

379  
N81  
No. 1925

THE DEVELOPMENT OF AN OBJECTIVE APPROACH TO THE  
MEASUREMENT AND IMPROVEMENT OF AURAL  
DISCRIMINATION IN MUSIC

THESIS

Presented to the Graduate Council of the  
North Texas State College in Partial  
Fulfillment of the Requirements

For the Degree of

MASTER OF MUSIC

By

1913.9

Margie M. Commander, B. M.

Groves, Texas

June, 1951

## TABLE OF CONTENTS

	Page
LIST OF TABLES . . . . .	iv
LIST OF ILLUSTRATIONS . . . . .	v
Chapter	
I. INTRODUCTION . . . . .	1
II. RESEARCH IN AUDITORY TRAINING. . . . .	8
III. RESEARCH PROCEDURE . . . . .	12
Test Number I, Major and Minor Chords	
Test Number II, Minor and Diminished Chords	
Test Number III, Augmented and Diminished Chords	
Test Number IV, Major, Minor, Augmented, and Diminished Chords	
Test Number Va, Intervals Played Consecu- tively	
Test Number Vb, Intervals Played Simul- taneously	
Analysis of the Test	
Practice Records in Aural Discrimination	
Practice Record Number I, Major and Minor Chords	
Practice Record Number II, Minor and Diminished Chords	
Practice Record Number III, Augmented and Diminished Chords	
Practice Record Number IV, Major, Minor, Augmented, and Diminished Chords	
Practice Record Number Va, Intervals Played Consecutively	
Practice Record Number Vb, Intervals Played Simultaneously	
IV. RESULTS OF THE STUDY . . . . .	41
V. SUMMARY AND CONCLUSIONS. . . . .	45
BIBLIOGRAPHY. . . . .	47

LIST OF TABLES

Table	Page
1. Percentage of Items Missed on Each Chord for Each Pre-Test. . . . .	42

## LIST OF ILLUSTRATIONS

Figure	Page
1. Examples of Each Type of Triad. . . . .	2
2. Practice Examples of Major and Minor Chords . .	13
3. Test Manuscript of Major and Minor Chords . . .	14
4. Practice Examples of Minor and Diminished Chords. . . . .	14
5. Test Manuscript of Minor and Diminished Chords.	15
6. Practice Examples of Augmented and Diminished Chords. . . . .	15
7. Test Manuscript of Augmented and Diminished Chords. . . . .	16
8. Practice Examples of Major, Minor, Augmented, and Diminished Chords . . . . .	16
9. Test Manuscript of Major, Minor, Augmented, and Diminished Chords . . . . .	17
10. Practice Examples of Intervals Played Con- secutively. . . . .	18
11. Test Manuscript of Intervals Played Con- secutively. . . . .	18
12. Practice Examples of Intervals Played Simul- taneously . . . . .	19
13. Test Manuscript of Intervals Played Simul- taneously . . . . .	19
14. Sample of Score Sheet Used. . . . .	21
15. Sample of Practice Score Sheet. . . . .	23
16. Practice Record of Major and Minor Chords-- First Part. . . . .	25
17. Practice Record of Major and Minor Chords-- Second Part. . . . .	26

Figure	Page
18. Practice Record of Minor and Diminished Chords-- First Part . . . . .	28
19. Practice Record of Minor and Diminished Chords-- Second Part . . . . .	29
20. Practice Record of Augmented and Diminished Chords--First Part . . . . .	30
21. Practice Record of Augmented and Diminished Chords--Second Part . . . . .	32
22. Practice Record of Major, Minor, Augmented, and Diminished Chords--First Part . . . . .	33
23. Practice Record of Major, Minor, Augmented, and Diminished Chords--Second Part . . . . .	34
24. Practice Record of Intervals Played Consecu- tively--First Part . . . . .	36
25. Practice Record of Intervals Played Consecu- tively--Second Part . . . . .	37
26. Practice Record of Intervals Played Simul- taneously--First Part . . . . .	39
27. Practice Record of Intervals Played Simul- taneously--Second Part . . . . .	40

## CHAPTER I

### INTRODUCTION

An ever-present problem in the undergraduate study of aural music theory is the development of the ability to hear tonal combinations correctly and to be able to identify them. One might refer to this as aural intelligence. As an example, too often the student, in hearing a major triad, must sing the arpeggio before he is able to identify the major, minor, augmented, or diminished feeling. The acquisition of this skill is a necessary adjunct to the study of theory, as would be the ability to hear mentally the notes on the printed score. Music is comprehended only through aural perception, which necessitates a knowledge of the structure of chords and intervals. It is compulsory for the students to understand that chords are formed by placing three tones, one above the other, that these chords can be built from any tone, that any three-tone chord is called a triad, that the tone upon which the triad is built is called the root, that the first tone above the root is called the third, and that the upper tone is called the fifth. It is necessary, also, that he understand that when the root of a triad is on a line, the other tones are also on lines, and when the root is in a space, the other tones are in spaces. Recognition can be developed further when a person

has a mental picture to assist his aural abilities. The relative tonal spacing of a triad determines whether it is major, minor, augmented, or diminished, and the size of the third and fifth designates the quality. This is perceived by the listener as difference in position (or spacing) and quality.

The structure and combinations used when building the major, minor, augmented, and diminished triads and intervals are of utmost importance. It is necessary, therefore, for the student to know that a triad composed of a major third and a perfect fifth is called a major triad. The minor third and perfect fifth is known as a minor triad. When the chord is constructed with a major third and an augmented fifth, it is called an augmented triad, whereas the triad with a minor third and a diminished fifth is diminished. This is accomplished by merely altering the pitch of either the third or the fifth tone a half step. The mere inversion of a triad does not alterate the major, minor, augmented, or diminished feeling. Following are examples of each type of triad.

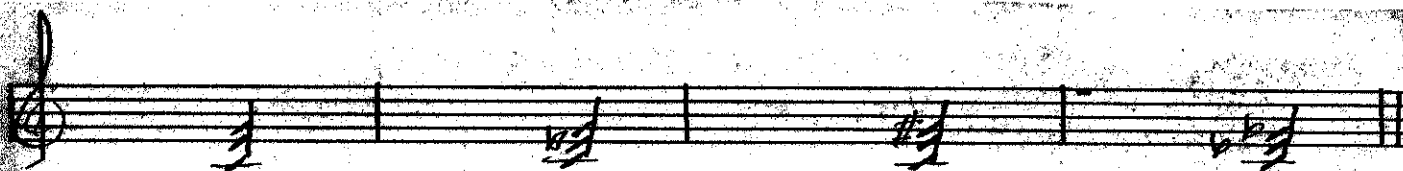


Fig. 1.--Examples of each type of triad

### Imagery Response

One of the most important aspects in the study of recognition is the response and feeling of the individual when tones are sounded. The student may feel the tonal combinations and associate with them the feeling of sound which appears to him to be hollow, full, dull, or gay. This kinesthetic association is of greatest value when one is associating feeling with the names of chords and intervals. Feeling is also greatly involved in the study of consonance and dissonance. However, major and minor triads are consonant to the listener, because they are complete and do not need to be resolved, whereas the augmented and diminished triads are dissonant, for they sound incomplete and need resolution to a consonant sound.

Although the title of this study has employed the term "Aural Discrimination," it could easily have been altered to read: "Aural Discrimination--A Factor in Sightreading Technique"--the ability of an individual to reproduce orally musical notations being read. The student may read music one note at a time, one phrase at a time, or one line at a time. The beginning vocalist or instrumentalist generally sees only one note at a time, but as he progresses, this span increases. The most important factor in sightreading is eye movement. A research study on sightreading is now being made by a graduate student at North Texas State College. From a psychological



standpoint, eye movement determines the course, the speed, and the integrating movements of attention.

The purpose of this experiment is therefore (1) to design a test to measure the skill of a heterogeneous group of college music students and (2) to administer and evaluate an aural training program which could be used to develop efficiently aural intelligence. The students used in this experiment were intentionally chosen with varying abilities in order to permit comparisons. A careful record was kept of their ages, musical experiences, major instruments (voice, piano, violin, and other orchestral instruments), amount of training, skill and technique, and theory grades.

In planning an experiment, or in evaluating the results of an experiment, one should follow the scientific testing procedure which Carl Seashore advocates. This will include the following items: (1) the factor under consideration must be kept constant, whereas the selected factor is varied under control; (2) the factor under consideration must be isolated in order that one may know exactly what is being measured; (3) the observed facts must be recordable; (4) the situation must be repeatable for verification; (5) the conclusion must be validated in relation to the total personality and in the total musical situation, and (6) the conclusion must be limited to the factor under control. If the plan for an experiment

fails on any one of these points, the conclusion to be drawn may be invalidated.<sup>1</sup>

After the vast scope of the problem had been considered, it was felt necessary to limit the study to instantaneous recognition of major, minor, augmented, and diminished chords, and to major, minor, and perfect intervals. Further testing and development of rhythmic and melodic dictation would have required a more thorough knowledge of the fundamental technique which had not been studied by the freshmen theory classes up to the time of the testing program.

The entire test was recorded in order to permit accuracy. Each section was prefaced with verbal instructions, and an opportunity was given for further explanations, if necessary. The test was composed of six parts; these were (1) major and minor chords, (2) minor and diminished chords, (3) augmented and diminished chords, (4) major, minor, augmented, and diminished chords, (5a) recognition of intervals (tones played consecutively), and (5b) recognition of intervals (tones played simultaneously). The test was administered twice: an initial test and a post-test. They provided the data necessary to (1) identify relative difficulty of items under study and (2) correlate absolute levels of ability and progress rates with evaluation of student musical abilities and other allied experiences (instruments studied, theory grade the previous

---

<sup>1</sup>Carl Seashore, The Psychology of Music, pp. 27-28.

semester, and the number of years the student had studied these principal instruments). From the data accumulated it was possible to establish tentative norms by ascertaining the absolute levels of ability before and after training and the amount of progress accomplished as a measure of training effectiveness.

The experimenter is greatly indebted to the theory department and the individual students who made this investigation possible. It is of interest to note that the students expressed gratitude for the mutual benefit which they received from the training. The test was also given to the music classes offered for majors in Elementary Education, composed of non-music majors. Likewise, the test was given to a group of students being professionally trained in the graduate class.

A series of practice records were made to be used with the second semester of freshmen theory classes. Resembling the initial test records in form, the practice recordings were made, prefaced with verbal instructions. Each part of the test contained one hundred examples for the purpose of practice. The amount of practice required between the pre-test and the post-test, of course, had not been determined. It was felt that five hearings of each practice record would be sufficient to obtain the preliminary data necessary for this research.

In order to evaluate the test it was necessary to obtain information concerning the musical background and training of the students being studied. It was felt that those with considerable musical experience would do better on the pre-test than would the musically-untrained group. It was also of interest to correlate the test grade with the type of musical skills represented in the group, such as (1) the instruments played and (2) the amount of instrumental training or vocal training.

## CHAPTER II

### RESEARCH IN AUDITORY TRAINING

Despite the numerous discussions and the limited knowledge on the subject "Aural Imagery," practically no research has been attempted. In fact, the bulk of research can be accredited to Carl Seashore.<sup>1</sup> Because of the limited understanding of this field of study, few people visualize its vast scope, most of which is yet to be explored. This study can be of importance to everyone interested in music, from the untrained person to the most gifted individual. To the untrained musician more enjoyment would be afforded through this understanding, and to the trained musician more thorough knowledge in the fields of theory and interpretation could be obtained. Cultivated recognition is an educative process, and students should exercise this skill to their greatest capacity.

Tonal imagery, which one fails to stress, can be a great asset to every musician. An aural association with musical notations will stimulate recognition, sightreading, interpretation, and appreciation.

Seashore emphasizes two phases of imagery--auditory and motor imagery.

---

<sup>1</sup>Carl Seashore, In Search of Beauty in Music, p. 252.

While we relive and create music through images in all the senses, two are essential and characteristic of musical life: auditory imagery and motor imagery. Auditory imagery must be determined because it is in terms of this that we relive music we have once heard and express new music in creative imagination. Motor imagery, that is, the subjective sensory experience of action in association, is also a basic factor, because it is the taproot of emotional expression and is really an index of musical emotion. For each of these we have serviceable introspection measures.

Memory. There are many vastly divergent aspects of musical memory which may be measured, but for the present purpose only one will be selected: memory span; that is, the capacity for grasping and retaining for a moment a group of musical sounds.<sup>2</sup>

To assist the memory and auditory imagery there appears another open field for research, that of chromaesthetic association to musical notations. For some individuals color or feeling is associated with musical tones. The color gray might be associated with the feeling produced by the minor chord, or the gay color of orange might be associated with the brilliant major chord. This chromaesthetic feeling can also be correlated with tonal imagery, the ability to visualize as one hears tonal combinations.

Closely associated with tonal imagery is auditory imagery. Seashore states that

All genuine musicians have superior auditory imagery, that is, they can recall a tone so realistically and objectively that it can be scrutinized in all its detail just as in actual hearing.

---

<sup>2</sup>Ibid., p. 211.

The composer of any consequence conceives his themes and carries out details of composition without access to physical tone in instruments. He first hears mentally in realistic auditory imagery the thing he attempts to set down on paper. Therefore to interrupt his musical thinking, whether it be in the act of formal composition, snatches of musical thinking, or musical reveries, is just as serious an interruption to him as if it came during his actual playing before an audience. This gives him the reputation of being distraught and oblivious to elements in the environment which to others seem significant. In other words, the genuine musician is engaged in music a great deal more through the avenue of vivid memory and creative imagination than in actual hearing or performance.

In hearing actual music as well as in performing, this imagery supplements the physical stimulus and furnishes a sort of matrix or setting which personalizes the overt tones in an artistic interpretation. The musician has extraordinary resources for pleasure in the reliving and in the mental creation of sound which the non-musical mind does not have. He really lives in a dissociated tonal world by himself, where, in tense moments, he may approach a state of ecstasy. Therefore, he may be annoyed because his pleasures or displeasures are not shared by others. This leads to impatience, fastidiousness, and eccentricity often recognized as part of the musical temperament.<sup>3</sup>

Despite the fact that Seashore has applied "tonal imagery" only to the highly-trained musician, it can be applied just as easily to the untrained musician. If a detailed experiment could be made, associating tonal imagery with tonal recognition, one might find tonal imagery far more profitable and valuable than the steadfast rules containing the knowledge of half steps and whole steps, such as the lowering of the third one-half step forms the minor chord, the lowered

---

<sup>3</sup>Ibid.

third and fifth the diminished chord, and the raised fifth the augmented chord.

It is unfortunate, indeed, that so little research has been done in this field, a study so important to the musician. However, if this investigation can serve as a stimulus for further research on this and allied subjects, the music educator will be given more impetus for the objectification of methods and procedures.



## CHAPTER III

### RESEARCH PROCEDURE

In planning this experiment it was found necessary to present a test which would be accurate and capable of being repeated, in order to insure the maximum reliability. Because of technical complexity, and in order to increase performance accuracy, the test was rehearsed and finally recorded, thus limiting the variabilities to those being measured. Several sets of trial tests were made before the final test was recorded. These trial tests were given to both students and members of the faculty, until a suitable test was initiated. These tests revealed errors in timing, relative spacing of chords and intervals, varied dynamics used on piano, and in the control of dynamics over each section of the test. Unless the dynamics were kept constant, those chords and intervals played in the upper register did not sound as brilliant as those played in the middle register. A concentrated study was made on the usage of the pedal and the effects it had on the sounding of tones. The keyboard spacing of the chords and intervals necessitated a thorough scrutiny of the manuscript before the final test was recorded. Chords were so arranged that they permitted no repetition of tones in adjacent chords.

After selecting a suitable set of chords and intervals, the entire test was cut at a speed of seventy-eight revolutions per minute, one chord every two seconds. Each was prefaced with verbal instructions, followed by a period for asking questions. Five samples were given on each test for practice purposes. Tests I, II, III, IV, Va, and Vb are the actual instructions and manuscript used on the test records.

#### Test Number I, Major and Minor Chords

Test Number I deals with the recognition of major and minor chords. The chords will be played on the piano in rapid succession. Do not try to sing them, but rather indicate your first impression. If you feel the chord is major, place a plus sign in the space provided under Column Number I. If you feel the chord is minor, place a minus sign in the space. Notice the sample under Test Number I. You will now be given five examples for practice. Ready!

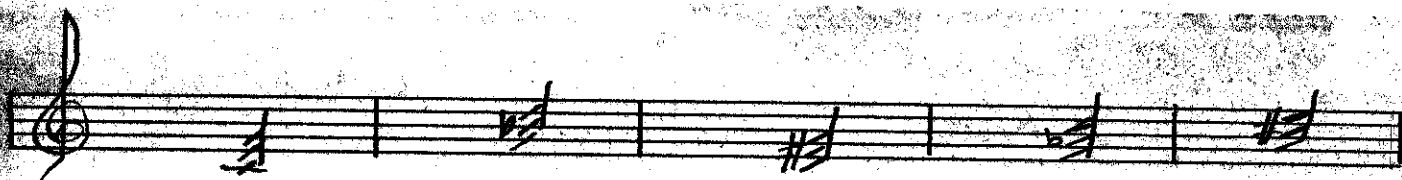


Fig. 2.--Practice examples of major and minor chords.

Your answers should be: plus, minus, plus, minus, plus. The entire test on major and minor chords will be conducted in

the same manner as the practice test. Are there any questions? Sit in a position of attention. Ready!

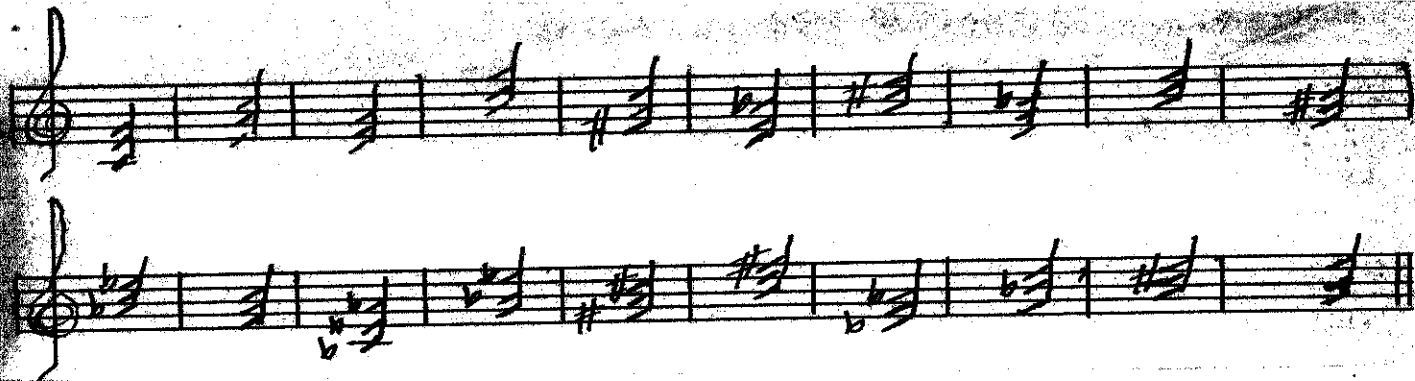


Fig. 3.--Test manuscript of major and minor chords.

#### Test Number II, Minor and Diminished Chords

Test Number II deals with the recognition of minor and diminished chords. If you feel the chord is diminished, place a "d" in the space provided under Column Number II. If the chord is minor, place a minus sign in the space. Notice the sample under Test Number II. As an example you will be given five chords for practice. Ready!



Fig. 4.--Practice examples of minor and diminished chords.

Your answers should be: minus, minus, diminished, minus, diminished. The entire test on minor and diminished chords will

be conducted in the same manner as the practice test. The chords will be played in rapid succession. Are there any questions? Sit in a position of attention. Ready!

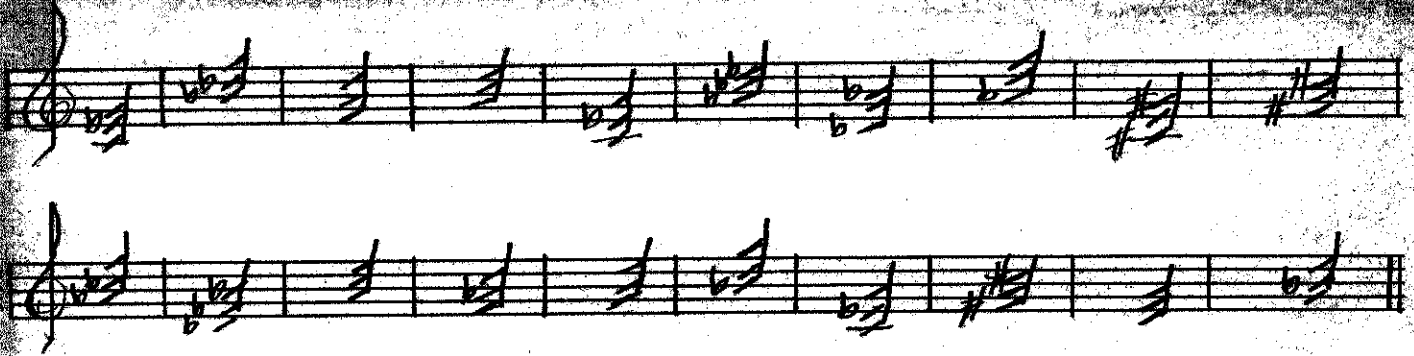


Fig. 5.--Test manuscript of minor and diminished chords.

### Test Number III, Augmented and Diminished Chords

Test Number III deals with the recognition of augmented and diminished chords. If the chord is augmented, place a printed "A" in the space provided under Column Number III. If the chord is diminished, write a "d" in the space. Please notice the sample under Test Number III. You will now be given five examples for practice. Ready!

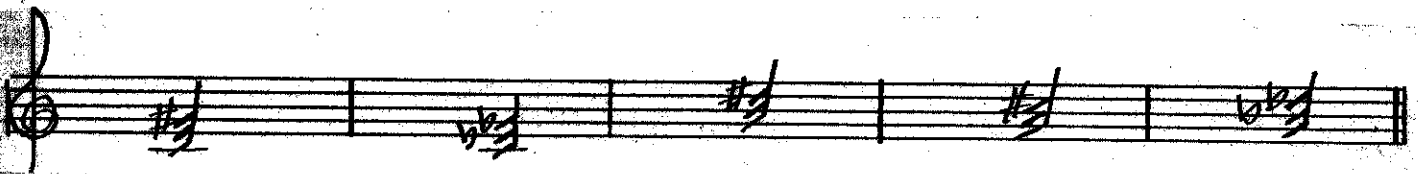


Fig. 6.--Practice examples of augmented and diminished chords.

Your answers should be: augmented, diminished, augmented, augmented, diminished. The entire test on augmented and diminished chords will be conducted in the same manner as the practice test. Are there any questions? Sit in a position of attention. Ready!

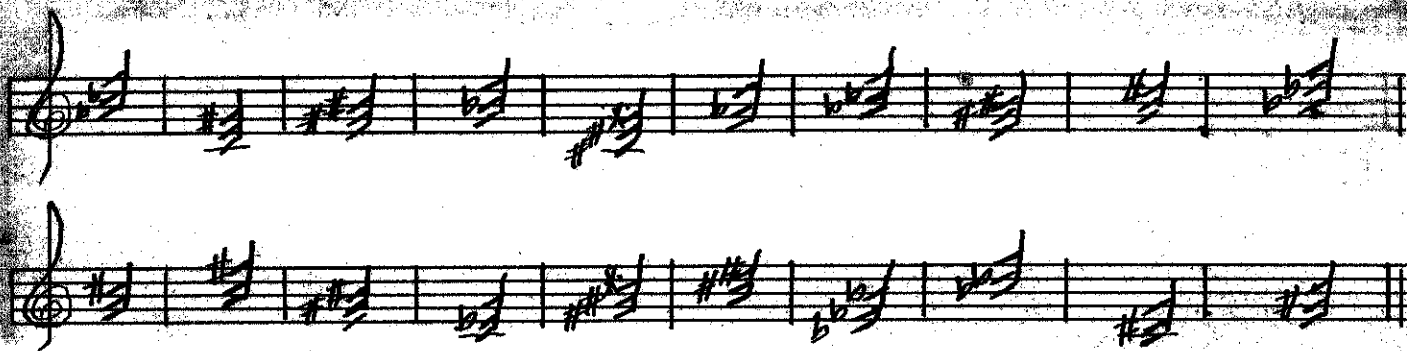


Fig. 7.--Test manuscript of augmented and diminished chords.

Test Number IV, Major, Minor, Augmented,  
and Diminished Chords

Test Number IV includes all four types of chords previously discussed--major, minor, augmented, and diminished. As in the previous tests, the chords will be played in rapid succession. As you will notice under the sample for Test Number IV, use the symbol "plus" for major, "minus" for minor, printed "A" for augmented, and a small "d" for diminished. You will now be given five examples for practice. Ready!

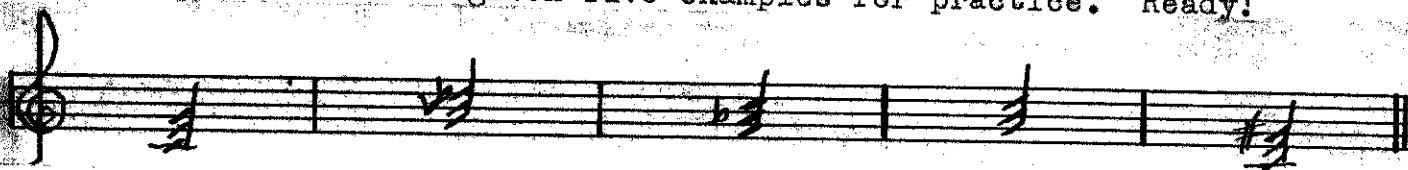


Fig. 8.--Practice examples of major, minor, augmented, and diminished chords.

Your answers should be: plus, diminished, minus, plus, augmented. You are now ready for Test Number IV. Since this test is the most difficult of all, make every effort to concentrate. Are there any questions? Sit in a position which will permit maximum concentration. Ready!

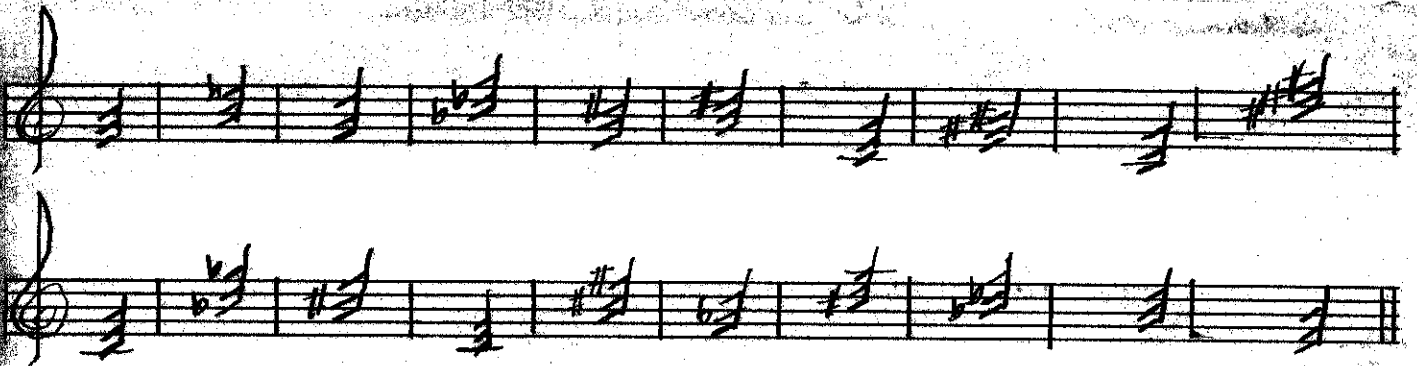


Fig. 9.--Test manuscript of major, minor, augmented, and diminished chords.

#### Test Number Va, Intervals Played Consecutively

Test Number Va deals with the recognition of intervals. As in the samples for Test Number Va, indicate the interval played by placing the number representing that interval in the space provided. Thirds and sixths can be either major or minor and should be so indicated by a plus or minus sign. The notes of the intervals will be played consecutively. As in the previous tests, the intervals will be played in rapid succession. You will now be given five examples for practice. Ready!

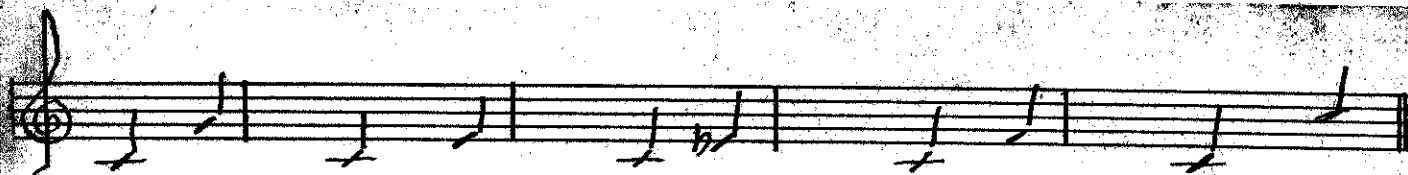


Fig. 10.--Practice examples of intervals played consecutively.

Your answers should be: five, plus three, minus three, four, eight. The entire test will be conducted in the same manner as the practice test. Are there any questions? Sit in a position of attention. Ready!

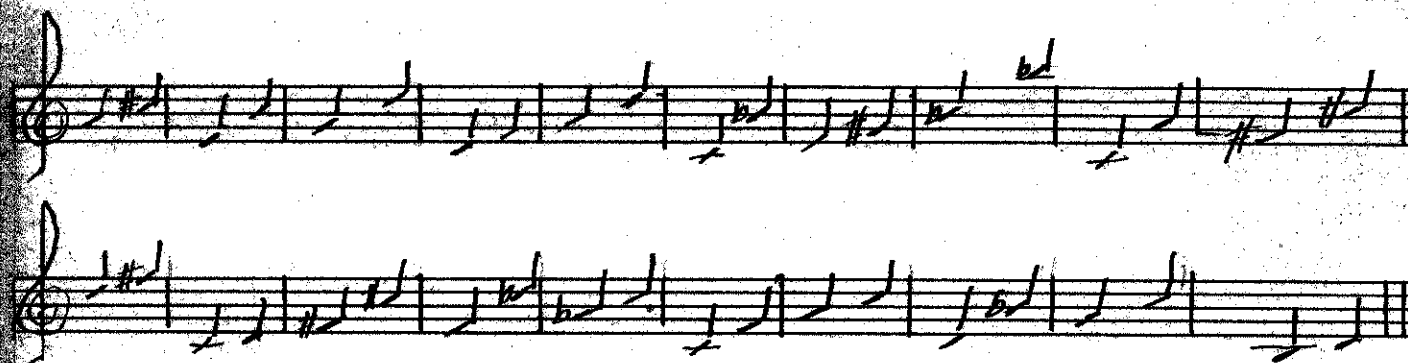


Fig. 11.--Test manuscript of intervals played consecutively.

Test Number Vb, Intervals Played Simultaneously

Test Number Vb differs from the one just completed in that the notes of the intervals will be played simultaneously. You will now be given five examples for practice. Ready!

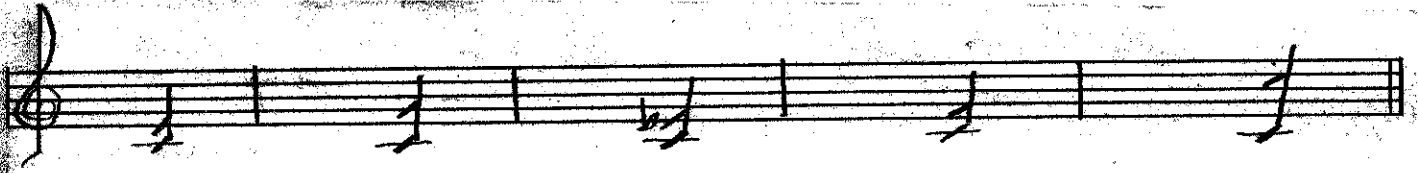


Fig. 12.--Practice examples of intervals played simultaneously.

The entire test will be conducted in the same manner as the practice test. Are there any questions? Sit in a position of attention. Ready!

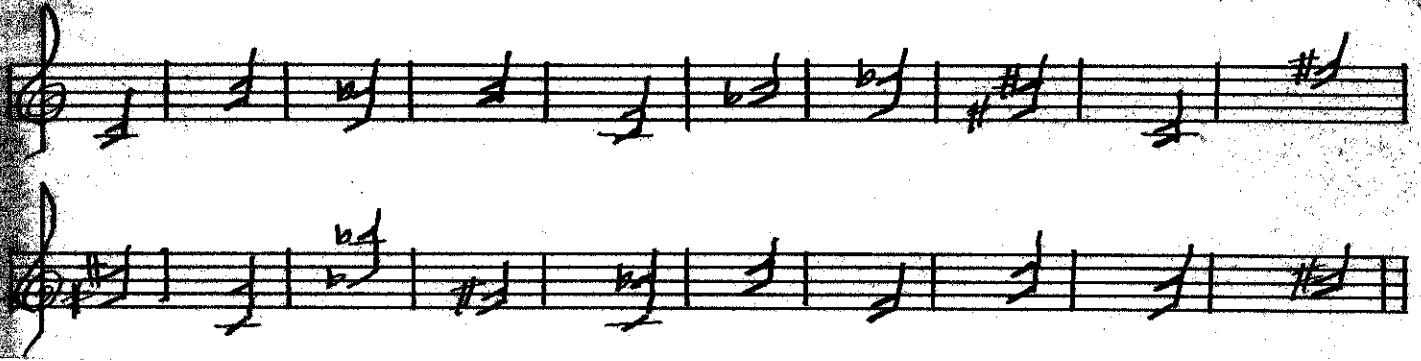


Fig. 13.--Test manuscript of intervals played simultaneously.

#### Analysis of the Test

The chief difficulty in the test was found not in speed in which the test was administered, but in the scoring of the test. It was necessary to devise a scoring sheet which would provide a simple method for marking each test. Trial score sheets were made, and tests were given to faculty and students before a decision was reached as to which score sheet insured



the testing of only one factor. Each score sheet provided for the name of the pupil and the date of the test. On this sheet was listed pre-test and post-test, and the pupil was asked to indicate which test he was taking. Scoring instructions were given for each test. The squares which provided space for the answers included five for the practice test and twenty spaces for the initial test. Figure 14 is a sample of the score sheet used.

TEST OF AURAL RECOGNITION

Name \_\_\_\_\_  
           last                      first

Date \_\_\_\_\_

	Test Number					
	1	2	3	4	5a	5b
A						
B						
C						
D						
E						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Practice

(Circle One)

Pretest  
 Mid-test  
 Post-test

Test #1

Major = +

Minor = -

Test #2

Minor = -

Dim. = d

Test #3

Aug. = A

Dim. = d

TEST OF AURAL RECOGNITION--Continued

	Test Number					
	1	2	3	4	5a	5b
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Test #4

Major = +

Minor = -

Aug. = A

Dim. = d

Tests 5a & 5b Indicate  
Intervals2  
±3  
3  
4  
5  
±6  
6  
7  
8

Fig. 14.--Sample of score sheet used

## Practice Records in Aural Discrimination

In order to provide training in aural discrimination, a series of practice records were recorded to be used by the freshmen theory classes. These records resembled the initial test in form, and each set contained verbal instructions. Each part of the test was composed of one hundred examples for the purpose of practice. Unlike the initial test, these recordings were cut at a speed of thirty-three and one-third revolutions per minute. The first fifty examples were played at a rate of one note every two seconds. The faster tempo was

that used in the initial test. In order to facilitate the checking of results, the answers were recorded after each ten examples. The amount of practice required between the pre-test and the post-test, of course, had not been determined. It was felt that two hearings of each practice record would be sufficient to obtain the preliminary data necessary for this study. The practice laboratory was open for freshmen students for a period of three weeks. Many students from advanced theory classes attended these sessions.

A special score sheet was devised for the practice records. Answers were given after each set of five chords had been played. Ample time was given for each student to check his own paper. At the bottom of the sheet was space for the students' scores to be recorded. It was interesting to note that the majority of students improved greatly on the second hearing of the test. Figure 15 is a sample of the practice score sheet.

PRACTICE SCORE SHEET

Classification \_\_\_\_\_ Instructor \_\_\_\_\_  
 Name \_\_\_\_\_ Theory Class \_\_\_\_\_  
     last                      first

Practice score sheets are to be kept by the student and turned in to his theory teacher when requested. This sheet may be used for any test. Use the type of marking system indicated for the specific test you are practicing. The symbols for scoring are listed below.



The following illustrations contain the verbal instructions and manuscript used in the set of practice records.

Practice Record Number I, Major and Minor Chords

Practice Record Number I, major and minor chords. Check your own paper by drawing a line through the incorrect answers. Ready!

The image displays seven staves of handwritten musical notation, each representing a different chord. Each staff includes a treble clef, a key signature, and a chord symbol. To the right of each chord symbol is a set of handwritten checkmarks (t, -, +) for identification. The chords and their corresponding checkmarks are as follows:

- Staff 1:  $F$  chord, check: t, t, -, t, t
- Staff 2:  $F\sharp$  chord, check: -, t, -, t, -
- Staff 3:  $F$  chord, check: t, -, -, t, t
- Staff 4:  $F\sharp$  chord, check: -, t, -, -, t
- Staff 5:  $F$  chord, check: t, -, t, -, -
- Staff 6:  $F\flat$  chord, check: t, -, -, t, t
- Staff 7:  $F\flat$  chord, check: t, -, t, t, -

Fig. 16.--Practice record of major and minor chords--first part.

(At the conclusion of the first fifty samples there was a break in the record which provided for relaxation and scoring. The second part of the practice record was also prefaced with verbal instructions.)

The second part of Practice Record Number I will be given at a slightly faster tempo. Ready!

The image shows seven staves of handwritten musical notation. Each staff contains a sequence of chords in treble clef, followed by a double bar line and a 'check' sequence of plus (+) and minus (-) signs. The chords and their corresponding check sequences are as follows:

- Staff 1: Chords:  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ . Check:  $t, -, t, -, t$
- Staff 2: Chords:  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ . Check:  $t, t, -, t, t$
- Staff 3: Chords:  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ . Check:  $t, t, t, -$
- Staff 4: Chords:  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ . Check:  $t, -, -, t, -$
- Staff 5: Chords:  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ . Check:  $t, t, t, -$
- Staff 6: Chords:  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ . Check:  $t, t, -, -$
- Staff 7: Chords:  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ . Check:  $-, -, t, t, -$

Fig. 17.--Practice record of major and minor chords--second part.

Practice Record Number II, Minor and Diminished Chords

Practice Record Number II, minor and diminished chords.  
 Check your own paper by drawing a line through the incorrect answers. Ready!

The image displays ten staves of handwritten musical notation. Each staff begins with a treble clef and contains a sequence of notes, primarily eighth and sixteenth notes, often beamed together. The notation is somewhat sketchy and appears to be a study or a draft. To the right of each staff, there is a rhythmic pattern written in a shorthand notation, such as "check: -, -, d, -, -" or "check: d, -, -, d, -". These patterns likely correspond to the notes on the staff, where "check" might indicate a specific note or a measure, and "d" represents a dotted quarter note. The patterns vary across the staves, showing different rhythmic groupings and rests.



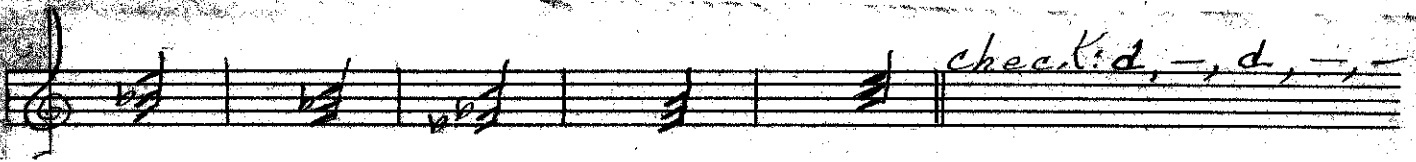


Fig. 18.--Practice record of minor and diminished chords--first part.

(At the conclusion of the first fifty samples there was a break in the record which provided for relaxation and scoring. The second part of the practice record was also prefaced with verbal instructions.)

The second part of Practice Record Number II will be given at a slightly faster tempo. Ready!

Handwritten musical notation for Fig. 19, showing five staves of chords and their corresponding checkmarks:

- Staff 1:  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$  | check: -, -, -, d, d
- Staff 2:  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$  | check: -, d, -, -, d
- Staff 3:  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$  | check: -, d, -, -, d
- Staff 4:  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$  | check: d, -, -, d, -
- Staff 5:  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$  | check: -, -, d, -, d

Fig. 19.--Practice record of minor and diminished chords--second part.

Practice Record Number III, Augmented and Diminished Chords

Practice Record Number III, augmented and diminished chords. Check your own paper by drawing a line through the incorrect answers. Ready!

Handwritten musical notation for Practice Record Number III, showing two staves of chords and their corresponding checkmarks:

- Staff 1:  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$  | check: A, A, d, A, d
- Staff 2:  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$ ,  $F_4$  | check: A, A, d, d, A

check: A, d, A, d, A

check: d, A, A, d, d

check: d, A, d, A, A

check: A, A, d, A, d

check: A, d, A, A, d

check: d, A, A, A, d

check: d, d, A, A, d

check: d, A, A, d, d

Fig. 20.--Practice record of augmented and diminished chords--first part.

(At the conclusion of the first fifty samples there was a break in the record which provided for relaxation and scoring. The second part of the practice record was also prefaced with verbal instructions.)

The second part of Practice Record Number III will be given at a slightly faster tempo. Ready!

Handwritten musical notation on seven staves, each with a treble clef and a key signature of one sharp (F#). Each staff contains a sequence of notes and rests, followed by a double bar line and a 'check' instruction. The instructions are:

- check: A, d, A, d, A
- check: A, A, d, A, d
- check: d, A, A, d, A
- check: A, d, A, d, d
- check: A, A, d, A, d
- check: A, d, A, d, A
- check: A, d, d, A, d

check: A, A, d, A, d

check: d, A, d, A, A

check: d, A, d, d, A

Fig. 21.--Practice record of augmented and diminished chords--second part.

Practice Record Number IV, Major, Minor, Augmented, and Diminished Chords--First Part

Practice Record Number IV, major, minor, augmented, and diminished chords. Check your own paper by drawing a line through the incorrect answers. Ready!

check: t, -, A, t, d

check: t, -, -, t, A

check: -, t, d, t, -

check: t, d, t, A, -

check: t, d, -, t, A

check: t, A, -, t, A

check: d, t, A, t, t

check: -, t, d, A, -

check: t, d, -, A, t

check: t, -, d, d, A

Fig. 22.--Practice record of major, minor, augmented, and diminished chords--first part.

(At the conclusion of the first fifty samples there was a break in the record which provided for relaxation and scoring. The second part of the practice record was also prefaced with verbal instructions.)

The second part of Practice Record Number IV will be given at a slightly faster tempo. Ready!

check: t, d, A, -, d

check: t, d, A, t, -

check: -, A, t, t, d

check: t, d, -, A, -

check: t, d, -, A, t

check: -, A, t, A, d

check: t, -, d, -, A

check: -, A, -, t, d

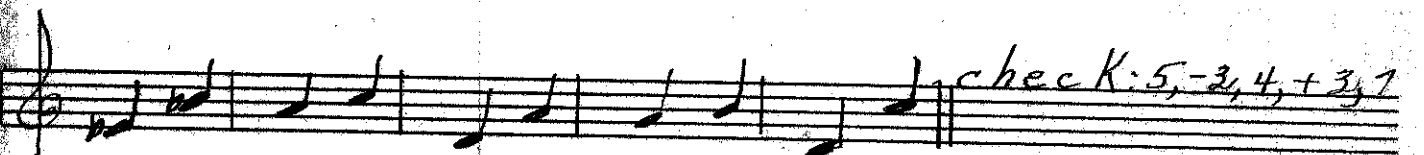
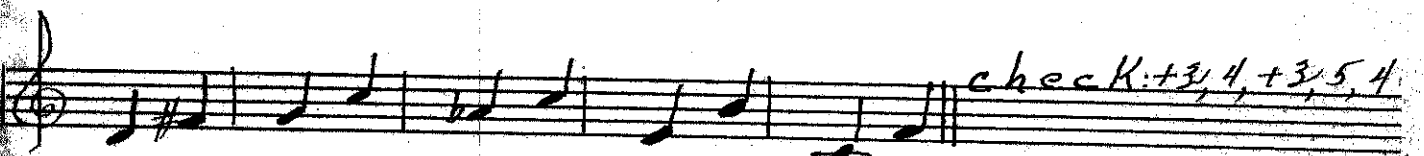
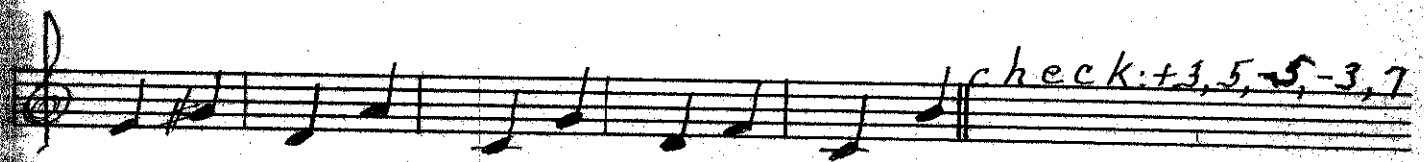
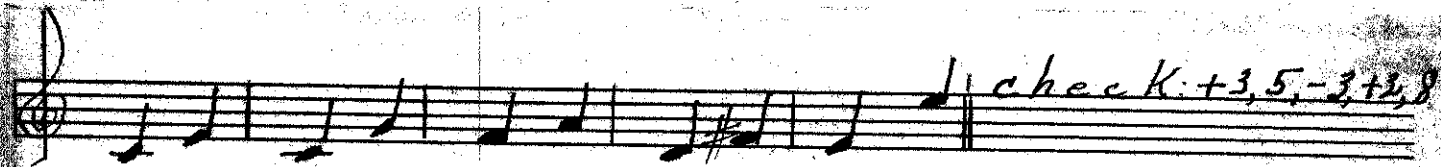
check: A, -, t, t, d

check: -, t, t, A, A

Fig. 23.--Practice record of major, minor, augmented, and diminished chords--second part.

Practice Record Number Va, Intervals Played  
Consecutively

Practice Record Number Va, intervals played consecutively. Check your own paper by drawing a line through the incorrect answers. Ready!





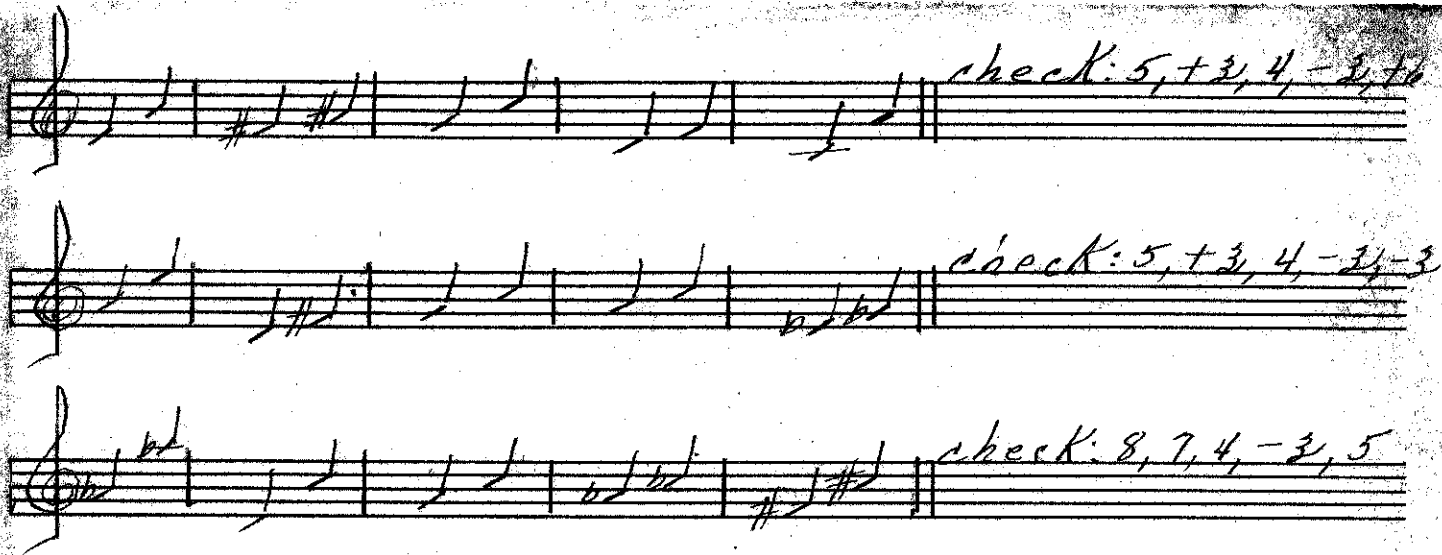
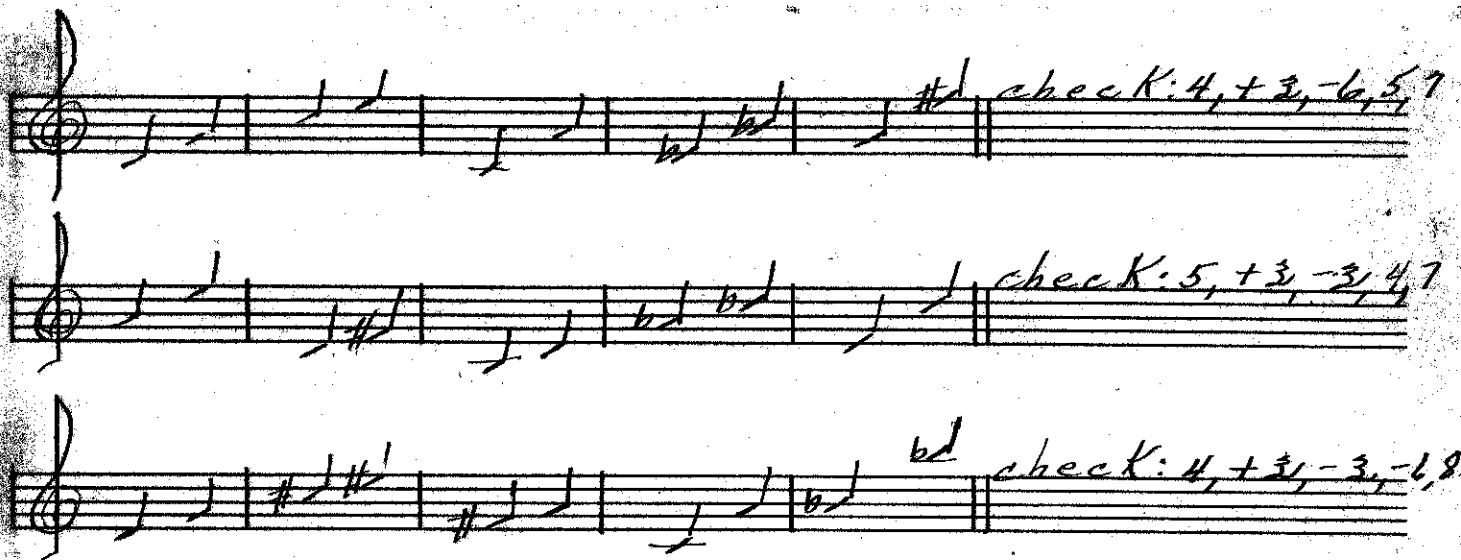


Fig. 24.--Practice record of intervals played consecutively--first part.

(At the conclusion of the first fifty samples there was a break in the record which provided for relaxation and scoring. The second part of the practice record was also prefaced with verbal instructions.)

The second part of Practice Record Number Va will be given at a slightly faster tempo. Ready!



check: +3, 5, 4, 4, 7

check: 4, 4, +3, 7, -3

check: +3, 5, 4, +3, 6

check: 7, +3, 8, 4, 5

check: +3, 4, 5, -3, 6

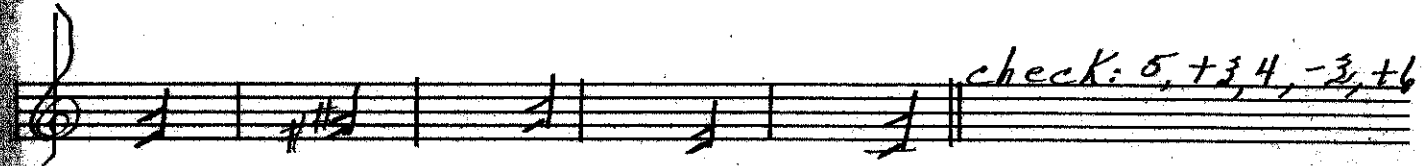
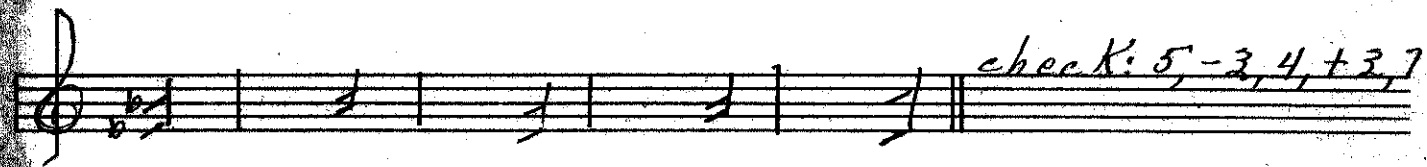
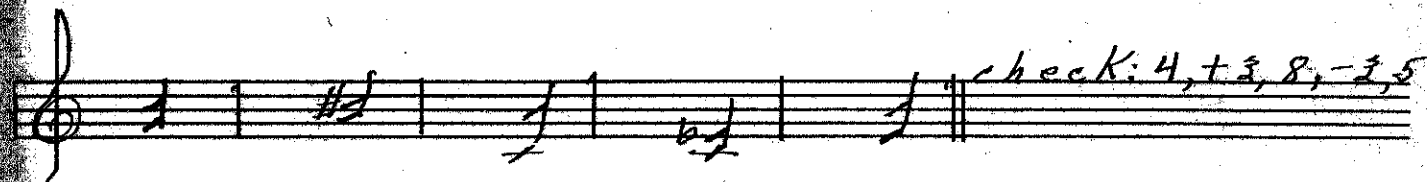
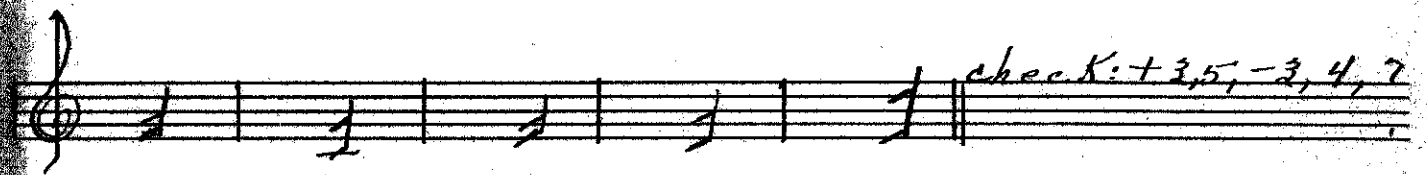
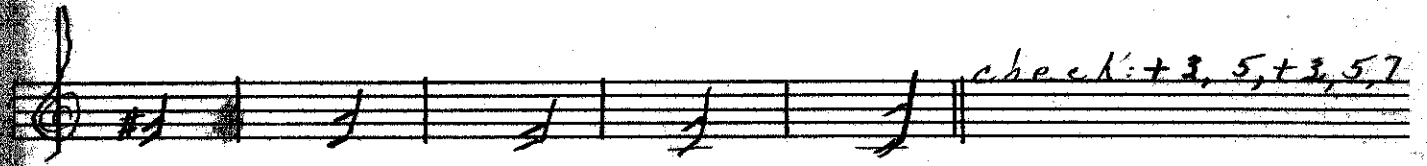
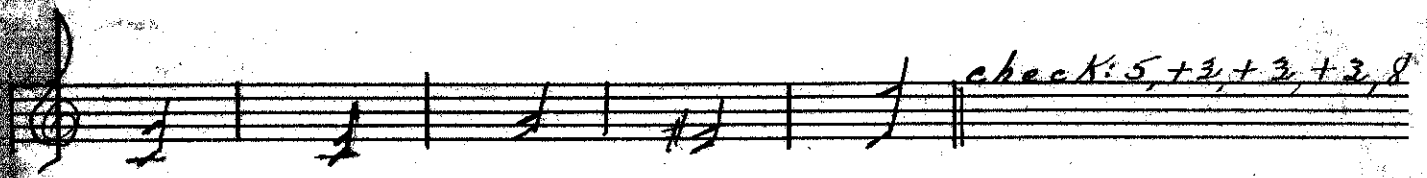
check: 5, -3, 7, +3, 6

check: +3, 5, 7, 4, -6

Fig. 25.--Practice record of intervals  
played consecutively--second part.

Practice Record Number Vb, Intervals Played  
Simultaneously

Practice Record Number Vb, intervals played simultane-  
ously. Check your own paper by drawing a line through the  
incorrect answers. Ready!



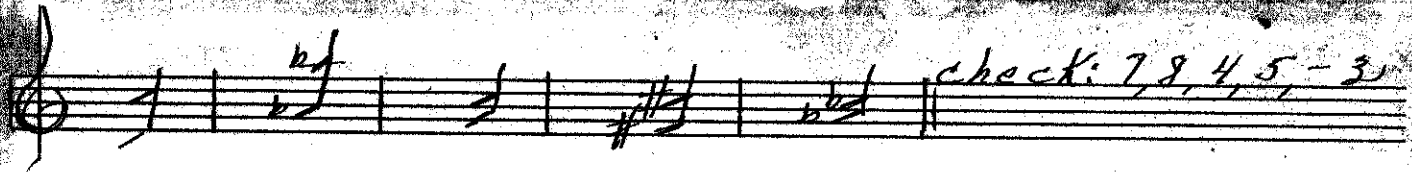


Fig. 26.--Practice record of intervals played simultaneously--first part.

(At the conclusion of the first fifty samples there was a break in the record which provided for relaxation and scoring. The second part of the practice record was also prefaced with verbal instructions.)

The second part of Practice Record Number Vb will be given at a slightly faster tempo. Ready!

check: +3, 5, 4, +3, -6

check: +2, 7, 8, 5, 4

check: +2, 4, 5, +3, -6

check: 5, -3, 7, +3, +6

check: +2, 5, 7, 4, -6

Fig. 27.--Practice record of intervals played simultaneously--second part.

## CHAPTER IV

### RESULTS OF THE STUDY

The pre-test and the post-test brought out a varied number of difficulties. The students who showed an inability to recognize chords which differed in tonal register in Test Number I (major and minor chords) showed an inability in some other phase of Test Number II (minor and diminished chords). The chief problems in these tests were (1) tonal register, (2) repeated tones, and (3) the speed in which the test was administered. The dictation was given at a fast rate of speed in order to require an instantaneous response, in this way not giving the student an opportunity to sing each chord.

The best scores were obtained in the first and second parts of the test; namely, in the recognition of major and minor chords. On the pre-test 83.4 per cent of the answers were correct on Test Number I; 76.6 per cent were correct on Test Number II; 60.8 per cent on Test Number III; 55.5 per cent on Test Number IV; 60.4 per cent on Test Number Va, and 45.1 per cent on Test Number Vb.

Table 1 shows the percentage of items missed on each chord or intervals for each pre-test given the freshman theory class; in this way the item difficulty of each chord was indicated.

TABLE 1  
 PERCENTAGE OF ITEMS MISSED ON EACH  
 CHORD FOR EACH PRE-TEST

Chord	Percentage Missed					
	Test I	Test II	Test III	Test IV	Test Va	Test Vb
1	0	37	11	31	16	53
2	52	31	2	70	59	53
3	27	39	2	30	47	73
4	5	37	19	51	28	62
5	9	26	8	12	30	42
6	8	41	22	53	73	61
7	28	47	17	41	42	72
8	6	31	36	59	5	58
9	8	50	30	17	42	30
10	6	30	32	36	34	58
11	59	47	33	48	42	41
12	20	42	44	36	23	70
13	5	48	25	69	51	72
14	0	34	22	14	56	64
15	3	22	23	59	44	56
16	5	25	25	48	25	62
17	9	34	20	81	33	58
18	11	23	36	47	58	59
19	12	42	20	33	50	62
20	6	59	22	50	27	45

The freshman theory class had a range of seventy-four points on the total pre-test, with a mean of 76.015. The formula used in finding the standard deviation for this group was  $s = \sqrt{\frac{\sum F D^2}{N} - C^2}$ , with a result of 37.25. The total post-test scores for the freshman theory class showed a range of fifty-six points. The mean was 90.95; the median was 90.0. The standard deviation for this group was 13.065, indicating greater homogeneity.

The graduate class showed a median of 77.0 for the total pre-test, with a mean of 81.14 and a standard deviation of 21.35.

As would be expected, most individuals showed a positive gain between the pre-test and the post-test. Fifty-six (93 per cent) showed an average gain of 16.3, with a range from 0 to forty-four points. Four students (7 per cent) showed a negative gain, averaging eight points with a range from two to thirteen points. Those individuals who made the highest scores on the pre-test showed the lowest gain and occasionally showed a loss. This is typical and, of course, was anticipated. The best score obtained on the post-test was one hundred sixteen, from a possible score of one hundred twenty. This score represents 97 per cent mastery.

It is interesting to note that the initial test grade and the number of years the student studied his major instrument showed little or no correlation ( $r = .150$ ). This would



indicate that the amount of training given the student probably could improve, but not necessarily, his ability to recognize tones and tonal relationships unless a conscious effort has been made to do so. The formula used in this correlation was  $r = \frac{E xy}{N (s_x)(s_y)}$ .

The type of instrument studied showed the placement of top scores on the instrumental majors, with the violinist and pianist making the best scores, and with vocal students tending to make the lowest scores.

A correlation was also made on the initial test versus the theory grade. The correlation was  $r = .381$ . Although the coefficient of correlation is slightly positive, it is not sufficiently high to indicate a definite relationship between the two factors considered.

## CHAPTER V

### SUMMARY AND CONCLUSIONS

It is well recognized that one of the chief weaknesses in college theory training lies in the lack of means for providing auditory training. Too frequently stress is placed on the acquisition of mechanical skill and not on the development of musical intelligence or feeling. Often one finds the student able to perform the selection he is studying with a high degree of technical fluency, yet at the same time he is unable to sightread a simple child's song or recognize the most obvious errors in musical performance. One realizes, therefore, that something is lacking in methods of teaching. It is not the purpose of this study to consider all the problems involved, but merely to explore the possibility for the use of auditory aids and development of aural musical intelligence. The results from the correlation between the number of years the student studied his major instrument and the test score seem to indicate that for the most part these individuals have been trained as described above; namely, that the training has been of high technical proficiency rather than of proficiency in musicianship.

The most beneficial auditory aid is the use of practice records. The possibilities for the usage of such records are endless. One of the chief problems overcome by such a method of training is found in the improvement of practice methods used by the student. It is far more beneficial for the student to practice with the assistance of recordings than it is for him to attempt to practice by himself with the aid of the piano only.

It is the belief of the writer that a continuation of this study would be very worthwhile to both the students and the theory department alike. This training would be most beneficial to the student if it were begun in the first semester of freshman theory and continued throughout the study of this course. Plans for a continuation of this study are now being formulated at North Texas State College.

## BIBLIOGRAPHY

### Books

- Good, Carter V., Barr, A. S., and Scates, Douglas E.,  
Methodology of Educational Research, revised edition,  
New York, D. Appleton-Century Company, 1941.
- Seashore, Carl Emil, In Search of Beauty in Music, New York,  
Ronald Press, 1947.
- Seashore, Carl Emil, Psychology of Music, New York, McGraw-  
Hill Book Company, 1938.

### Unpublished Material

- Gordon, Roderick, "Interlochen Report--1948," Unpublished  
paper, 1948.
- Thiele, William, "An Objective Test of Music Literacy," Un-  
published Master's thesis, Department of Music, North  
Texas State College, 1947.