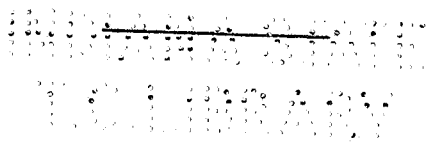
AN EXPERIMENT WITH MOUTHPIECE FACINGS FOR BEGINNING CLARINET CLASSES

Contributions
of the Graduate School
Indiana State Teachers College
Number 558



In Partial Fulfillment
of the Requirements for the Degree
Master of Science in Education

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by
Robert V. Hawkins
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The thesis of Robert V. Hawkins,

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AN EXPERIMENT WITH MOUTHPIECE FACINGS FOR BEGINNING CLARINET CLASSES

is hereby approved as counting toward the completion of the Master's degree in the amount of 8 hours' credit.

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CHAPTER I

THE PROBLEM AND DEFINITION OF TERMS USED

With the increasing demands for finer performance in the instrumental music groups in the public schools, it becomes more important to improve not only the quality of instruction, but also the quality and standardization of equipment. It is a well known fact that many instrumental music instructors in the public schools permit the use of the mouthpieces the pupils happen to obtain on their instruments. In fact, many instructors do not know what type of mouthpiece is being used by their pupils. On the other hand, it is known that some school instrumental music instructors require the use of one accepted standard type of mouthpiece by all players of that particular instrument. This is especially true of woodwind instruments.

The clarinet was the instrument chosen for this experiment, partly because of the writer's interest in that instrument, but more specifically because the clarinet section, as a general rule, is a relatively weak section of the average high school band although one of the most important.

I. THE PROBLEM

Statement of the problem. It is the purpose of this experiment to determine whether the use of one accepted standard mouthpiece facing in beginning clarinet classes will insure

better results in playing the instrumeht.

Importance of the problem. On many occasions the writer has been acquainted with pupils of the clarinet who have been struggling against the handicap of an inferior mouthpiece. This, in many cases, caused the instrument to blow hard, made good tone quality hard to obtain, and in some cases generally discouraged the pupil even to the point of his giving up the study of the instrument. Not realizing the true difficulties which were encountered by the pupil, the persons involved in this situation were likely to acquire an undesirable opinion of instrumental music in general, and of the clarinet in particular.

II. DEFINITIONS OF TERMS AND METHODS USED

Method of procedure. The experimental method was selected for use in this research according to the following procedure: (1) select two groups of beginning clarinet pupils; one group using any mouthpiece they happen to obtain, and the other group using one accepted standard mouthpiece facing, (2) give the two groups equalized instruction for a given period of time, (3) use an objective test to determine the progress, both by groups and by individuals, and (4) interpret the results of the test as a measure of success.

Methods of selection. Three requirements had to be met before a pupil was permitted to take part in this experiment: (1) satisfactory scholarship rating, (2) a certain level of achievement on a musical aptitude test,[1] and (3) no previous experience on a wind instrument. The first twenty-two pupils who could meet these requirements were accepted for participation in the experiment.

Mouthpiece facing.[2] The facing of a clarinet mouthpiece is the curve or opening on which the reed vibrates.

Embouchure. The embouchure on a wind instrument is understood to be the forming of the facial muscles, lips, teeth, jaws, etc., in producing a tone on the instrument.

Ligature.[3] The ligature on a clarinet is a metal clamp with screws which holds the reed on the facing of the mouthpiece.

Reed.[4] The reed is a small piece of cane, shaved to a sharp edge at the tip. The reed actually is the piece of the clarinet which produces the tone as it vibrates across the facing of the mouthpiece.

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[1] C. L. McCreery, Elementary Rhythm and Pitch Test (Chicago: Lyons Band Instrument Company, 1936)

[2] See Appendix A.

[3] Loc. cit.

[4] Loc. cit.

Pre-class clinic. The pre-class clinic is a procedure in which the instructor gives the prospective instrumental pupil a try-out on the instrument. The purpose is to test the capability of the pupil to blow and handle the instrument correctly after a very short period of instruction, or, in other words, to test the adaptability of a pupil to a particular instrument.

III. ORGANIZATION OF THE REMAINDER OF THE THESIS

Chapter II is a description of the experiment; Chapter III gives the results of the experiment; and Chapter IV is a summary with conclusions. The bibliography and appendix follow the final chapter.

CHAPTER II

DESCRIPTION OF THE EXPERIMENT

Setting of the experiment. Ten clarinets were used in this experiment. They were all thoroughly checked, and where necessary, repairs were made so that all instruments were in good playing condition. The instruments were numbered from one to ten. Each instrument was used by two pupils. For instance, Clarinet 1 was used by Pupils 1 and 11; Clarinet 2 by Pupils 2 and 12, etc. The Smith Yoder Bachman Elementary Ensemble Method for Clarinet was used as instructional material. Twenty mouthpieces, numbered from one to twenty, were used. Mouthpieces 1 to 10[1] each had a different facing. Mouthpieces 11 to 20[2] were identical. Each mouthpiece was used by only one pupil. The twenty pupils were then divided into two groups by means of a matching process. Group I included pupils 1 to 10, and Group II included pupils 11 to 20. The two groups met separately because of the fact that each instrument was used by one pupil from each group.

The experiment was conducted in the Junior Band Room of the Hartford City High School from 4:00 until 5:30 o'clock

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[1] See Appendix C.

[2] See Appendix C.

five days a week for a period of four and one half weeks. This made a total of twenty-two class meetings for each group, or forty-four class meetings in all.

Securing the necessary equipment. The clarinets used in this experiment were secured from different sources. Two were furnished by the writer, and the others were borrowed from players of the Hartford City High School and Junior High School Bands and a musical instrument dealer. The ten mouthpieces numbered from eleven to twenty were purchased and refaced by a woodwind craftsman. No attempt was made to select the mouthpiece facings on the ten mouthpieces numbered from one to ten. The method for securing mouthpieces one to ten was as follows: earlier in the school year the clarinet players in the Hartford City High School Band were issued new mouthpieces with a uniform facing. In return these players turned in the mouthpieces they had been using. Ten of these mouthpieces were picked at random to be used by Group I. The ligatures used were all the conventional type with two screws. All reeds used by Group II were Rico reeds, strength one and one-half. The reeds used by Group I were also Rico reeds but of various strengths. The reason for this is that different strength reeds are desirable with various degrees of openings of the facings, and an effort was made to fit each reed to the particular mouthpiece used in group I. The general rule for the different strengths of reeds with

various mouthpiece facings is as follows: the more open the facing, the softer the reed; the closer the facing, the stiffer the reed. The instruction books used were property of the Hartford City High School Band Department.

Equating the groups. The two groups were equated by means of a matching process. Each of the twenty pupils was given an objective pre-class clinic test.[3] Results of this test were tabulated, and the twenty pupils were ranked by their scores. The pupil making the highest score was placed in Group I; the pupil making the second highest score was placed in Group II; the third highest in Group I, the fourth highest in Group II, etc.

Devising an objective test for equating the groups. The writer was unable to find any objective measuring device on the pre-class level; so it was decided to prepare a test for this experiment. The test, which appears in Appendix A, measures four factors: embouchure, ability to produce a tone, hand position, and rhythm. The test was administered to each pupil individually and was scored by the writer.

Conducting the experiment. It was announced in Grades 5B to 7A that a clarinet class was being formed and anyone in-

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[3] See Appendix A.

terested in participating was directed to see the writer in his office. A list of those pupils who came was made in the order in which they appeared. Three requirements were set up for eligibility to participate. (1) A pupil must have been on the honor roll at least once during the past four six-week periods. The honor roll is made up of pupils with a B average or higher during the six-week period. (2) A pupil must have made a grade of not lower than 80 on a musical aptitude test[4] which was previously given to all pupils in Grades 5 to 7 inclusive. (3) No previous experience on a wind instrument was the third requirement.

After the list of pupils with the records of honor roll and musical aptitude scores were checked, the first twenty-two pupils on the list with the three eligibility requirements were selected for the experiment. It should be noted here that although heretofore it has been stated that twenty pupils took part in the experiment, there was one spare pupil included in each group in order to safeguard against the possibility that a pupil might drop out of the class. However, the original twenty pupils completed the experiment, and the two additional ones will not be mentioned hereafter.

Next the pre-class clinic objective test was given to all pupils, and after the matching process was completed, the

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[4] Op. cit.

groups were formed and the experiment began.

In Group I the range in musical aptitude scores was 80 to 94; the mean musical aptitude score was 86.8. In Group II the range in musical aptitude scores was 80 to 96; the mean musical aptitude score was 89.2. The mean difference in musical aptitude was 2.4. Table I, page 10, shows the musical aptitude score of each pupil.

In Group I the range of pre-class clinic test scores was 11 to 33; the mean pre-class clinic test score was 24.1. In Group II the range of pre-class clinic test scores was 8 to 33; the mean pre-class clinic test score was 22.9. The mean difference was 1.2. Table II and Graph I, pages 11 and 12, show the ranked scores on the pre-class clinic test and a graphical picture of aptitude for the clarinet as determined by the pre-class clinic method. Table III, page 13, gives a composite of scores made by each pupil on each of the four factors of the pre-class clinic objective test.

A comparison of Tables I and II, pages 10 and 11, might lead to the conclusion that musical aptitude scores and pre-class clinic test scores do not have a very high correlation. It should be noted that the possible range of musical aptitude scores of all pupils in this experiment is only 80 to 100, the top 20 percent of the possible range of scores on this test; but the pre-class clinic test scores represent the entire range of possible scores on the test. However, it is possible that not too high a correla-

TABLE I

MUSICAL APTITUDE SCORES

MC CREERY ELEMENTARY PITCH AND RHYTHM TEST

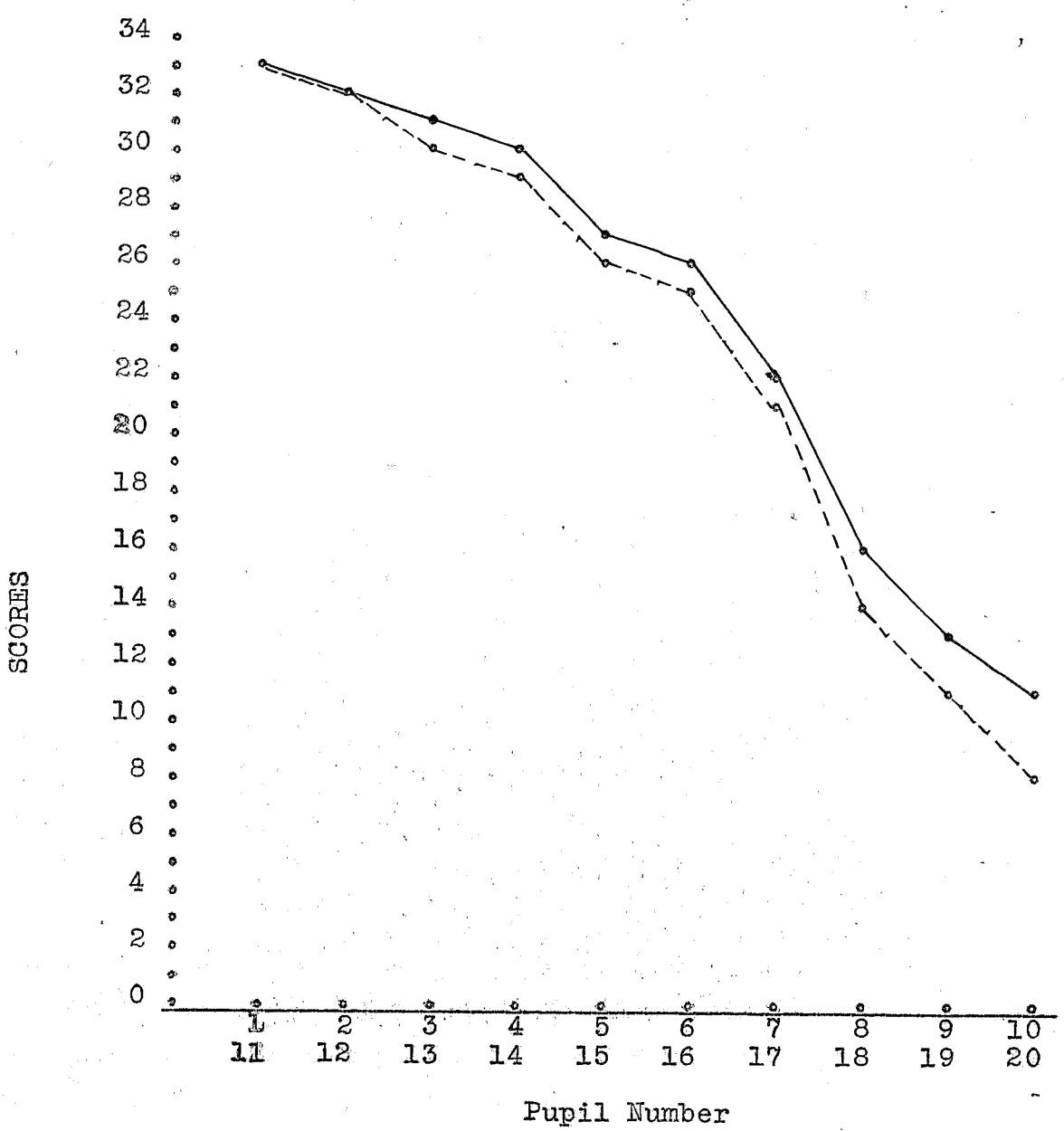
GROUP I		GROUP II	
Pupil Number	Score	Pupil Number	Score
1	80	11	86
2	88	12	92
3	94	13	86
4	90	14	82
5	80	15	82
6	86	16	96
7	94	17	90
8	80	18	94
9	88	19	90
10	88	20	94
Mean	86.8		89.2
Diff. of Mean			2.4

TABLE II

RANKED SCORES

PRE-CLASS CLINIC OBJECTIVE TEST

GROUP I		GROUP II	
Pupil Number	Score	Pupil Number	Score
1	33	11	33
2	32	12	32
3	31	13	30
4	30	14	29
5	27	15	26
6	26	16	25
7	22	17	21
8	16	18	14
9	13	19	11
10	11	20	8
Mean	24.1		22.9
Diff. of Mean	1.2		



GRAPH I

RANKED SCORES

PRE-CLASS CLINIC OBJECTIVE TEST

TABLE III

A COMPOSITE OF SCORES

ON EACH FACTOR OF THE PRE-CLASS CLINIC TEST

Pupil Number	Emboucher	Hand Position	Tone Production	Rhythm	Final Score
1	6	7	8	12	33
2	6	8	6	12	32
3	4	7	8	12	31
4	6	6	6	12	30
5	2	7	6	12	27
6	6	6	4	12	26
7	6	8	6	2	22
8	0	4	6	6	16
9	2	4	1	6	13
10	2	1	2	6	11
11	6	7	8	12	33
12	6	8	6	12	32
13	6	6	6	12	30
14	6	5	6	12	29
15	4	6	4	12	26
16	2	5	6	12	25
17	6	5	4	6	21
18	2	4	2	6	14
19	0	3	2	6	11
20	2	3	1	2	8
Mean	4	5.5	4.9	9.2	23.5

tion would exist between musical aptitude scores and pre-class clinic scores because the musical aptitude test measures inherent musical ability and the pre-class clinic test measures only mechanical aptitude for a certain instrument.

The two groups were taught for four and one-half weeks as outlined in the lesson plans.[5] Throughout the experiment there were fourteen absences, but the highest frequency of absence for any one pupil was only three. The frequency of tardiness was practically negligible. This is probably due to the fact that the classes were held right after school for one group and that the other group, which met forty-five minutes later, usually waited around the school building.

Holding the variables constant. An attempt was made to hold the variables constant. Although the groups did not meet together, they received the same amount and kind of instruction from the same instructor throughout the experiment. Reeds were all checked each day and were replaced when it was necessary. Each instrument was checked daily by the instructor to insure that the mechanical adjustment was correct. The testing procedure at the end of the experiment was identical for each group and individual. No pupil in the experiment had had previous experience on a wind instrument. Requirement Number 2 for

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[5] See Appendix B.

eligibility for participation in the experiment can also be considered a method of holding the variables constant, as the range of musical aptitude scores of those participating is relatively small. No outside practice was permitted. Each pupil actually had the same amount of experience in playing the instrument.

Devising an achievement test. A search for a device to measure achievement on this level revealed no test that would be entirely suitable for this experiment. Therefore, an achievement test[6] was devised.

Since results were to be measured both by groups and by individuals, the test has two sections: I. Ensemble and II. Individual.

In the Ensemble Test, four factors are included with degrees of achievement good, fair, and poor assigned to each factor. The factors are Tone Quality, Precision, Rhythm, and Intonation.

In the Individual Test, five factors are measured. These are, namely, Tone Quality, Attack and Release, Rhythm, Intonation, and Range. Good, fair, and poor are the degrees of achievement, as in the Ensemble Test, which are assigned to the first four factors. The fifth factor is measured

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[6] See Appendix A.

objectively with six degrees of achievement, one for each note in the F Major Scale the pupil was able to extend his range below D, space below the staff.

The possible range of scores on the Ensemble Test is 8 to 24. The possible range on the Individual Test is 9 to 30.

For obvious reasons, Rhythm and Range were the only factors on which it was possible to measure achievement entirely objectively.

Testing the experiment. A woodwind specialist who holds two degrees in music was selected to judge the testing. Before the testing, the judge was given complete instructions, and standards were agreed upon.

The objectivity of the test was heightened by the fact that the judge was situated behind a screen and did not see the groups or individuals as they played. Hence, visual impressions of posture, mannerisms, and general appearance did not enter in. This was possible because the achievement test measured only the aspects of playing which are auditory, and not such factors as posture, hand position, embouchure, etc.

The testing routine[7] was done as uniformly as possible. All the pupils warmed up together before they played as a group. Then they were allowed another warm-up period individually before playing individually. The second warm-up period was of equal

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[7] See Appendix B.

length for all pupils, and the instructor supervised each pupil's individual warm-up period.

CHAPTER III

RESULTS OF THE EXPERIMENT

This chapter will present the results of the experiment as measured by the achievement test. The data were treated statistically and are presented in the following order: (1) Findings of the group testing; (2) Group findings from the individual testing; (3) Class (combined group) findings from the individual testing; and (4) General observations.

Findings of the group testing. The final achievement score for Group I is 12. For Group II it is 22. The mean score of Group I on the four factors measured is 3. The mean score of Group II on the four factors measured is 5.5. It will be noted that the mean of Group II exceeds the mean of Group I by a difference of 2.5. In computing the critical ratio, by using the standard error of the difference of these means, it was found that there are 100 chances in 100 of the difference between the true means being greater than zero, in favor of Group II. The standard error of the difference of these means was found to be .77. Table IV, page 19, shows the scores of each group on each factor measured. Graph II, page 20, gives a graphical picture of these scores. It should be noted that Group II exceeds Group I on each factor.

Group findings from the individual testing. In Group I

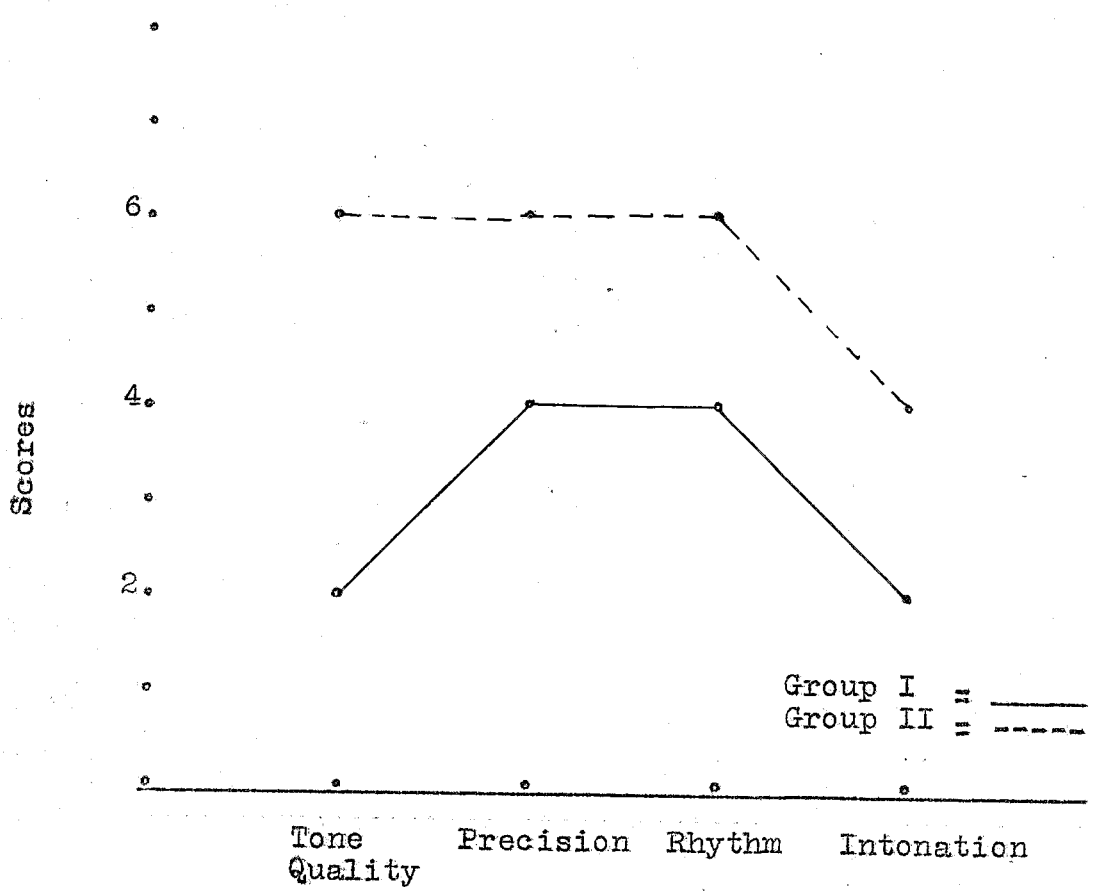
TABLE IV

GROUP SCORES ON THE

FACTORS OF THE ACHIEVEMENT TEST

	GROUP I	GROUP II
Factors	Scores	Scores
Tone Quality	2	6
Precision	4	6
Rhythm	4	6
Intonation	2	4
Mean	3	5.5
Diff.	1	2.5
S.D.		.87
S.E. of Diff.		.77
C.R.		3.25

C.R. 3.25 means that there are 100 chances in 100 that the difference between the true means is greater than zero in favor of Group II.



GRAPH II

GROUP SCORES ON THE

FACTORS OF THE ACHIEVEMENT TEST

the range of scores in tone quality is 2 to 6; the mean is 3.4. In Group II the range of scores in tone quality is 4 to 6; the mean is 4.8. The mean of Group II exceeds that of Group I by a difference of 1.4. In computing the critical ratio, by use of the standard error of the difference of these means, it was found that there are 100- chances in 100 of the difference between the true means being greater than zero, in favor of Group II. The Standard error of the difference of the means was found to be .51.

The range of scores on attack and release for Group I is 2 to 4; the mean is 3.2. The range of scores on attack and release for Group II is 2 to 6; the mean is 4.4. The mean difference is 1.2 in favor of Group II. The critical ratio here signifies that there are 99- chances in 100 of the difference between the true means being greater than zero, in favor of Group II. The standard error of the difference of the means is .52.

The range of scores on rhythm for Group I is 2 to 4; the mean is 2.8. The range of scores on rhythm for Group II is 2 to 6; the mean is 4.4. The mean difference is 1.6 in favor of Group II. The critical ratio here signifies that there are 100 chances in 100 of the difference between the true means being greater than zero, in favor of Group II. The standard error of the difference of the means is .52.

The range of scores on intonation for Group I is 2 to 6; the mean is 4.2. The range on intonation for Group II is also 2 to 6; the mean is 5.4. The mean difference is 1.2 in favor of

Group II. The critical ratio signifies that there are 98 chances in 100 of the difference between the true means being greater than zero in favor of Group II. The standard error of the difference of the two means is .57.

The range of scores on playing range for Group I is 3 to 6; the mean is 4.3. The range on playing range for Group II is 3 to 6; the mean is 4.7. The mean difference is .4 in favor of Group II. The standard error of the difference of the two means is .27. The critical ratio, as computed from this standard error, signifies that there are 93 chances in 100 of the difference between the true means being greater than zero, in favor of Group II.

It will be noted that Group II exceeds Group I in each of the factors tested. The means of Group II exceed those of Group I from .4 to 1.6. The measures of reliability on the separate factors of the individual test indicate a distinct superiority in Group II. Table V, page 23, shows the achievement scores on each of the factors tested. Graph III, page 24, shows a graphical picture of the ranked order of pupils in the separate factors measured in the achievement test. Graph IV, page 25 gives a graphical picture of the difference of the means of each group on each of the five factors measured.

The range of total achievement scores for Group I is 14 to 22; the mean score is 17.9. The range of total achievement scores for Group II is 13 to 28; the mean score is 23.6. The

TABLE V

RANKED ORDER OF PUPILS IN THE SEPARATE FACTORS MEASURED BY ACHIEVEMENT TEST AND THE MEAN SCORE OF EACH

GROUP I						GROUP II					
Pupil Number	Tone Qual.	Attack & Release	Rhythm	Intonation	Range	Pupil Number	Tone Qual.	Attack & Release	Rhythm	Intonation	Range
1	6	4	4	6	6	11	6	6	6	6	6
2	4	4	4	6	5	12	6	6	6	6	6
3	4	4	4	4	5	13	6	6	6	6	6
4	4	4	4	4	5	14	6	4	4	6	6
5	4	4	2	4	5	15	4	4	4	6	5
6	4	4	2	4	4	16	4	4	4	6	4
7	2	2	2	4	4	17	4	4	4	6	4
8	2	2	2	4	3	18	4	4	4	6	4
9	2	2	2	4	3	19	4	4	4	4	3
10	2	2	2	2	3	20	4	2	2	2	3
Mean	3.4	3.2	2.8	4.2	4.3	Mean	4.8	4.4	4.4	5.4	4.7
Diff.							1.4	1.2	1.6	1.2	.4
S.D.	1.35	.98	.98	1.08	1		1.03	1.2	1.2	1.28	1.19
S.E.Diff.							.51	.52	.52	.57	.27
C.R.							2.75	2.31	3.1	2.12	1.49

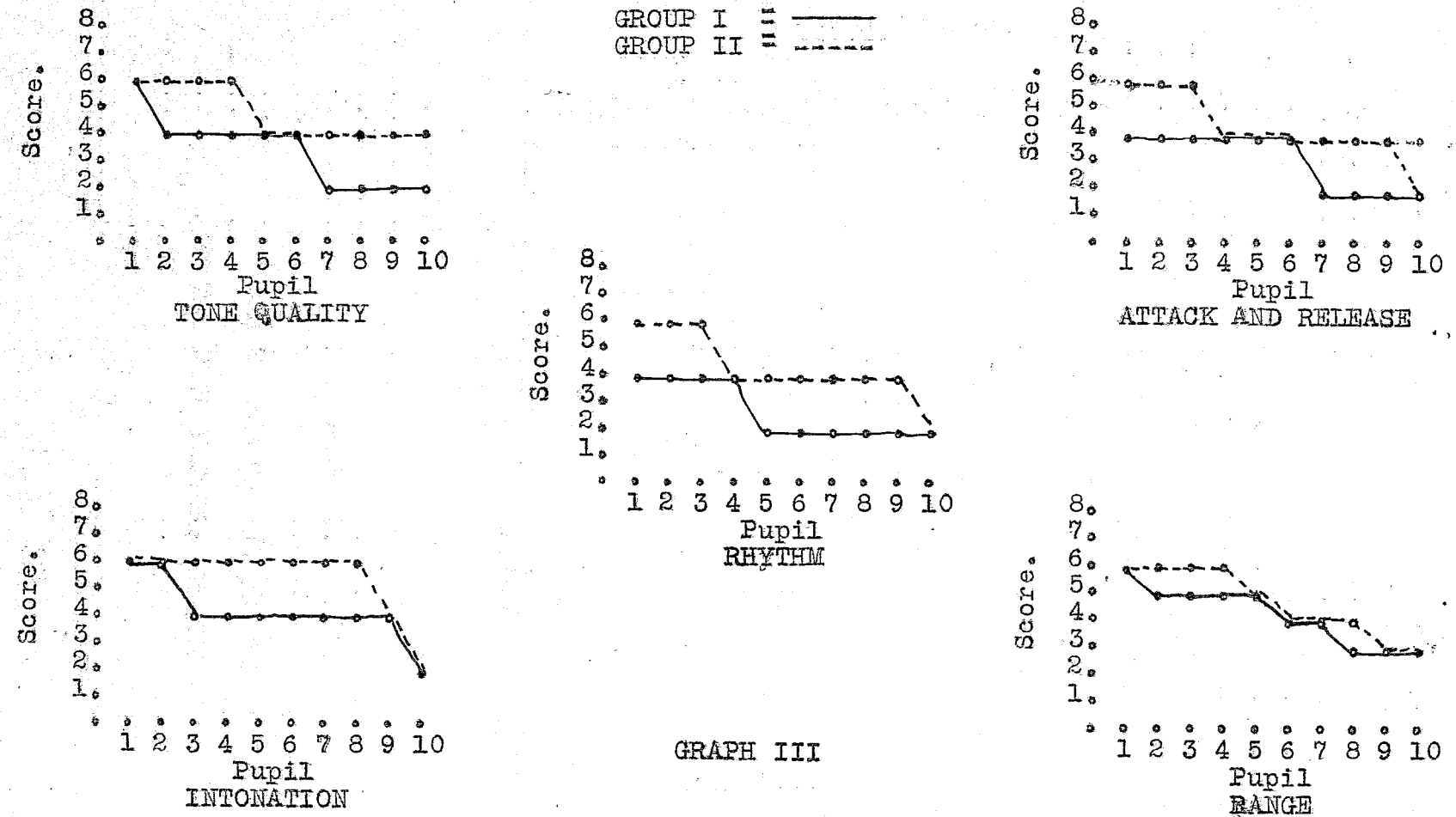
C.R. 2.75 means that there are 100- chances in 100 that the difference between the true means is greater than zero in favor of Group II.

C.R. 2.31 means that there are 99- chances in 100 that the difference between the true means is greater than zero in favor of Group II.

C.R. 3.1 means that there are 100 chances in 100 that the difference between the true means is greater than zero in favor of Group II.

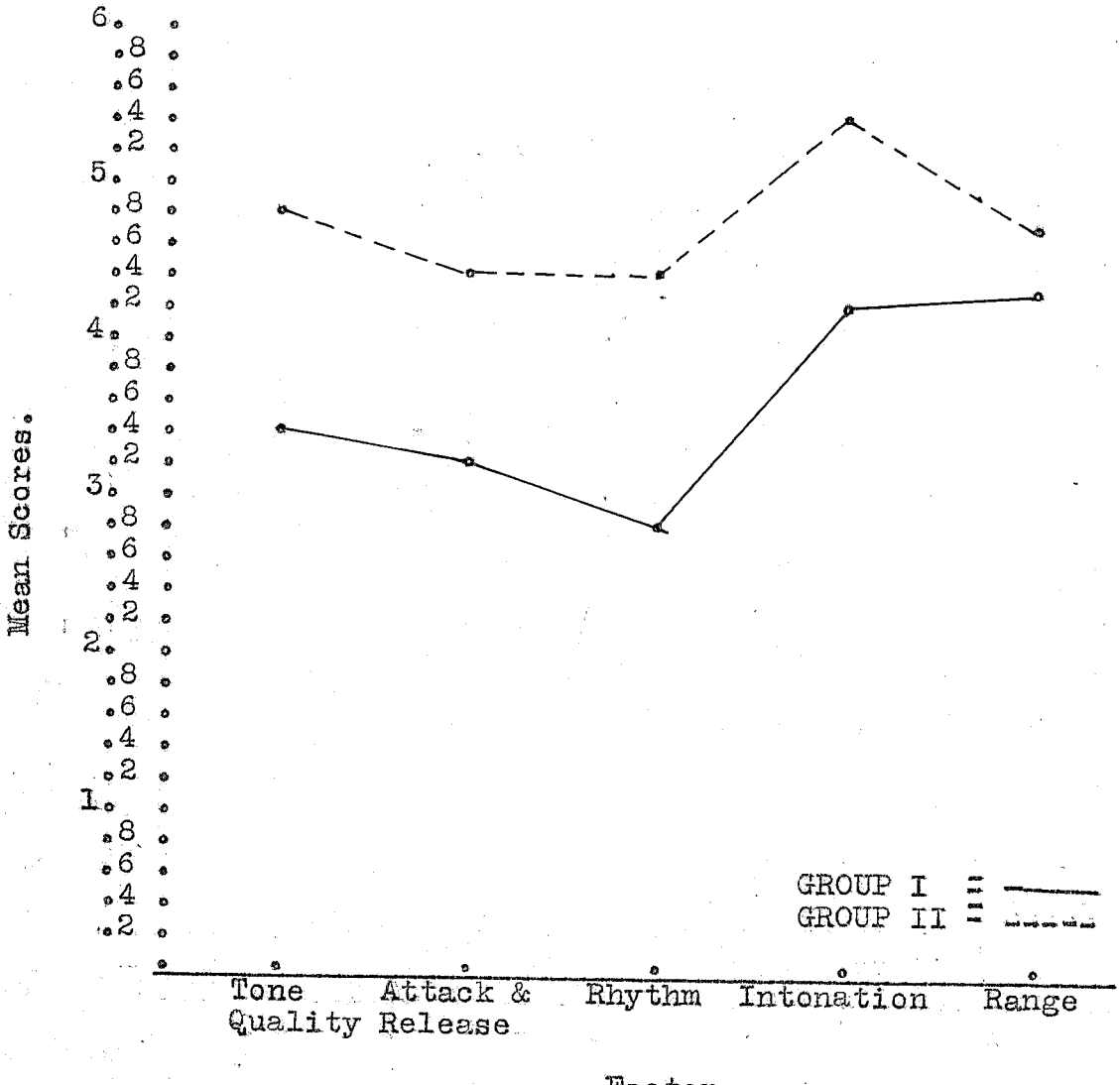
C.R. 2.12 means that there are 98 chances in 100 that the difference between the true means is greater than zero in favor of Group II.

C.R. 1.49 means that there are 93 chances in 100 that the difference between the true means is greater than zero in favor of Group II.



GRAPH III

RANKED ORDER OF PUPILS IN THE SEPARATE FACTORS MEASURED IN THE ACHIEVEMENT TEST



GRAPH IV

MEAN SCORES OF THE GROUPS

ON THE FIVE FACTORS MEASURED

mean difference is 5.7 in favor of Group II. The standard error of the difference of the two means is 1.83, the reliability being 100 chances in 100 that the difference between the true means is greater than zero, in favor of Group II. This shows, statistically, the superiority of Group II on the final achievement scores. Table VI, page 27, and Graph V, page 28, show the ranked final achievement scores of each group.

Class (combined group) findings from the individual testing. The class scores were statistically treated. In tone quality the class scores range from 2 to 6; the mean is 4.1. Four pupils exceed the mean from Group II, but only one from Group I exceeds the mean.

In attack and release the range is 2 to 6, and the mean is 3.8. Nine pupils from Group II and six from Group I exceed the mean.

The range of class scores in rhythm is 2 to 6; the mean is 3.6. Nine pupils from Group II and four from Group I exceed the mean.

In intonation the range is 2 to 6, and the mean is 4.8. Eight pupils from Group II and two from Group I exceed the mean.

In range the range of scores is 3 to 6; the mean is 4.5. Four pupils from Group II and one from Group I exceed the mean.

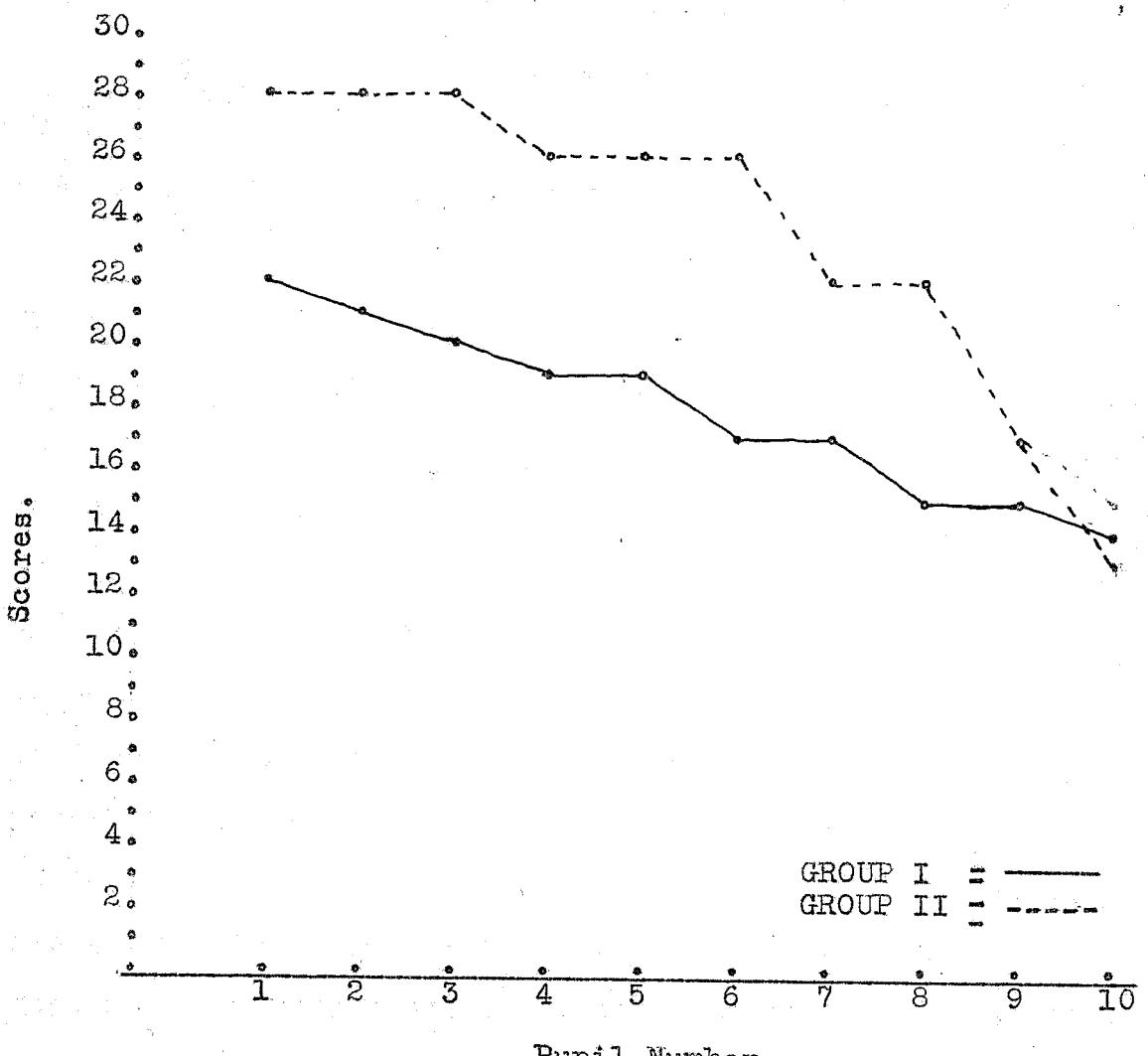
The range of final achievement scores is 13 to 28; the mean is 20.75. Eight pupils from Group II exceed the mean, while

TABLE VI

RANKED ORDER OF FINAL ACHIEVEMENT SCORES

GROUP I		GROUP II	
Pupil Number	Final Achievement Score	Pupil Number	Final Achievement Score
1	22	1	28
2	21	2	28
3	20	3	28
4	19	4	26
5	19	5	26
6	17	6	26
7	17	7	22
8	15	8	22
9	15	9	17
10	14	10	13
Mean	17.9	Mean	23.6
Diff.			5.7
S.D.	2.6		4.8
S.E. of Diff.			1.83
C.R.			3.22

C.R. 3.22 means that there are 100 chances in 100 that the true difference is greater than zero, in favor of group II.



GRAPH V

RANKED ORDER OF FINAL ACHIEVEMENT SCORES

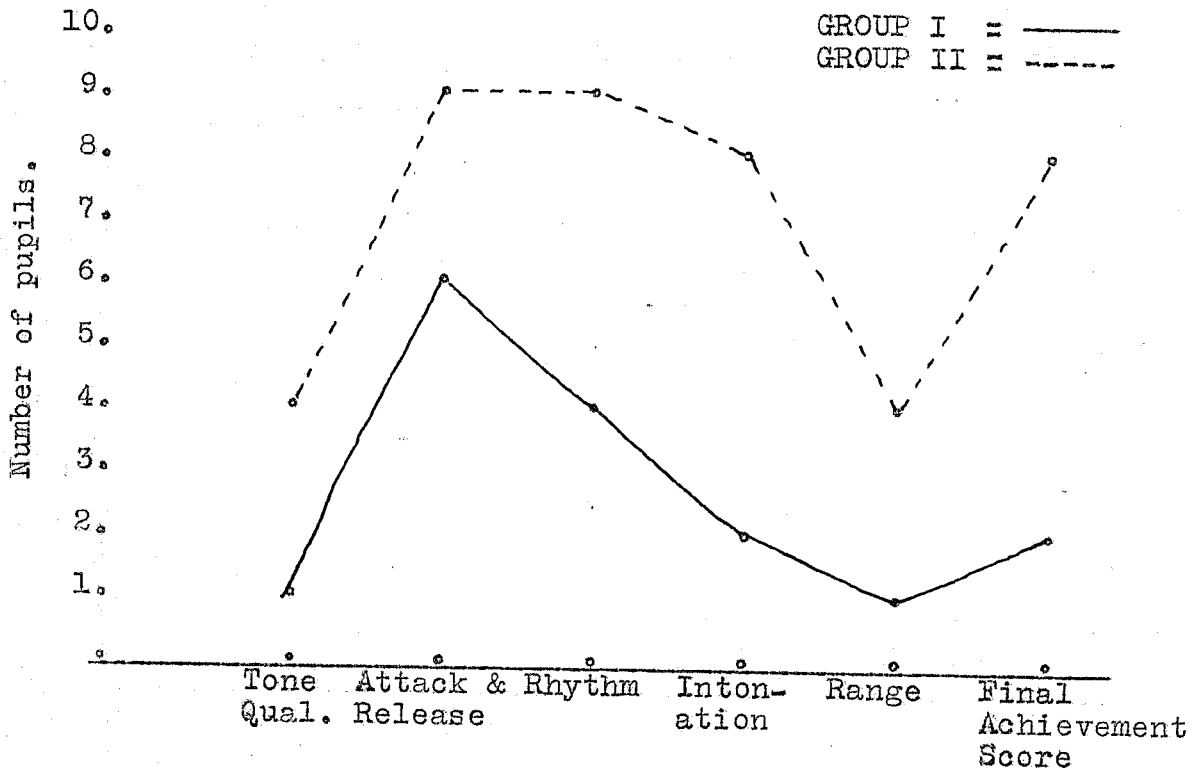
only two from Group I exceed the mean.

Graph VI, page 30, illustrates the superiority of Group II in the number of pupils exceeding the mean on each of the factors and on the final achievement scores.

Table VII, page 31, gives a composite study of musical aptitude scores, pre-class clinic test scores, scores on each factor, and final achievement scores for each pupil.

It has been shown that Group II was superior to Group I in each of the five factors measured. However, good tone quality is the most obvious result of the use of a good mouthpiece facing, so the Pierson Product-Moment Coefficient of Correlation was computed, using the class scores on tone quality with those of the other factors measured. This was done to determine what correlation, if any, existed between tone quality and the other factors. The correlation between tone quality and attack and release is .56 $\pm$ .16; tone quality and rhythm, .627 $\pm$ .138; tone quality and intonation, .635 $\pm$ .163; and tone quality and range, .64 $\pm$ .134. This shows that there is a definite correlation between tone quality and each of the other factors.

General observations. Since Group II shows definite superiority in each phase of the testing, it is safe to assume that the facing used by Group II is a satisfactory one. This facing is of medium length and is well open at the tip. Any mouthpiece facing used in this experiment can be duplicated exactly



GRAPH VI

NUMBER OF PUPILS OF EACH GROUP EXCEEDING THE MEAN IN EACH FACTOR AND THE FINAL ACHIEVEMENT SCORES

TABLE VII

A COMPOSITE STUDY OF MUSICAL APTITUDE,

PRE-CLASS TESTING, AND ACHIEVEMENT SCORES

Pupil Number	Musical Aptitude	Pre-Class Testing	Tone Quality	Attack & Release	Rhythm	Intonation	Range	Final Achievement Score
1	80	33	2	2	4	4	3	15
2	88	32	4	4	4	4	4	20
3	94	31	2	4	2	2	5	15
4	90	30	4	2	2	6	5	19
5	80	27	4	4	2	4	5	19
6	86	26	4	4	2	6	6	22
7	94	22	6	4	4	4	3	21
8	80	16	2	4	2	4	5	17
9	88	13	2	2	2	4	4	14
10	88	11	4	2	4	4	3	17
11	86	33	6	6	4	6	6	28
12	92	32	6	4	4	6	6	26
13	86	30	4	4	6	6	5	26
14	82	29	6	6	6	6	4	28
15	82	26	4	4	4	6	4	22
16	96	25	4	6	4	6	6	26
17	90	21	4	2	4	4	3	17
18	94	14	6	4	6	6	6	28
19	90	11	4	4	4	6	4	22
20	94	8	4	2	2	2	3	15

by using the charts in Appendix C. It is interesting to compare the facings of the first ten charts with the achievement scores of Group I. However, since this study does not propose to examine the relative merits of the different mouthpiece facings used, no further mention will be made of these facings. An extensive field for further research exists here.

It is interesting to note that the scores of the pre-class clinic objective test were highly predictive in Group II, but not in Group I. In Group II six pupils exceeded the mean on the pre-class clinic objective test, and the same six pupils plus two more, a total of eight, exceeded the mean on the final achievement scores. On the other hand, six pupils in Group I exceeded the mean on the pre-class clinic objective test, while only one of the six plus one other, a total of two, exceeded the mean on the final achievement scores. This is only an indication, but it is well worth consideration that predictive measures may depend for their reliability, to a certain extent, upon the quality of equipment used. This, of course, would call for further research.

Previously in this chapter, it was shown that the test scores of all pupils on tone quality correlated well with the scores on the other factors measured. Attack and release, intonation, and range, obviously should correlate with tone quality, but the correlation between tone quality and rhythm might be discounted by some people who are of the opinion that the ability

to play with good rhythm on an instrument is entirely an inherent ability possessed by some but not by others. It also should be noted in this connection that in computing the critical ratio from the standard error of the difference of the means of the two groups, the difference in means of the groups in rhythm has a higher reliability than any other factor measured. Perhaps it is possible that in instrumental performance the factor of rhythm is influenced by the ease in blowing and the confidence the pupil has in his attack. In other words, if each tone is produced with confidence and surety, the rhythmic continuity will flow without interruptions better than if the player is stumbling along with a hard-blowing instrument, getting a good attack on one tone but missing the next. This, also, would be an interesting field for further research.

Both groups were well matched in musical aptitude and predictive scores, although in predictive scores Group II was slightly inferior to Group I. On the results of the group testing, Group II was superior to Group I in each factor measured and on the final scores. The mean score of the factor scores of Group II was superior to that of Group I with a reliability of 100 chances in 100 that the difference of the true means is greater than zero, in favor of Group II. On the results of the individual testing, the same was true. Group II was superior on each factor with a reliability of 100 chances in 100 that the difference of the true means of the final achievement scores

is greater than zero, in favor of Group II. More pupils from Group II than from Group I exceeded the mean on each factor measured.

CHAPTER IV

SUMMARY AND CONCLUSIONS

Summary. It was the purpose of this experiment to determine whether it is advantageous to use one accepted standard mouthpiece facing for all beginning clarinet pupils, or to use whatever facings the pupils happen to obtain.

A search for related literature revealed nothing on this phase of instrumental music. It is therefore believed that this is an unexplored field of research.

The experimental method was used and the procedure was as follows: (1) Select two groups of beginning clarinet pupils, one group (Group I) using whatever mouthpiece the pupils happened to obtain, and the other (Group II) using one accepted standard mouthpiece facing. (2) Give the two groups equalized instruction for a given period of time. (3) Use an objective test to determine the success, both by groups and by individuals. (4) Interpret the results of the test as a measure of success.

The experiment was conducted in the Junior Band Room of the Hartford City High School, Hartford City, Indiana. The twenty pupils chosen for the experiment were selected on the basis of three requirements: (1) satisfactory scholarship rating, (2) a certain level of achievement on a musical aptitude test, and (3) no previous experience on a wind instrument. They were then divided into two groups by means of a matching process

which was based on the results of a pre-class clinic objective test. Group I used whatever mouthpiece facing the pupils happened to obtain, and Group II used an accepted standard mouthpiece facing.

The two groups were given equalized instruction for a period of four and one-half weeks, five days per week. An achievement test was devised, and at the end of the instruction period it was administered to the class. This test measured the class both by groups and by individuals.

The results of the achievement test were computed and show:

1. In the group testing, Group II was superior to Group I on the final scores.
2. In the group testing, Group II was superior to Group I on each factor measured.
3. In the individual testing, the mean of final achievement scores of Group II exceeds that of Group I.
4. In the individual testing, the mean of Group II exceeds that of Group I in each factor measured.
5. A greater number of pupils from Group II than from Group I exceed the mean of the class (combined group) scores on the final achievement test.
6. A greater number of pupils from Group II than from Group I exceed the mean of the class (combined group) scores on each factor of the final achievement test.

7. The scores made by the individual pupils on attack and release, rhythm, intonation, and range, correlated well with the scores on tone quality.
8. The use of one accepted standard mouthpiece facing appears to contribute to success in beginning clarinet playing.

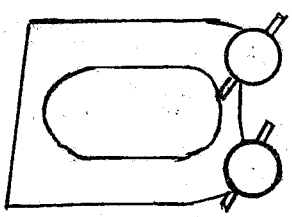
Conclusions. Even though this experiment has a limited number of cases, and instruction was carried on for a relatively short period of time, it seems logical to conclude:

1. In tone quality, precision, intonation, and rhythm, Group II attained greater success in playing the clarinet as a group than did Group I.
2. In tone quality, attack and release, rhythm, intonation, and range, Group II attained greater success in playing the clarinet as individuals than did Group I.
3. The use of one accepted standard mouthpiece facing in beginning clarinet classes contributes to success in the factors of instrumental performance measured in this experiment.

APPENDIX

APPENDIX A

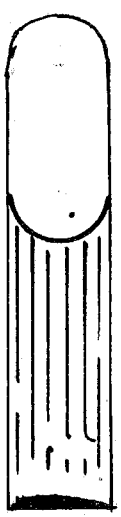
THE MOUTHPIECE, REED, AND LIGATURE

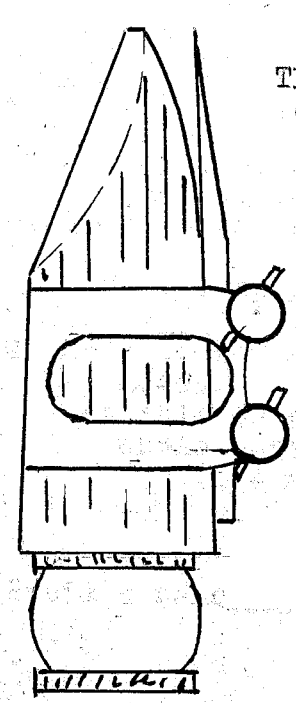


The ligature.

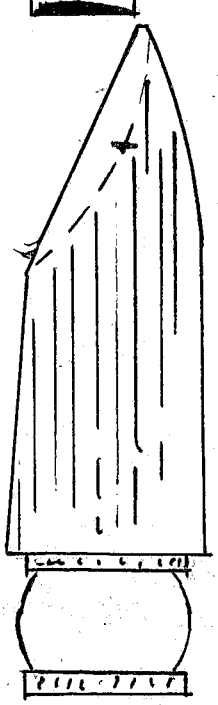
The reed, side view.

The reed, top view.





The mouthpiece, completely assembled.



The facing.

PRE-CLASS CLINIC OBJECTIVE TEST
(Clarinet)

I. Embouchure. (as observed while producing the tone)

A.	Facial anatomy regular	2
	Facial anatomy irregular	0 _____
B.	Embouchure well formed in producing the tone	4
	Embouchure not well formed in producing the tone	0 _____

II. Producing the tone. (after preliminary instruction)

A.	Good quality first time tried	8
	Poor quality first time tried	6
	Good quality second time tried	6
	Poor quality second time tried	4
	Good quality third time tried	4
	Poor quality third time tried	2
	Finally produced a good tone	3
	Finally produced a poor tone	1
	Never was able to produce a tone	0 _____

III. Hand position. (after preliminary instruction)

A.	Able to play low G	8
	Able to play low A	7
	Able to play low Bb	6
	Able to play low C	5
	Able to play low D	4
	Able to play 1st line E	3
	Able to play 1st space F	1
	Able to play open G	0 _____

IV. Rhythm. (after preliminary instruction)

A.	Able to pat foot and correctly play four quarter notes.	6
	Not able to pat foot and correctly play four quarter notes.	0 _____
B.	Able to pat foot and correctly play two half notes.	4
	Not able to pat foot and correctly play two half notes.	0 _____
C.	Able to pat foot and correctly play two whole notes.	2
	Not able to pat foot and correctly play two whole notes.	0 _____

(4/4 meter, using the note open G)

Pupil's name_____ Total score_____

ACHIEVEMENT TEST

GROUP NO. _____

INDIVIDUAL NO. _____

(Judge will circle the number best describing the pupil's performance.)

I. ENSEMBLE	good	fair	poor	total
Tone quality	6	4	2	_____
Precision	6	4	2	_____
Rhythm	6	4	2	_____
Intonation	6	4	2	_____
			Total score	_____

II. INDIVIDUAL	good	fair	poor	total
Tone quality	6	4	2	_____
Attack and release	6	4	2	_____
Rhythm	6	4	2	_____
Intonation	6	4	2	_____
Range	E F G A Bb C 6 5 4 3 2 1 (from middle C down)			_____
			Total score	_____

_____

Judges signature.

APPENDIX B

LESSON PLANS

The following lesson plans show only an outline of the classwork which was done. After the first few days a routine was established. This routine was as follows: (1) Pupils entered the room and got their instruments from the storage rack; (2) Reeds and mouthpieces were issued and pupils put instruments together and adjusted reeds; (3) Instructor inspected each mouthpiece to insure that all reeds were adjusted to the facing of the mouthpiece correctly; (4) All pupils would then sound open G in unison to warm up; (5) Each pupil would then sound open G individually so the instructor could determine whether each reed was working freely. Next came a review of previous lessons followed by the introduction of new material. At the conclusion of each lesson the pupils turned in reeds and mouthpieces, put their instruments away, and left the room. Throughout the experiment the instructor did not discuss anything pertaining to the instrument or the lessons with any of the pupils outside the class periods.

The material listed in the lesson plans are from the Smith Yoder Bachman Elementary Ensemble Method for clarinet.

LESSON I

I. PURPOSE:

To develope the fundamentals of tone production.

II. PROCEDURE:

A. Correct position of the emboucher.

B. Correct posture.

C. Correct breathing. Use of diaphram.

D. Blowing with the mouthpiece.

E. Blowing with the mouthpiece on the instrument.

F. Attack and release.

G. Sustaining the tone.

LESSON II

I. PURPOSE:

To review the fundamentals of tone production and introduce the elements of music notation which were necessary at this stage.

II. PROCEDURE:

A. Review Lesson I.

B. Clef sign, staff, measures, time signature, and whole notes and rests.

C. Review Lesson I.

LESSON III

I. PURPOSE:

To review knowledges and begin to play exercises.

II. PROCEDURE:

A. Review Lesson I.

B. Review Lesson II.

C. Review Lesson I.

D. Exercise 1, page 2, in the instruction book.

E. Exercise 2, page 2, in the instruction book.

LESSON IV

I. PURPOSE:

To review knowledges and induce activities which will develop new skills.

II. PROCEDURE:

A. Review Lesson I.

B. Review Lesson II.

C. Review Lesson III.

D. Exercise 3, page 2, in the instruction book.

E. Exercise 4, page 2, in the instruction book.

F. Exercise 5, page 2, in the instruction book.

LESSON V

I. PURPOSE:

To review knowledge and induce activities which will develop new skills.

II. PROCEDURE:

A. Review Lesson I.

B. Review Lesson II.

C. Review Lesson III.

D. Review Lesson IV.

E. Exercise 6, page 3, in the instruction book.

LESSON VI

I. PURPOSE:

To review knowledges and induce activities which will develop new skills.

II. PROCEDURE:

A. Review Lesson IV.

B. Review Lesson V.

C. Exercise 7, page 3, in the instruction book.

D. Exercise 8, page 3, in the instruction book.

E. Exercise 9, page 3, in the instruction book.

F. Exercise 10, page 3, in the instruction book.

LESSON VII

I. PURPOSE:

To review knowledges and induce activities which will develop new skills.

II. PROCEDURE:

A. Review Lesson IV.

B. Review Lesson V.

C. Review Lesson VI.

D. Exercise 11, page 3, in the instruction book.

E. Exercise 12, page 3, in the instruction book.

F. Exercise 13, page 3, in the instruction book.

LESSON VIII

I. PURPOSE:

To review knowledges and induce activities which will develop new skills.

II. PROCEDURE:

A. Review Lesson VII.

B. Exercise 14, page 3, in the instruction book.

C. Exercise 15, page 4, in the instruction book.

D. Exercise 16, page 4, in the instruction book.

E. Exercise 17, page 4, in the instruction book.

F. Exercise 18, page 4, in the instruction book.

G. Exercise 19, page 4, in the instruction book.

LESSON IX

I. PURPOSE:

To review knowledges and induce activities which will develop new skills.

II. PROCEDURE:

A. Review Lesson VIII.

B. Exercise 20, page 4, in the instruction book.

C. Exercise 21, page 4, in the instruction book.

D. Exercise 22, page 4, in the instruction book.

E. Exercise 23, page 4, in the instruction book.

LESSON X

I. PURPOSE:

To review knowledges and induce activities which will develop new skills.

II. PROCEDURE:

A. Review Lesson IX.

B. "Primo," page 5, in the instruction book.

C. "At Pierrot's Door," page 5, in the instruction book.

LESSON XI

I. PURPOSE:

To review knowledges and induce activities which will develop new skills.

II. PROCEDURE:

A. Review Lesson IX.

B. Review Lesson X.

C. "Waltz Time," page 5, in the instruction book.

D. "Hold On," page 5, in the instruction book.

LESSON XII

I. PURPOSE:

To review knowledges and induce activities which will develop new skills.

II. PROCEDURE:

A. Review Lesson X.

B. Review Lesson XI.

C. "Now the Day is Over," page 5, in the instruction book.

D. "Recess," page 5, in the instruction book.

LESSON XIII

I. PURPOSE:

To review knowledges and induce activities which will develop new skills.

II. PROCEDURE:

A. Review Lesson XI.

B. Review Lesson XII.

C. Exercise 24, page 6, in the instruction book.

D. Exercise 25, page 6, in the instruction book.

LESSON XIV.

I. PURPOSE:

To review knowledges and induce activities which will develop new skills.

II. PROCEDURE:

A. Review Lesson XIII.

B. Exercise 26, page 6, in the instruction book.

C. Exercise 27, page 6, in the instruction book.

D. Exercise 28, page 6, in the instruction book.

LESSON XV

I. PURPOSE:

To review knowledges and induce activities which will develop new skills.

II. PROCEDURE:

A. Review Lesson XIV.

B. Exercise 29, page 6, in the instruction book.

C. Exercise 30, page 6, in the instruction book.

LESSON XVI

I. PURPOSE:

To review knowledges and induce activities which will develop new skills.

II. PROCEDURE:

A. Review Lesson XV.

B. Exercise 31, page 6, in the instruction book.

C. Exercise 32, page 6, in the instruction book.

D. Line X, individual practice routine, page 6, in the instruction book.

LESSON XVII

I. PURPOSE:

To review knowledges and induce activities which will develop new skills.

II. PROCEDURE:

A. Review Lesson XVI.

B. Line Y, individual practice routine, page 6, in the instruction book.

C. Line Z, individual practice routine, page 6, in the instruction book.

D. "Old French Lullaby," page 7, in the instruction book.

E. "Princess," page 7, in the instruction book.

LESSON XVIII

I. PURPOSE:

To review knowledges and induce activities which will develop new skills.

II. PROCEDURE:

A. Review Lesson XVII.

B. "German Cradle Song," page 7, in the instruction book.

C. "Chromatic," page 7, in the instruction book.

LESSON XIX

I. PURPOSE:

To review knowledges and induce activities which will develop new skills.

II. PROCEDURE:

A. Review individual practice routine, page 6, in the instruction book.

B. "Lullaby," page 7, in the instruction book.

C. "Hickory Dickory Dock," page 7, in the instruction book.

D. "Half Steps," page 7, in the instruction book.

LESSON XX

I. PURPOSE:

To review knowledges and skills.

II. PROCEDURE:

A. Review "Recess," page 5, in the instruction book.

B. Review exercise 29, page 6, in the instruction book.

C. Review individual practice routine, page 6, in the instruction book.

D. Review "Old French Lullaby," page 7, in the instruction book.

LESSON XXI

I. PURPOSE:

To review knowledges and skills.

II. PROCEDURE:

A. Review "Recess," page 5, in the instruction book.

B. Review exercise 29, page 6, in the instruction book.

C. Review individual practice routine, page 6, in the instruction book.

D. Review "Old French Lullaby," page seven, in the instruction book.

LESSON XXII

I. PURPOSE:

To review knowledges and shills.

II. PROCEDURE:

A. Review Lesson XXI.

ACHIEVEMENT TEST ROUTINE

I. PURPOSE:

To evaluate each group and each individual.

II. PROCEDURE:

A. Each group play the following:

1. "Recess," page 5, in the instruction book.
2. Exercise 29, page 6, in the instruction book.
3. "Old French Lullaby," page 7, in the instruction book.

B. Each individual play the following:

1. "Recess," page 5, in the instruction book.
2. Exercise 29, page 6, in the instruction book.
3. "Old French Lullaby," page 7, in the instruction book.
4. a. Line X, individual practice routine, page 6, in the instruction book.

   b. First six notes of line Y, individual practice routine, page 6, in the instruction book.

APPENDIX C

B♭ Sop. Clar.
(KIND OF INSTRUMENT)

Mouthpiece Facing

No 1

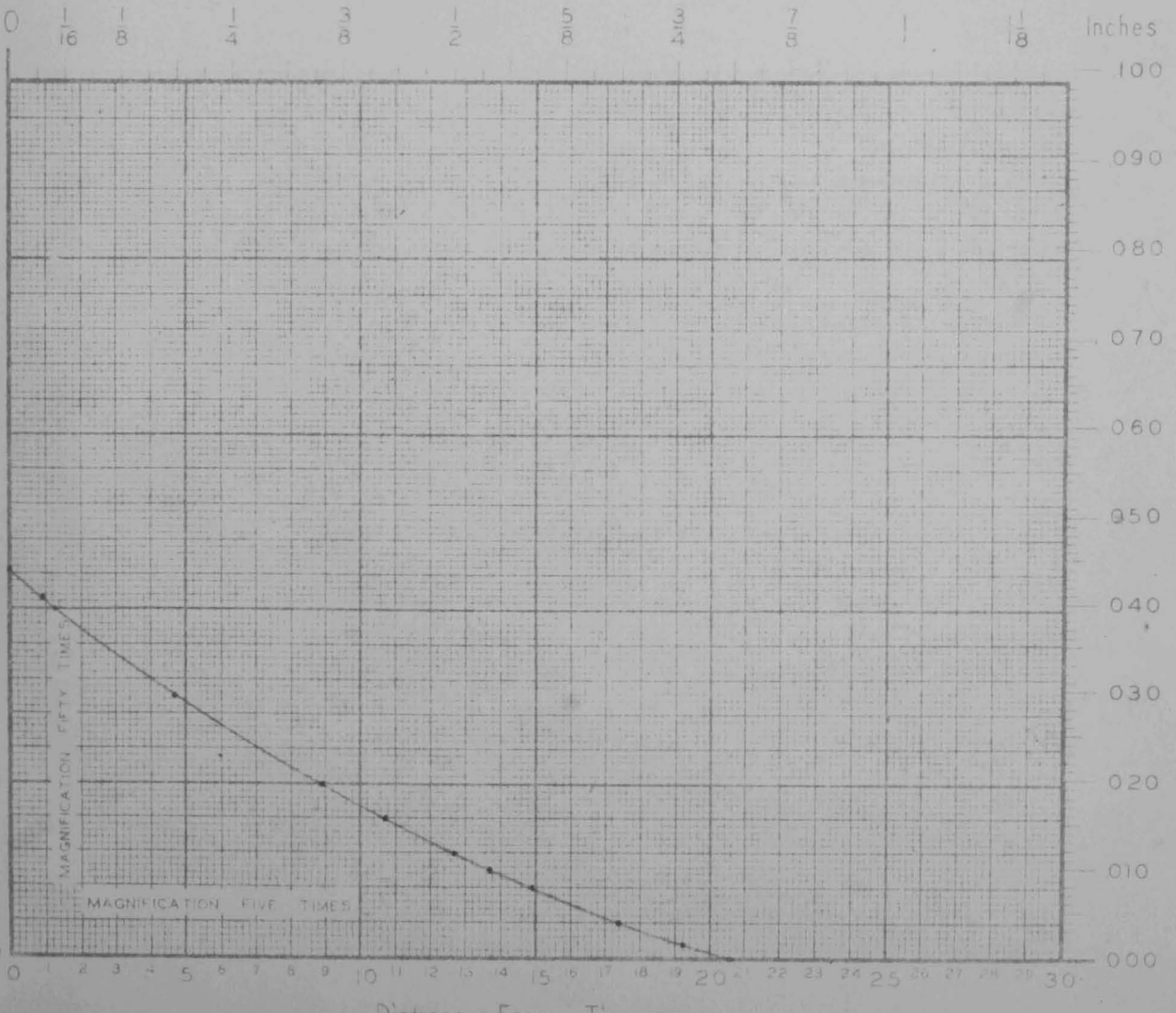
Model

Number

ured By ZIEMS Date 14 JULY 47

rks

Open. mm	Dist mm	Open mm	Dist. mm
0	20.6		
.04	19.2		
.10	17.4		
.20	14.9		
.25	13.7		
.30	12.7		
.40	10.7		
.50	8.9		
.75	4.7		
1.00	1.3		
1.03	0.9		
1.10	0		



B♭ SOP. CLAR. MOUTHPIECE FACING

(KIND OF INSTRUMENT)

No 2

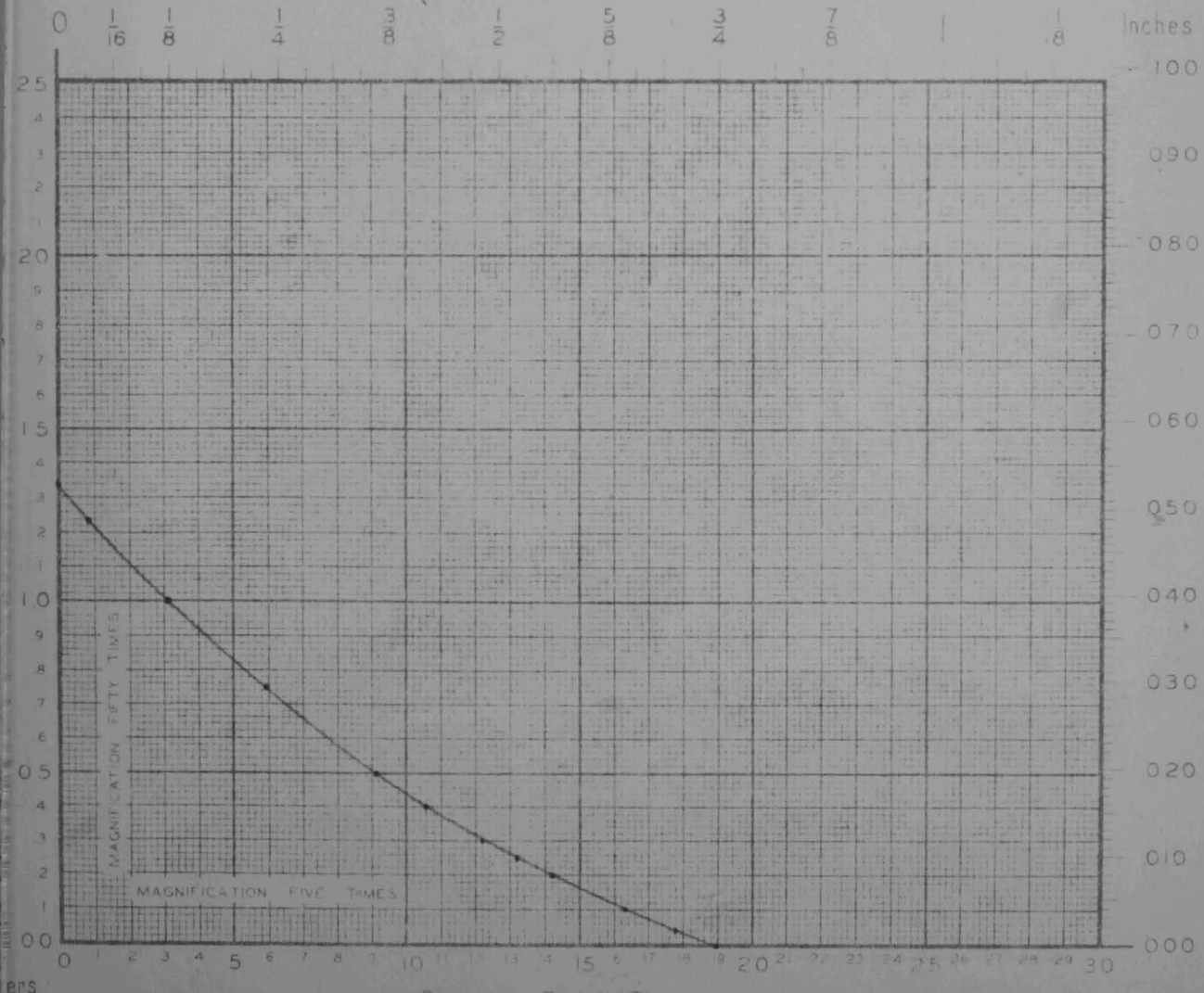
Model

Number C

ured By ZIEMS Date 14 JULY 47

ks:

Open mm	Dist mm	Open mm	Dist. mm
0	19.0		
.04	17.8		
.10	16.3		
.20	14.2		
.25	13.2		
.30	12.2		
.40	10.6		
.50	9.1		
.75	5.9		
1.00	3.1		
1.24	0.8		
1.34	0		



ers

B♭ SOP. CLAR. MOUTHPIECE FACING

(KIND OF INSTRUMENT)

No 3

Model

Number

ured By ZIEMS Date 14 JULY 47

ns

Open mm	Dist mm	Open mm	Dist mm
0	16.2		
.04	14.9		
.10	13.3		
.20	11.2		
.25	10.4		
.30	9.5		
.40	8.2		
.50	6.9		
.75	3.5		
.94	1.0		
1.00	0.2		
1.01	0		

B♭ SOP. CLAR. (KIND OF INSTRUMENT)

MOUTHPIECE FACING

No 4

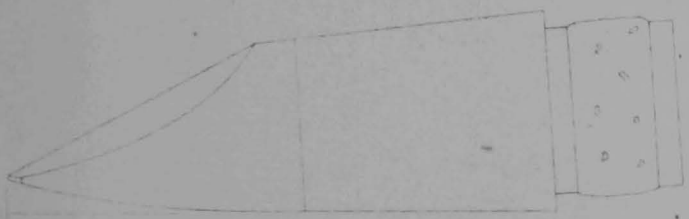
MEGAPHONE Model

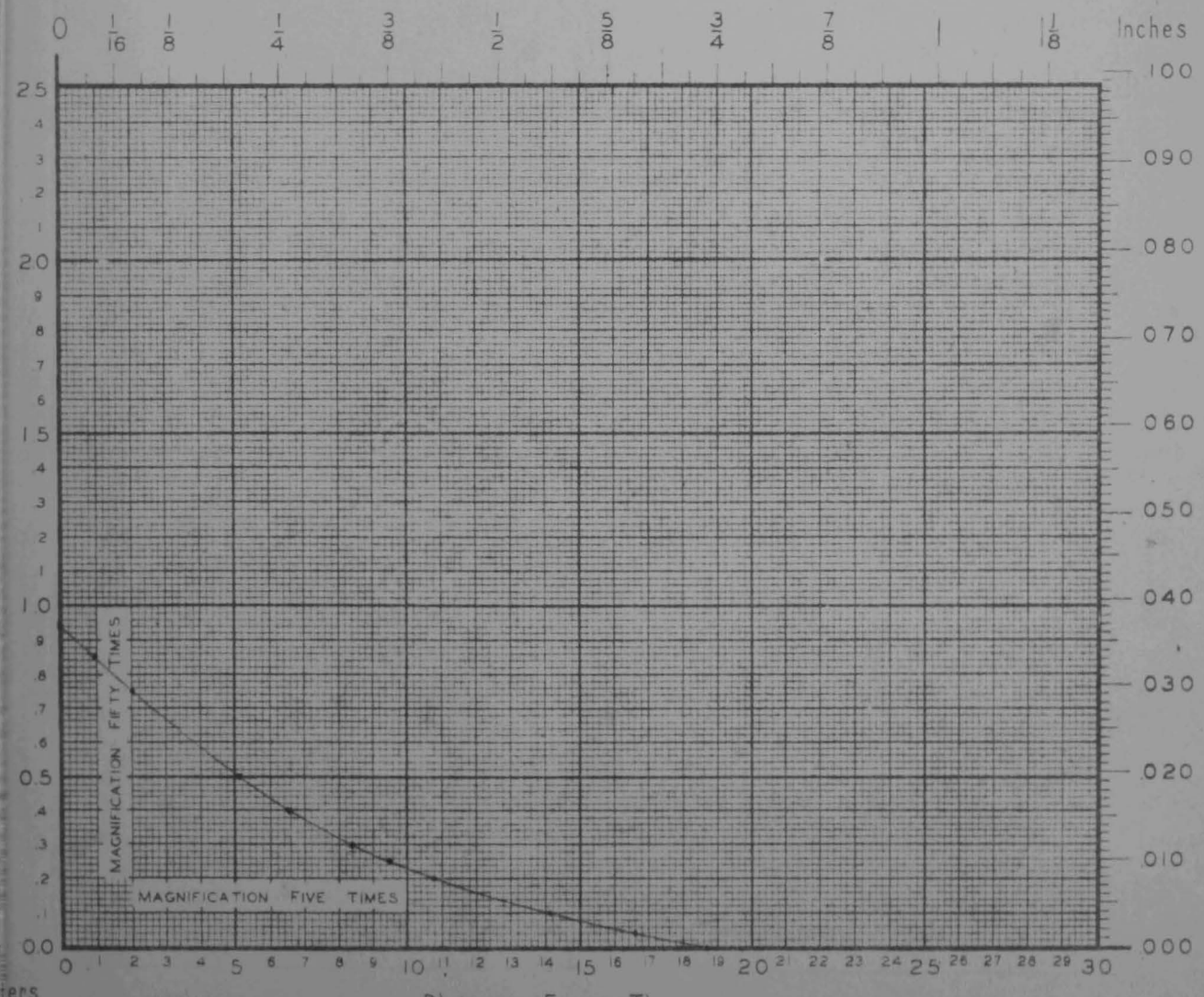
Number

ured By ZIEMS Date 14 JULY 47

rks

Open mm	Dist. mm	Open mm	Dist. mm
0	18.7		
.04	16.6		
.10	14.1		
.20	10.8		
.25	9.5		
.30	8.4		
.40	6.5		
.50	5.1		
.75	2.0		
.85	0.9		
.94	0		





RAY LEW RDL 8-28-40

Bb Sop. Clar. · Mouthpiece Facing

No. 5

(Kind of Instrument)

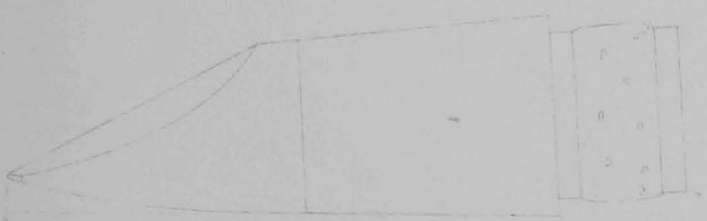
Make PEDLER Model —

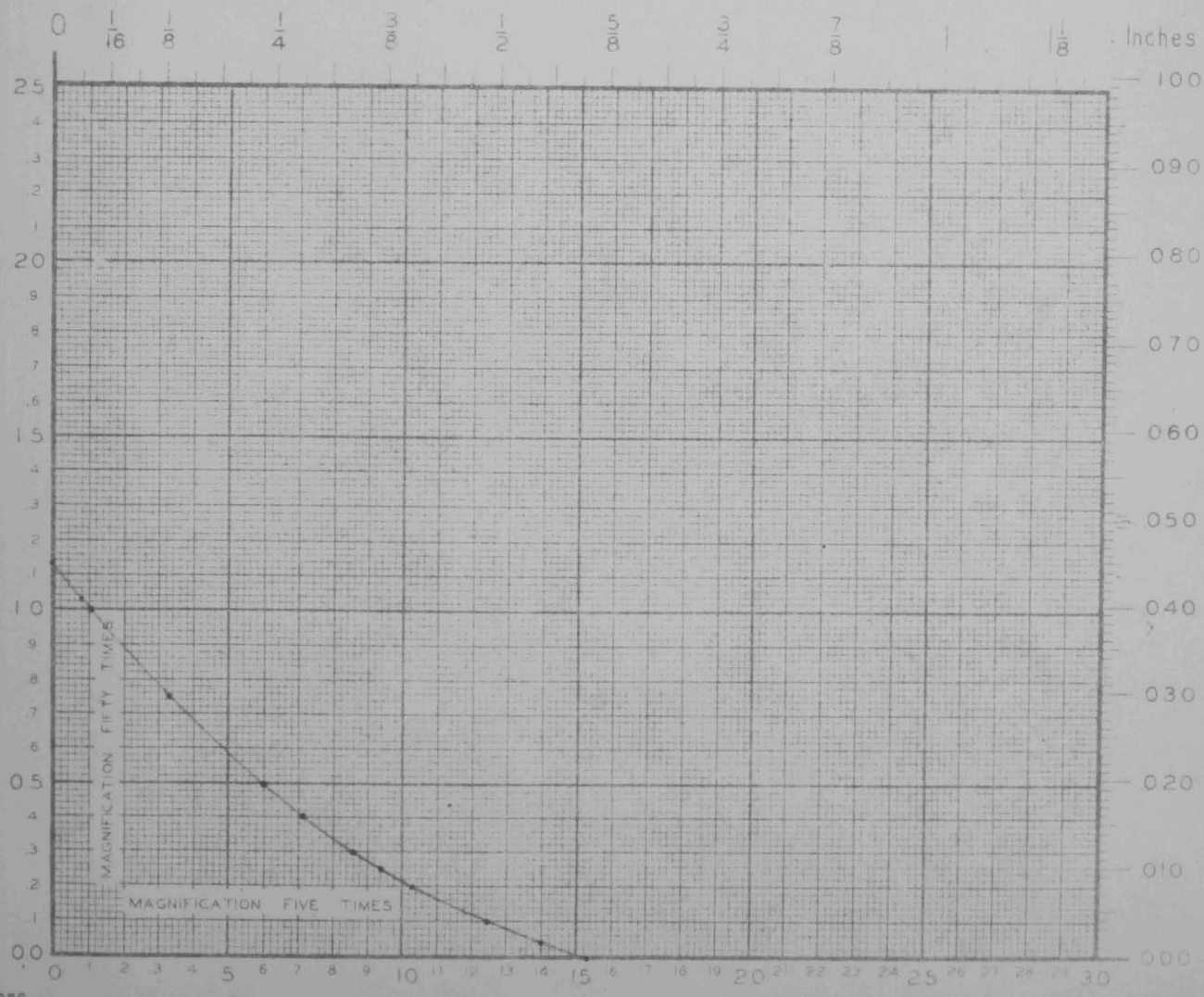
Play Number 11

Measured By ZIEMS Date 14 JULY 47

Remarks:

Open mm	Dist. mm	Open mm	Dist mm
0	15.3		
.04	14.0		
.10	12.5		
.20	10.3		
.25	9.4		
.30	8.6		
.40	7.1		
.50	6.0		
.75	3.3		
1.00	1.0		
1.03	0.8		
1.13	0		





B^{b} SOP. CLAR. — MOUTHPIECE FACING

(KIND OF INSTRUMENT)

No. 6

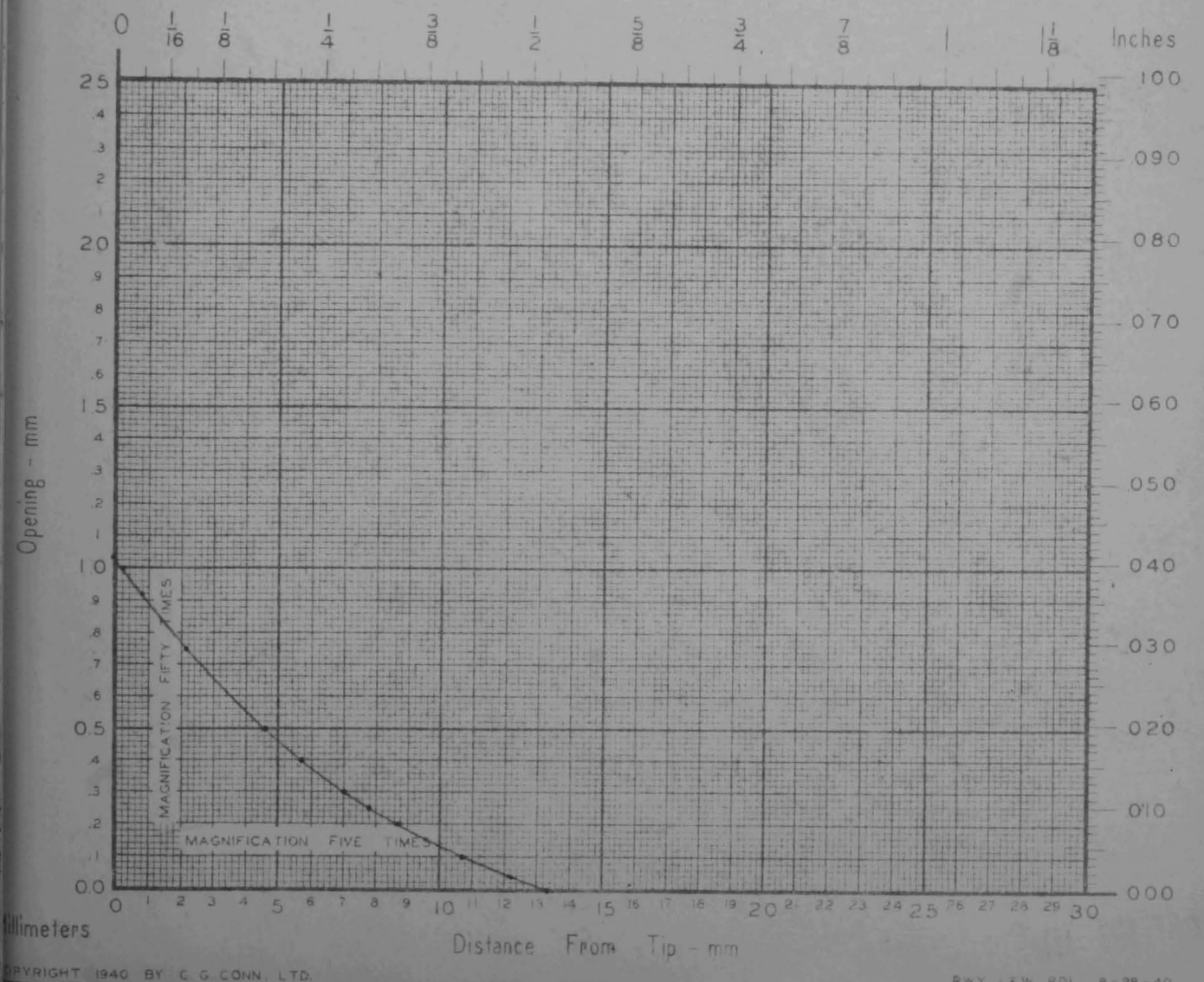
Make — Model —

Lay Number 1 K

Measured By ZIEMS Date 14 JULY 47

Remarks:

Open mm	Dist. mm	Open mm	Dist. mm
0	13.3		
.04	12.2		
.10	10.7		
.20	8.7		
.25	7.8		
.30	7.0		
.40	5.7		
.50	4.6		
.75	2.1		
.92	0.8		
1.00	0.2		
1.03	0		



RWY LEW RDL 8-28-40

Bb SOP. CLAR.
(KIND OF INSTRUMENT)

MOUTHPIECE FACING

No 7

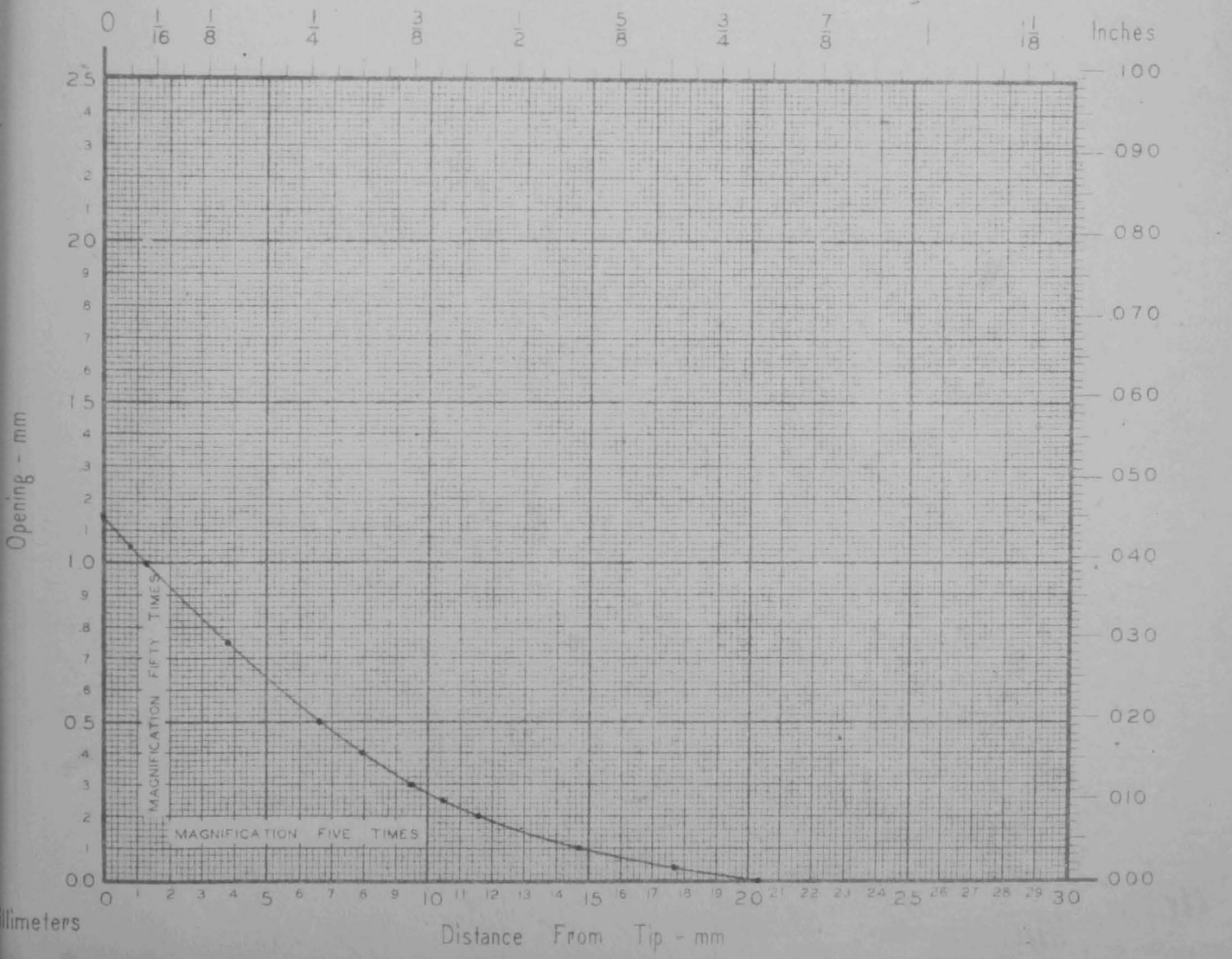
Make ____ Model ____

Lay Number ____

Measured By ZIEMS Date 14 JULY 47

Remarks:

Open mm	Dist mm	Open mm	Dist mm
0	20.3		
.04	17.7		
.10	14.7		
.20	11.6		
.25	10.5		
.30	9.5		
.40	7.9		
.50	6.6		
.75	3.8		
1.00	1.3		
1.05	0.8		
1.14	0		



RWY LEW RDL 8-28-40

B♭ Sop. Clar. (KIND OF INSTRUMENT) Mouthpiece Facing

No 8

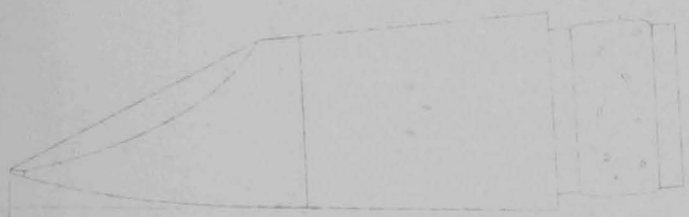
Make Pedler Model

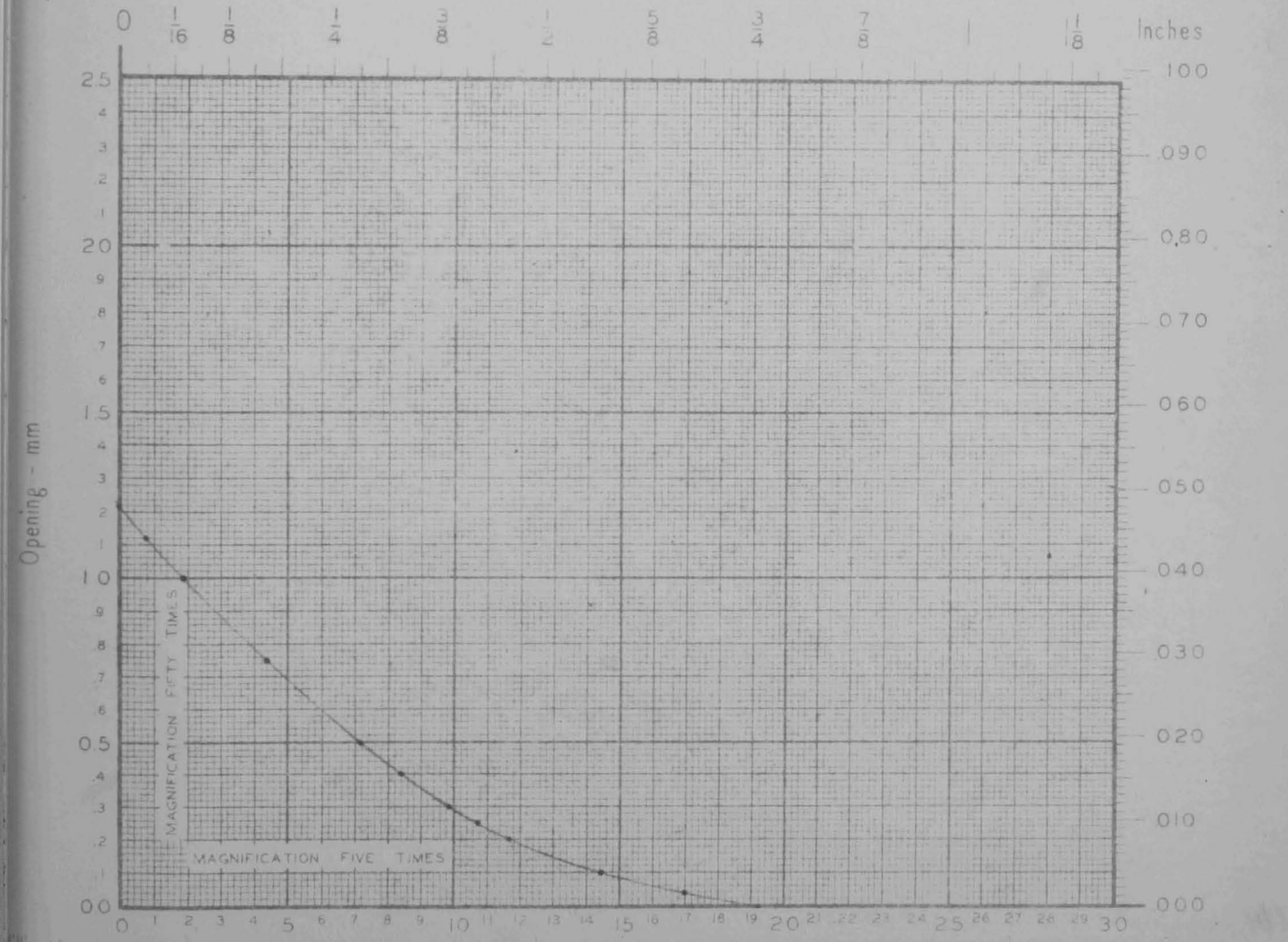
Lay Number

Measured By Ziems Date 14 July 47

Remarks

Open mm	Dist mm	Open mm	Dist mm
0	19.2		
.04	17.0		
.10	14.4		
.20	11.7		
.25	10.7		
.30	9.9		
.40	8.4		
.50	7.2		
.75	4.4		
1.00	1.9		
1.12	0.8		
1.21	0		





RWY EW RDC 8-28-40

Bb Sop. Clar (KIND OF INSTRUMENT) Mouthpiece Facing

No 9

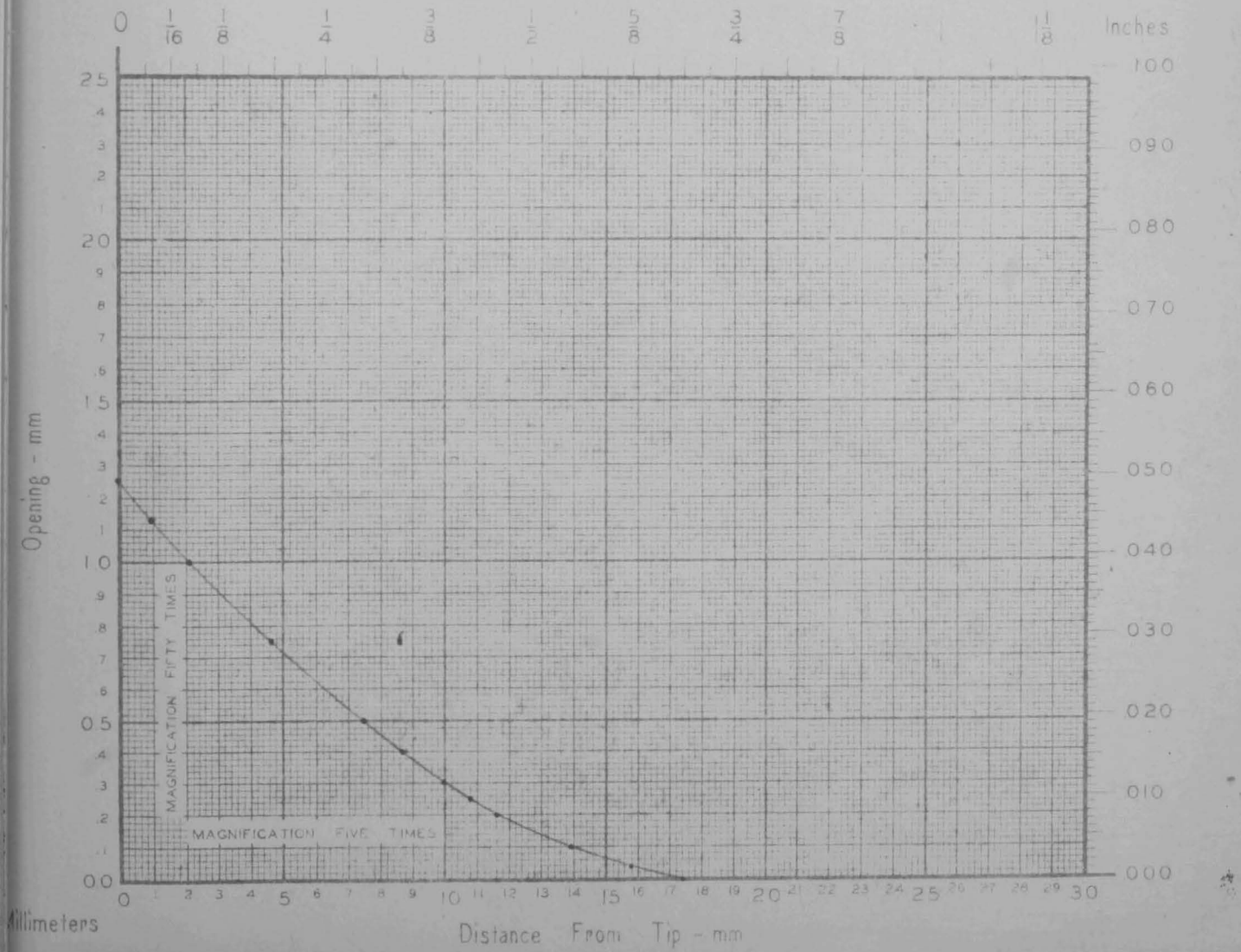
Make Pedler Model —

Lay Number

Measured By Ziems Date 14 July 47

Remarks:

Open mm	Dist. mm	Open mm	Dist. mm
0	17.4		
.04	15.8		
.10	13.9		
.20	11.6		
.25	10.8		
.30	10.0		
.40	8.7		
.50	7.5		
.75	4.6		
1.00	2.1		
1.13	0.9		
1.25	0		



RWY LEW RDS 8-28-40

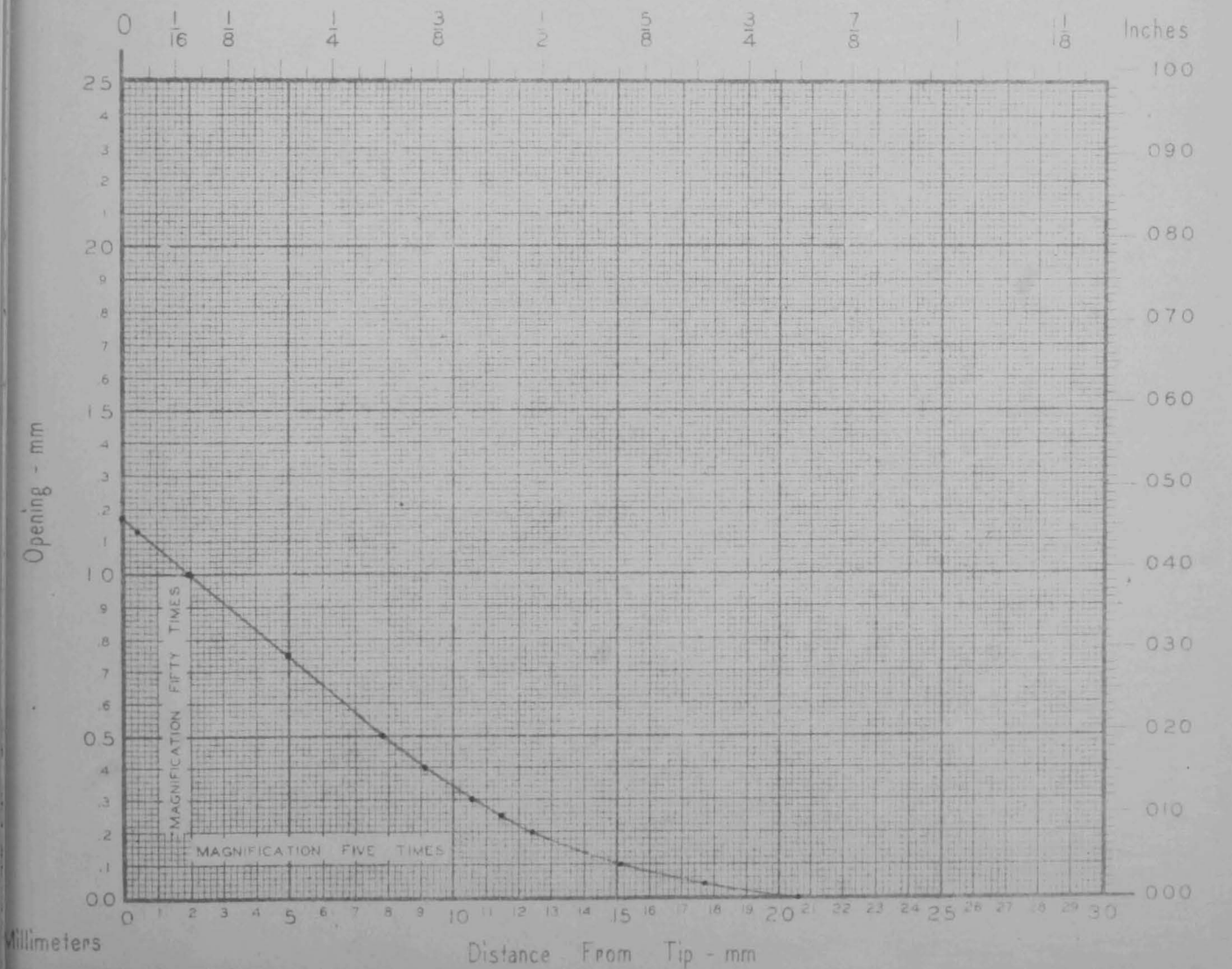
B♭. SOP. CLAR.
(KIND OF INSTRUMENT)

MOUTHPIECE FACING

No 10

Make _____ Model _____
Lay Number C
Measured By ZIEMS. Date 14 JULY 47
Remarks

Open mm	Dist. mm	Open mm	Dist. mm
0	20.6		
.04	17.7		
.10	15.1		
.20	12.4		
.25	11.5		
.30	10.6		
.40	9.1		
.50	7.8		
.75	5.0		
1.00	2.0		
1.13	0.4		
1.17	0		



B♭ Sop. Clar. — Mouthpiece Facing

(Kind of Instrument)

No 11

Make _____ Model _____

Lay Number _____

Measured By ZIEMS Date 14 JULY 47

Remarks

Open mm	Dist mm	Open mm	Dist mm
0	19.4		
.04	17.0		
.10	14.7		
.20	12.4		
.25	11.4		
.30	10.6		
.40	9.0		
.50	7.7		
.75	4.5		
1.00	1.8		
1.10	0.8		
1.19	0