The individual who scores high on the B1-N scale shows a tendency toward a neurotic condition.

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[13] Robert G. Bernreuter, "Validity of the Personality Inventory," Personnel Journal, 11: 383, 1933.

[14] Irving Lorge, "Personality Traits by Fiat: A Correction," Journal of Educational Psychology, 26: 654, 1935.

Such an individual often feels miserable, is sensitive to blame, and is troubled by useless thoughts, by shyness, and by feelings of inferiority. He feels shut off from other people, he frequently day-dreams, and worries both over things that have happened and over things that may happen.

Low B1-N. The individual who scores low on the B1-N scale is an emotionally stable person. He is rarely troubled by moods, by worries, or by the criticisms of others. He is self-confident, and is a doer rather than a daydreamer.

High B2-S. The individual who scores high on the B2-S scale is a self-sufficient person. He is able to be contented when by himself. He prefers to work alone and depends upon his judgment in reaching decisions and in formulating plans.

Low B2-S. The individual who scores low on the B2-S scale is dependent upon others for his enjoyments. He likes to be with other people a great deal, and prefers company both while working and during leisure hours. He prefers to talk problems over with others and to receive advice before reaching decisions.

High B3-I. The individual who scores high on the B3-I scale is introverted in the sense that he is introspective and is given to autistic thinking. He shows the symptoms of a neurotic condition which are typical of those individuals who score high on the B1-N scale.

Low B3-I. The individual who scores low on the B3-I scale is extroverted in the sense that he rarely substitutes day-dreaming for action. He is emotionally stable and possesses the characteristics of those individuals who score low on the B1-N scale.

High B4-D. The individual who scores high on the B4-D scale is dominating in face-to-face situations with his equals. He is self-confident and aggressive, and readily assumes a position in the foreground at social functions. He converses readily with strangers or with prominent people and suffers no feelings of inferiority when doing so.

Low B4-D. The individual who scores low on the B4-D scale is submissive in face-to-face situations

with his equals. He lacks self-confidence, keeps in the background at social functions, and rarely takes the initiative in directing people or activities. He experiences feelings of inferiority and is reluctant to meet important personages.[15]

The Flanagan scores are described by Bernreuter as follows:

F1-C. A measure of confidence in oneself. Persons scoring high on this scale tend to be hamperingly self-conscious and to have feelings of inferiority; those scoring above the ninety-eighth percentile would probably benefit from psychiatric and medical advice. Those scoring low tend to be wholesomely self-confident and to be very well adjusted to their environment.

F2-S. A measure of sociability. Persons scoring high on this scale tend to be non-social, solitary, or independent. Those scoring low tend to be sociable and gregarious.[16]

A summary of research done with this test reveals a great amount of interest on the part of researchers in this test and in the area of personality testing in general. This summary of research done with the Bernreuter Personality Inventory has involved some 140 research studies including principally (1) investigations into the reliability and validity of the inventory, and (2) studies of correlation with many different variables.

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[15] Robert G. Bernreuter, "The Theory and Construction of the Personality Inventory," Journal of Social Psychology, 4: 402-403, 1933.

[16] David G. Ryans, "A Tentative Statement of the Relation of Persistence Test Scores to Certain Personality Traits as Measured by the Bernreuter Inventory," Pedagogical Seminary and Journal of Genetic Psychology, 54: 230, 1939.

In a study of the Bernreuter Personality Inventory as a measure of student adjustment, Stogdill and Thomas state:

> The test apparently finds its most useful application at the college level, rather than with younger people. It is more adequate with the college group than with the definitely psychotic or neurotic inmates of state institutions. It appears to be more useful in the determination of the introverted and submissive individual than with the opposite types. The significance of a low score on the scale for measuring neurotic tendency (B1-N) is not well established. Scores in the middle range on each of the six scales of the test seem to be highly related to the possession of a desirable personality as judged by criteria.
>
> As a measure of adjustment the Bernreuter Personality Inventory appears to be very helpful in discriminating between well-adjusted and maladjusted students.[17]

In a study similar to the one cited above, Fisher and Hayes conclude:

> There is a significant and reliable relation between high scores on the Bernreuter Personality Inventory (taken on entrance to college) and serious maladjustments uncovered later in college. Scales F2-S, B1-N and B2-S are most important in this connection. Scoring of the other scales adds to the effectiveness of the test in predicting possible maladjustments only when they are used to corroborate a high score on one of these three.[18]

In an imposing summary of 147 studies concerned with research on the Bernreuter Personality Inventory, Super

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[17] Emily Stogdill and Minnie E. Thomas, "The Bernreuter Personality Inventory as a Measure of Student Adjustment," Journal of Social Psychology, 9: 313, 1938.

[18] Willis Fisher and Samuel P. Hayes, Jr., "Maladjustment in College Predicted by Bernreuter Inventory Scores and Family Position," Journal of Applied Psychology, 25: 96, 1941.

makes the following cautious statement:

> This brief synthesis of findings concerning the Bernreuter Personality Inventory points to the conclusion that it has considerable validity as a research instrument; that when properly used it has some value in work with individuals; that in either type of work care must be taken to secure adequate rapport; and that, some situations may be such as to make such rapport out of the question.[19]

In a validity study, St. Clair and Seegers summarize as follows:

> Examination of F1 and F2 scores (measure of confidence and sociability) of certain students, whose responses to a questionnaire might lead one to expect certain abnormal personality traits, indicates that the F1 score possesses a degree of validity as a measure of self-confidence. The F1 and B1 scores seem to measure nearly identical traits. However, certain inconsistencies were apparent when the F2 scores were analyzed.
>
> A multi-modal distribution of the F2 scores of students who were selected for membership in fraternities and sororities and scores of a number of student leaders confirmed the impression that a high F2 score is not consistently an indication of non-sociability. Examination and analysis of the Bernreuter scores of the same individuals indicate fairly definite profiles which seem to depict personality types. These profiles are determined by studying the B1, B2 and B4 scores (measures of neurotic tendency, self-sufficiency and dominance) in their interrelationships and the B2 score seems especially important. Two profiles have been delineated tentatively, Profile I, it appears might be associated with a withdrawal tendency. Profile II, probably is indicative of leadership. In general, the evidence presented strongly supports the view that the profile approach to the interpretation of the Bernreuter scores presents a fruitful field for research

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[19] Donald E. Super, "A Review of Research," Journal of Psychology, 9: 120, 1940.

[20] Walter F. St. Clair and J. Conrad Seegers, "Certain Aspects of the F scores of the Bernreuter Personality Inventory," Journal of Educational Psychology, 29: 311, 1938.

Lorge, in an investigation into certain statistical considerations relating to the BPI (both Bernreuter and Flanagan keys) states: "Flanagan has provided the Bernreuter Personality Inventory with a set of independent keys which results also in consistent scores."[21]

In a study of the validity and reliability of his Inventory, Bernreuter states as follows:

> Twenty-four determinations of the split-half reliability of the four scales of the Personality Inventory averaged .86, the emotional stability and dominance-submission scales showing the highest reliability. The validity of the scales in predicting scores on Thurstone's Neurotic Tendency, Allport's A-S Reaction Study, Laird's C2 Intro-Extroversion Test and the author's Self-Sufficiency test is very high, the lowest coefficient being a .84 and the most frequently found values approximating 1.00. Correlations ranging between .56 and .67 were obtained with self-ratings of admittedly low reliability.[22]

In an exhaustive survey of research done on the Bernreuter Personality Inventory, Patterson makes the following statements concerning its reliability:

> The reliability of the Inventory is uniformly high, or relatively high, from study to study. Averaging the split-half and odd-even coefficients reported in half a dozen studies indicates that .85 may be taken as the best measure of the reliability of most of the scales. B2-S and F2-S appear to be rather consistently slightly less reliable, perhaps .80 rather than .85. Test-retest

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[21] Irving Lorge, "Personality Traits by Fiat: A Correction," Journal of Educational Psychology, 26: 654, 1935.

[22] Robert G. Bernreuter, "Validity of the Personality Inventory," Personnel Journal, 11: 383, 1933.

> correlations from a number of studies average about ten points lower, or .75. These coefficients indicate high internal consistency for the test, although they are not high enough for accurate individual prediction.[23]

Patterson has also summarized, in this same study, numerous other studies concerned with the relation of the Bernreuter scores to the following variables: (1) ratings and case studies, (2) various clinical groups, (3) intelligence, scholastic aptitude and achievement, (4) special abilities, (5) social groupings, (6) family resemblance and birth order, (7) physical and physiological factors, and (8) other personality test scores. Patterson reports correlations, which he considers to be low, though ranging as high as .78. In each instance he reports negative or inconclusive findings.

Summary. Regarding the research done with the Bernreuter Personality Inventory, the following statements appear to summarize the findings as pertinent to this study:

(1) Within limits, the Personality Inventory can be used to learn something of the adjustment of college students.

(2) The Personality Inventory is a usable research instrument in some situations. There appear to be situations

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[23] Cecil H. Patterson, "The Relation of Bernreuter Scores to Parent Behavior, Child Behavior, Urban Rural Residence, and Other Background Factors in One Hundred Normal Adult Parents," Journal of Social Psychology, 24: 5, 1946.

in which the Personality Inventory is not usable principally because of poor conditions of test administration.

(3) The Personality Inventory (though not as reliable as intelligence tests) yields reliability coefficients comparable with other tests of personality, being best estimated by a reliability coefficient of .85. Correlations with other similar personality tests can probably be termed "fairly high."

IV. THE SEASHORE MEASURES OF MUSICAL TALENT

The Seashore Measures of Musical Talent. This test is one of the oldest of the musical talent tests and is probably the best known. It consists of a battery of six tests in two forms: (1) Series A, for use with undifferentiated groups and, (2) Series B, for use with musical groups. These tests are given by means of the phonograph. The original battery included the following tests:

> (a) Sense of Pitch: This test consists of one hundred pitch comparisons of varying difficulty, the subject being required to decide whether a second tone is higher or lower than the first. (b) Intensity Discrimination: This consists of one hundred comparisons of two tones differing more or less in intensity, the subject being required to decide whether the second is louder or softer than the first. (c) Sense of Time: This consists of one hundred comparisons of the length of two time intervals marked off by clicks. (d) Sense of Consonance: This consists of fifty comparisons between pairs of two-tone clangs, the subject being required to judge whether the second clang is better or worse than the first on the basis of smoothness,

purity, and blending. (e) Tonal Memory: This consists of fifty comparisons between two sets of unrelated tones, one tone in the set being changed on repetition, the subject being required to identify the changed tone. (f) Sense of Rhythm: This consists of fifty comparisons between pairs of rhythm patterns, the subject being required to judge whether the second pattern is the same as, or different from the first.[24]

In 1939, Seashore and others published a manual of instructions to go with their revision of this battery.

Lewis says regarding the revision of the Seashore Measures:

> Of the six tests in the original Seashore battery (pitch, intensity, time, rhythm, tonal memory, and consonance), all have been retained except the consonance test. Each one has been modified to a considerable extent but is basically unchanged.[25]

The following summary of research done with the Seashore Measures of Musical Talent, consists of studies done with the original battery.

In a study investigating the validity of the Seashore Measures of Musical Talent, Mursell outlines the following points:

> (1) Reliabilities were found by correlating the first and second five rows of the scoring tables and applying the Spearman-Brown prophecy formula. . . . Reliabilities so obtained were approximately similar to those of previous studies. . . . Reliabilities as revealed by the standard error were so low that the use of

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[24] Don Lewis, "The Timbre Test in the Revised Seashore Measures," Journal of Applied Psychology, 25: 108, 1941.

[25] Ibid., 25: 108.

the tests for individual diagnosis seemed questionable. (2) In most of the tests, the performance of conservatory students was superior to that of college students, measured both by averages or median overlapping. This superiority was not sufficiently marked to warrant any very specific educational advice. (3) Grades in Applied Music, and estimates of musical talent seemed to have a reliability which should render them good validation material. There was almost no relationship between Seashore Test performance, and the above criteria (applied music grades and talent ratings). Taken with similar results from other studies, this leads to the conclusion that the tests cannot make fine discriminations of true musical talent within musical groups. The relationship of the Seashore Test scores to performance on special tests indicates that the former may be of use as aids in diagnosing special musical abilities. Where significant correlations between Seashore Test scores and tests of special abilities and types of achievement were found, we are usually dealing with very heterogeneous groups, which indicates that the battery may be able to discriminate roughly, though it cannot do so very accurately or finely.[26]

Mursell reports the following reliability coefficients:

	r	N
Pitch	.66	161
Intensity (Loudness)	.86	164
Time	.81	164
Consonance	.52	165
Tonal Memory	.88	165
Rhythm	.64	163

These coefficients are comparable to those reported by Seashore and somewhat higher than other studies.

Mursell[27] also reports correlation coefficients between the Seashore tests and talent ratings, piano final grades and

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[26] James L. Mursell, "Measuring Musical Ability and Achievements: A Study of the Correlations of Seashore Test Scores and Other Variables," Journal of Educational Research, 25: 125, 1932.

[27] Ibid., 25: 118.

voice final grades. All of these coefficients are low ranging from a negative correlation of .27 to a positive correlation of .25. None of these correlations are as large as three times its probable error.

Somewhat higher correlations have been found between Seashore test scores and other special ability tests. Gaw,[28] for 149 cases, found the following correlations for her sight-singing test with the Seashore Tests: Pitch, .46; Intensity, .36; Tonal Memory, .56. Mosher[29] obtained the following coefficients between his group measures of sight-singing and the Seashore Tests: Time, .3581, Consonance, .2912, Pitch, .4391, Tonal Memory, .4386, and Intensity, .485. These correlations were found for numbers varying from 430 to 460. Wright,[30] for 24 cases, found correlations between her three sets of music achievement tests and the Seashore battery as a whole of .45, .51, and .73.

In a similar study of the Seashore tests, McCarthy makes the following general statement: "The Seashore tests

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[28] Esther Allen Gaw, "Five Studies in the Music Tests," Psychological Monographs, 39: 145-156, 1928.

[29] R. M. Mosher, A Study of the Group Method of Measurement of Sight-Singing. Contributions to Education, No. 194. New York: Teachers College, Columbia University, 1925, 75 pp.

[30] F. A. Wright, "The Correlation Between Achievement and Capacity in Music," Journal of Educational Research, 17: 50-56, 1928.

are of the greatest practical value at the extremes of the scale and as is the case with most measures of vocational aptitude, it is much easier to predict failure than it is to predict success."[31]

Additional studies concerned with the original Seashore Measures of Musical Talent will be found in Chapter Two, "Summary of Pertinent Literature," of this study.

The 1939 Revision of the Seashore Measures of Musical Talents. The records on which these measures are recorded are described by Saetveit, Lewis, and Seashore:

> These records are twelve-inch double-faced Victor records. They were recorded in the RCA recording laboratory and are available in all music houses and RCA Victor dealers handling Victor records in this country and abroad. They consist of two series. Series A is designed for use with unselected groups, as in the schoolroom, or in general group surveys. This series furnishes a general dragnet for the discovery and rating of six different talents. The B Series is designed for testing of musical groups or individuals, as in the selection for musical organizations, admission to music schools, the assignment to musical instruments, or in the search for causes of failure in music. Series B may also be used for individual measurement where greater reliability is desired, as in the music studio or the psychological laboratory.
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> Each of the two series, A and B, measures the same talents and each series consists of three double-faced records which may be purchased separately; but for general use both series should be available. Series A covers the full range of talent or lack of

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[31] Dorothea McCarthy, "A Study of the Seashore Measures of Musical Talent," Journal of Applied Psychology, 14: 454, 1930.

talent and is therefore essential for such surveys. Series B covers a narrower range and is therefore more diagnostic and more economical in musical situations. There are three records for each series, with one measure on each side. The records are listed as follows:

Series A		Series B	
Record No.	Test	Record No.	Test
450A	Pitch	453 A	Pitch
450 B	Loudness*	453 B	Loudness*
451 A	Time	454 A	Time
451 B	Timbre	454 B	Timbre
452 A	Rhythm	455 A	Rhythm
452 B	Tonal Memory	455 B	Tonal Memory

*The Acoustical Society of America has defined and recommended the use of the term "loudness" to designate what we have formerly called "intensity."[32]

Seashore writes the following description of this 1939 revision:

> These measures present the following characteristics: they are based on a scientific analysis of musical appreciation and performance; they deal with elements which function in all music; they are standardized for content so that alternate or new series are not needed; they give quantitative results which may be verified to a high degree of certainty; they are economical in that expensive instruments are replaced by phonograph records; they may be used with any language and at any racial or cultural level; they are simple and as nearly self-operative as possible; they are designed for group measurements; they are interpreted in terms of established norms.
>
> They are called measures to distinguish them from the ordinary paper and pencil tests and because they are patterned on principles of accurate measurement with

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[32] Carl E. Seashore, Don Lewis, and Joseph G. Saetveit, Manual of Instructions and Interpretations for the Seashore Measures of Musical Talent, 1939 Revision. Camden, New Jersey: Educational Department, RCA Victor Division, Radio Corporation of America, 1940, pp. 4-5.

scientific instruments in the laboratory. They are based upon two fundamental laws of scientific measurement. The first is that the factor under observation must be isolated in order that we may know exactly what we are measuring. This factor is varied under control while all other factors are kept constant. Thus in measuring the sense of time, we vary duration only, keep all other factors constant, and avoid complex situations.

The second principle maintains that the conclusion to be drawn must be limited specifically to the implications of the factor which has been measured under control. Thus if we measure the sense of rhythm and find a very superior performance, the conclusion is not that the subject is musical; it is merely that the individual has a very superior sense of rhythm.

. . . they (these measures) may be used extensively as class experiments in general psychology, music, and phonetics. They are convenient measuring tools for acoustical research in many fields.

They do not measure training or achievement in music. Excellence in these is a condition for artistic appreciation and skills in performance; but 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 fool-proof. As measuring instruments they are fully adequate, but the use of them requires tact, skill, ability to motivate, favorable atmosphere, and wisdom in interpretation.[33]

The general procedure used in revising the Seashore Measures of Musical Talent is described by Saetveit and others as follows:

The first step in the process of revising was to make an item analysis of the original measures on the basis of the responses made to each item (or group of items) by large numbers of school children and adults. The analytical data yielded information on the relative

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[33] Ibid., pp. 3-4.

difficulty of each item and served as a basis for choosing items to be included in tentative or trial forms. These trial forms were recorded on acetate records and administered to three different age groups: fifth- and sixth-grade pupils, seventh- and eighth-grade pupils, and adults. The results were used for a second evaluation of individual items. A new set of tentative forms was then recorded and administered. This general procedure was followed until items covering a satisfactory range of difficulty had been selected for both Series A and Series B of each of the new measures.[34]

The following coefficients of reliability for the revised measures together with the means and standard deviations of the scores obtained on each measure by large groups of subjects are tabled by Saetveit.[35]

	Total No.	Mean Score in Percentiles	S. D.	r	P. E.
Pitch A	1071	75.9	12.2	.88	.01
Loudness A	1037	81.4	10.8	.88	.01
Time A	1116	76.8	9.7	.76	.02
Timbre A	852	75.1	9.7	.74	.02
Rhythm A	1104	83.5	9.2	.62	.02
Tonal Memory A	980	83.3	13.5	.88	.01
Pitch B	752	69.6	10.6	.78	.02
Loudness B	777	76.9	11.1	.77	.02
Time B	792	66.3	10.1	.70	.02
Timbre B	603	60.9	8.2	.72	.02
Rhythm B	794	71.8	11.3	.72	.02
Tonal Memory B	731	70.4	17.5	.89	.01

These measures are published with a manual of instructions and interpretations by Seashore and others in which norms are available. These norms make it possible to convert the number

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[34] Joseph G. Saetveit, Don Lewis, and Carl E. Seashore, Revision of the Seashore Measures of Musical Talents. Iowa City, Iowa: University of Iowa Press, 1940, p. 13.

[35] Ibid., p. 34.

of right answers into a ranking order. "The highest rank, 1, represents the scores of the highest ten per cent in a normal unselected community. The next highest, 2, includes scores made by the next ten per cent and so on to rank ten which includes scores made by the lowest ten per cent of a normal population."[36]

V. MUSICAL ABILITY RATINGS

The ratings of musical abilities. Ratings of the following musical aspects were included in this study: (1) Musicality, (2) Ability to Sight-Read music, and (3) Ability to Perform. In order to obtain ratings of these abilities for these 180 students, the help of the Music Faculty of Michigan State College was enlisted. The process was implemented in the following manner.

First, the general outline of the study was presented, verbally to this faculty group. The general rating procedure was outlined at this meeting.

Secondly, a letter was sent to each staff member outlining the purpose and technique of the study. As regards to the ratings, the purposes of this letter were:

(1) To acquaint each music staff member with the musical abilities for which a rating was needed. This letter included

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[36] Seashore, op. cit., p. 16.

a variety of definitions for each musical ability. Each faculty member was asked to state his reaction to these definitions as to adequacy and pertinency. In this way, consensus definitions were arrived at for each musical ability.

(2) To give each faculty member opportunity to list those individual students for whom ratings based upon adequate contact could be made. An alphabetical checklist of students was included with this letter. Applied music teachers were asked to rate their private students in applied music as to Musicality, Sight-Reading, and Ability to Perform. Teachers of class instruments and voice classes were asked to rate their students on these three abilities as they applied to the instrumental or vocal music class. Theory teachers were asked for ratings of Musicality for their theory class students. Other faculty members were asked to check those students for whom ratings could be made, based on adequate contacts with the student in situations other than those listed above.

As these checklists of students were returned, a second letter was sent to each staff member with (1) a discussion of the rating procedure and (2) individual rating scale forms for each student included on the particular checklist.

This second letter included the following: (1) Statement of the rationale of the scales. "Each of the rating scales has many factors which contribute to it in some unknown and not directly measurable ratio. It would seem most satisfactory

and justifiable, therefore, to obtain the desired rankings through the judgment of professionally qualified persons. It is assumed, further, that each item will be considered as a single concept rather than as a composite of discrete elements."

(2) Detailed statement of the procedure to be used in making these ratings. The rating instructions were made explicit according to procedures delineated by Adkins.[37]

(3) The final form of the definitions of abilities in the rating scales as follows:

Musicality: Having a responsiveness to music; having a fondness or intelligent appreciation for music; having a sensitivity to musical feeling; having an inner urge towards music.

Ability to Sight-read. Ability to perform music of a reasonable grade of difficulty at sight on his major or minor instrument. Ability to perform music of a reasonable grade of difficulty at sight on his class instrument or in the vocal class. In general: Ability to organize musical material into an intelligible performance at sight.

Ability to Perform. Ability to organize studied or memorized music into a musical performance commensurate with

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[37] Dorothy Adkins, Construction and Analysis of Achievement Tests. Washington, D. C.: United States Government Printing Office, 1947, p. 179.

his level of training and musicality before any audience. In general: Ability to realize his musical potentialities in a performing capacity before any audience.

(4) Rating scale forms for individual students. These forms included information as to the student's major instrument, curriculum, year in school and age at which he began music study. (See the Appendix for the actual rating form and the discussion of the rating procedure.)

VI. APPLIED MUSIC GRADES

Applied music grade point averages. Each music student is required to enroll for a minimum of two years study of applied music at Michigan State College. In most instances undergraduate students continue applied music study with the same instrument throughout all four years of college. This applied music study consists of private lessons on a musical instrument or in voice. It appeared safe to assume that grades received for such work would be of some usefulness to the present research problem.

Letter grades are used at Michigan State College and are given the following quality point values:

A - 4 quality points
B - 3 quality points
C - 2 quality points
D - 1 quality point
F - no quality points

In order to arrive at a workable score relating to the applied music study grades the following procedure was used:

(1) Grades received during consecutive school terms for the 1950-1951 regular session were selected for inclusion in the study. This included grades received in Fall quarter 1950, Winter quarter 1951, and Spring quarter 1951. In three cases, consecutive grades were not available. Consecutive grades for the previous session were used in these instances. In one instance, grades were not available, because the level of work done was below college requirements.

(2) A score combining grades received in each of these three consecutive terms was arrived at by converting letter grades to quality points and summing. This procedure yielded "averages" which were readily usable and which avoided the use of decimals.

CHAPTER V

SUMMARY OF STUDY DATA

This chapter presents the test data in various forms pertinent to the problem. The chapter presents data designed (1) to point up the performance of this group on the several tests used in the study, (2) to show the relation between this test performance of the group and ratings and grades, and (3) to point up the test performance of several sub-groups. For the sake of conciseness, certain abbreviations have been used throughout this chapter and those to follow.

I. ABBREVIATIONS FOR TESTS

The American Council on Education Psychological Examination will be abbreviated as follows: ACE will refer to the test in general, ACE-T to the total score, ACE-Q to the quantitative score, ACE-L to the Linguistic score.

The Bernreuter Personality Inventory will be abbreviated as follows: BPI will refer to the test in general, B1-N to the Neuroticism score, B2-S to the Self-Sufficiency score, B3-I to the Introversion score, B4-D to the Dominance score, F1-C to the Confidence score, and F2-S to the Sociability score.

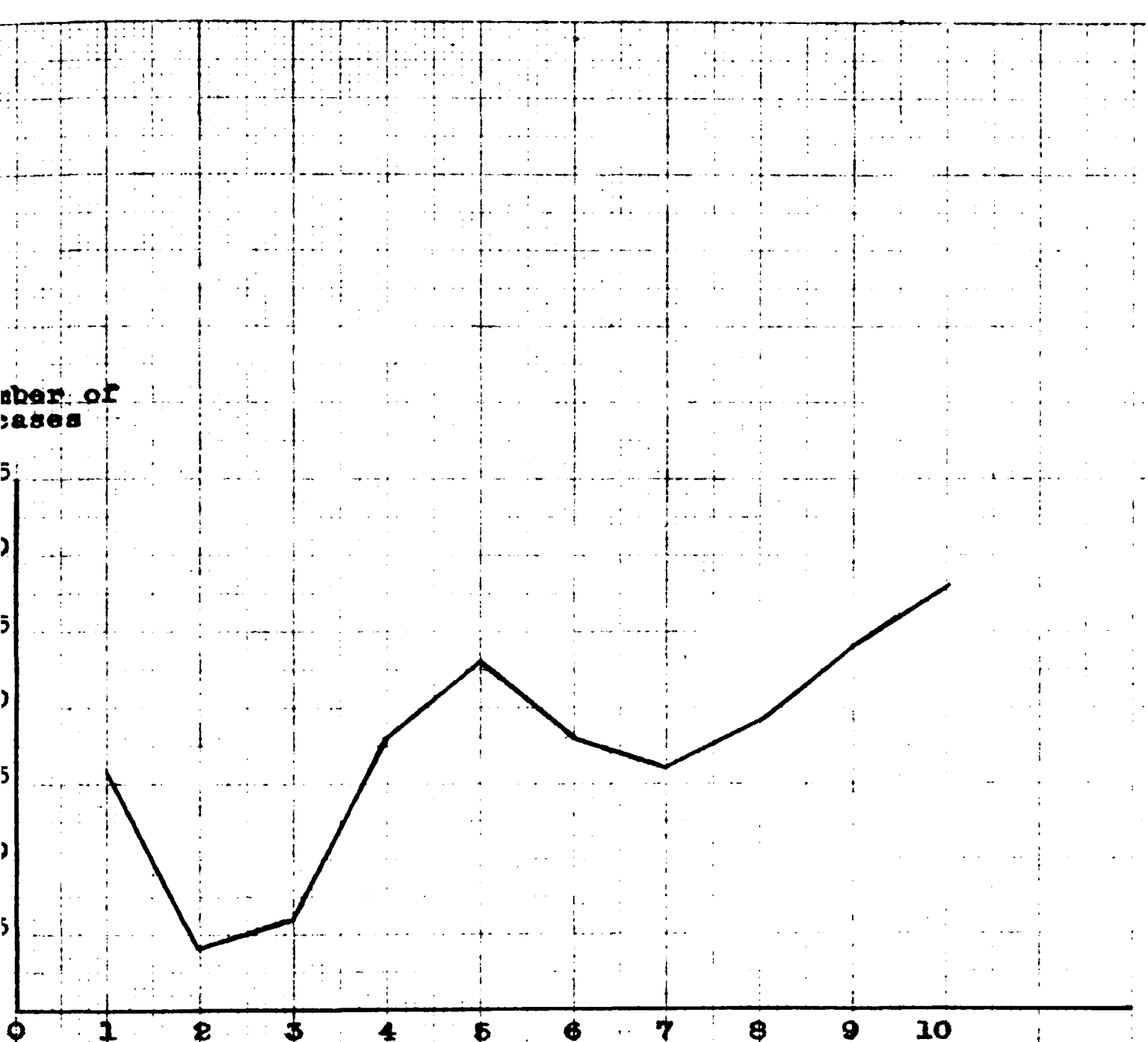
The Cooperative Reading Comprehension Test will be abbreviated as follows: CRCT will refer to the test in general, CRCT-T to the Total score, CRCT-V to the Vocabulary score, CRCT-R to the Speed of Reading Score, and CRCT-C to the Level of Comprehension Score.

The scores of the Seashore Measures of Musical Talent will be identified simply as the Seashore scores. The various measures will be identified as Pitch, Time, Timbre, Rhythm, Loudness, and Tonal Memory tests.

The musical ability ratings and applied music grades will be identified as such.

II. THE ACE RESULTS

Graph 5 presents the decile distribution of ACE-T scores for the total group of students studied. These scores tended toward negative skewness, with a concentration of scores above the fifth decile. This distribution tended toward bi-modality with modes at the tenth and fifth deciles with 28 and 23 scores, respectively. Above the fifth decile, there were 61.04 per cent of the scores, whereas 50 per cent would be expected. Above the eighth decile, there were 30.23 per cent of the scores, whereas 20 per cent would be expected. The middle four deciles had 43.60 per cent of the scores and the bottom three deciles contained 15.11 per cent of the scores. The decile mean of these ACE-T scores was 6.37 with a standard



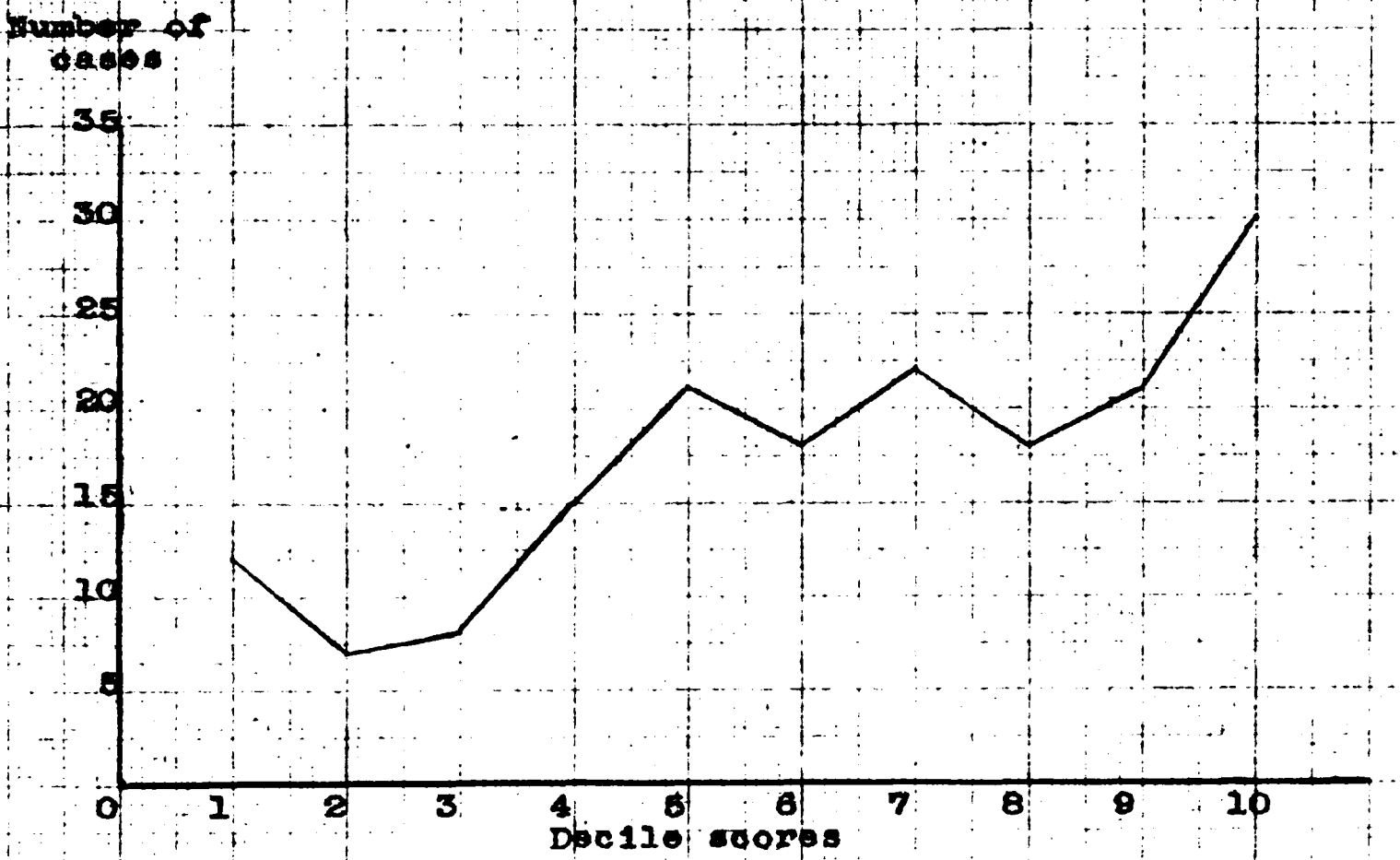
Graph 5

DISTRIBUTION OF ACE-T SCORES

deviation of 2.67. The decile having the most scores (the mode) was the tenth, with 28 scores, 16.27 per cent of the total. It should be noted that this decile had more scores than the sum of those scores in the first, second, and third deciles.

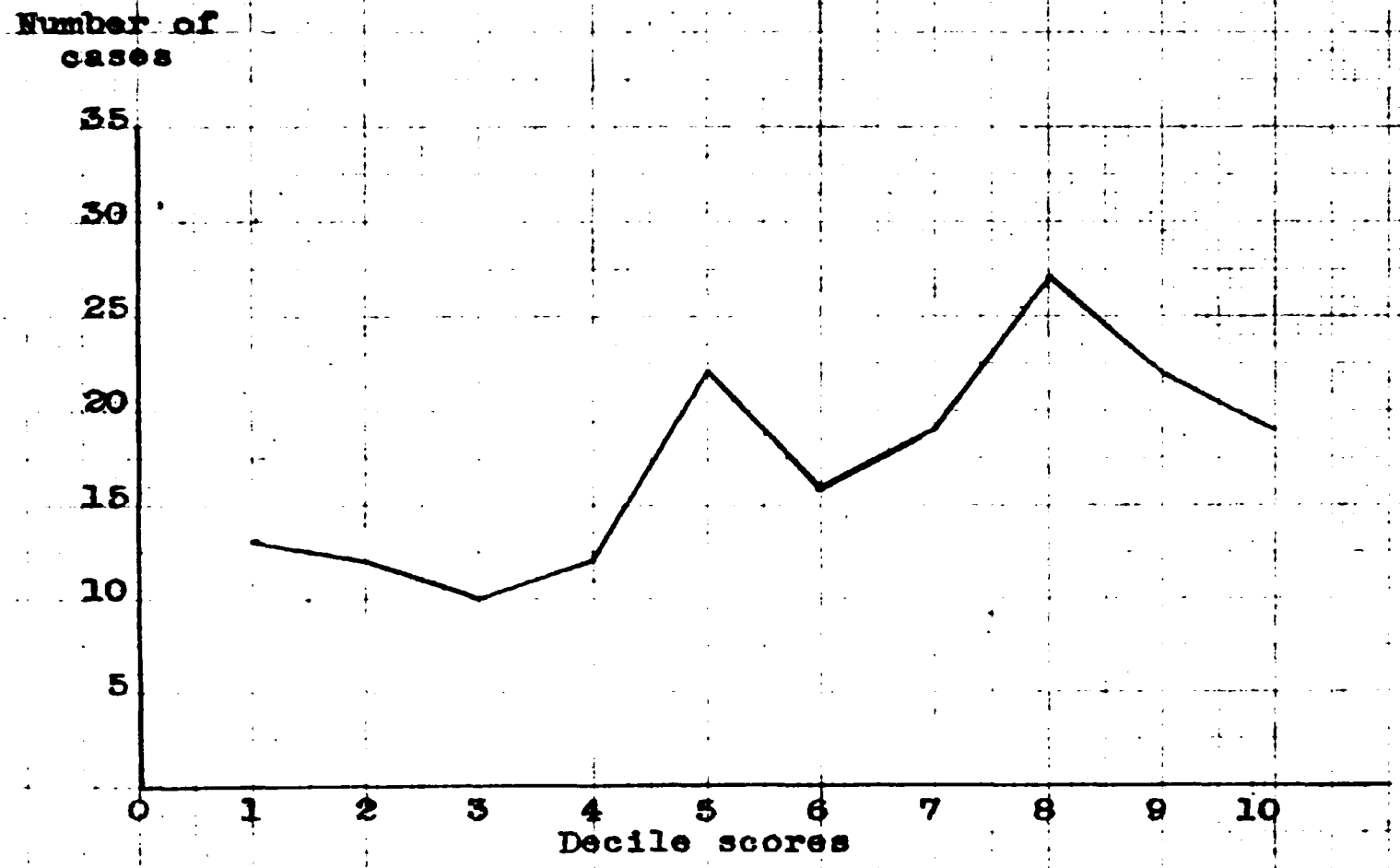
Graph 6 shows the distribution of the ACE-L scores. These scores exhibited a tendency, similar to that of the ACE-T scores, toward negative skewness. Above the fifth decile, there were 63.37 per cent of the scores, with 17.44 per cent of the scores clustered at the tenth decile. The lowest three deciles taken together, contained 16.27 per cent of the scores, fewer than in the tenth decile alone. The middle four deciles contained 44.12 per cent of the scores. The decile mean for this distribution of ACE-L scores was 6.40 with a standard deviation of 2.97. This distribution exhibited considerable tendency toward eveness of distribution of scores above the fourth decile.

Graph 7 shows the decile distribution of the ACE-Q scores. This distribution showed somewhat less negative skewness than was found in the other ACE distributions. The middle four deciles taken together contained 40.11 per cent of the scores; the bottom four deciles contained only 27.32 per cent of the scores. The mean of the ACE-Q scores was 6.08 with a standard deviation of 2.61. Of these scores, 59.81 per cent were above the fifth decile, with 50.58 per cent above the sixth decile.



Graph 6

DISTRIBUTION OF AGE-L SCORES



Graph 7

DISTRIBUTION OF ACE-Q SCORES.

Table I gives the decile means of the ACE scores made by the four undergraduate classes. Seniors as a group scored slightly higher on all ACE scores than the other three classes. All averages on the table were higher than the fifth decile.

In Table II, the decile means scored by the several curricular groups are shown. The Theory, Science and Arts, and Music Therapy students had the highest averages on all ACE scores. The larger groups tended to show small differences between groups. In general, the ACE-L averages were higher than the ACE-Q averages. All averages were above the fifth decile.

On Table III, the ACE means are shown computed for the several major instrument groupings. The averages for the woodwind instrument players were highest in each instance, with the averages of the string instrument players second highest. In general, the ACE-L averages were higher than the ACE-Q averages. This was not true, however, when there were more males than females in a grouping, as in the instance of brass instrument players, who had higher ACE-Q averages. All averages were above the fifth decile.

On Table IV, averages scored on the ACE are given for the male and female students. The ACE-T averages showed only a slight difference in favor of the males. The males had the highest ACE-Q average, while the females had the hignest ACE-L average. All averages were higher than the fifth decile.

TABLE I

AVERAGE ACE SCORES FOR THE FOUR CLASSES

Class	No.	ACE-L	ACE-Q	ACE-T
Freshman	66	6.42	5.91	6.29
Sophomore	28	6.39	5.43	6.14
Junior	45	6.22	6.09	6.24
Senior	34	6.71	6.79	7.00

TABLE II

AVERAGE ACE SCORES FOR THE CURRICULAR GROUPS

Curriculum	No.	ACE-L	ACE-Q	ACE-T
Applied Music	28	6.32	5.25	5.89
SM-general*	71	6.30	5.94	6.28
SM-instrumental	39	6.05	6.07	6.15
Theory	16	7.50	7.18	7.56
Science & Arts	11	7.72	6.64	7.55
Music Therapy	5	7.60	7.00	7.60

*SM--School Music

TABLE III

AVERAGE ACE SCORES FOR THE INSTRUMENTAL GROUPS

Instrumental Group	No.	ACE-L	ACE-Q	ACE-T
Brass	18	5.33	5.61	5.44
Woodwind	28	7.04	7.00	7.18
String	14	6.71	6.71	6.93
Piano	69	6.77	6.25	6.64
Voice	42	6.24	5.26	5.93

TABLE IV

AVERAGE ACE SCORES FOR THE MALE AND FEMALE GROUPS

Sex	No.	ACE-L	ACE-Q	ACE-T
Male	66	6.24	6.50	6.44
Female	107	6.53	5.72	6.36

Table V shows product-moment correlation coefficients found between the ACE scores and ratings of Musicality, Sight-Reading ability, Performance ability, and applied music grades. These ACE scores were not significantly correlated with Performance ability ratings nor with applied music grades. The coefficients of correlation found between ratings of Musicality and Sight-Reading ability were found to be significant, though low. The correlations involving the ACE-Q scores and ratings were larger than those correlations involving the ACE-L scores and the ratings. The largest single correlation was .305 ±.07 found between ACE-T and Musicality ratings.

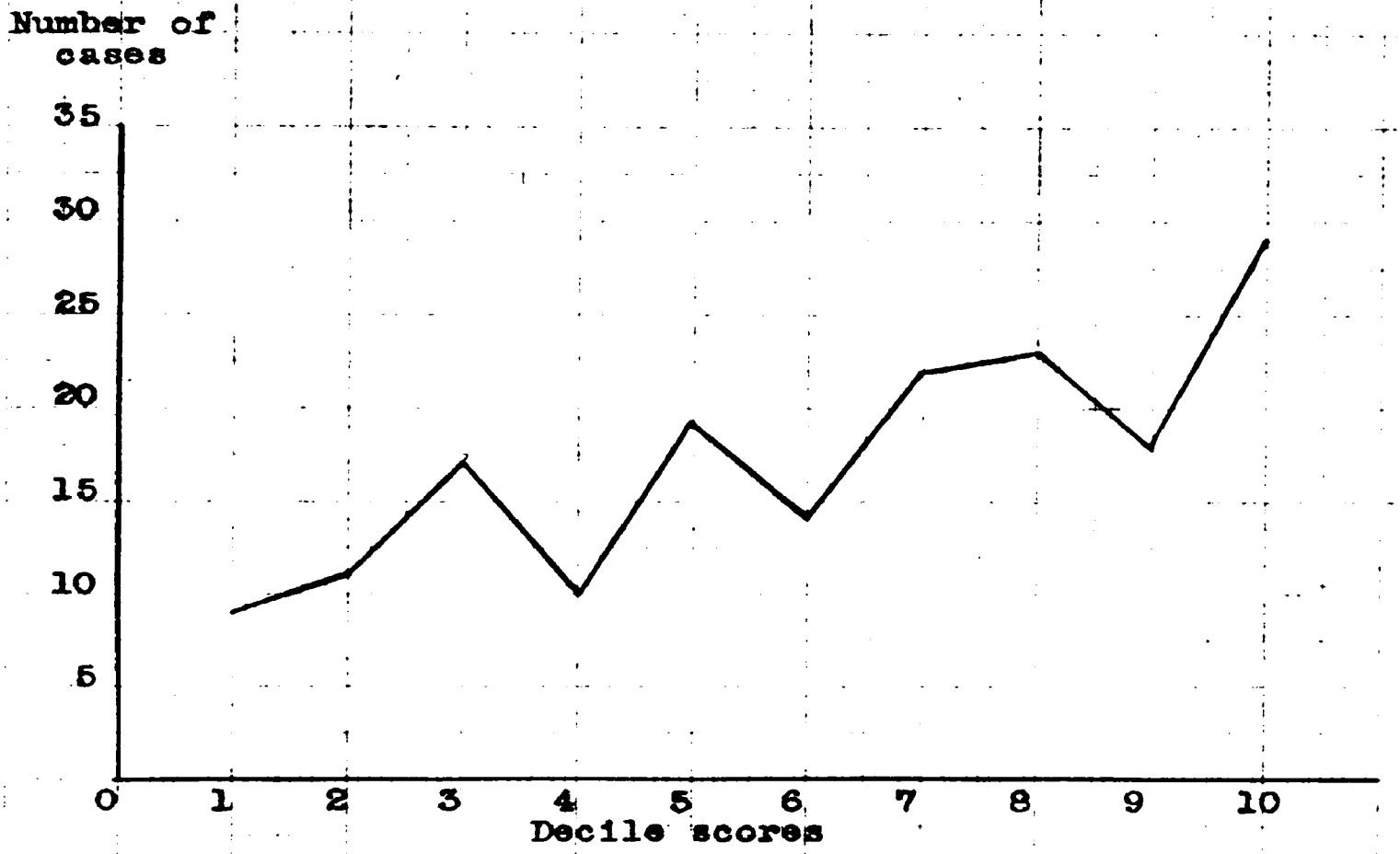
III. THE CRCT RESULTS

Graph 8 presents the distribution of CRCT-T scores by deciles. This distribution was similar to those of the ACE scores, exhibiting a tendency toward negative skewness. The distribution was a multi-modal one with concentrations of scores at the third, fifth, seventh, eighth, and tenth deciles. The tenth decile had 29 scores, or 16.86 per cent of the total, and in the top five deciles were 61.62 per cent of the scores, whereas, 50 per cent would normally be expected. The middle four deciles contained 37.79 per cent and the bottom three deciles contained 21.51 per cent of the total. The mean of this CRCT-T distribution was 6.05 with a standard deviation of 2.65.

TABLE V

CORRELATION COEFFICIENTS FOUND BETWEEN ACE SCORES AND THE MUSICAL ABILITY RATINGS AND APPLIED MUSIC GRADES

ACE Scores	Musicality	Sight-Reading	Performance	Applied Music Grades
ACE-L	.218±.07	.213±.08	.012±.08	.082±.07
ACE-Q	.271±.07	.250±.07	.095±.08	.002±.07
ACE-T	.305±.07	.242±.07	.039±.08	.074±.07



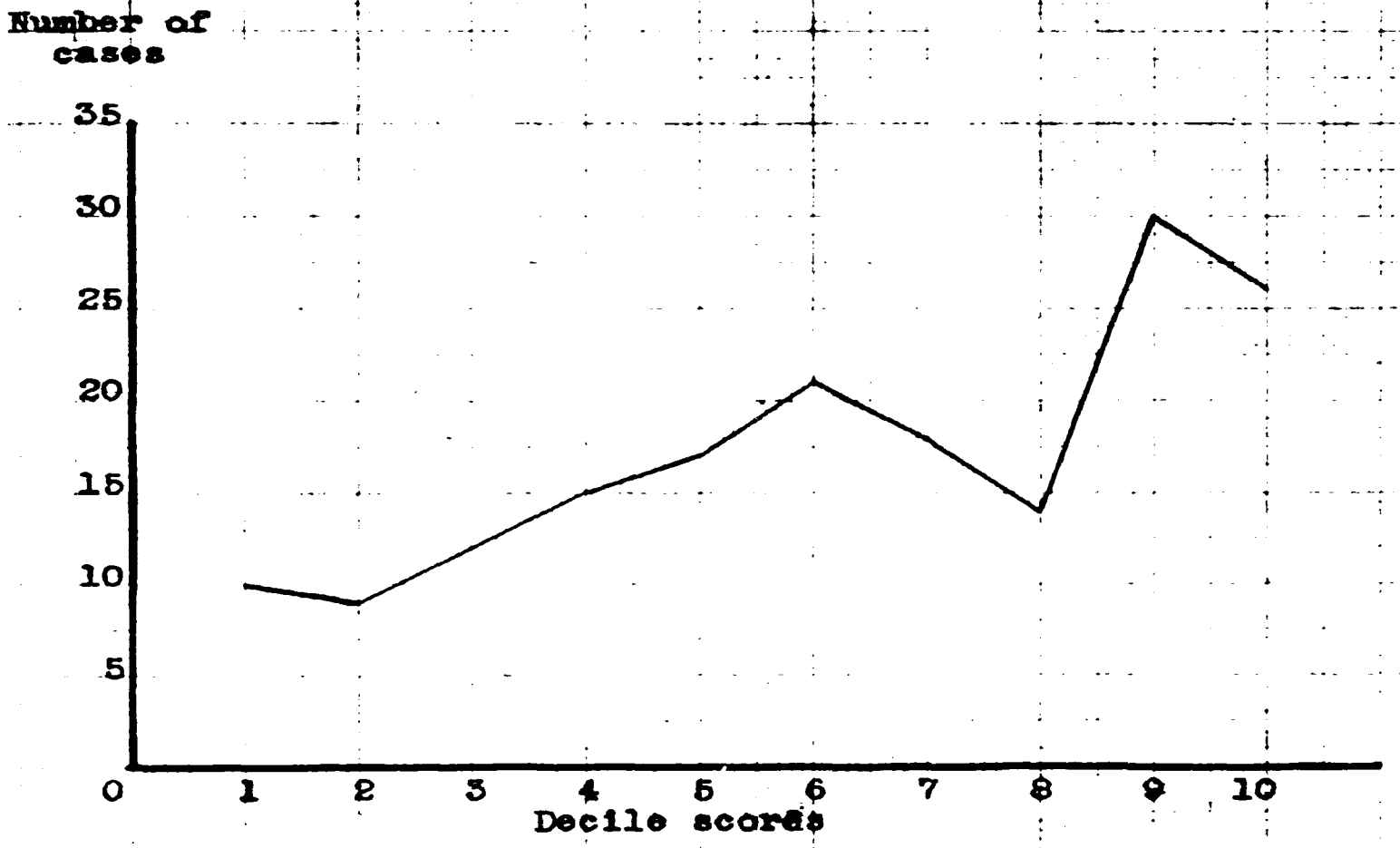
Graph 8

DISTRIBUTION OF CRCT-T SCORES

The distribution of the CRCT-V scores is shown on Graph 9. This distribution of scores was bi-modal, but exhibited considerable negative skewness. In the top five deciles there were 63.37 per cent of the scores, with 32.55 per cent concentrated in the ninth and tenth deciles, taken together. In the middle four deciles were 41.27 per cent of the scores and 18.02 per cent of the scores were found in the first three deciles taken together. The mean of these scores was 6.55 with a standard deviation of 2.41.

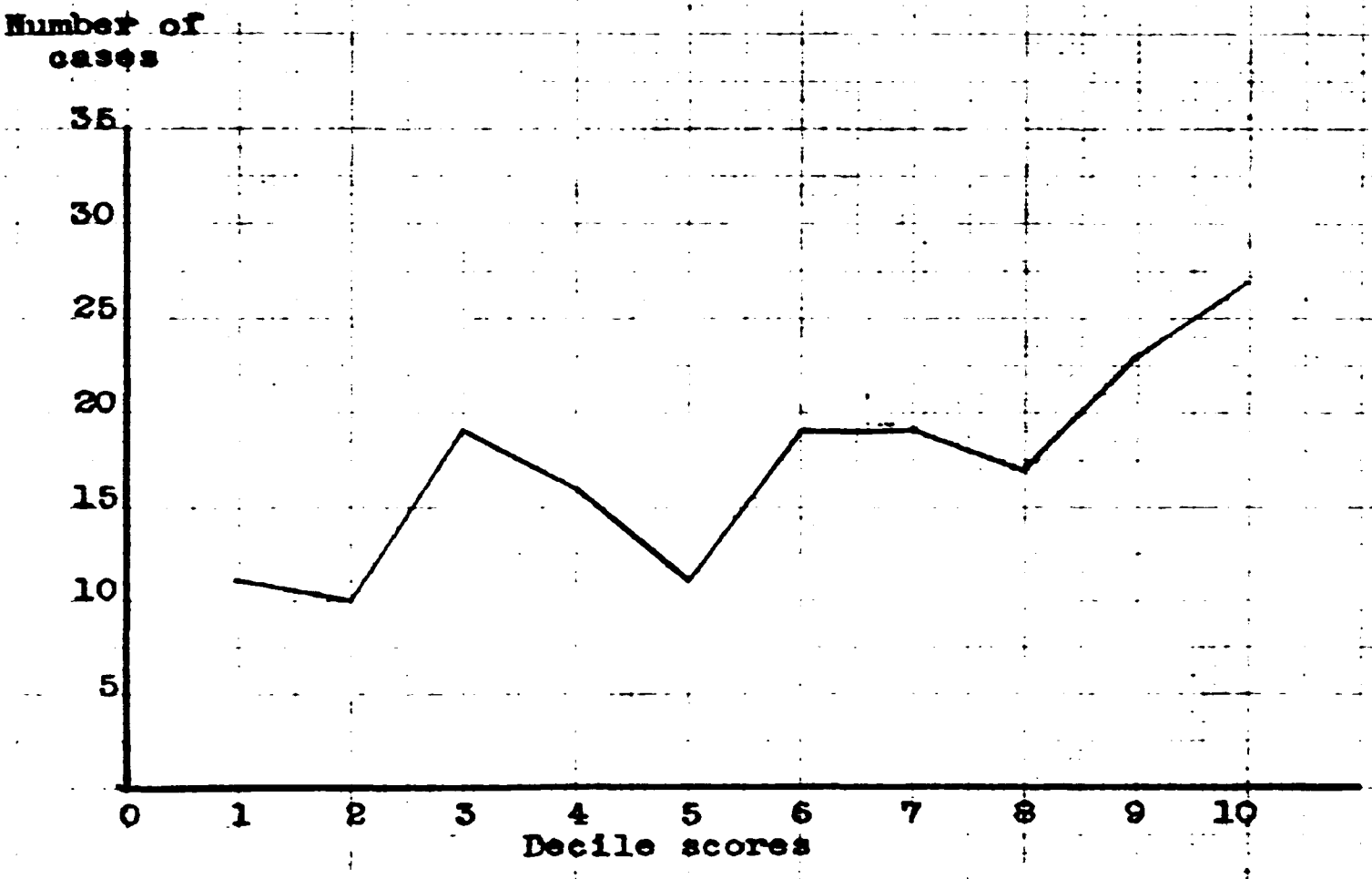
The distribution of CRCT-R scores is shown on Graph 10. The distribution was negatively skewed and had modes at the third, the sixth and seventh, and tenth deciles. In the upper five deciles, there were 61.04 per cent of the scores with 29.06 per cent in the top two deciles, taken together. The middle four deciles contained 37.79 per cent and the bottom two deciles, taken together, had 12.20 per cent of the total. The mean of this CRCT-R distribution was 6.31 with a standard deviation of 2.86.

The distribution of the CRCT-C scores is given in Graph 11. This distribution tended toward negative skewness but was unique in its tendency toward flatness. No well marked modes appear, although there was a piling up of scores above the sixth decile. In the top four deciles there were 51.74 per cent of the scores and 38.37 per cent were found in the middle four deciles, and 22.67 per cent were found



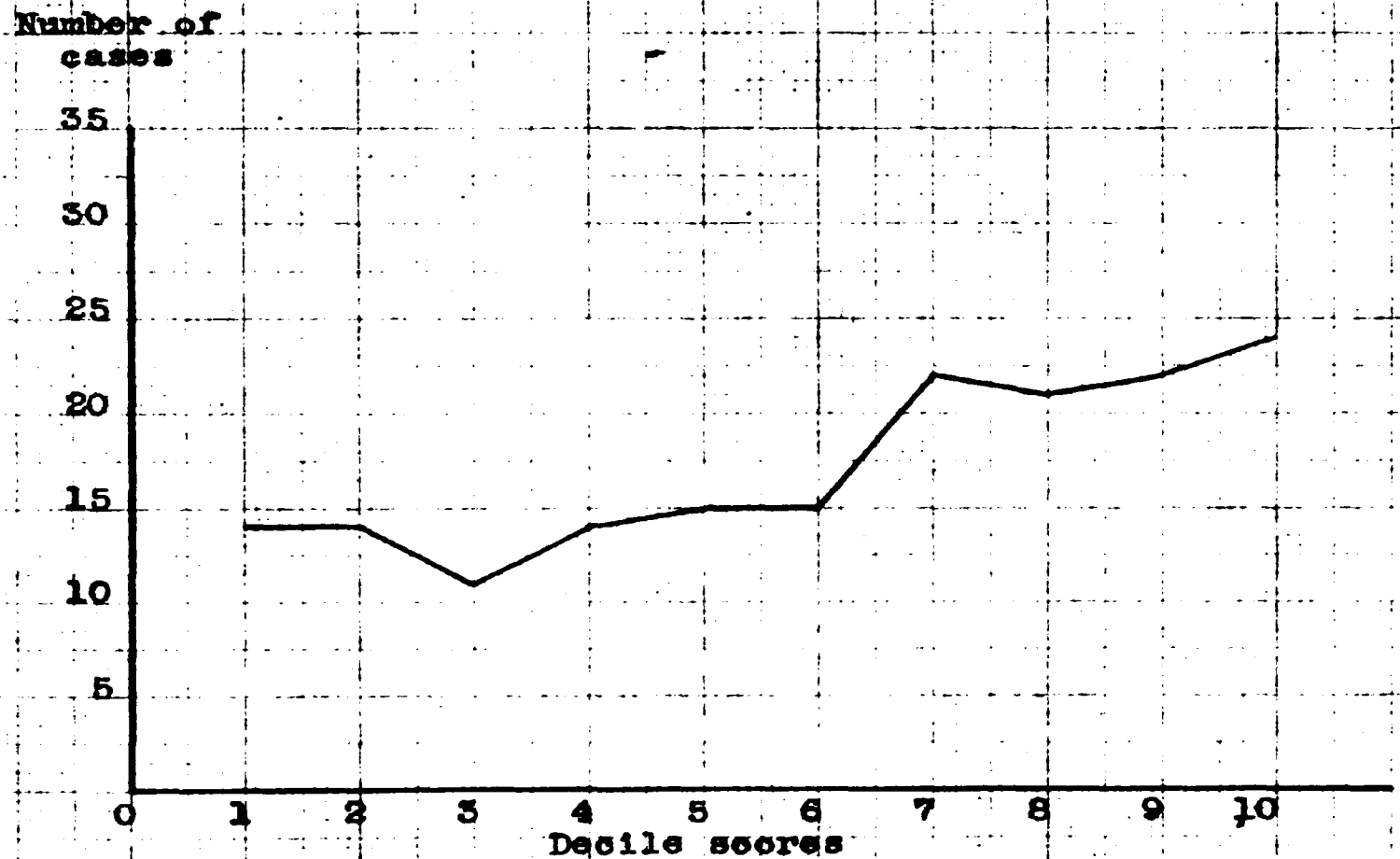
Graph 9

DISTRIBUTION OF CRCT-V SCORES



Graph 10

DISTRIBUTION OF CRCT-R SCORES



Graph 11

DISTRIBUTION OF CRCT-C SCORES

in the bottom three deciles. The mean of the distribution was 6.19 with a standard deviation of 2.89. The means of each of the CRCT scores was higher than the fifth decile.

In Table VI, the means scored by the four undergraduate classes for each of the CRCT scores are shown. The classes were ranked by CRCT-T averages as follows: seniors, sophomores, juniors, and freshmen. There was no definite profile pattern from class to class on these averages. All averages were above the fifth decile.

In Table VII, the distribution of CRCT means (in deciles) is shown computed for curricular groupings. The averages of the Music Therapy, Theory, and Science & Arts groups tended to cluster from one to two deciles above the Applied, PSM-general, and PSM-instrumental curricula. No profile pattern fitted all curricula groups. All averages were above the fifth decile.

In Table VIII, the CRCT averages are given for major instrument groupings. Average differences between the groups were not large except in the instance of the brass instrument group, which had averages approximately a decile or more below the other groupings. In general, the averages of the woodwind instrument group were highest on these CRCT scores. All averages were higher than the sixth decile, with the exception of those of the brass instrument group.

TABLE VI

AVERAGE CRCT SCORES FOR THE FOUR CLASSES

Class	No.	Vocabulary	Speed of Comprehension	Level of Comprehension	Total
Fresh.	65	6.40	5.99	6.12	6.14
Soph.	28	6.54	6.68	5.79	6.39
Jr.	45	6.20	6.23	6.44	6.31
Sr.	23	6.76	6.27	6.21	6.64

TABLE VII

AVERAGE CRCT SCORES FOR THE CURRICULAR GROUPS

Curriculum	No.	Vocabulary	Speed of Comprehension	Level of Comprehension	Total
App. Music	28	6.64	6.39	6.28	6.42
SM-general*	71	6.21	6.08	6.18	6.24
SM-instrumental	39	5.97	5.53	5.20	5.66
Theory	16	7.56	7.18	7.43	7.50
Science & Arts	11	6.91	7.00	6.27	7.00
Music Therapy	5	7.20	7.40	7.40	7.80

*SM--School Music

TABLE VIII

AVERAGE CRCT SCORES FOR THE INSTRUMENTAL GROUPS

Instrument	No.	Vocabulary	Speed of Comprehension	Level of Comprehension	Total
Brass	18	5.56	4.78	4.39	4.94
Woodwind	28	6.36	6.79	6.61	6.68
String	14	6.43	6.21	6.36	6.50
Piano	69	6.59	6.45	6.44	6.59
Voice	42	6.59	6.07	6.19	6.34

In Table IX, the CRCT means are shown computed for sex groups. The female students had higher averages in all instances, with the exception of the CRCT-V scores. Differences between the groups were not great. All averages were above the fifth decile.

The correlation coefficients found between the CRCT scores and the musical ability ratings and applied music grades are shown in Table X. There were two significant coefficients on the table: (1) between the CRCT-V scores and the Musicality rating, .267 ± .07; and (2) between the CRCT-R scores and the Musicality ratings, .249 ± .07.

IV. THE BPI RESULTS

The BPI scores were computed in percentiles and were used in this form throughout the study except when compiled into frequency distributions. For clarity and conciseness, decile scores were used in the distributions of B1-N, B2-S, B3-I, and B4-D scores. In Graph 12, the distribution of the B1-N scores is shown by deciles. This distribution was multi-modal, but had considerable positive skewness. There were 69.07 per cent of the scores in the bottom five deciles, with 47.51 per cent in the bottom three deciles and 35.91 per cent in the bottom two deciles. The middle four deciles contained 35.91 per cent of the scores. The percentile mean of these scores was 38.91 with a standard deviation of 26.56.

TABLE IX

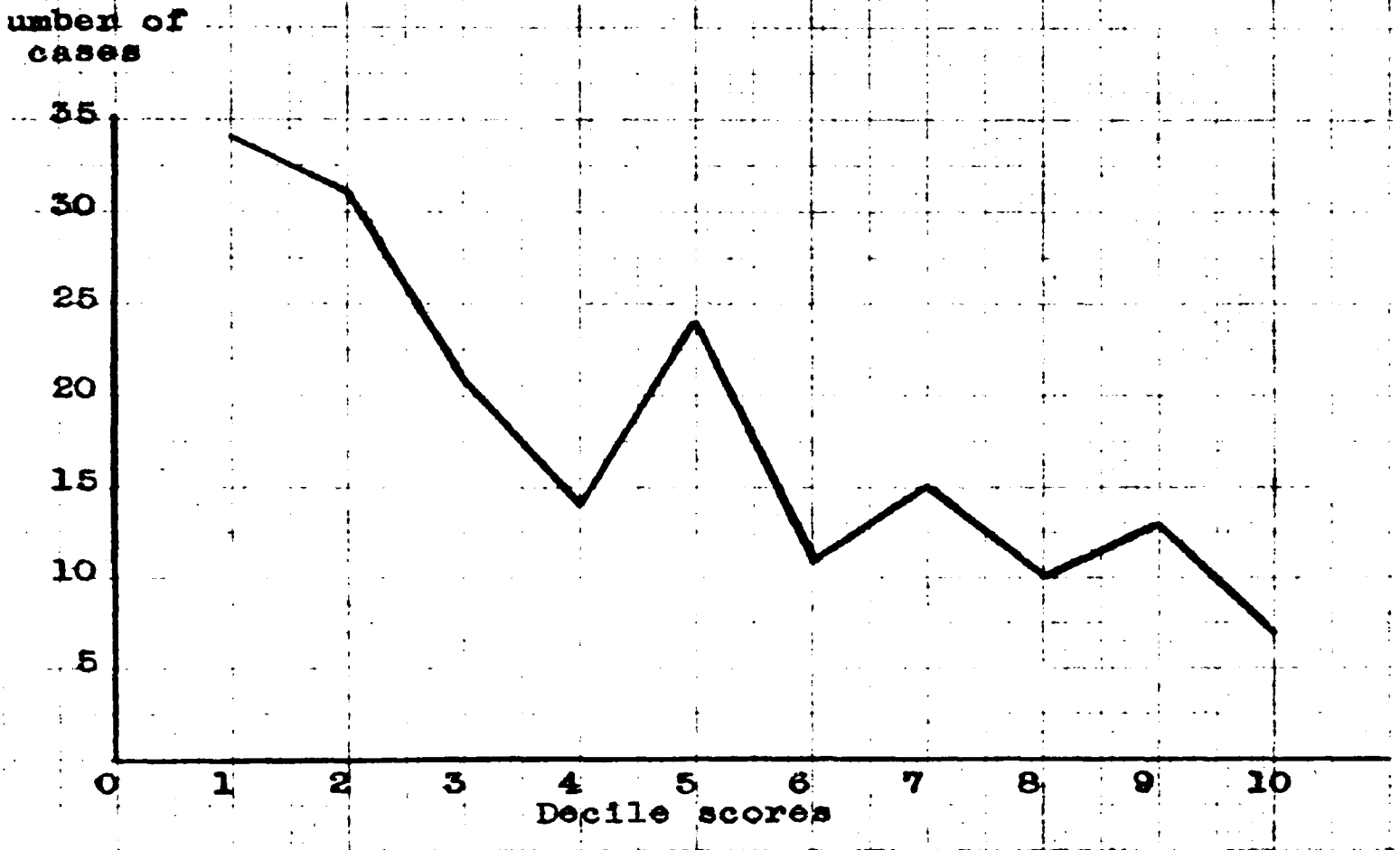
AVERAGE CRCT SCORES FOR THE MALE AND FEMALE GROUPS

Sex	No.	Vocabulary	Speed of Comprehension	Level of Comprehension	Total
Male	66	6.57	6.09	5.78	6.20
Female	107	6.42	6.30	6.36	6.42

TABLE X

CORRELATION COEFFICIENTS FOUND BETWEEN CRCT SCORES AND THE MUSICAL ABILITY RATINGS AND APPLIED MUSIC GRADES

CRCT Scores	Musicality	Sight-Reading	Performance	Applied Music Grades
CRCT-V	.267±.07	.206±.08	.102±.09	.142±.08
CRCT-R	.249±.07	.222±.08	.094±.08	.117±.08
CRCT-C	.133±.07	.149±.08	.057±.09	.015±.08
CRCT-T	.201±.07	.215±.08	.100±.08	.111±.08



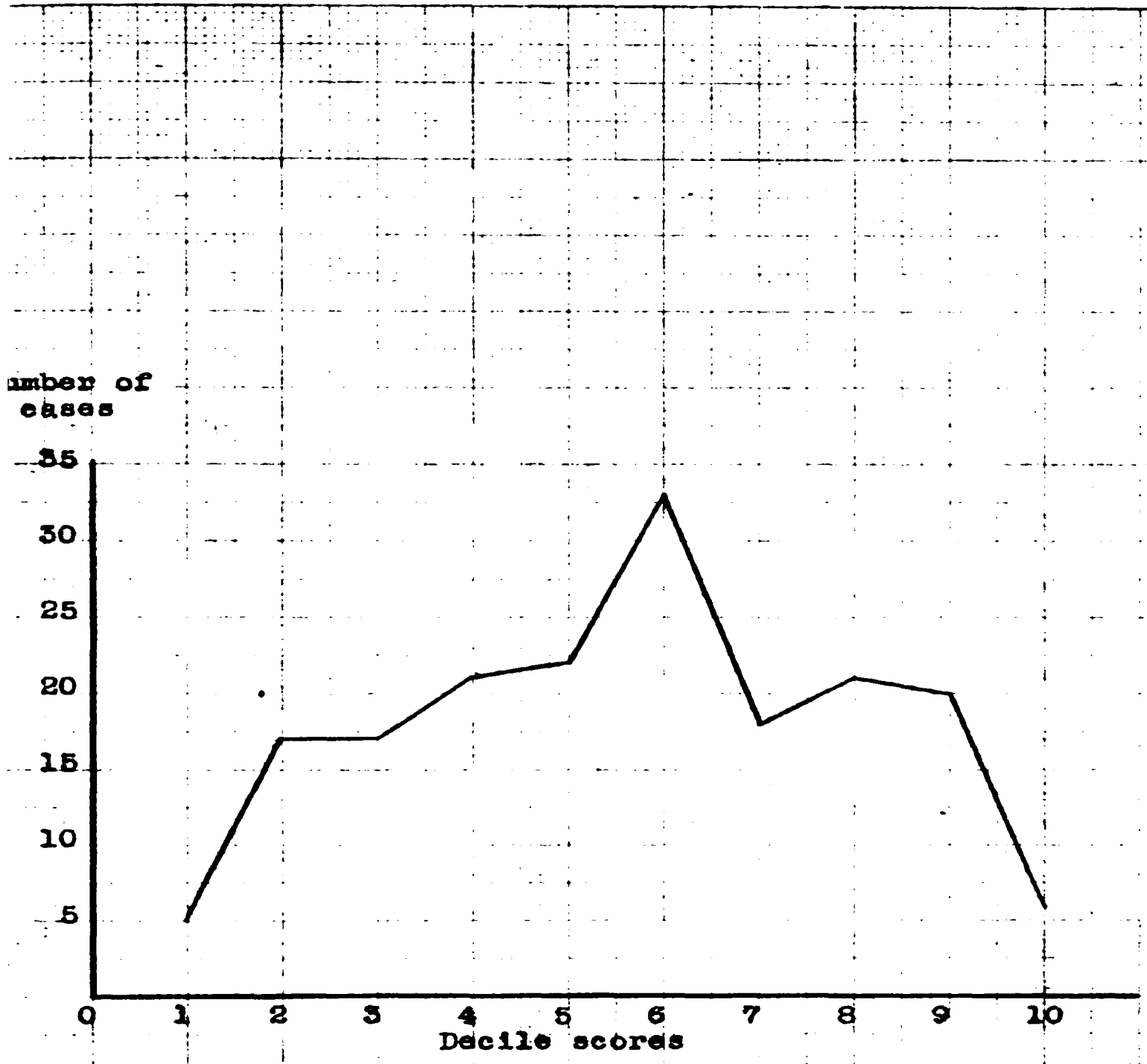
Graph 12

DISTRIBUTION OF BERNREUTER PERSONALITY INVENTORY B1-N SCORES

The distribution of the B2-S scores is shown in Graph 13. This distribution resembled a normal distribution in several ways. (1) The distribution had a marked central tendency, with 33 scores at the sixth decile. (2) The top five deciles contained fifty per cent of the scores and the middle four deciles contained 52.22 per cent of the scores. The percentile mean of these scores was 51.52 with a standard deviation of 22.87.

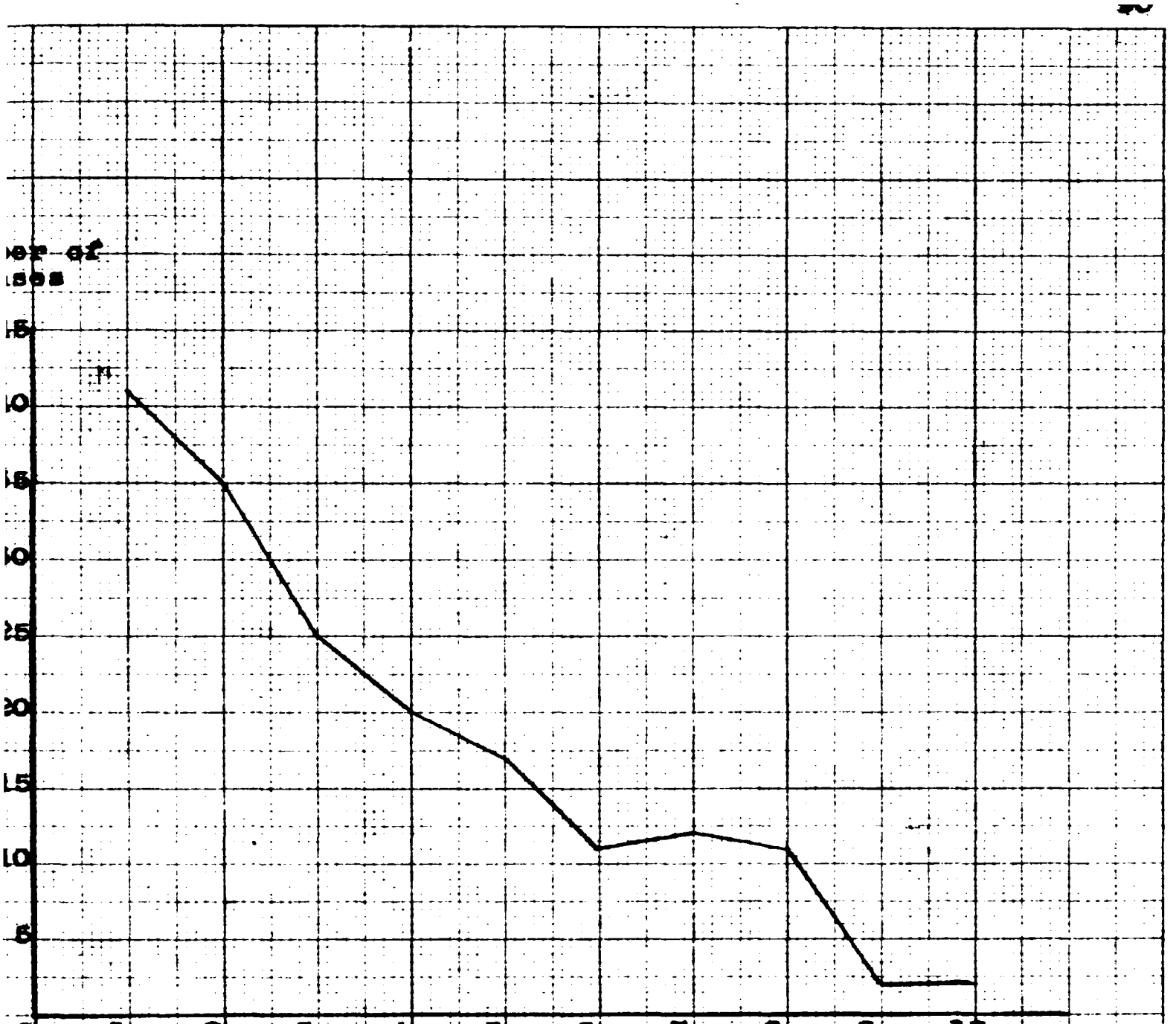
The distribution, in deciles, is given for the B3-I scores in Graph 14. This distribution showed the sharpest negative skewness of all the BPI distributions, but showed some resemblance to the B1-N distribution. In the bottom five deciles were 76.66 per cent and in the top two deciles were 42.22 per cent of the scores. In the top two deciles were only 4.44 per cent of the scores. The percentile mean of these scores was 31.79 with a standard deviation of 25.28.

The distribution of B4-D scores is shown on Graph 15. The distribution was bi-modal, but was similar in several respects to a normal distribution. The top five deciles contained 48.33 per cent of the scores. The middle four deciles contained 52.22 per cent of the scores and the middle two deciles contained 31.66 per cent of the scores. In the bottom four deciles were 35.55 per cent of the scores. The percentile mean of the distribution was 48.29 with a standard deviation of 24.60.



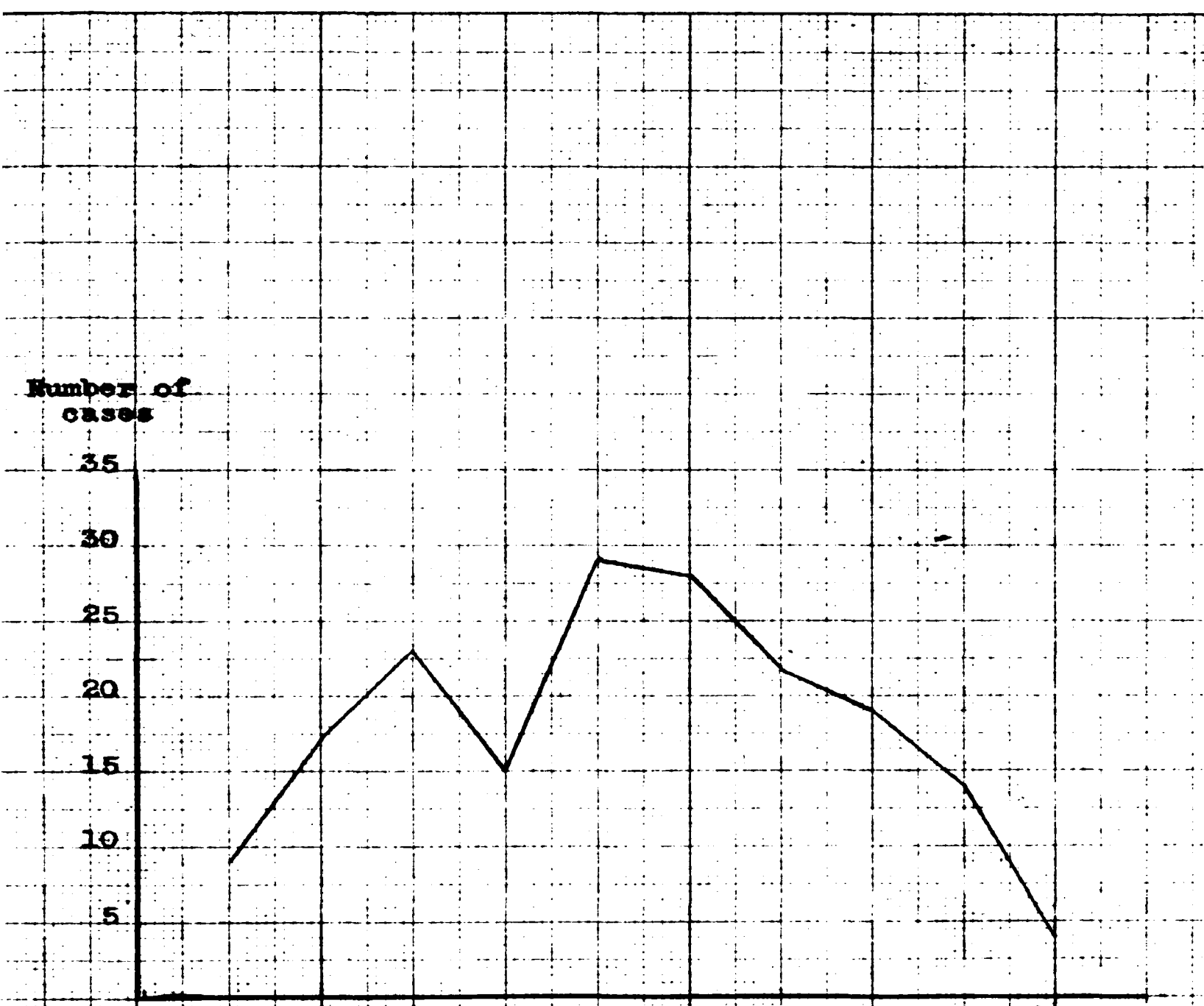
Graph 13

DISTRIBUTION OF BERNREUTER PERSONALITY INVENTORY B2-S SCORES



Graph 14

DISTRIBUTION OF BERNREUTER PERSONALITY INVENTORY BS-I SCORES

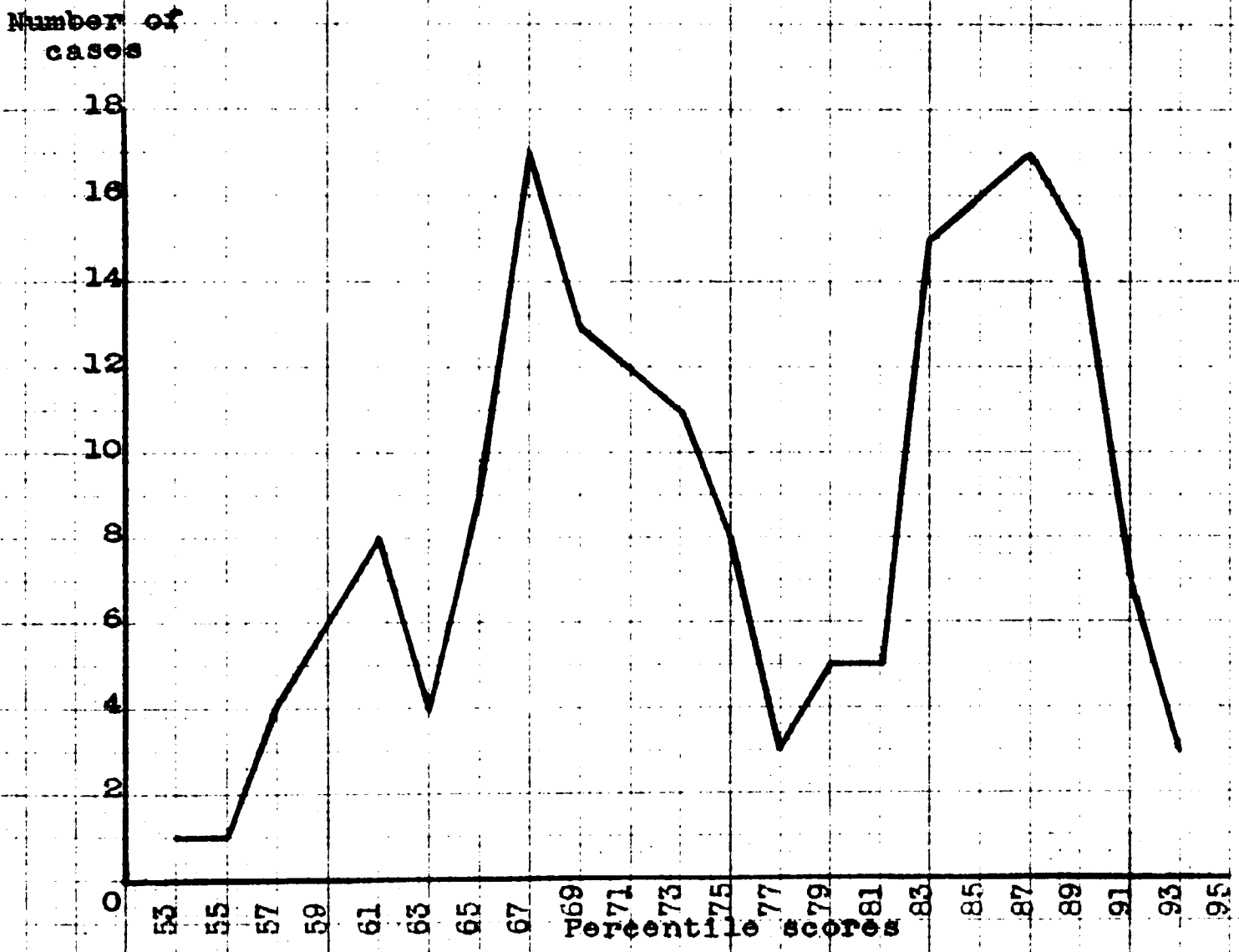


Graph 15

DISTRIBUTION OF BERNREUTER PERSONALITY INVENTORY B4-D SCORES

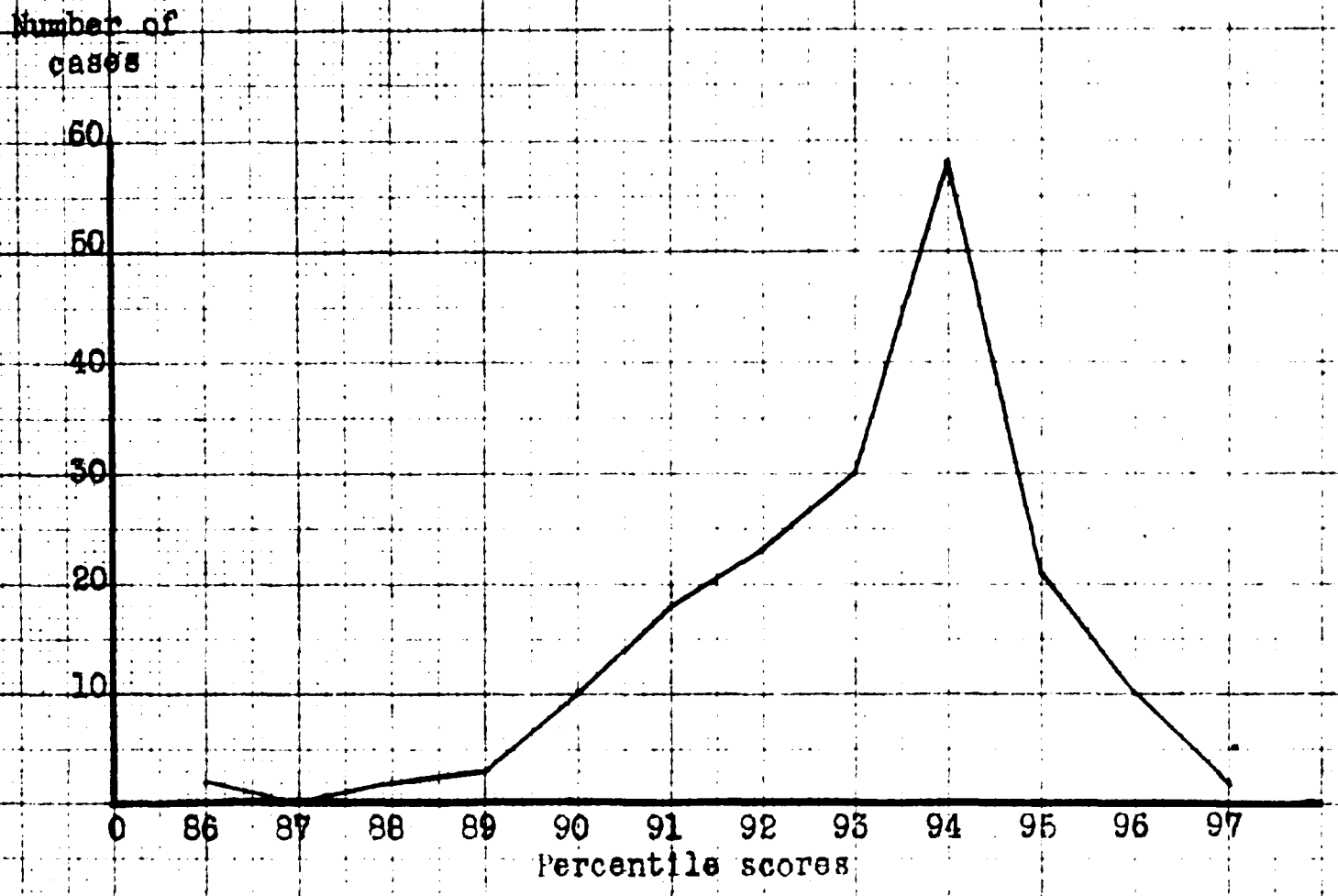
The distribution of F1-C scores is shown on Graph 16. These scores were all concentrated within four deciles ranging from the 53rd percentile to the ninety-third percentile. These scores were graphed in percentiles (grouped in intervals of two) to show the sharpness of the bi-modality of the distribution. From the fifty-second percentile to the seventy-seventh percentile were 52.22 per cent of the scores in a distribution having a strong central tendency. The area between the seventy-eighth percentile and the ninety-fifth percentile contained 46.11 per cent of the scores. This mode had a concentration of 63 scores between the eighty-second and ninety-first percentiles showing a second strong central tendency, in this total distribution of F1-C scores. The median score, of the mode found between the fifty-second and seventy-ninth percentiles (the lower mode), was approximately 69. The median score, found between the seventy-eighth and ninety-fifth percentiles, (the upper mode), was approximately 87. These modes were separated by 18 percentiles. The mean of the total distribution was 75.32 percentiles with a standard deviation of 10.59. The median score of the total distribution was at the seventy-sixth percentile.

The distribution of the F2-S scores is given in Graph 17. These scores were graphed in percentiles with a single percentile in each interval. All of the scores were above the eighty-fifth percentile with 90.55 per cent above the



Graph 16

DISTRIBUTION OF BERNREUTER PERSONALITY INVENTORY F1-C SCORES



Graph 17

DISTRIBUTION OF BERNREUTER PERSONALITY INVENTORY F2-S SCORES

ninetieth percentile, and 51.11 per cent above the ninety-third percentile. The distribution showed a marked modal tendency at the ninety-fourth percentile which had 58 scores, 32.22 per cent of the total. Despite a strong modal tendency, the distribution simulated a bell-shaped distribution. The mean of these scores was 93.08 with a standard deviation of 1.95.

Table XI gives the averages of the BPI scores computed by classes. Averages for all classes on all scores tended to cluster around the total group averages. A single pattern described the profile of these averages. The averages of these BPI scales tended to cluster as follows: B1-N averages around the thirty-ninth percentile, the B2-S averages around the fifty-second percentile, the B3-I averages around the thirty-second percentile, the B4-D averages around the forty-eighth percentile, the F1-C averages around seventy-fifth percentile, and the F2-S averages around the ninety-third percentile.

The averages for the BPI scales are shown on Table XII computed for the several curricular groups. The profile pattern described by each of these curricular averages was described as follows: B1-N, low; B2-S high; B3-I, low; B4-D, high; F1-C, very high; and F2-S, extremely high. Sharpest differences from scale to scale were found in the profile of averages of the Music Therapy group, consisting of five students. The BPI averages of the larger curricular

TABLE XI

AVERAGE BPI SCORES FOR THE FOUR CLASSES

Class	No.	B1-N	B2-S	B3-I	B4-D	F1-C	F2-S
Freshman	68	39.16	50.07	31.44	47.14	74.86	92.97
Sophomore	29	40.97	56.03	33.59	50.03	75.86	93.41
Junior	47	38.81	53.28	31.96	49.81	73.62	93.23
Senior	36	37.53	50.94	31.06	49.06	77.97	92.88

TABLE XII

AVERAGE BPI SCORES FOR THE CURRICULAR GROUPS

Curriculum	No.	B1-N	B2-S	B3-I	B4-D	F1-C	F2-S
Applied Music	30	38.43	57.63	30.66	51.33	72.70	93.70
SM-general*	72	35.65	49.57	28.26	48.90	70.85	92.08
SM-instrumental	42	44.90	42.57	37.35	42.66	84.57	92.21
Theory	16	47.24	65.56	41.62	50.68	82.06	94.18
Science & Arts	12	39.91	55.17	25.92	52.67	70.92	93.67
Music Therapy	5	10.00	73.60	7.40	77.80	64.40	93.40

*SM--School Music

groups had smaller differences, (1) between groups and (2) between scales, than those of the smaller groups.

Averages for the BPI scales are shown on Table XIII computed for the several major instrument groupings. The sharpest profile pattern was found in the averages for the string instrument students. The string and piano students had scale averages separated by at least a decile from those of the other groups. In general, profile patterns were similar from group to group.

The BPI averages for the male and female students are shown on Table XIV. The profile pattern from test to test was sharper for the females than for the males. These profile patterns were similar, however.

Table XV gives correlation coefficients found between BPI scores, musical ability ratings, and applied music grades. The coefficients were all very low, none significant. The ratings and grades appeared to be unrelated to the BPI scores.

V. THE SEASHORE TEST RESULTS

The scores for the Seashore tests are computed as inverted decile scores.[1] For clarity and consistency, the frequency distribution of the Seashore scores have been

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[1] Carl E. Seashore, J. G. Saetveit, and Don Lewis, Manual of Instructions and Interpretations for the Seashore Measures of Musical Talent. Camden, New Jersey: Educational Department, RCA Victor Division, Radio Corporation of America, 1939, 19 pp.

TABLE XIII

AVERAGE BPI SCORES FOR THE INSTRUMENTAL GROUPS

Instrument	No.	B1-N	B2-S	B3-I	B4-D	F1-C	F2-S
Brass	18	47.05	47.06	42.33	45.28	86.17	92.56
Woodwind	30	43.80	46.37	36.47	44.00	81.23	92.83
String	15	32.40	56.00	29.13	54.33	76.73	92.67
Piano	72	37.53	56.14	30.49	51.21	72.11	93.50
Voice	43	38.64	49.21	31.48	46.81	72.33	93.00

TABLE XIV

AVERAGE BPI SCORES FOR THE MALE AND FEMALE GROUPS

Sex	No.	B1-N	B2-S	B3-I	B4-D	F1-C	F2-S
Male	71	45.44	47.30	37.28	45.85	86.11	92.44
Female	109	34.86	55.14	27.46	51.35	68.29	93.52

TABLE XV

CORRELATION COEFFICIENTS FOUND BETWEEN BPI SCORES AND THE MUSICAL ABILITY RATINGS AND APPLIED MUSIC GRADES

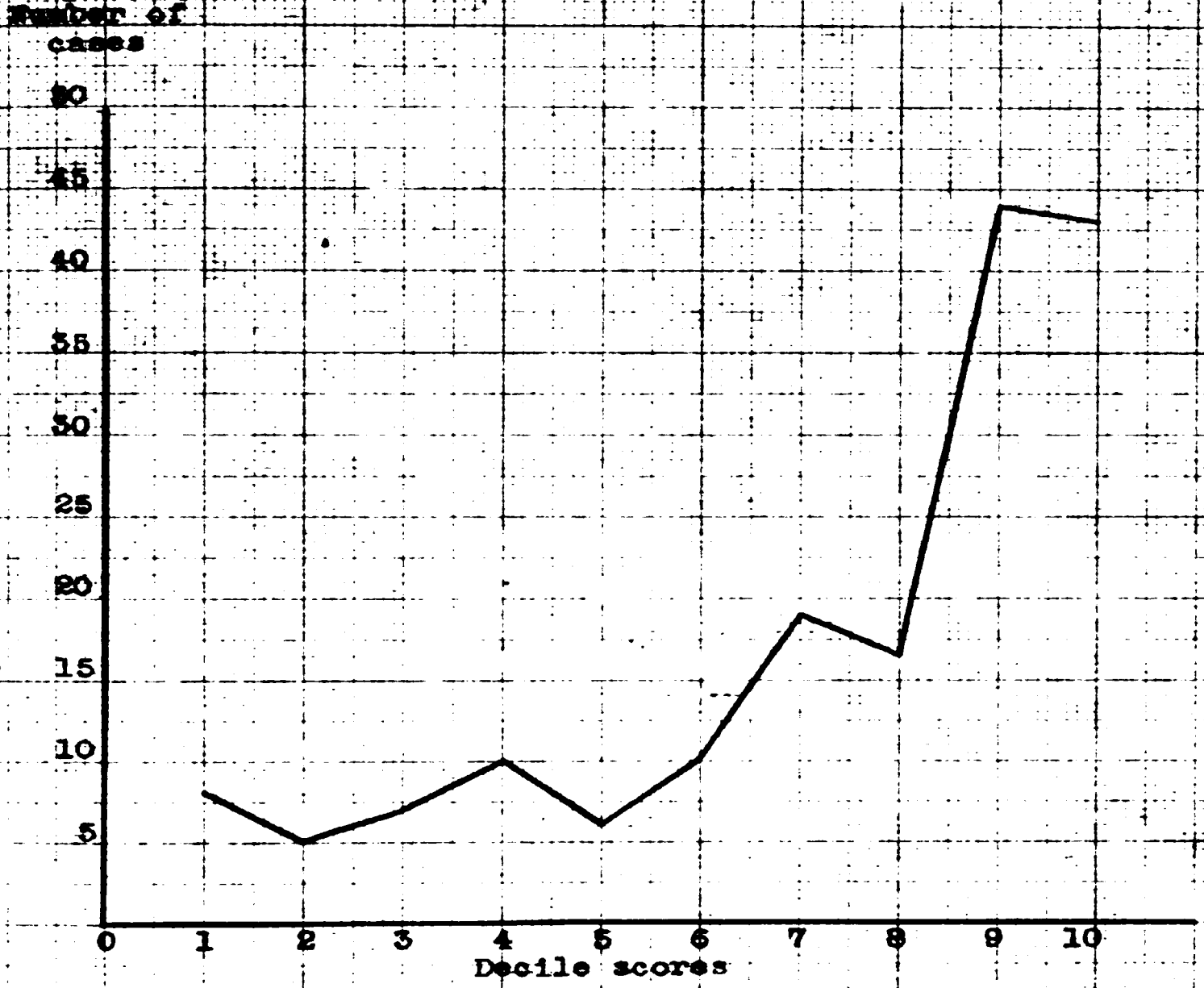
BPI Scores	Musicality	Sight-Reading	Performance	Applied Music Grades
B1-N	.005±.05	.044±.08	.097±.08	-.028±.07
B2-S	.107±.05	-.030±.08	.028±.08	.149±.07
B3-I	.002±.06	.022±.08	.100±.08	-.028±.07
B4-D	.130±.07	.054±.08	.043±.08	.023±.07

graphed in the normal order with the top decile as ten and the bottom decile as one. In Graph 18 is shown the distribution of the Seashore Pitch scores by deciles. This distribution was very sharply skewed negatively. In the top five deciles were 88 per cent of the scores, with 57.98 per cent in the top two deciles. In the bottom five deciles were 27.30 per cent of the scores. The mean of these scores was 7.57 with a standard deviation of 2.70.

The distribution of the Seashore Loudness (Intensity) is shown on Graph 19. This distribution exhibited negative skewness combined with a tendency toward flatness above the fourth decile. In the top six deciles were 85.80 per cent of the scores, with 70.41 per cent in the top five deciles and 36.09 per cent in the top two deciles. In the middle four deciles were 32.54 per cent of the scores and in the bottom four were 14.20 per cent of the scores. The mean of these scores was 7.11 with a standard deviation of 2.49.

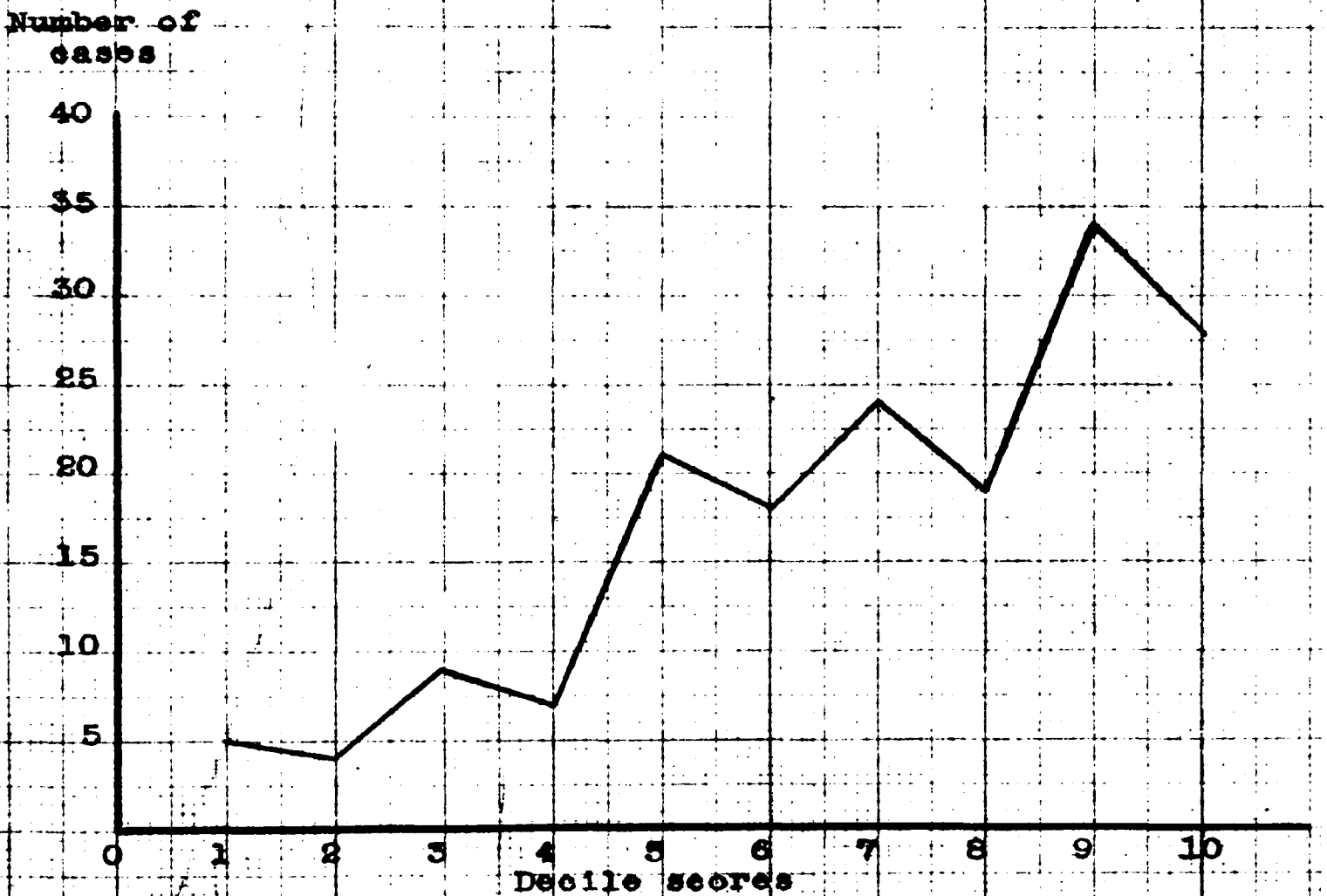
The distribution of the Seashore Time scores is shown in Graph 20. The distribution was negatively skewed with 78.10 per cent of the scores in the upper five deciles and 74.55 per cent in the upper four deciles. In the bottom six deciles were 26.83 per cent of the scores. The mean of these scores was 7.39 with a standard deviation of 2.52.

The distribution of the Seashore Timbre scores is shown on Graph 21. These scores were the most sharply skewed of



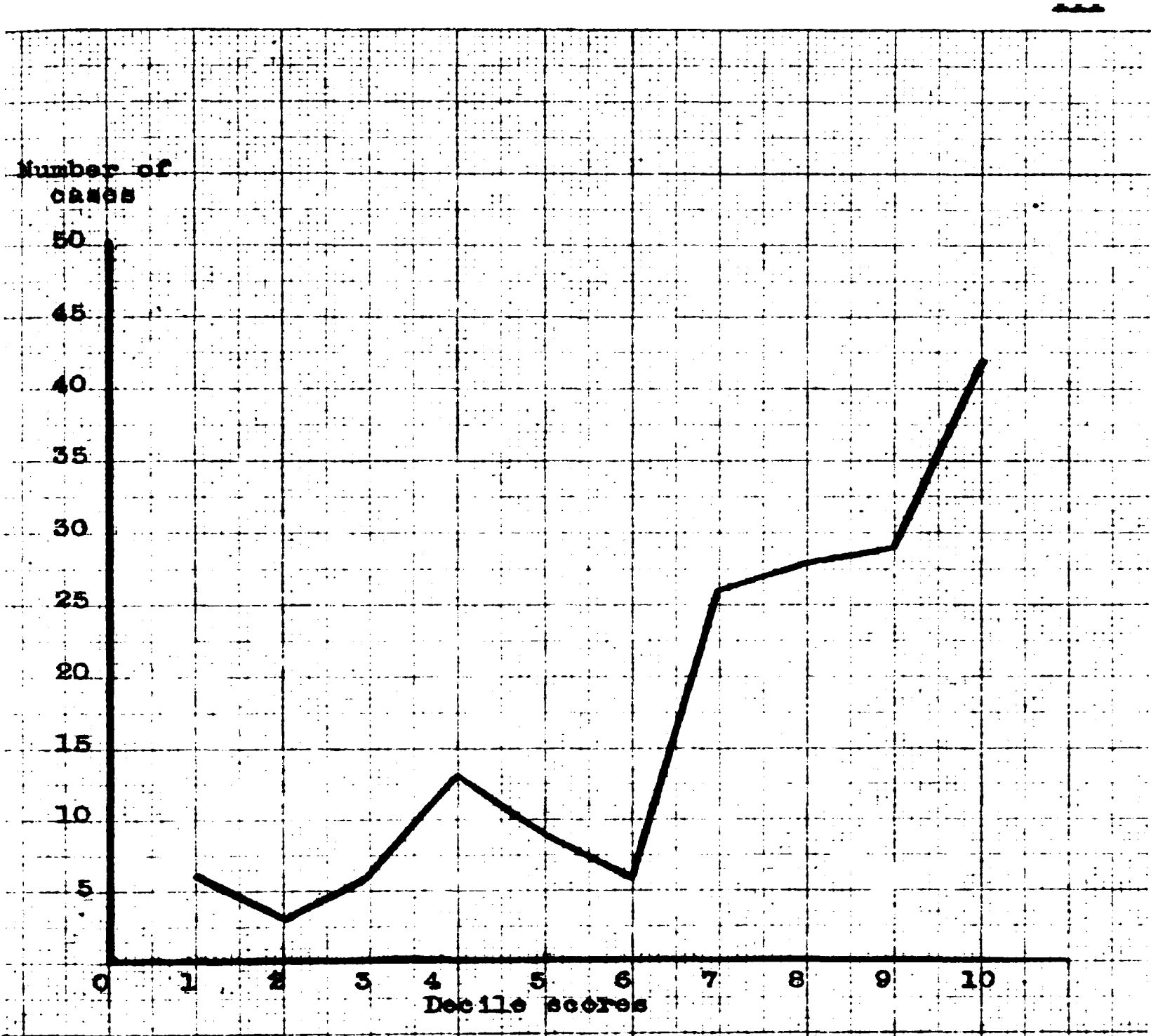
Graph 18

DISTRIBUTION OF SEASHORE PITCH SCORES



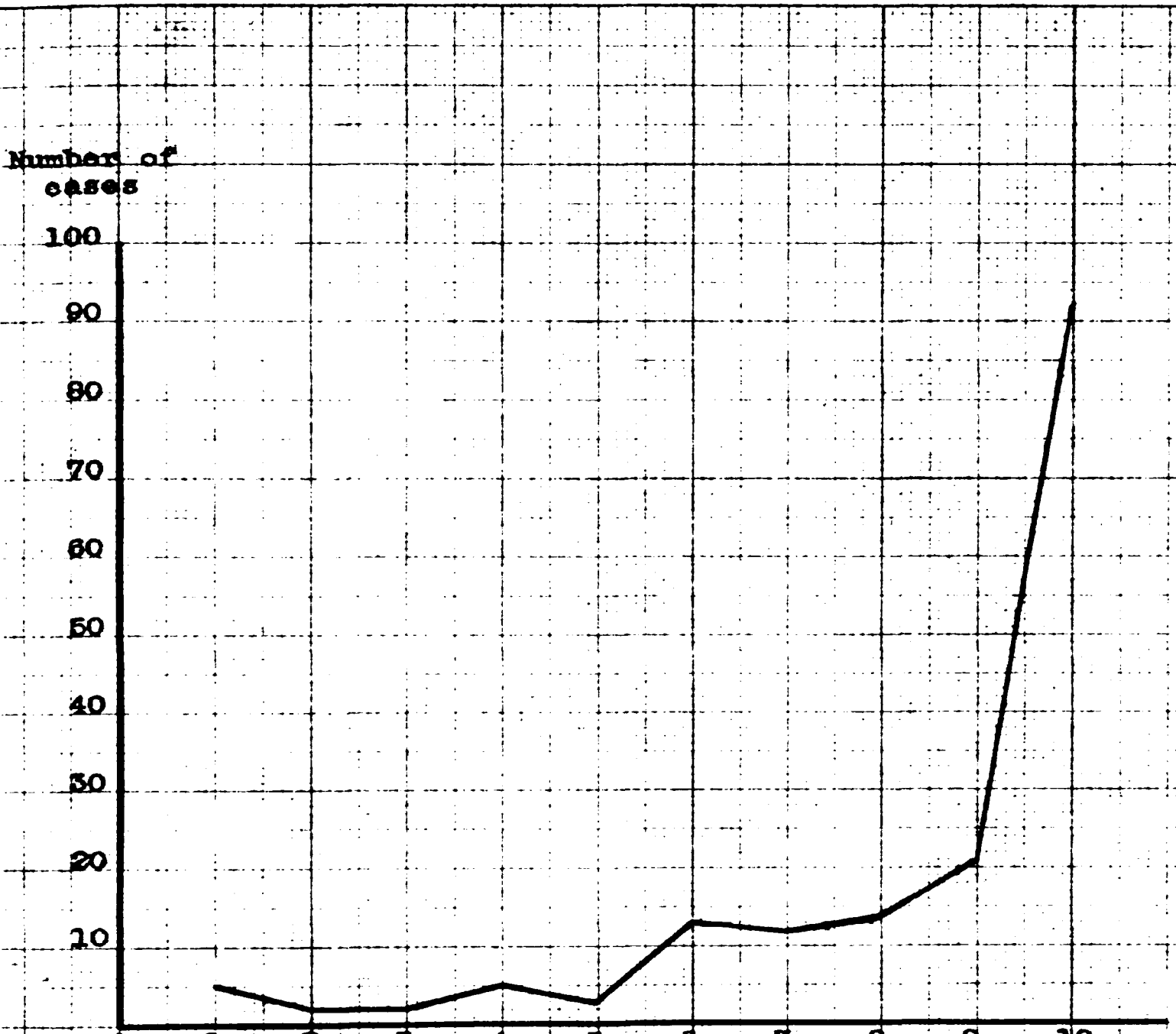
Graph 19

DISTRIBUTION OF SEASHORE LOUDNESS SCORES



Graph 20

DISTRIBUTION OF SEASHORE TIME SCORES



Graph 21

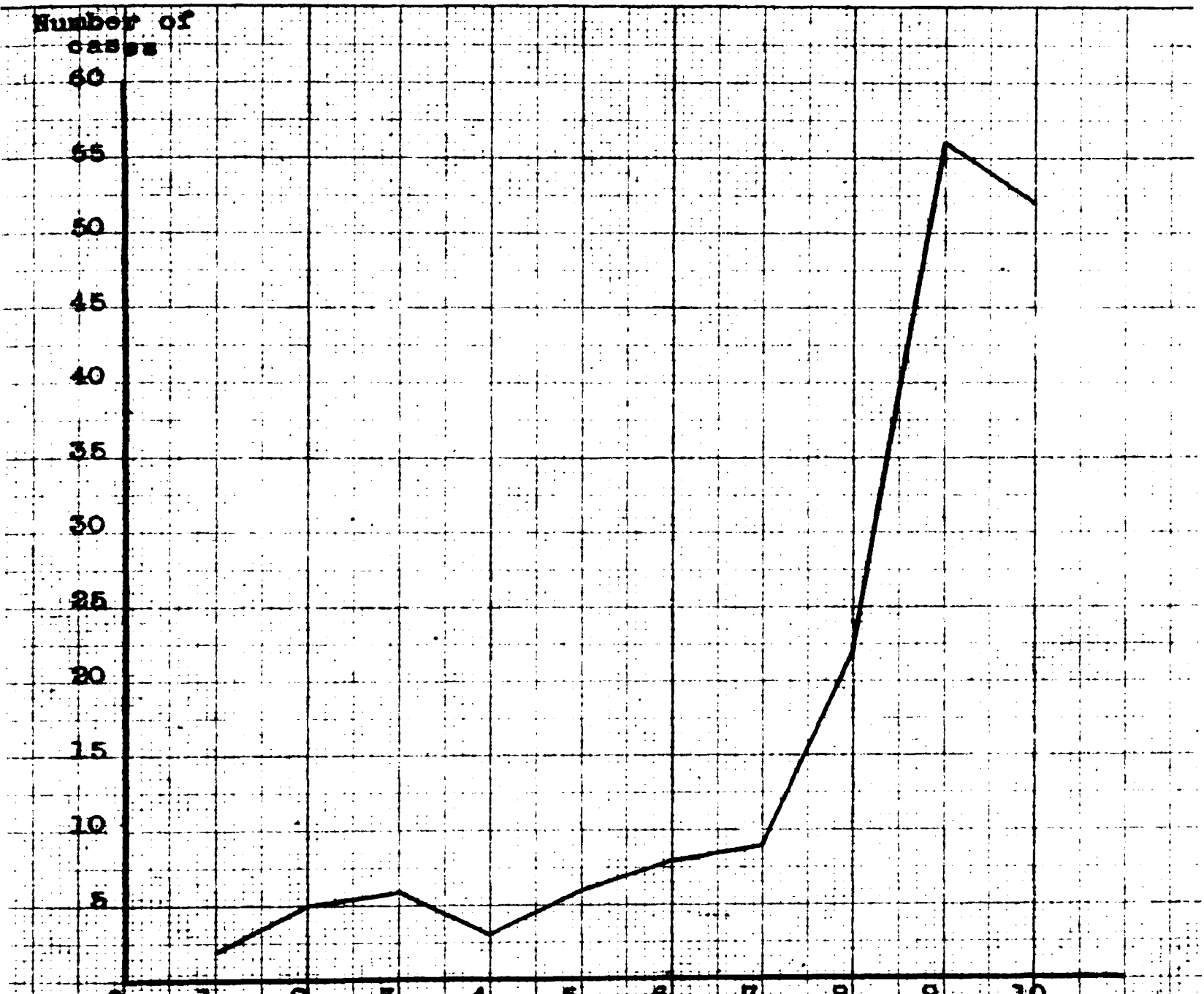
DISTRIBUTION OF SEASHORE TIMBRE SCORES

all the several scores in the data with 90.53 per cent of the scores in the upper five deciles and 55.02 per cent in the tenth decile alone. In the bottom five deciles were 10.05 per cent of the scores. The mean of these scores was 8.55 with a standard deviation of 2.17. The median score was approximately at the ninety-first percentile.

The distribution of the Seashore Rhythm scores is shown on Graph 22. The distribution was sharply skewed negatively, with 87.57 per cent of the scores in the top five deciles and 64.49 per cent in the top two deciles. In the bottom five deciles were 23.07 per cent of the scores. The mean of these scores was 8.20 with a standard deviation of 2.19. The median score was approximately at the eighty-fourth percentile.

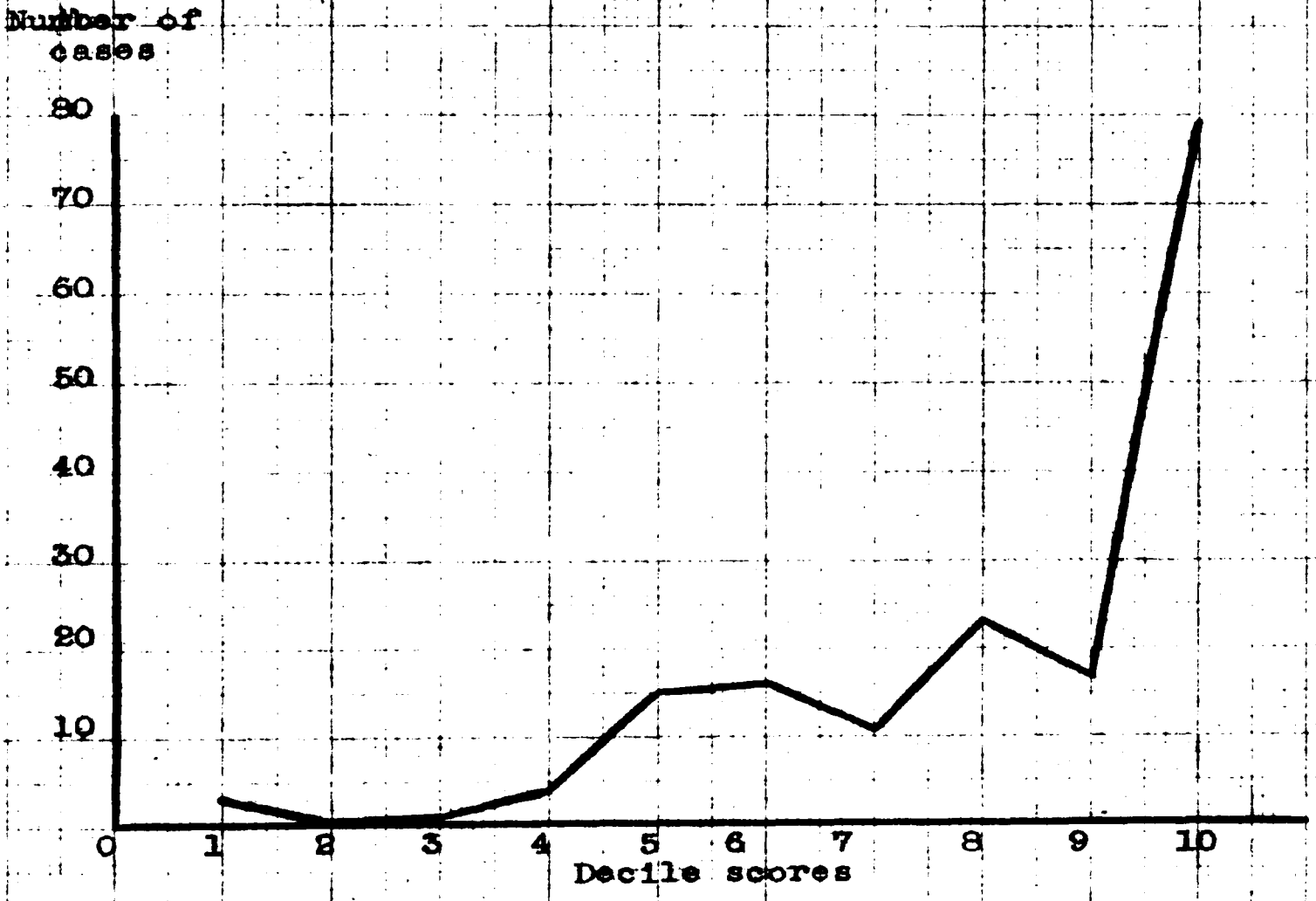
The distribution of the Seashore Tonal Memory scores is shown on Graph 23. Sharp negative skewness was exhibited, with 87.55 per cent of the scores in the upper five deciles and 47.92 per cent in the tenth decile alone. In the bottom four deciles were only 4.73 per cent. The mean of these scores was 8.34 with a standard deviation of 2.01. The median score was found at approximately the eighty-ninth percentile.

The scores of the six Seashore tests discussed above were averaged and referred to as a total, or "T", score. (The meaning of this average score is not entirely clear.



Graph 22

DISTRIBUTION OF SEASHORE RHYTHM SCORES



Graph 23

DISTRIBUTION OF SEASHORE TONAL MEMORY SCORES

Seashore[2] points out that these scores are not to be averaged. Several studies have used such averages, however, and for purposes of comparison, this average was computed and used in the study.)

The distribution of these Seashore averages is shown on Graph 24. The distribution was a negatively skewed one. No average scores were below 3.6 deciles. The scores were heavily concentrated above the sixth decile and tended toward a sloping skewness from the eighth decile to the third decile. The mean of these scores was 7.05 with a standard deviation of 1.21.

In Table XVI the Seashore averages scored by the four class groups are compared. Inspection of the table revealed no strong ranking pattern or large differences in class averages. From class to class and from Measure to Measure scores were fairly high and uniform. Seniors had the highest average on three tests; Juniors, Sophomores, and Freshmen had the highest average on a single test each. The Seniors had the highest six-test average.

Table XVII shows a comparison of the averages scored by the various curricular groups. The SM - Instrumental students tended to score highest, with highest averages on three single tests and the highest six-test average score.

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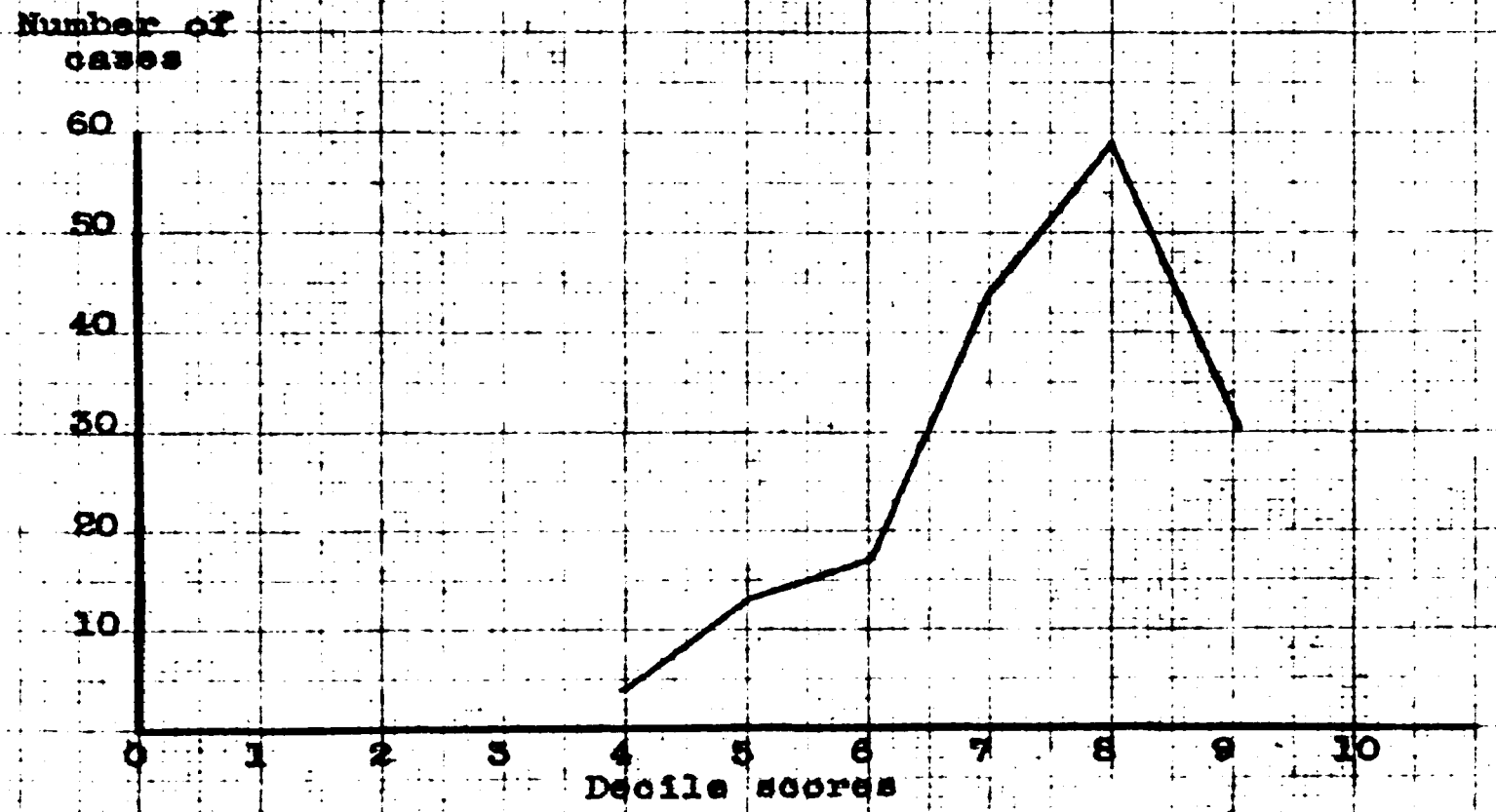
[2] Ibid., p. 4.



Graph 24

DISTRIBUTION OF SEASHORE SIX-TEST AVERAGE SCORES

TABLE XVI

AVERAGE SEASHORE SCORES FOR THE FOUR CLASSES

Class	No.	Pitch	Loud-ness	Rhythm	Time	Timbre	Tonal Memory	Average
Fresh.	62	7.17	6.73	8.71	7.31	8.39	8.47	7.80
Soph.	28	7.86	6.25	8.25	7.93	8.43	8.04	7.81
Jr.	42	7.96	7.55	7.89	7.29	8.08	8.15	8.01
Sr.	34	7.89	7.92	7.48	7.24	8.95	8.68	8.05

TABLE XVII

AVERAGE SEASHORE SCORES FOR THE INSTRUMENTAL GROUPS

Instrument	No.	Pitch	Loud-ness	Rhythm	Time	Timbre	Tonal Memory	Average
Brass	17	8.70	7.64	8.59	8.00	8.53	8.53	8.34
Woodwind	29	8.28	7.21	7.97	8.21	8.48	8.52	8.11
String	15	8.13	6.47	7.93	8.13	8.87	7.80	7.92
Piano	70	7.34	6.99	8.25	6.84	8.29	8.45	7.67
Voice	39	6.69	7.31	8.03	7.18	8.33	8.13	7.63

The Theory students were highest on two single tests, but also had the lowest single test average. Scores tended to be fairly high and uniform, however, from curriculum to curriculum.

The distribution of Seashore averages computed for the various instrument groups is shown in Table XVIII. The averages for the voice students tended to be lowest as indicated by a six-test average of 7.63 deciles. The brass instrument students tended to score highest, with highest averages on four single tests and with the highest six-test average score. The woodwind instrument students scored highest on two single tests and had the second highest six-test averages. This comparison shows that, in general, the brass, woodwind, and string students, in that order, tended to score higher on these tests than the piano and voice students.

The Seashore test averages computed for male and female students are shown on Table XIX. Differences in averages for these groups were not large. Each group had higher averages on three tests; the six-test average favors the male group slightly.

The correlation coefficients found between the Seashore scores and the musical ability ratings and applied music grades are given in Table XX. All correlation coefficients with the applied music grades and performance ratings were low and

TABLE XVIII

AVERAGE SEASHORE SCORES FOR THE CURRICULAR GROUPS

Curriculum	No.	Pitch	Loud-ness	Rhythm	Time	Timbre	Tonal Memory	Average
App. Music	30	7.77	7.53	7.37	7.50	8.43	8.33	7.85
SM-general	68	7.02	7.14	8.46	7.11	8.43	8.19	7.74
SM-instru-mental*	40	8.12	7.45	8.02	8.37	8.62	8.12	8.12
Theory	16	8.18	5.50	8.88	7.13	8.06	8.75	7.77
Science & Arts	10	7.00	6.40	8.60	6.20	8.10	8.20	7.44
Music Therapy	5	7.60	6.40	8.80	7.60	8.60	9.00	7.98

*SM--School Music

TABLE XIX

AVERAGE SEASHORE SCORES FOR THE MALE AND FEMALE GROUPS

Sex	No.	Pitch	Loud-ness	Rhythm	Time	Timbre	Tonal Memory	Average
Male	69	7.74	6.98	7.87	7.57	8.52	8.25	7.91
Female	101	7.35	7.02	8.33	7.33	8.32	8.35	7.81

TABLE XX

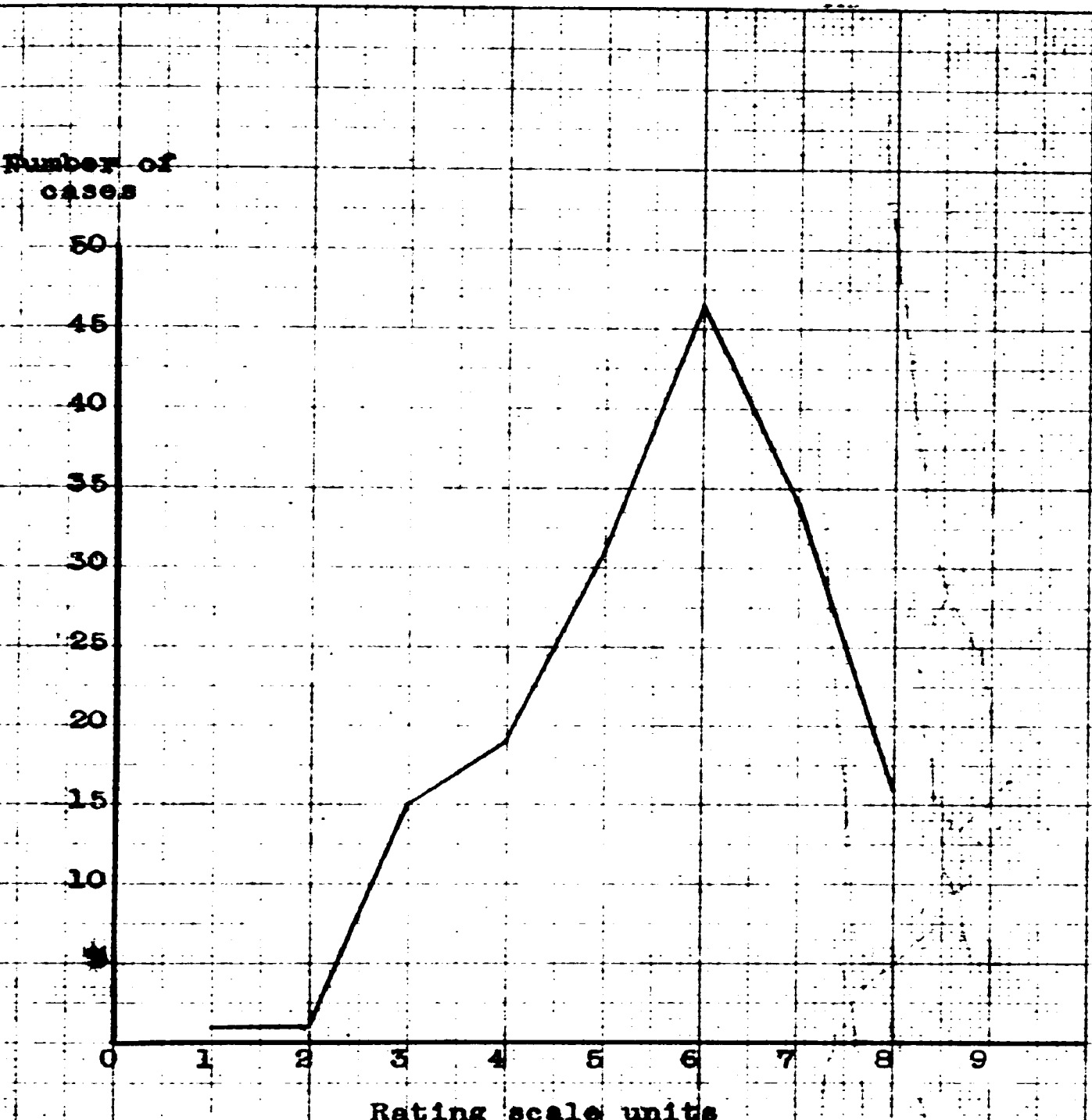
CORRELATION COEFFICIENTS FOUND BETWEEN SEASHORE SCORES AND THE MUSICAL ABILITY RATINGS AND APPLIED MUSIC GRADES

Seashore Measures	Musicality	Sight-Reading	Performance	Applied Music Grades
Pitch	.216±.07	.211±.08	.215±.08	.143±.07
Loudness	.213±.07	.187±.08	.012±.08	.116±.07
Rhythm	-.034±.08	.003±.08	-.101±.08	-.117±.08
Time	.069±.08	.151±.08	.059±.08	.017±.08
Timbre	-.014±.08	.065±.08	.176±.08	.050±.08
Tonal Memory	.189±.07	.210±.08	.061±.08	.059±.08
Average Score	.230±.07	.254±.07	.103±.08	.074±.07

not significant. (That is, the coefficient was smaller than three times its standard error.) The coefficient found between the six-test averages and the Sight-Reading rating was significant, .25 ±.07, but low. A significant correlation was found between the six-test average and the Musicality rating, .230 ±.07. Between the Pitch and Loudness scores and the Musicality ratings, coefficients of .216±.07, and .213± .07, respectively, were found. This table was characterized by low coefficients, consisting of four significant coefficients and twenty coefficients which were not significant. Three of the four significant coefficients were between Seashore scores and Musicality ratings.

VI. RESULTS OF THE MUSICAL ABILITY RATINGS AND APPLIED MUSIC GRADES

The distribution of the ratings of Musicality, (grouped by scale units) are shown on Graph 25. The distribution resembled a normal distribution but was slightly negatively skewed. There were 30.49 per cent of the ratings in the top three scale intervals (7, 8, and 9), designated "upper third"). In the middle three scale intervals (4, 5, and 6, designated "middle third") were 59.15 per cent of the ratings. In the bottom three scale intervals (1, 2, and 3, designated "lower third"), were 10.36 per cent of the ratings. The mean rating (in scale units) was 5.98 and the standard deviation of the distribution was 1.51.



Graph 25

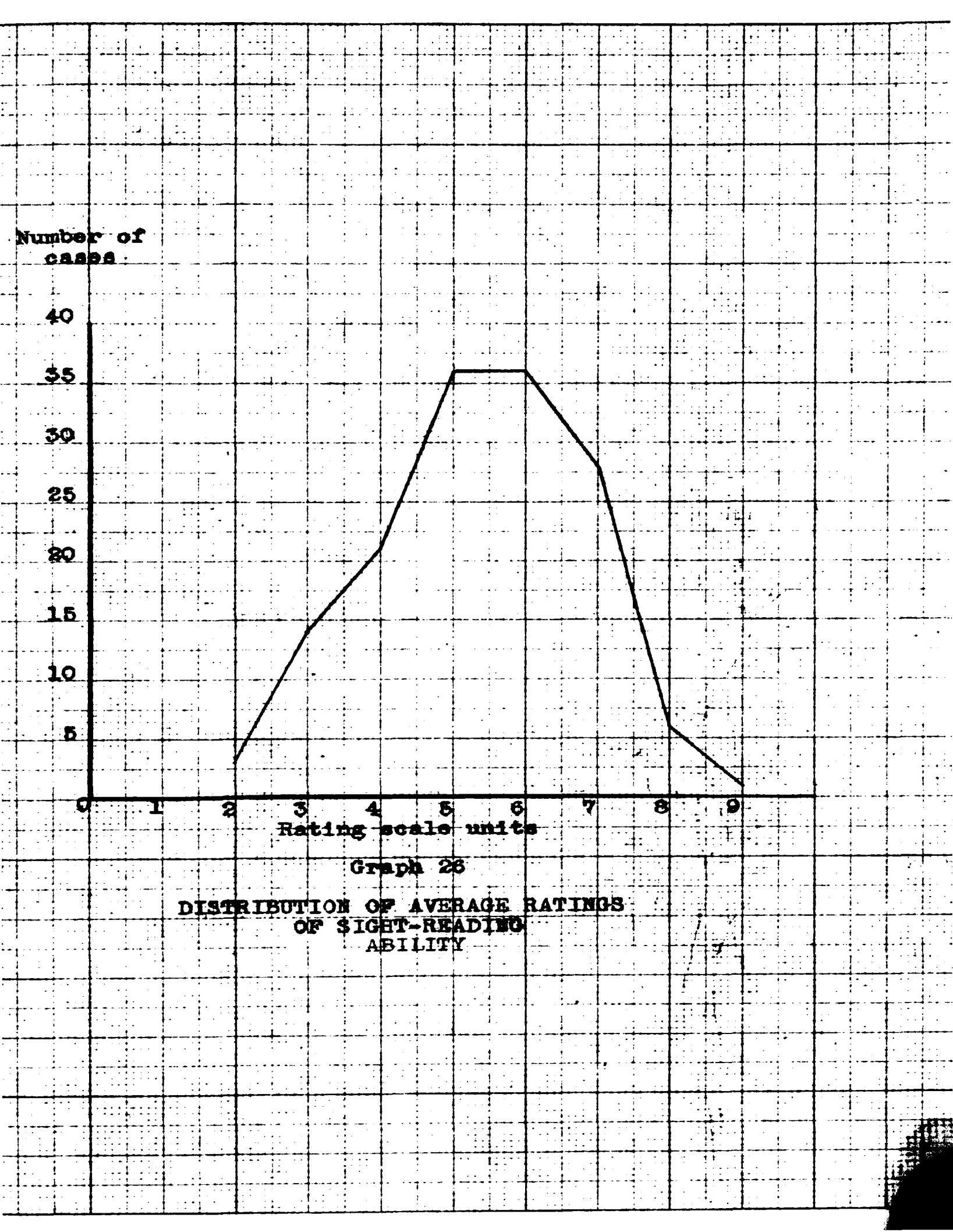
DISTRIBUTION OF AVERAGE RATINGS OF MUSICALITY

The distribution of the Sight-Reading ability ratings is shown on Graph 26. The distribution resembled a normal distribution but tended toward flatness near its mean. The ratings were distributed as follows: In the upper three scale units were 24.14 per cent, in the middle three scale units were 64.14 per cent, and in the bottom three scale units were 11.72 per cent of the ratings. The mean of these ratings in scale units was 5.68 with a standard deviation of 1.51.

The distribution of the Performance ability ratings is shown on Graph 27. This distribution was roughly bell-shaped, but had a slight negative skewness. The ratings were distributed as follows: In the upper three scale units were 29.93 per cent of the ratings, in the middle three scale units were 62.04 per cent, and in the bottom three scale units were 8.03 per cent of the ratings. The mean of these ratings, in scale units, was 5.96 with a standard deviation of 1.45.

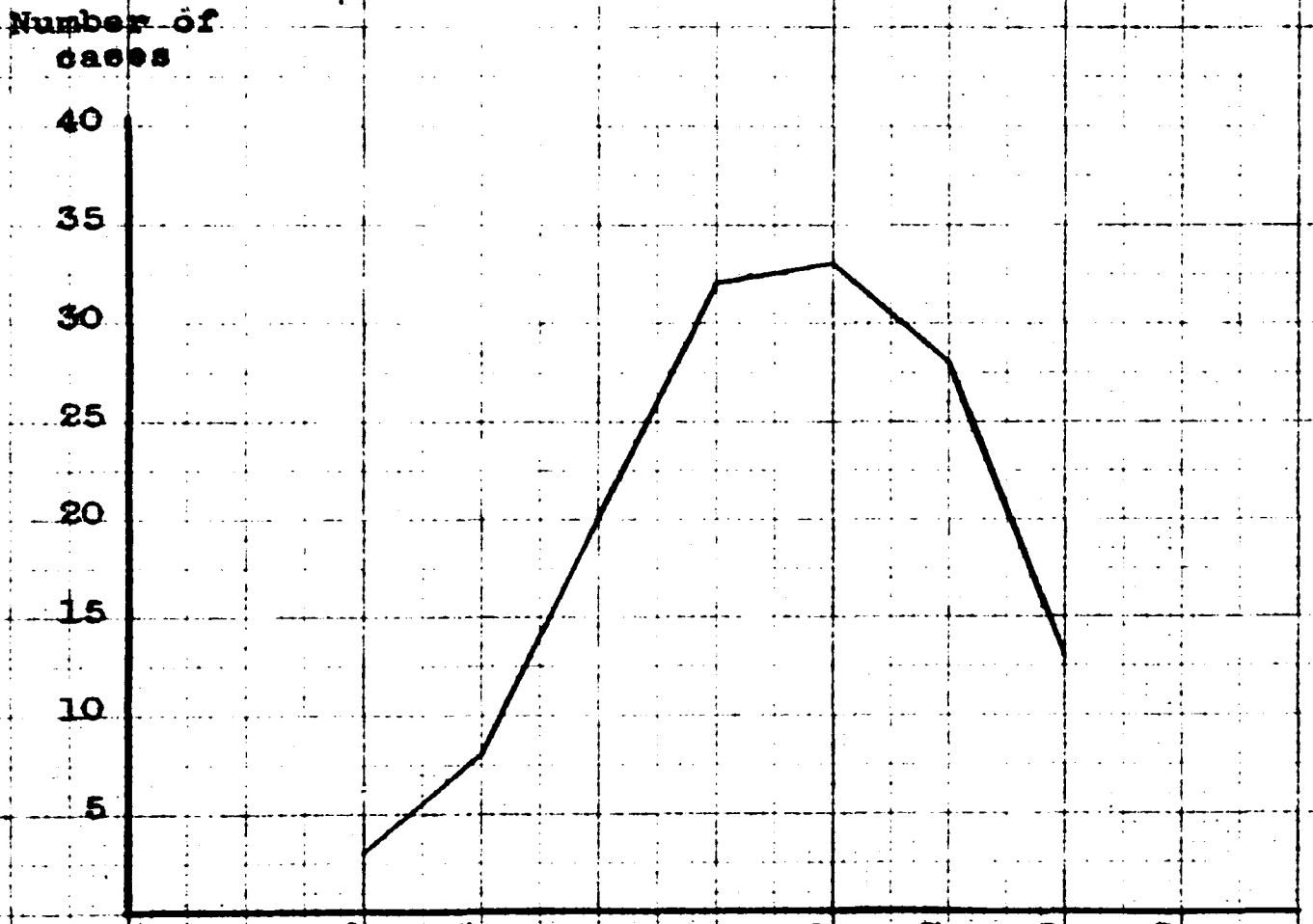
Table XXI shows the distribution of the averages of the musical ability ratings computed for the four classes. The classes were ranked on each scale as follows: Seniors, Sophomores, Juniors, and Freshmen.

Comparison of average musical ability ratings for the various curricula is shown on Table XXII. The applied music students had the highest average rating on each scale. The Theory students had second highest averages on each scale;



Graph 26

DISTRIBUTION OF AVERAGE RATINGS OF SIGHT-READING ABILITY



Graph 27

DISTRIBUTION OF AVERAGE RATINGS OF PERFORMANCE ABILITY

TABLE XXI

AVERAGE RATINGS OF MUSICAL ABILITY
FOR THE FOUR CLASSES

Class	No.	Musicality	Sight-Reading	Performance
Freshman	59	56.00	57.16	57.00
Sophomore	27	62.81	60.04	61.08
Junior	44	59.27	54.21	58.79
Senior	35	63.66	60.90	62.43

TABLE XXII

AVERAGE RATINGS OF MUSICAL ABILITY
FOR THE CURRICULAR GROUPS

Curriculum	No.	Musicality	Sight-Reading	Performance
Applied Music	30	65.78	64.04	70.48
SM-general*	72	57.38	55.29	56.14
SM-instrumental	42	59.59	57.98	59.41
Theory	16	64.92	60.27	65.64
Science & Arts	12	49.63	43.00	44.33
Music Therapy	5	54.80	52.60	53.60

*SM--School Music

the SM - instrumental students had third highest averages on each scale; the SM - general students had fourth highest averages on each scale; the Music Therapy students had fifth highest averages in each instance and the Science and Arts students had the lowest averages in each instance. The ranking of the curricular averages was the same on each rating scale.

A comparison of the averages of the musical ability ratings made by students of the several instrument groupings is shown on Table XXIII. Differences did not follow a set pattern, but in general, the brass, woodwind and string instrument students had averages higher on each scale than those of the piano and voice students. The string students scored highest on the performance ability scale.

The musical ability rating averages for the male and female students are shown in Table XXIV. The male students scored higher averages on all three scales; differences, however, were small.

The distribution of the applied music grades is shown on Graph 28. These grades were distributed as follows: grades of "A", 17.85 per cent; grades of "B", 44.64 per cent; grades of "C", 32.73 per cent; and grades of "D", 4.76 per cent. This distribution tended to be normal despite the misleading shape of Graph 28. The averages used in the Graph were quality point sums and exhibited of course, less central tendency than would be expected of a grade distribution.

TABLE XXIII

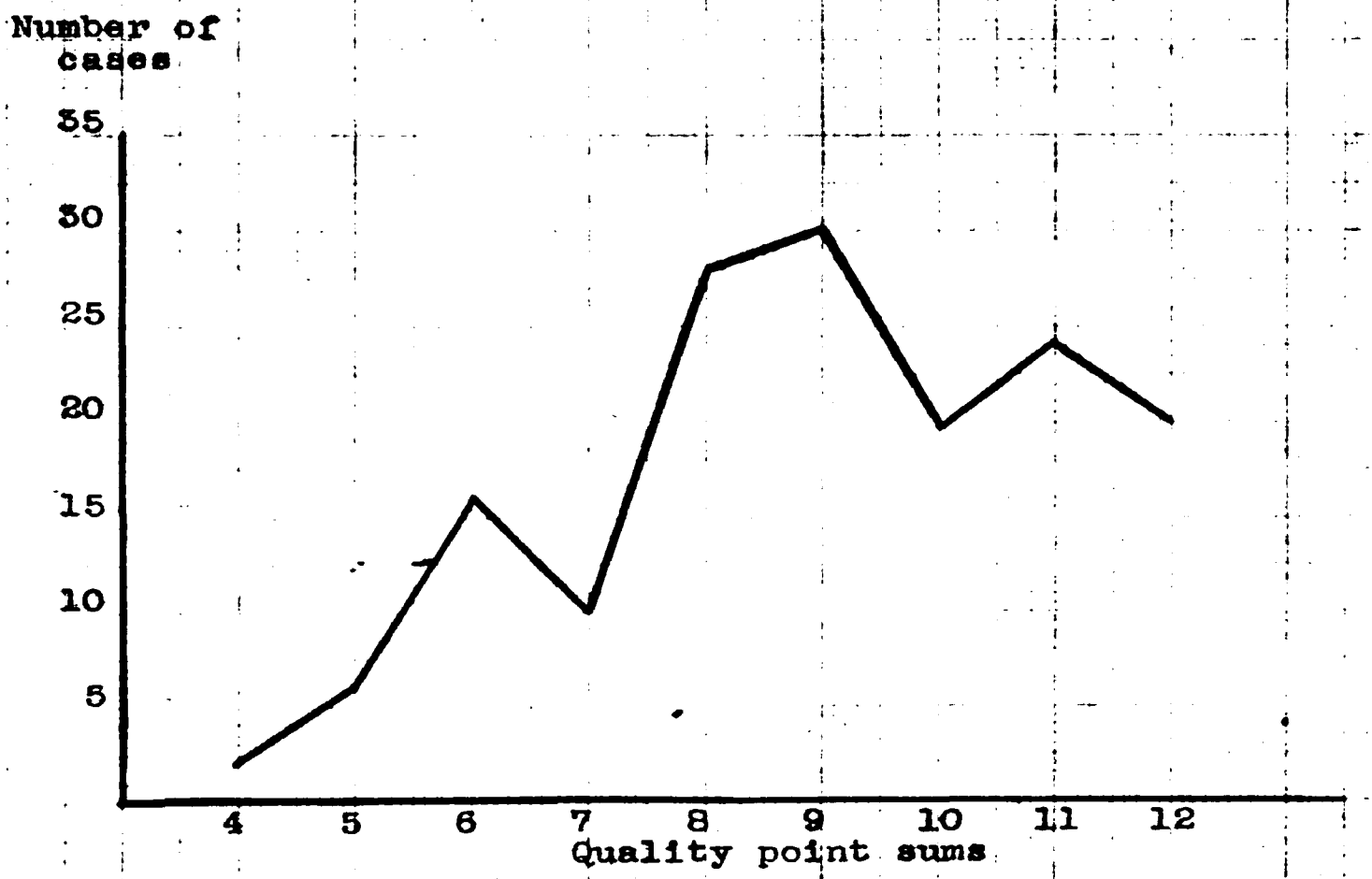
AVERAGE RATINGS OF MUSICAL ABILITY
FOR THE INSTRUMENTAL GROUPS

Instrument	No.	Musicality	Sight-Reading	Performance
Brass	17	64.71	60.89	61.17
Woodwind	30	59.47	59.52	60.24
String	13	60.77	58.54	67.44
Piano	65	57.75	54.13	58.82
Voice	39	59.69	58.91	57.44

TABLE XXIV

AVERAGE RATINGS OF MUSICAL ABILITY
FOR THE MALE AND FEMALE GROUPS

Sex	No.	Musicality	Sight-Reading	Performance
Male	67	61.55	58.61	62.35
Female	98	58.29	56.57	57.43



Graph 28

DISTRIBUTION OF APPLIED MUSIC GRADE AVERAGES

The applied music grade averages are shown on Table XXV as scored by classes. The classes were ranked by this average in the following order: (1) Seniors, (2) Sophomores, (3) Juniors, and (4) Freshmen.

Table XXV

APPLIED MUSIC GRADE POINT AVERAGES FOR FOUR CLASSES

APPLIED MUSIC GRADE POINT AVERAGES FOR FOUR CLASSES

Class	No.	Grade Average
Freshmen	62	8.719
Sophomores	28	9.393
Juniors	42	9.068
Seniors	34	9.771

Applied music grade averages are shown in Table XXVI by the several curricular groups. These curricular groups were ranked from highest to lowest averages as follows: Applied music, SM - instrumental, Music Therapy, SM - general, Science and Arts, and Theory.

Table XXVI

DISTRIBUTION OF APPLIED MUSIC GRADES BY CURRICULAR GROUPINGS

Group	No.	Grade Average
Applied	30	10.83
SM - instrumental	42	8.83
SM - general	68	8.69
Theory	14	8.21
Science & Art	10	8.30
Therapy	5	8.80

These grade averages are shown in Table XXVII as scored by the major instrument groupings. These groups were ranked from highest to lowest averages as follows: (1) Voice

students, (2) String students, (3) Brass instrument students, (4) Woodwind instrument students, and (5) Piano students.

Table XXVII

DISTRIBUTION OF APPLIED MUSIC GRADE POINT AVERAGES FOR THE INSTRUMENTAL GROUPS

Instrument	No.	Grade Average
Piano	70	8.48
Woodwind	32	8.87
Brass	19	9.31
String	16	9.60
Voice	41	10.20

The female students had an applied music grade average of 9.43; the male students had an average of 8.82.

VII. SUMMARY OF RESULTS

The ACE results. All distributions of ACE scores for the total group were negatively skewed, with means above the sixth decile. The profile pattern tended toward a high ACE-L score and a slightly lower ACE-Q score.

From freshman to senior class there were slight differences in ACE averages. Seniors had the highest averages; the other three class groups had generally lower averages but indicating no clear-cut ranking pattern.

The smaller curricular groups (Theory, Music Therapy, and Science & Arts) had higher ACE averages than the larger curricular groups. The averages of these smaller groups were clearly higher (a decile, or more) than those of the larger groups.

Of the major instrument groups, the woodwind and string students had the highest averages; the brass students had the lowest ACE averages.

Sex differences on the ACE scores were not large and were most clearly apparent in profile patterns. The profile pattern of the male students had an ACE-Q average higher than the ACE-L average. The reverse of this pattern characterized the averages of the female students.

Correlation coefficients showed some relation between the ACE scores and the ratings of Musicality and of Sight-Reading ability. Apparently, the ACE scores were not related to the ratings of Performance ability nor to applied music grades.

The CRCT results. The distribution of the CRCT scores were all negatively skewed, in varying degrees. Each total group average of these scores was higher than the sixth decile.

The various classes were ranked according to the magnitude of the CRCT-T average as follows: Seniors, Sophomores, Juniors, and Freshmen. All averages were near the sixth decile or higher. No consistent differences were shown.

The Theory, Science and Arts, and Music Therapy students tended to have the highest averages of the curricular groupings on all of the CRCT tests. The SM - instrumental students had the lowest averages of the curricular groups.

The CRCT averages of the major instrument groupings showed only small group differences except in the instance of the averages of the brass instrument group. These latter averages tended to cluster around the fifth decile or below. All other averages were above the sixth decile.

Sex differences in CRCT scores were small, but generally favored the female students.

The CRCT scores showed some relation to the musical ability ratings, but no relation to the applied music grades. The CRCT-C scores were less closely related to these ratings than were the other CRCT scores.

The BPI results. This group of students tended to score slightly low on the B1-N scale (thirty-ninth percentile), higher on the B2-S scale (fifty-second percentile), low on the B3-I scale (twenty-fifth percentile), higher on the B4-D scale (forty-eighth percentile), considerably higher on the F1-C scale (seventy-fifth percentile), and extremely high on the F2-S scale (ninety-third percentile).

When BPI averages were computed for classes, this same profile pattern (referred to above) was shown.

When BPI averages were computed for curricular groupings, these groups were ranked, according to the range of between test differences, as follows: Music Therapy, Theory, Applied Music, Science and Arts, SM - general, and SM - instrumental.

The profile patterns of the SM averages tended toward flatness; the SM - instrumental group averages tended to be the reverse of that for the whole group.

The profile pattern of the BPI averages, computed for the major instrument groupings, was similar to that of the group as a whole. The profiles of BPI averages of the brass and woodwind instrument students tended toward flatness. The sharpest profiles of averages were those of the string and piano students.

The musical ability ratings and applied music grades appeared to be unrelated to the BPI scores.

The Seashore results. The distributions of the Seashore scores were all negatively skewed, some sharply so. Means were all above the seventh decile; three were above the eighth decile. When median scores were computed, these scores were usually higher than the mean.

When averages for the Seashore scores were computed for classes, these averages showed small differences, without a well-marked trend. Seniors had highest averages on three tests and on the six-test average. Juniors, Sophomores, and Freshmen followed in that order.

The curricular groups were ranked by Seashore averages as follows: SM - instrumental, Music Therapy, Applied Music, Theory, SM - general, and Science and Arts. Differences were not great and showed no clear differentiation pattern.

When averages for the Seashore scores were computed for the several major instrument groupings, the brass instrument group tended to have averages slightly higher than those of other groups. Averages for this group were higher on four of the tests and on the six-test average. Next, in order of ranking, were the woodwind, string, piano, and voice groups.

Differences between the Seashore averages of the male and female students were small and not consistent.

The correlation coefficients between the Seashore scores and the musical ability ratings and applied music grades were low. Low, but significant coefficients were found between (1) Pitch scores and Musicality ratings, (2) Loudness scores and Musicality ratings and (3) Six-test average scores and Musicality and Sight-Reading ability ratings. The rest of the Seashore scores appeared to be only slightly related to, or not related, to these ratings and grades, as indicated by coefficients which were not significant.

The musical ability rating results. The distribution of the musical ability ratings tended to resemble normal distributions. The distributions of these ratings were, however, slightly skewed, negatively.

On both the Musicality and Performance ratings, the classes were ranked by class averages as follows: Seniors, Sophomores, Juniors, and Freshmen. On the Sight-Reading

scale the rankings were Senior, Sophomore, Freshmen and Juniors.

On all rating scales, curricular groups were ranked by averages, from highest to lowest, as follows: Applied, Theory, SM general, SM instrumental, Music Therapy, and Science and Arts. Differences between adjacent rankings were not large. Differences between the highest and lowest averages in each scale, varied from one to more than two standard deviations.

There were small differences in the rating averages of the various instrument groups with no clear ranking pattern between groups nor between ratings indicated.

The averages for the male students were higher than those of the females on all of the rating scales.

The applied music grade results. By applied music grade averages, the classes were ranked as follows: Seniors, Sophomores, Juniors, and Freshmen. These averages ranked the curricular groups as follows: Applied, SM - instrumental, Music Therapy, SM - general, Science and Arts and Theory. The several instrumental groups were ranked by grade averages as follows: voice, string, brass, woodwind and piano. The applied grade average of the female students was higher than that of the male students. The applied music grades appeared not to be related to any of the scores of the four test batteries used.

CHAPTER VI

SIGNIFICANCE OF THE STUDY DATA

In Chapter V, the data of the study were factually presented. Chapter VI points up the significance of these data including the following points: (1) the significance of the performance of the group studied on the four tests utilized in the study; (2) the relation of the test scores to the musical ability ratings and (3) the implications of the test profile of the musical group studied.

I. SIGNIFICANCE OF THE ACE RESULTS

The performance of the group under study on this test was clearly a superior one. Each of the ACE means for the total group was found to be statistically significantly different from a mean of 5.5 deciles (taken as the best estimate of the average of the population that has taken the test).

The ACE-T mean. Statistical tests of the significance of the difference between the ACE-T mean of 6.37 for this group and estimates of the mean of the large group of students that have ever taken this ACE test were made. The difference between ACE-T mean of 6.37 deciles (for the group studied)

and an estimated population mean of 5.50 deciles was found to be significant beyond the one per cent confidence level. When 5.03 was taken as the population mean, this difference was still significant at the one per cent confidence level.

The ACE-L mean. This mean (6.46 deciles) was found to be significantly different from an estimated population mean of 5.50 deciles, beyond the one per cent confidence level. The critical region of this confidence level was not reached until the estimated population mean was raised to 6.15 deciles.

The ACE-Q mean. This mean (6.08 deciles) was found to be significantly different from an estimated population mean of 5.50 deciles, beyond the one per cent confidence level. The critical region of this confidence level was reached when the estimated population mean was raised to 6.01 deciles.

II. THE SIGNIFICANCE OF THE CRCT RESULTS

All of the CRCT means for the whole group were found to be significantly different from a mean of 5.5 deciles beyond the one per cent level of confidence.

The CRCT-V mean. This CRCT-V mean (6.55 deciles) for the group was found to be significantly different from an estimated population mean of 5.5 deciles, beyond the one per cent confidence level. The critical region of this confidence

level was not reached until the estimated population mean was raised to 5.97 deciles.

The CRCT-R mean. This mean (6.25 deciles) was found to be significantly different from an estimated population mean of 5.50 deciles beyond the one per cent confidence level. The critical region of this level of confidence was not reached until the estimated population mean was raised to 6.06 deciles.

The CRCT-C mean. This mean (6.11 deciles) was found to be significantly different from an estimated population mean of 5.50 deciles beyond the one per cent confidence level. The critical region of this confidence level was not reached until the estimated population mean was raised to 6.07.

The CRCT-T mean. This mean (6.05 deciles) was found to be significantly different from an estimated population mean of 5.50 beyond the one per cent confidence level. The critical region of this confidence level was not reached until the estimated population mean was raised to 6.02 deciles.

III. THE SIGNIFICANCE OF THE BPI RESULTS

The differences between estimated population means and observed means of the BPI scores were not significant in every instance. The means of the B2-S and B4-D scores were found to be not significantly different from estimates of

the population mean. The means of the other scales (B1-N, B3-I, F1-C, and F2-S) were found to be significantly different, some highly so, from estimates of the population mean beyond the one per cent level of confidence.

The B1-N mean. The B1-N mean (26.56 percentiles) was found to be very highly significantly different from an estimated population mean of fifty percentiles beyond the one per cent confidence level. The critical region of this confidence level was not reached until the estimated population mean was lowered to 31.56 percentiles, a probably untenable estimate of the population mean.

The B2-S mean. The mean of the B2-S scores (51.52 percentiles) was not found to be significantly different from an estimated population mean of fifty percentiles. The critical region of the five per cent level of confidence was not reached until the estimated population mean was lowered to 46.42 percentiles.

The B3-I mean. The B3-I mean was found to be significantly different from an estimated population mean of 50.00 deciles beyond the one per cent level of confidence. The critical region of the confidence level was not reached until the estimated population mean was lowered to 36.64 percentiles, a probably untenable estimate of the population mean.

The B4-D mean. This mean (48.29) was found to be not significantly different from an estimated population mean of fifty percentiles at the one per cent level of confidence. The critical region of this confidence level was reached when 53.01 percentiles was taken as the estimate of the population mean.

The F1-C mean. This mean (75.32) was found to differ significantly from an estimated population mean of fifty percentiles beyond the one per cent level of confidence. The critical region of this level of confidence was reached when the estimated population mean was raised to 72.95 percentiles, a probably untenable estimate of the population mean.

The F2-S mean. This mean (93.08) was found to differ significantly from an estimated population mean of fifty percentiles beyond the one per cent confidence level. The critical region of this confidence level was reached when the estimated population mean was raised to 89.01 percentiles, a probably untenable estimate of this mean.

IV. THE SIGNIFICANCE OF THE SEASHORE RESULTS

All of the Seashore means for the whole group were found to differ significantly from an estimated mean of 5.00 deciles. Three of these means were at least two deciles, and three, were three deciles above this estimate, a difference which was found to be highly significant well beyond the one per cent level of confidence.

V. RELATION OF MUSIC ABILITY RATINGS TO TEST SCORES

It has been shown that the test performance of this group of music students in several instances was significantly different from the expected norms of test performance. The following discussion is concerned with product-moment correlation coefficients found between these several test scores and the ratings of musical abilities.

An examination of the correlation tables in Chapter V revealed the following facts. (1) These several test scores appeared to be unrelated to applied music grades, and to ratings of performance, (2) The ACE scores appeared to be slightly related to ratings of musicality and of Sight-Reading ability. Of the six correlation coefficients found between the ACE scores and the ratings of Musicality and of Sight-Reading ability, five were significant correlations, beyond the one per cent level of confidence. The average of the coefficients found between the ACE scores and the Musicality ratings was .265. The average of coefficients found between these scores and the Sight-Reading ratings was .198. (3) The CRCT scores appeared to be slightly related to the ratings of Musicality and of Sight-Reading ability. Of the eight coefficients found between CRCT scores and the ratings of

Musicality and of Sight-Reading ability; two were significant and four coefficients approached statistical significance at the one per cent confidence level. The average of the coefficients found between the CRCT scores and the Musicality ratings was .213. The average of the coefficients found between the CRCT scores and the Sight-Reading ratings was .198. (4) The coefficients found between the above tests (ACE and CRCT) tended to be homogeneous, and varied but slightly from coefficient to coefficient. (5) The coefficients found between the Seashore scores and the Musicality and Sight-Reading ratings tended to be heterogeneous, varying both in size and sign. Of the fourteen coefficients found between the Seashore scores and the Musicality and Sight-Reading ratings, four were significant at the one per cent level of confidence and two coefficients approached statistical significance at this level. (6) All of the significant coefficients tended to be homogeneous with a difference between the largest and smallest coefficient of only .09, and with a range from .211 between Seashore Pitch scores and Sight-Reading ratings, to .305 between ACE-T scores and Musicality ratings. The coefficients found between the ACE and CRCT scores and musical ability ratings were more homogeneous and more consistent than were coefficients found between Seashore scores and these ratings.

The test profile of the group. The profile of test scores for the group of music students studied, revealed the following facts. (1) The average scores of this group on the ACE were all above the sixth decile, with the ACE-L scores tending to be slightly higher than the ACE-Q scores. This difference between the ACE-L scores and the ACE-Q scores tended to be reversed for the male music students. The observed difference between these two ACE scores for the total group was apparently due to the fact that there were more female students than male students.

(2) Average scores of this group on the CRCT were all above the sixth decile. A majority of the scores were above the estimated test population mean on all sub-scores.

(3) Average scores on the Seashore single tests and on the six-test average were all above the seventh decile; three were above the eighth decile. On all sub-tests, these scores tended to concentrate at the ninth and tenth deciles.

(4) Four of the BPI sub-score averages were significantly different from estimated averages of unselected college groups. On the scales of Neuroticism, Introversion, Confidence, and Sociability, these differences were significant beyond the one per cent level of confidence.

(5) Curricular groups were found to have related rankings on the ACE and CRCT tests, as indicated by rank difference correlation coefficient of .83 found between

rankings of the ACE-T and CRCT-T averages. The rankings of the CRCT-T averages were related to the B1-N and B3-I means as indicated by rank difference correlation coefficients of -.94 and -.83 respectively.

(6) Instrumental groups had related rankings on the ACE-T and CRCT-T means as indicated by a rank difference correlation coefficient of .90. Other related rankings were indicated by the following rank difference correlation coefficients: (a) between Seashore six-test average means and F1-C means, .90; (b) between Seashore six-test average means and F2-S means, .85; and (c) between Musicality ratings means and applied music grade average means, .80. The following rank difference correlation coefficients were found between Sight-Reading rating means and BPI means as follows: (a) B1-N means, -.90; (b) B2-S means, .90; (c) B3-I means, -.90; (d) B4-D means, .80; and (e) F1-C means, .90. Other large coefficients found were: (a) between B1-N means and B3-I means, 1.00; (b) between B1-N means and B4-D means, -.90; (c) between B2-S means and B3-I means, -.80; (d) between B2-S means and B4-D means, .90; (e) between B2-S means and F1-C means, .80; (f) between B3-I means and B4-D means, -.90; and (g) between F1-C means and F2-S means, -.90.

(7) Certain rankings of class group means appeared to be related. The relation of these rankings between ACE-T and BPI means was indicated by the following rank difference

correlation coefficients: between ACE-T and: (a) B1-N, .80; (b) B2-S, .80; (c) B3-I, 1.00; (d) B4-D, .80; and (e) F2-S, -1.00. The following rank difference correlation coefficients were found between CRCT-T and: (a) Seashore six-test average means, .80; (b) Musicality rating means, 1.00; (c) Sight-Reading rating means, .80; (d) Performance rating means, 1.00; (e) applied music grades, 1.00; and (f) F1-C means, .80. The following rank difference correlation coefficients were found between Musicality rating means and: (a) Sight-Reading rating means, .80; (b) Performance rating means, 1.00; (c) applied music grades, 1.00; and (d) F1-C, .80. The following rank difference correlation coefficients were found between Seashore six-test average means and: (a) Musicality rating means, .80; (b) Performance rating means, .80; (c) applied music grades, .80; and (d) B1-N means, .80. The following rank difference correlation coefficients were found between Sight-Reading rating means and: (a) Performance rating means, .80; (b) applied music grades, .80; and (c) F1-C, 1.00. The following rank difference correlation coefficient was found between applied music grades and: F1-C, .80. Other rank difference correlation coefficients were found between B1-N and (a) B3-I, .80; (b) B4-D, 1.00; (c) F1-C, 1.00; and (d) F2-S, .80. Further rank difference correlation coefficients were found between B3-I and: (a) B4-D, .80; (b) F2-S, 1.00; A last rank difference correlation coefficient was found between B4-D and F2-S, .80.

Complete tables of all rank difference correlation coefficients for class, curriculum, and instrumental groupings will be found in the Appendix.

CHAPTER VII

CONCLUSIONS AND INTERPRETATIONS

This study has, so far, presented the problem, its reality, and its background. The technique of the study has been explained and evidence has been given (1) to support the validity of this method of investigation, and (2) to describe its limitations. It has been shown that the group utilized in the study was especially suited to its purpose. Evidence has been presented that the data were collected under excellent and standardized conditions.

The limitation and utility of the tests used in the study have been treated at length. The data have been presented and summarized and the statistical significance of this data, demonstrated. This present chapter presents a discussion and summary of the conclusions and interpretations of the study. The validity of these conclusions is based upon the limits of validity of (1) the technique of the study and (2) the implementation of this technique. In regard to the implementations of the study technique, it is not assumed that the several tests are accurate, finite, nor absolute measures of specific qualities.

I. CONCLUSIONS AND INTERPRETATIONS OF THE STUDY

Relation of intelligence and reading ability to Musicality. This study has presented evidence that high intelligence and reading ability tend to go with musicality. It has been established that the group of students utilized in this study was a musical group. It was also established, regarding the tests of intelligence and of reading comprehension used in the study, not only that the group averages were significantly higher than the norms of unselected college groups, but that the majority of the individuals in this group scored above the unselected population averages. This was the case on the distributions of scores of the intelligence test and on the four distributions of scores on the test of reading comprehension.

This study has presented evidence that musicality and ability to sight-read music are significantly, though not closely, correlated with intelligence and reading ability. The smallness of this correlation suggests that, although this group had high intelligence and reading ability ratings, musicality cannot be accounted for by intelligence and reading ability ratings alone. It must be noted that this correlation was more consistent and was generally of greater magnitude, from test to test, than that with the Seashore scores.

Relation of Seashore scores to musicality. This study has presented evidence that high scores on the Seashore tests go with musicality. All Seashore averages for this group were significantly higher than the means of an unselected population. Despite the fact that these Seashore averages were all high for this group, correlation coefficients between these scores and various musical ability ratings were low, most of them not significant. These facts would tend to suggest that those things measured by the Seashore scores go with musicality but apparently do not constitute an adequate measure of musicality for use with college music students.

The relation of personality to musicality. The means of several of the Bernreuter sub-scores were significantly different from estimated means of the college population that has ever taken the test. Significant differences were found for the means of the Neuroticism, Introversion, Confidence, and Sociability scores. This was taken as evidence that college music students tend to differ in personality profile from unselected college students. Correlation coefficients between these personality scores and ratings of Musicality, Sight-Reading, Performance, and applied music grades were very low, none of them significant and not differing from chance correlations.

II. SUMMARY

1. There is evidence that high intelligence and high reading ability, as well as superior performance on the Seashore tests, tend to go with musicality. There is evidence that there is a slight, but significant, correlation between intelligence and reading ability rankings, and ratings of Musicality and Sight-Reading ability, and that this relation is more consistent and of greater magnitude than that between the Seashore scores and these ratings of Musicality and Sight-Reading ability.

2. There is evidence that the personality profile of the college music student differs from that of the unselected college student. There is no evidence that personality traits are correlated with musicality, or with ratings of functional musical abilities.

CHAPTER VIII

EDUCATIONAL IMPLICATIONS AND SUGGESTED RESEARCH

This chapter points out the educational implications of this study and suggests hypotheses which require further study.

I. EDUCATIONAL IMPLICATIONS

1. Any use of test scores for selection of college music students and for their guidance should be subject to considerable caution. None of the test scores utilized in this study show sufficient correlation with criteria of musicality and/or statistical reliability to be used successfully in predicting the musical success of individual students. In the light of this, it is evident that whatever value such scores have, in the selection and guidance of college music students, would be negative. Such scores would have some value, perhaps, in the prediction and diagnosis of failure rather than of success.

2. The results of this study have tended to lend support to the view that general intelligence is a concomitant of musical talent, and that other more specific abilities tend to go with musical talent. It would appear reasonable to assume (in the light of the results of this and other

similar studies), that there are many factors which are concomitants of musicality and of functional musical abilities.

II. SUGGESTED FURTHER RESEARCH

This study has suggested an hypothesis that could be studied with some adequacy utilizing a technique similar to that used in this problem. This study has shown some evidence of hierarchies of curricular and instrumental groupings, in terms of test performance. It is a temptation to describe such hierarchies. Generalizations were not made, however, because of the inadequacy of the numbers in some of these sub-groupings. Further research would be needed to support or reject such hypotheses.

It is the feeling of the writer that musical talent and musical abilities of college students cannot be adequately accounted for by an atomistic technique describing a multiplicity of specific factors. It is his view that an approach attempting to measure psycho-musical gestalten would be worth the effort of further research. Such an approach would be implemented by attempting to measure (1) the Seashore variables in musical contexts, (2) musical interest, and (3) motivational factors such as "the will to be musical."

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DISCUSSION OF THE RATING PROCEDURE

Purpose of the scales: To give measures of relative standing as to Musicality, Ability to Sight-Read, and Ability to Perform for the music majors included on the Check-List.

Rationale of the scales (assumption): Each item of the rating scales has many factors which contribute to it in some unknown and not directly measurable ratio. It would seem most satisfactory and justifiable, therefore, to obtain the desired rankings through the judgment of professionally qualified persons. It is assumed, further, that each item will be considered as a single concept rather than as a composite of discrete elements.

Cautions:

1. Read carefully the "Definitions of Terms" and rate according to these definitions.

2. Rate one item at a time. For example, be careful not to consider Ability to Perform when rating Musicality. It has been pointed out that not all musical individuals can sing or play an instrument.

3. Do not be too lenient. A student with low performance ability should be rated in the lowest third on this item.

4. Give extremely high and extremely low ratings. To be overly conservative is to be inaccurate. Extremely good and extremely poor students are not so numerous as the others but they are present in most groups.

Directions: (A) For those ratings having a Check-List code number "1", "3", or "4".

Foreword: Before beginning the actual rating try to remember several individuals who obviously would rank in the highest third in the particular item which you are rating. At the same time select several individuals who obviously would rank in the lowest third in the particular item which you are rating. Rate each student with these two standards in mind.

1. Rate each student in comparison with others of similar training and experience. Tend to rate sophomores with other sophomores, seniors with other seniors, etc. Keep in mind that the applied music majors are supposed to be the best performers (as a group). However, do not rate the students according to their curriculum. In some instances students not in the applied curriculum perform or sight-read as well as or better than students in the applied curriculum and should be rated accordingly. In rating the students, then, keep in mind these differences in opportunity for practice.

2. Classify the student as either "low," "average," or "superior" with respect to the item being rated. The "low" group is defined as including the bottom third of a large representative sample of students such as you have observed in your college teaching. The "average" group is the middle third of such a group and the "superior" group is the top third.

3. After making the broad classification of "low," "average," or "superior," decide whether the student is typical of the broad group in which he is placed, or somewhat better, or somewhat poorer. Then place a check in the appropriate position.

Directions: (B) For those ratings having a check-list code number of "2."

Foreword: Before beginning the actual rating, try to remember several individuals that you have observed in your college <u>class instrument</u> or <u>class voice</u> teaching who obviously would rank in the highest third in the particular item which you are rating. At the same time select several individuals who obviously would rank in the lowest third in the particular item which you are rating. Rate each student in your voice or instrumental class with these two standards in mind. Keep in mind

that <u>ability to perform</u> and <u>ability to sight-read</u>, in this instance, are defined as <u>ability to perform</u> and <u>ability to sight-read on the class instrument or in the voice class</u>.

1. Rate each student in comparison with other students who are or have been in your instrumental or voice classes. Tend to rate sophomores with other sophomores, seniors with other seniors, etc. Keep in mind that upper classmen have had more experience in the instrument and voice class than the freshmen and sophomores and rate accordingly.

2. Classify the student as either "low," "average," or "superior" with respect to the item being rated. The "low" group is defined as including the bottom third of a large representative sample of students whom you have observed in your class instrument or class voice teaching. The "average" group is the middle third of such a group and the "superior" group is the top third.

3. After making the broad classification of "low," "average," or "superior," decide whether the student is typical of the broad group in which he is placed, or somewhat better, or somewhat poorer. Then place a check in the appropriate position.

4. After rating your students return the rating forms to Miss Iliff in the Music Office.

Please accept my gratitude to you for your time, interest, and professional judgment. If in any event something in this rating procedure is not yet clear, please do not hesitate to contact me. Phone: 8-4280; I am always there from 8:00 till 12:00 mornings, Monday through Friday.

DEFINITIONS OF TERMS IN RATING SCALES

<u>MUSICALITY</u>: Having a responsiveness to music; having a fondness or intelligent appreciation for music; having a sensitivity to musical feeling; having an inner urge towards music.

"1," "2," "3," and/or "4."

ABILITY TO SIGHT-READ:

"1" and/or "2." — Ability to perform music of a reasonable grade of difficulty at sight on his major or minor instrument.

"2." — Ability to perform music of a reasonable grade of difficulty at sight on his class instrument or in the vocal class.

In general: Ability to organize musical material into an intelligible performance at sight.

ABILITY TO PERFORM:

"1," "2," or "4." — Ability to organize studied or memorized music into a musical performance commensurate with his level of training and musicality before any audience.

In general: Ability to realize his musical potentialities in a performing capacity before any audience.

RATING SCALE FORM

Student _____ Thesis No. _____ Rating by _____ Thesis No. _____

Major Instrument _____ Age at which music study began _____ Year in College _____

Student's Curriculum _____

Scale for rating Musicality

LOWEST THIRD			MIDDLE THIRD			TOP THIRD		
1	2	3	4	5	6	7	8	9

Scale for rating Ability to Sight-Read

LOWEST THIRD			MIDDLE THIRD			TOP THIRD		
1	2	3	4	5	6	7	8	9

Scale for rating Ability to Perform

LOWEST THIRD			MIDDLE THIRD			TOP THIRD		
1	2	3	4	5	6	7	8	9

PRODUCT-MOMENT CORRELATION COEFFICIENTS
FOUND BETWEEN THE VARIOUS TEST SCORES
AND THE RATINGS OF MUSICALITY, SIGHT-READING ABILITY,
PERFORMANCE ABILITY AND APPLIED MUSIC GRADES

Test Scores	Applied Grades	Musicality	Sight-Reading	Performance
B1-N	-.028 ± .07	.005 ± .05	.044 ± .08	.097 ± .08
B2-S	.149 ± .07	.107 ± .05	-.030 ± .08	.028 ± .08
B3-I	-.028 ± .07	.002 ± .06	.022 ± .08	.100 ± .08
B4-D	.023 ± .07	.130 ± .07	.054 ± .08	.043 ± .08
F1-C	-.055 ± .08	.099 ± .07	-.080 ± .08	.198 ± .08
F2-S	-.016 ± .08	.058 ± .07	-.034 ± .08	.040 ± .08
ACE-T	.074 ± .07	.305 ± .07	.242 ± .07	.039 ± .08
ACE-Q	.002 ± .07	.271 ± .07	.250 ± .07	.095 ± .08
ACE-L	.082 ± .07	.218 ± .07	.213 ± .08	.012 ± .08
CRCT-T	.111 ± .08	.201 ± .07	.215 ± .08	.100 ± .08
CRCT-V	.142 ± .08	.267 ± .07	.206 ± .08	.102 ± .09
CRCT-R	.117 ± .08	.249 ± .07	.222 ± .08	.094 ± .08
CRCT-C	.015 ± .08	.133 ± .07	.149 ± .08	.057 ± .09
S-Total	.074 ± .07	.230 ± .07	.254 ± .07	.103 ± .08
S-Pitch	.143 ± .07	.216 ± .07	.211 ± .08	.215 ± .08
S-Rhythm	-.117 ± .08	-.034 ± .08	.003 ± .08	-.101 ± .08
S-Time	.017 ± .08	.069 ± .08	.151 ± .08	.059 ± .08
S-Timbre	.050 ± .08	-.014 ± .08	.065 ± .08	.176 ± .08
S-T. M.	.059 ± .08	.189 ± .07	.210 ± .08	.061 ± .08
S-Loudness	.116 ± .07	.213 ± .07	.187 ± .08	.012 ± .08
Age began	-.054 ± .08	-.155 ± .07	-.271 ± .08	-.183 ± .08

RANK DIFFERENCE CORRELATION COEFFICIENTS
FOUND BETWEEN TEST AVERAGE RANKINGS
FOR THE CURRICULAR GROUPINGS

		1	2	3	4	5	6	7	8	9	10	11
1.	ACE-T											
2.	CRCT-T	.83										
3.	Sea-T	-.14	-.14									
4.	Mus.	-.48	.09	.15								
5.	S. R.	-.48	.09	.15	1.00							
6.	Perf.	-.48	.09	.15	1.00	1.00						
7.	Grades	-.51	-.43	.66	.26	.26	.26					
8.	B1-N	-.15	.26	.03	-.20	-.20	-.20	.38				
9.	B2-S	-.66	-.94	-.03	-.14	-.14	-.14	.20	-.25			
10.	B3-I	.38	.38	-.20	-.65	-.65	-.65	.09	.83	-.26		
11.	B4-D	-.54	-.83	.20	.37	.37	.37	.08	-.48	.77	-.71	
12.	F1-C	-.49	-.49	.31	.37	.37	.37	.08	-.88	.43	-.88	.6
13.	F-2S	.20	.60	-.37	.43	.43	.43	-.37	-.06	-.80	-.20	-.4

RANK DIFFERENCE CORRELATION COEFFICIENTS
FOUND BETWEEN TEST AVERAGE RANKINGS
FOR THE INSTRUMENT GROUPINGS

		1	2	3	4	5	6	7	8	9	10	11
1.	ACE-T											
2.	CRCT-T	.90										
3.	Sea.-T	.00	-.10									
4.	Mus.	-.20	-.20	.50								
5.	S. R.	-.56	-.60	.70	.60							
6.	Perf.	.04	-.05	.70	.60	.20						
7.	Grades	-.30	-.40	-.30	.80	.20	.00					
8.	B1	.40	.30	-.60	-.30	-.90	.10	.10				
9.	B2	.10	.00	.60	.30	.90	.10	.10	-.80			
10.	B3	.40	.30	-.60	-.30	-.90	.10	.10	1.00	-.80		
11.	B4	.00	.10	.50	.00	.80	-.20	-.20	-.90	.90	-.90	
12.	F1	.10	.30	.90	.70	.90	.60	-.10	.70	.80	.70	.60
13.	F2	-.25	-.44	.85	.75	.55	.85	-.05	-.44	-.65	-.55	.35

RANK DIFFERENCE CORRELATION COEFFICIENTS
FOUND BETWEEN TEST AVERAGE RANKINGS
FOR THE CLASS GROUPINGS

		1	2	3	4	5	6	7	8	9	10	11
1.	ACE-T											
2.	CRCT-T	.20										
3.	Sea.-T	.40	.80									
4.	Mus.	.20	1.00	.80								
5.	S. R.	.40	.80	.40	.80							
6.	Perf.	.20	1.00	.80	1.00	.80						
7.	Grades	.20	1.00	.80	1.00	.80	1.00					
8.	B1	.80	.40	.80	.40	.20	.40	.40				
9.	B2	.80	-.40	-.20	-.40	.00	.40	.40	-.40			
10.	B3	1.00	.20	.40	.20	.40	.20	.20	.80	-.80		
11.	B4	.80	-.40	-.20	-.40	.00	.40	.40	-.40	1.00	.80	
12.	F1	.40	.80	.40	.80	1.00	.80	.80	-.20	1.00	-.40	.00
13.	F2	-1.00	-.20	-.40	-.20	-.40	-.20	-.20	.80	.80	1.00	.80