Seashore, C.E.
Manual of instructions and interpretations for measures of musical talent

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FOR

Measures of Musical Talent

By

C. E. SEASHORE

COLUMBIA GRAPHOPHONE COMPANY
NEW YORK CITY
EDUCATIONAL DEPARTMENT

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INSTRUCTIONS FOR THE USE OF THE FOLLOWING COLUMBIA RECORDS

A7536	Measures of Musical Talent.	Sense of Pitch, No. 1A.
12 in. $1 50	Measures of Musical Talent.	Sense of Pitch, No. 1B.
A7537	Measures of Musical Talent.	Sense of Intensity, No. 2A.
12 in. $1.50	Measures of Musical Talent.	Sense of Intensity, No. 2B.
A7538	Measures of Musical Talent.	Sense of Time, No. 3A.
12 in. $1 50	Measures of Musical Talent.	Sense of Time, No. 3B.
A7539	Measures of Musical Talent.	Sense of Consonance, No. 4A.
12 in. $1.50	Measures of Musical Talent.	Sense of Consonance, No. 4B.
A7540	Measures of Musical Talent.	Tonal Memory, No. 5A.
12 in. $1.50	Measures of Musical Talent.	Tonal Memory, No. 5B.

Based on the author's

"THE PSYCHOLOGY OF MUSICAL TALENT"

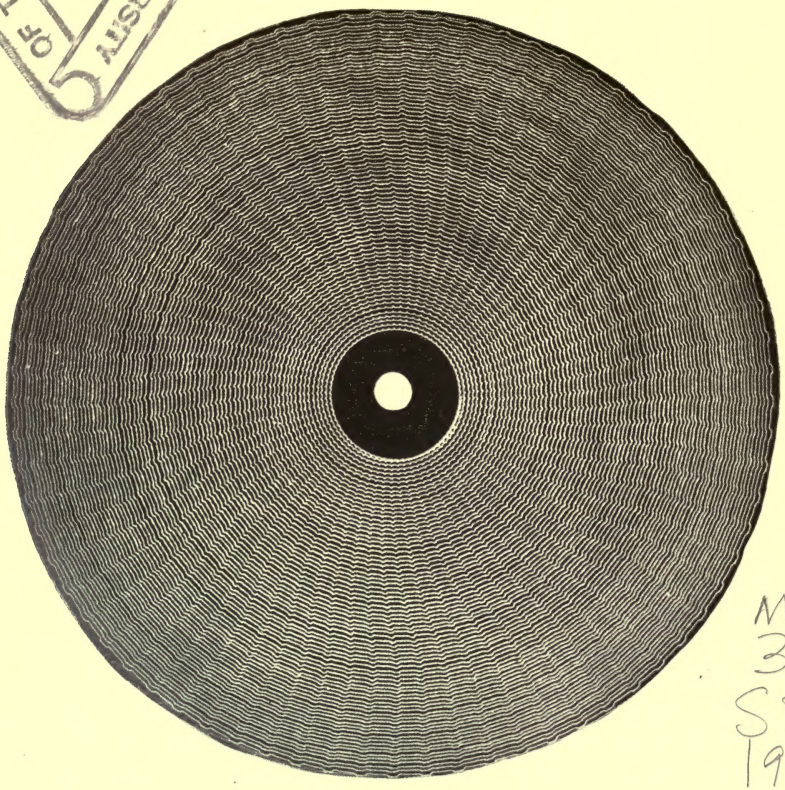
(Silver, Burdett and Company, Boston, 1919)

COLUMBIA GRAPHOPHONE COMPANY

NEW YORK CITY

EDUCATIONAL DEPARTMENT

Adv. 1325-5-19



THIS figure illustrates the extraordinary accuracy of the modern phonograph motor. Each wave represents one one-hundredth of a second in the motion of the disc. If there were a discrepancy of as much as one-tenth of a wave in two successive circles, that would mean an error of one one-thousandth of a second in the revolution; but there is scarcely any place in this record of a tuning fork in which an error to that extent can be detected. It is this high accuracy of the reproducing machines that has made possible the present "Measures of Musical Talent" in the form of records.

NATURE AND USE OF THE MEASURES OF MUSICAL TALENT

JUST as the great musicians live before us now in the wonderful reproduction of the modern phonograph, so the intricate experiments of the psychological laboratory may now be popularized by the faithful reproduction of the sounds of laboratory instruments and their scientific presentation.

Musical talents vary enormously both in degree and kind. Many of these capacities can be measured before musical education has been begun. It is of inestimable value for the art of music that these capacities and traits should be discovered early and be analyzed for the purpose of guidance in musical education. The material presented in these records furnishes measures for five of the most fundamental and essential capacities of the musical mind. As we may hear the prima donna sing in school and home, so we can command the scientific means for aid in the detection, analysis, and rating of musical talents.

These measures of musical talent comply with the following conditions: they are based on a thorough analysis of musical talent; they are standardized for content that does not need to be changed; they give quantitative results which may be verified to a high degree of certainty; they are simple and as nearly self-operating as possible; they are adapted for group measurements; they take into account practice, training, age, and intelligence; they have a two-fold value in the concrete information furnished, and in the training and pleasure gained from the critical hearing of musical elements.

These measures are adapted primarily for use in the regular music course and for special surveys in the public schools. They should be used first in the fifth grade, because this is the earliest age at which group measurements can be made satisfactorily, and it is early enough to make serious arrangements for a musical education. They should then be repeated in the eighth grade, just before the great sorting of children into the vocations of practical life and elective courses in the high school.

They furnish also material for scientific entertainment in the home. Taking one test each evening, this outfit provides material for five evenings of delightful entertainment in the form of a competitive game.

For teaching purposes the tests furnish excellent class experiments in elementary psychology. If the performance of each of these tests is linked with the corresponding chapter of reading in the "Psychology of Musical Talent," this will furnish five days of intensive training in the measurement of individual differences. These class experiments, with required readings, will also fill a great need in the theoretical instruction in the music school. Such use of them will not conflict with the previous use in the entrance examinations.

The instructions herewith furnished are stated with reference to the school room. They may be readily adapted to other situations.

The Material Needed

All the test material for this series is contained on the five double-disc records. The measures are so adjusted as to be easy enough in parts for the poorest listener, and difficult enough in parts for the best listener. A measure consists in the playing of both sides of a disc. The playing of one side takes from four to five minutes. The material is so ordered as to regulate natural periods for the flow of attention.

The discs may be played on any good standard phonograph, provided the instrument is in good, smooth running condition, properly set, balanced, and lubricated. A first class phonograph, well regulated, runs with an error of less than one-thousandth of a second per revolution. Care about winding is necessary; it is well to give the crank a few turns during the interruption at the middle of the record. The instrument should be set for seventy-eight revolutions per minute for all the records except that of the sense of time; for that it should be set at sixty or sixty-five. Loudness appropriate to the room may be varied by proper selection of metal needles.

The pupils should be supplied with test blanks, either printed or ruled by the pupil, as in the model on the opposite page. For ex-

Name _____ Test _____

Date _____ Hour _____

School _____ Grade _____ Age ____ yrs. ____ mos.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1																				
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

tensive use it is most economical to make a zinc etching from the model, and print the blank on both sides of a half letter-size sheet.

The material in this leaflet is limited to the barest directions for the giving of the test. Their setting, their valuation, and their interpretation, can best be learned at present by reference to the author's text book on this subject, "The Psychology of Musical Talent." The norms here used are taken from "A Survey of Musical Talent in the Public Schools," published by The Iowa Child Welfare Research Station, Iowa City.

These five measures do not constitute a complete survey of musical talent, as may be seen in the analysis of a musical mind and inventory of talents in the text book, but they are specific measures of these five basic capacities. That is what makes them scientific. They do not measure the musical mind as a whole, but they do measure specific and fundamental traits of the musical mind.

Before going further in these instructions the reader should play over each record so as to have the material discussed concretely in mind.

Computation and Interpretation of the Results

A key giving the right answer for each trial is furnished for each measure. These should be read in the order in which trials are recorded on the blank; namely, first ten trials in column A, then ten trials in column B, etc.

The degree of difficulty is indicated at the head of each column of the key. For pitch, it is given in terms of vibrations, one vibration being equivalent to one fifty-fourth of a tone. For intensity, it is given in terms of units of loudness on the original instrument, which is called an audiometer. For time, the difference between two time intervals is given in terms of hundredths of a second. For consonance each step is different. For memory the difficulty is given in terms of number of notes in the span. The listener, however, need not concern himself about these technical items.

If the class is reliable and can be trusted, the key may be read aloud slowly allowing each to check mistakes by drawing a bold line through all wrong answers. Teachers may devise various substitutes for this method to meet local needs. Should the teacher wish to check all the records herself, this can be done most ex-

peditiously by making a key, with a hole for each square, to lay over the records.

All the records are interpreted in terms of rank, which is a serviceable unit that may be easily understood. It simply denotes the rank that the person holds in a community of his kind on a scale of 100, in which 100 represents the highest possible rank, 1 the lowest possible, and 50 the average. These norms of rank were made by taking very large numbers of cases and arranging the actual records in the order of excellence, and finding what rank in a normal community each per cent. right will yield.

The original footings, *i.e.*, % right, are converted into rank in the tables of rank, for each measure. Thus, in pitch, 75% right for the adult yields a rank of 26; for the eighth grade 44; and for the fifth grade 72. The average age for fifth grade children is between ten and eleven years; and for eighth grade children about fourteen. In dealing with children we find that the grade is more significant than the age.

Since only three norms are given it is necessary to estimate rank for intervening ages or grades. Children below the fifth grade who are intelligent enough to take the tests satisfactorily should be ranked on the fifth grade norm because the difference in the norms is due chiefly to the difference in capacity for intelligent effort in the tests, rather than to age. Children of the sixth and seventh grades may be assigned proportional rank between the fifth and eighth grades. Likewise high school students may be assigned proportional rank between the eighth grade and the adults; for example, in pitch, 83% right for the sixth grade would be a rank of 88; for the seventh grade 83; for high school freshmen, about 73, and sophomores 68. High school juniors and seniors may rank as adults.

The tables of rank do not go below 35% right for memory, and, for all the other measures, 55% right. Those who fall below these records can not be ranked. The reliability of records is somewhat proportional to the rank. Those above the rank of 50 may be regarded as entirely reliable; those below 50 should, wherever possible, be verified under most favorable conditions.

In the graphs, Figs. 1 to 5, adults are represented thus——, eighth grade children thus — — —, and fifth grade children thus. . . . . The graphs show what per cent. of cases occur normally in each five-group of % right. The scale at the left

gives the per cent. of cases for each five-group; the scale on the base line, the % right. The number on this line denotes the middle of the group; thus, 55 covers from 52.5 to 57.5.

This distribution is given for the purpose of showing the relative frequency of each talent for different degrees of achievement as represented by % right. The distribution becomes more significant when interpreted quantitatively in terms of the smallest difference that can be perceived, as is done in the fuller discussions of this subject. Thus, a person who ranks 100 may hear a difference of one two-hundredth of a tone, whereas a person who ranks 1 can not hear a difference of less than a half tone. The former is more than a hundred times as keen as the latter. The person who ranks 50, and therefore average, can hear a difference of 2.7 vibrations; *i.e.*, five hundredths of a tone.

KEYS TO THE RECORDS

Pitch Key

	A	B	C	D	E	F	G	H	I	J
	30	23	17	12	8	½	1	2	3	5
1.	H	H	L	H	L	L	L	H	L	H
2.	H	L	H	H	H	H	L	L	H	H
3.	L	L	L	L	H	L	H	L	L	L
4.	H	L	L	L	L	L	L	H	H	H
5.	L	H	L	H	H	H	H	L	H	L
6.	L	H	H	L	H	H	L	H	H	L
7.	H	L	H	L	L	L	L	L	L	H
8.	H	L	L	H	H	L	L	L	H	L
9.	L	L	L	L	L	H	H	L	L	L
10.	L	H	L	H	H	H	L	H	L	H

Intensity Key

	A	B	C	D	E	F	G	H	I	J
	5	4	3	2	1	5	4	3	2	1
1.	W	S	S	W	S	S	S	S	S	S
2.	S	S	S	S	W	S	W	S	W	W
3.	W	W	W	S	S	W	W	W	W	W
4.	S	W	W	W	S	W	W	S	S	W
5.	S	S	W	W	W	S	S	W	W	S
6.	S	W	S	W	S	W	S	W	S	S
7.	W	S	S	S	W	W	W	S	S	W
8.	W	S	S	W	W	S	W	W	W	W
9.	W	S	W	S	S	W	W	W	S	S
10.	S	W	W	S	S	S	S	S	W	S

Time Key

	A	B	C	D	E	F	G	H	I	J
	20	20	14	14	9	2	2	5	5	9
1.	L	L	L	S	L	L	S	L	S	S
2.	S	S	S	L	S	L	L	S	L	L
3.	L	L	S	S	S	S	S	L	L	L
4.	S	L	L	S	L	L	L	L	S	S
5.	S	L	L	L	L	L	S	S	S	S
6.	S	S	S	L	S	S	S	L	L	S
7.	L	L	S	L	S	S	L	S	S	L
8.	L	L	L	S	S	L	S	S	L	S
9.	S	S	S	L	L	S	L	L	L	L
10.	S	S	L	L	L	L	L	L	L	L

Consonance Key

	A	B	C	D	E
1.	W	W	B	W	W
2.	W	W	W	B	B
3.	B	B	B	B	W
4.	B	W	W	W	B
5.	B	W	B	B	W
6.	W	B	B	W	B
7.	B	B	B	W	B
8.	W	B	W	W	W
9.	W	W	B	B	W
10.	B	W	B	B	W

Memory Key

	A	B	C	D	E
	2	3	4	5	6
1.	1	2	4	3	2
2.	1	1	2	5	4
3.	1	1	1	2	6
4.	2	1	2	1	1
5.	2	2	3	4	5
6.	1	3	4	3	3
7.	2	2	1	2	4
8.	2	3	3	5	2
9.	1	1	2	1	3
10.	1	3	2	4	1

Instructions for the Teacher or Experimenter

1. Give specific instructions to the listener as directed for each measure and explain the method of recording.

2. Give preliminary practice, using the A-side of the disk, and allowing the listeners to speak the answers together in competition. until the nature of the test is thoroughly understood. If necessary,

play the entire one side of the record, stopping as often as necessary to discuss and explain procedure clearly.

3. Guard against the memorizing of the order, either from seeing the key or frequent repetitions of the record. No one who knows the order can participate in the test.

4. Take rigid precautions against copying from neighbors, or being influenced by the sound of the writing movements.

5. Direct the listener to take a position of muscular tension, leaning forward with muscles firm in the most favorable position for writing, in an attitude of attention, eyes closed while listening.

6. If the listener can not hear the effect called for, he must guess, as the results are computed on the theory of chance. Require a prompt record for all trials. There is always a difference!

7. After the preliminary trials and the full explanation, charge the listeners by firm command, to give their attention in maximum effort without interruption throughout the playing. This charge is important as those who are not accustomed to psychological measurements often do not realize the necessity of concentrated and uninterrupted effort. Impress the fact that every trial counts.

8. Treat the result of the test as private, personal, and confidential, except where by common consent the test is taken as a game, a contest, or a demonstration.

9. One block of trials consists of the playing of the two sides of one disc. If not more than twenty minutes are available with the children, take only one block; if thirty-five minutes, take two blocks; and, if fifty minutes, take three blocks, with reasonable periods of rest or exercise. Ordinarily two blocks of trials will give a reasonable reliability.

10. Check the result by the key as directed above. Count the number of mistakes in the entire record and subtract this from the total number of trials. This will give the number of right answers. Reduce this to per cent. right by dividing the number of correct answers by the total number of trials.

11. Transform the per cent. right into per cent. rank as directed above.

12. For answers to questions and for further tests consult the "Psychology of Musical Talent."

SENSE OF PITCH

To THE LISTENER: You will hear two tones which differ in pitch. You are to judge whether the second is higher or lower than the first. If the second is higher record H; if lower, record L.

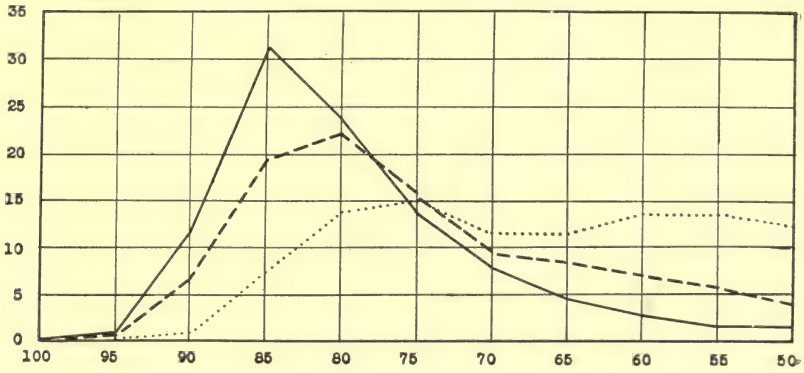


Fig. 1—DISTRIBUTION FOR PITCH

Table 1—Rank for Pitch

% Right	RANK Adult	8th Gr.	5th Gr.	% Right	RANK Adult	8th Gr.	5th Gr
100-94	100	100	100	74	23	41	69
93	99	100	100	73	21	38	66
92	99	100	100	72	19	35	63
91	98	99	100	71	17	33	61
90	96	98	100	70	15	31	59
89	94	97	100	69	13	29	56
88	91	95	99	68	12	27	53
87	87	93	99	67	11	25	51
86	81	90	98	66	10	23	49
85	76	86	97	65	9	22	47
84	70	82	95	64	8	20	44
83	63	78	93	63	7	19	42
82	56	73	91	62	6	17	40
81	50	68	89	61	5	16	37
80	45	63	87	60	5	14	35
79	40	59	84	59	4	13	32
78	36	55	81	58	4	12	29
77	32	51	78	57	3	10	26
76	29	47	75	56	3	9	23
75	26	44	72	55	3	7	21

SENSE OF INTENSITY

To THE LISTENER: You will hear two tones which differ in loudness, or strength. You are to judge whether the second is weaker or stronger than the first. If the second is stronger, record S; if the second is weaker, record W.

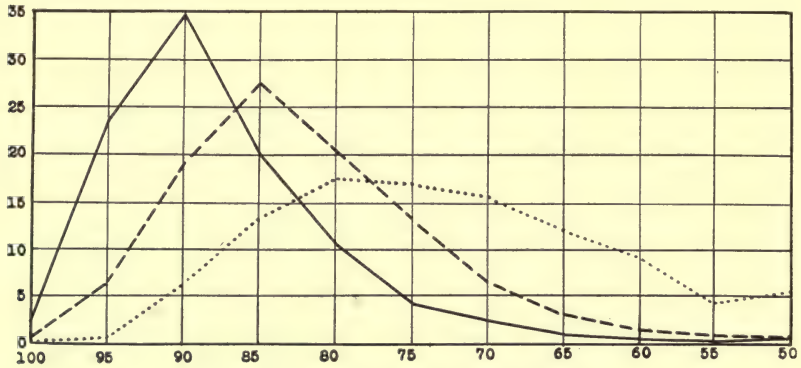


Fig. 2—DISTRIBUTION FOR INTENSITY

Table 2—Rank for Intensity

% Right	RANK Adult	8th Gr.	5th Gr.	% Right	RANK Adult	8th Gr.	5th Gr
100	100	100	100	77	8	25	62
99	100	100	100	76	7	22	58
98	99	100	100	75	6	19	55
97	97	100	100	74	5	16	51
96	95	99	100	73	5	14	48
95	92	98	100	72	4	12	45
94	87	97	100	71	4	10	41
93	82	95	100	70	3	8	38
92	74	93	99	69	3	7	35
91	66	91	99	68	3	6	32
90	58	87	98	67	2	5	29
89	51	83	97	66	2	4	26
88	45	78	95	65	2	3	24
87	39	73	93	64	2	3	22
86	34	67	91	63	2	2	20
85	29	61	89	62	1	2	18
84	25	56	86	61	1	1	16
83	22	51	83	60	1	1	14
82	19	46	80	59	1		12
81	16	41	77	58	1		11
80	14	36	73	57			10
79	12	32	69	56			9
78	10	28	65	55			8

SENSE OF TIME

TO THE LISTENER: You will hear three clicks marking off two intervals of time. If the second interval (that is, the time between the second and third clicks) is longer than the first interval, record L; if it is shorter, record S.

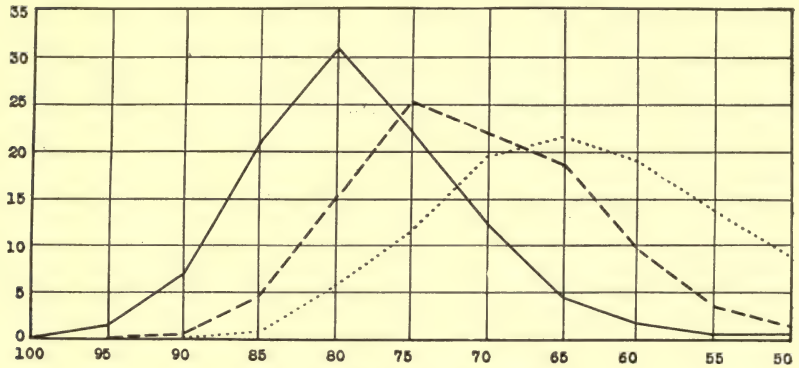


Fig. 3—DISTRIBUTION FOR TIME

Table 3—Rank for Time

% Right	RANK Adult	8th Gr.	5th Gr.	% Right	RANK Adult	8th Gr.	5th Gr.
100-92	100	100	100	73	24	60	85
91	99	100	100	72	20	55	82
90	98	100	100	71	16	50	79
89	97	100	100	70	13	45	75
88	96	100	100	69	11	40	71
87	94	99	100	68	9	36	67
86	90	99	100	67	7	32	63
85	87	98	100	66	6	28	59
84	83	98	99	65	5	24	54
83	78	97	99	64	4	20	49
82	73	95	99	63	3	17	45
81	67	93	98	62	3	14	41
80	61	90	97	61	2	11	37
79	54	87	96	60	2	9	33
78	48	84	95	59	1	7	29
77	42	80	94	58	1	6	26
76	37	75	92	57	1	5	23
75	32	70	90	56	1		20
74	28	65	88	55			17

SENSE OF CONSONANCE

To the Listener: You will hear two combinations of two tones each; one combination is better or worse than the other in consonance (harmony). A good combination is one in which the two tones are smooth, and blend, tending to fuse together into one. A bad combination is just the opposite. If the second combination is better, record B; if worse, W.*

* This calls for a judgment on blending, smoothness, and fusion, apart from the feelings of like or dislike, and apart from theory or feeling of musical value. Blending, smoothness, and fusion should be explained fully, and may be illustrated on the piano before the preliminary practice.

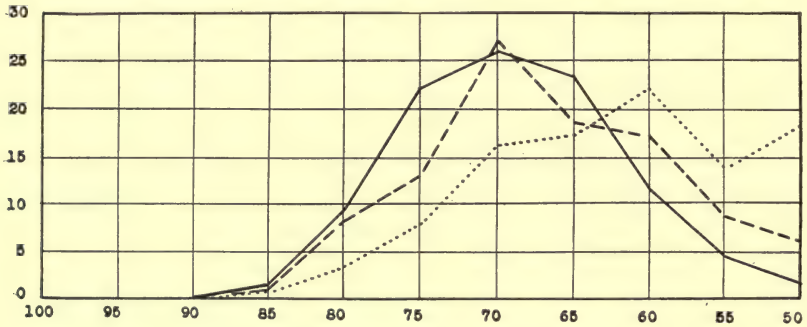


Fig. 4.—DISTRIBUTION FOR CONSONANCE

Table 4—Rank for Consonance

% Right	RANK Adult	8th Gr	5th Gr.	% Right	RANK Adult	8th Gr.	5th Gr.
100-86	100	100	100	70	56	66	83
85	100	100	100	69	51	62	80
84	99	99	99	68	46	58	77
83	99	99	99	67	41	54	74
82	99	99	99	66	36	49	70
81	98	98	98	65	31	44	66
80	97	97	98	64	26	39	62
79	95	95	98	63	21	35	58
78	93	94	97	62	18	31	54
77	90	92	96	61	15	27	50
76	86	90	95	60	12	24	46
75	82	87	94	59	10	21	42
74	78	84	92	58	8	18	38
73	73	80	90	57	7	15	34
72	68	76	88	56	6	13	30
71	62	72	86	55	4	11	27

TONAL MEMORY

To the Listener: In each trial you will hear a series of tones played twice. In the second playing, one note is changed. You are to record, by number, which one was changed. In listening count mentally; for example, 1, 2, in the first playing, and then likewise in the second playing, so that you may identify the one that was changed without error.*

* There should be preliminary drill for each span of the five degrees of difficulty, with emphasis on the silent counting.

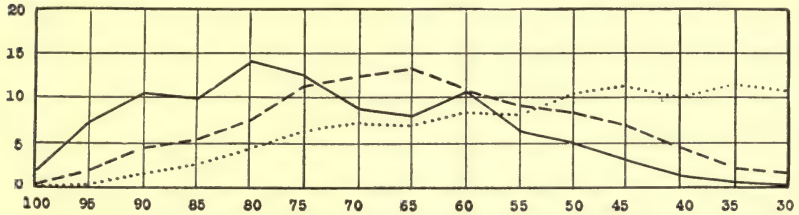


Fig. 5.—DISTRIBUTION FOR MEMORY

Table 5—Rank for Memory

% Right	RANK Adult	8th Gr.	5th Gr.	% Right	RANK Adult	8th Gr.	5th Gr.
100	100	100	100	67	35	56	77
99	100	100	100	66	34	53	76
98	99	100	100	65	32	51	74
97	98	100	100	64	30	48	73
96	97	100	100	63	29	45	72
95	96	99	100	62	27	43	70
94	95	99	100	61	25	40	69
93	93	98	100	60	33	38	67
92	91	98	100	59	21	36	66
91	89	97	100	58	19	34	64
90	87	96	99	57	17	31	62
89	85	95	99	56	15	28	61
88	83	94	99	55	14	27	59
87	81	93	98	54	13	25	58
86	79	92	98	53	12	23	56
85	77	91	98	52	11	22	54
84	75	90	97	51	10	20	52
83	73	89	97	50	9	18	50
82	71	88	96	49	8	17	48
81	68	86	95	48	7	15	45
80	65	84	94	47	6	14	43
79	62	83	93	46	5	12	41
78	60	81	92	45	4	11	39
77	57	80	91	44	3	9	37
76	55	78	90	43	3	8	34
75	53	76	89	42	2	7	32
74	50	74	87	41	2	6	30
73	47	71	86	40	2	5	28
72	45	69	84	39	1	4	26
71	43	67	83	38	1	3	24
70	41	64	82	37		2	22
69	39	62	80	36			20
68	37	59	79	35			18

ELEMENTS OF MUSICAL TALENT

(*This outline, from "The Psychology of Musical Talent," shows the relation of the present* Measures *to other measurable factors of the musical mind.*)

I. Musical Sensitivity

A. Basic capacities

*1. Sense of pitch
*2. Sense of intensity
*3. Sense of time
4. Sense of extensity

B. Complex capacities

1. Sense of timbre
2. Sense of rhythm
*3. Sense of consonance
4. Sense of volume

II. Musical Action

Natural capacity for skill in accurate and musically expressive production of tones (vocal or instrumental, or both) in:

1. Control of pitch
2. Control of intensity
3. Control of time
4. Control of timbre
5. Control of rhythm
6. Control of volume

III. Musical Memory and Imagination

1. Auditory imagery
2. Motor imagery
3. Creative imagination
*4. Memory span
5. Learning power

IV. Musical Intellect

1. Musical free association
2. Musical power of reflection
3. General intelligence

V. Musical Feeling

1. Musical taste: likes and dislikes
2. Emotional reaction to music
3. Emotional self-expression in music

Why a Columbia Type D-2 School Grafonola and Pushmobile?

Because the volume of tone, tone-control, and tone quality are not equalled by any other school phonograph. The volume of tone is sufficient for any auditorium, class-room, hall or gymnasium purpose.

Because the design of the Grafonola harmonizes with the design of the Pushmobile making it appear as a single unit.

Because the Pushmobile has seven shelves that records may be classified as Band, Marches, Folk Dances, Songs, Music Appreciation, Orchestra, Stories, etc.

Because the Pushmobile has double doors and is fitted with lock and key, thus protecting the records at all times.

Because the Pushmobile is equipped with rubber-tired wood wheels, making the outfit most convenient for moving from classroom to hall, to gymnasium, to auditorium, to playground, etc.

Because the Grafonola may be purchased separately if the school funds are not sufficient to purchase the entire outfit.

Because the Grafonola and Pushmobile are finished in either Oak or Mahogany as may be desired in order to harmonize with school interiors.

We no longer manufacture the outer-horn-type instruments as they are considered obsolete and are not desired by the general public, because of their unsymmetrical appearance, and also because of their greater liability to damage.

Any Columbia dealer will gladly place a Grafonola and Pushmobile in your school room on trial, without cost or obligation to you, that you may test every claim that has been made for this Columbia School Grafonola and Pushmobile.

Educational Department

COLUMBIA GRAPHOPHONE COMPANY

Woolworth Building **New York City**


Columbia
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Records
TRADE MARK
Grafonola