

A STUDY TO DETERMINE THE EFFECTIVENESS OF  
TWO METHODS OF TEACHING BADMINTON

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A Thesis  
Presented to  
the Faculty of the Physical Education for Women  
Kansas State Teachers College of Emporia

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Master of Science in Education

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## TABLE OF CONTENTS

CHAPTER	PAGE
I. THE PROBLEM, DEFINITIONS OF TERMS USED, METHODS OF STUDY, AND LIMITATIONS OF THE STUDY . . . . .	1
The Problem . . . . .	2
Statement of the problem. . . . .	2
Definitions of Terms. . . . .	2
Skill test method . . . . .	2
Traditional game method . . . . .	2
Methods of the Study. . . . .	3
Limitations of the Study. . . . .	4
II. REVIEW OF THE LITERATURE. . . . .	5
III. PROCEDURES OF THE STUDY AND ANALYSIS AND INTERPRETATION OF DATA. . . . .	10
Selection of Groups . . . . .	10
Equation of the Groups. . . . .	11
Introduction and Practice of Badminton Skills . .	13
Development of a Badminton Performance Rating Chart and Scale . . . . .	15
Analysis and Interpretation of Data . . . . .	16
IV. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY . . . . .	22
Summary . . . . .	22
Conclusions . . . . .	24
Recommendations for Further Study . . . . .	25

CHAPTER	PAGE
BIBLIOGRAPHY . . . . .	26
APPENDIX A. Badminton Questionnaire and Results . . . . .	30
APPENDIX B. Scott Motor Ability Test. . . . .	32
APPENDIX C. Lockhart and McPherson Badminton Test . . . . .	36
APPENDIX D. Control Group Badminton Class Schedule. . . . .	39
APPENDIX E. Experimental Group Badminton Class Schedule . . . . .	44
APPENDIX F. Experimental Group Skill Tests in Badminton and Experimental Group Floor Pattern . . . . .	50
APPENDIX G. Badminton Performance Rating Chart and Badminton Performance Rating Scale. . . . .	68
APPENDIX H. Results of the Scott Motor Ability Test . . . . .	71
APPENDIX I. Results of the Initial, Final and Net Gain of the Lockhart and McPherson Badminton Test. . . . .	72
APPENDIX J. Results of the Judges' Ratings. . . . .	73

LIST OF TABLES

TABLE	PAGE
I. Mean, Standard Deviation, Standard Error of the Mean and T-Ratio of the Tests to Determine the Equality of the Control and Experimental Group. .	18
II. Mean, Standard Deviation, Standard Error of the Mean and T-Ratio of the Scores Made on the Badminton Performance Rating Chart by the Control and Experimental Group. . . . .	19
III. Mean, Standard Deviation, Standard Error of the Mean and T-Ratio of the Second Administration and Net Gain Scores Made on the Lockhart and McPherson Badminton Test. . . . .	20

## CHAPTER I

### THE PROBLEM, DEFINITIONS OF TERMS USED, METHODS OF STUDY, AND LIMITATIONS OF THE STUDY

No one method of teaching activities can be precisely defined or rigidly adhered to because students, teachers, and situations vary from class to class and from day to day. No wise teacher will discard a method merely because it is considered old, or refuse to try one because it is new. Students vary in their ability to learn, in the way they learn, and consequently respond differently to different methods.

For many years a difference of opinion has existed regarding the effectiveness of the whole and the part method of teaching an activity. The law of exercise as stated by Kilpatrick says, "within limits, the more often a response is made to a situation, the closer becomes the bond connecting the two, and the more surely and smoothly is the response made when the situation presents itself again."<sup>1</sup>

One difficulty in emphasizing game play is that situations requiring a certain reaction occur so irregularly that players have difficulty making the right judgment. Intelligent use of skill tests enables players to practice

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<sup>1</sup>W. H. Kilpatrick, Foundations of Method (New York: The MacMillan Company, 1929), p. 158.

skills and combinations of skills so that correct reactions are smooth and automatic.

## I. THE PROBLEM

Statement of the problem. The purpose of this study was to determine the effectiveness of two methods of teaching badminton to two different groups. One group was instructed through use of skill tests prior to a game situation, and the second group was instructed in a game situation for learning the basic skills of badminton. The following question was to be answered: Will badminton taught by the use of skill tests result in the attainment of a higher level of skill than when taught by the traditional game method?

## II. DEFINITIONS OF TERMS

Skill test method. The method of teaching badminton by having the subjects learn the basic skills through use of skill tests prior to a game situation.

Traditional game method. The method of teaching badminton by having the subjects learn the basic skills through a game situation.



### III. METHODS OF THE STUDY

Twenty-seven women students enrolled in two regularly scheduled physical education badminton activity classes at Kansas State Teachers College were used in the study. Members of these groups included freshman, sophomore, and junior students. One class was designated as the control group and was taught by the traditional game method. The second class was designated as the experimental group and was taught by the skill test method. All subjects were given the Scott Motor Ability Test and the Lockhart and McPherson Badminton Test at the beginning of the learning period to determine whether or not the groups were equal in general motor ability and initial badminton playing ability.

The experimental group was given instruction for learning the basic skills of badminton by use of skill tests twice a week for six and one-half weeks. Instruction on playing the game of badminton was given twice a week for three and one-half weeks.

The control group was given instruction for learning the basic skills of badminton in a game situation but without any skill test experience. This group played twice a week for ten weeks. The control group practiced on days different than the experimental group. Neither group was informed of the different methods of instruction.

IV. LIMITATIONS OF THE STUDY

This study was limited to college women in two physical education badminton activity classes at Kansas State Teachers College, Emporia, Kansas. The number of subjects participating in this study was confined to twenty-seven students because of the scheduling process. The number of practice sessions was limited to two days a week for ten weeks, a total of fifteen hours.

## CHAPTER II

### REVIEW OF THE LITERATURE

The study of the superiority of the whole and part methods of learning has been one of constant controversy. According to Pechstein, the following definitions are given for the whole and part methods of learning:

Whole method procedure demands the continuous repetition of an entire body of material until the desired stage of mastery is attained. Part method procedure demands an initial mastery of the definite sections of material and their final connection of these different sections in proper serial order.<sup>1</sup>

Psychologists hold that behavior depends upon unified patterns. The essential feature of learning is the relating or combining of the various elements; the total pattern, interrelationships, and synthesis are emphasized. The human organism is seen as a unitary whole; complete responses and total personalities, rather than isolated reactions of a part of the organism, should be emphasized in considering the learning process. The organism as a whole, rather than any specific neural pattern, determines reactions. If the theories of field psychologists are correct, it would seem

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<sup>1</sup>L. A. Pechstein, "Alleged Elements of Waste in Learning a Motor Problem by the Part Method," Journal of Educational Psychology, VIII (May, 1919), p. 303.

that learning by wholes would be greatly superior to learning by parts, but this does not hold true in all areas of learning.

There are numerous reports of data collected on the whole-versus-part problem but few relate to the learning of motor skills. Inconsistency concerning the relative effect of the whole and part methods for learning motor skills has been found; these differences seem to arise from (1) lack of evidence showing what individual characteristics cause one person to learn a given skill more rapidly with one method while others profit more by another.

Studies by Combs<sup>2</sup> and Stahmer,<sup>3</sup> in the areas of track events and swimming, respectively, found that some individuals learn more rapidly with one method while others find more success with another method. The results of their studies indicated the whole method for learning track and swimming is better for subjects who are more intelligent, and more mature.

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<sup>2</sup>Clyde Knapp and E. Patricia Hagman, Teaching Methods for Physical Education (New York, Toronto, and London: McGraw-Hill Book Company, Inc., 1953), p. 118 citing L. V. Combs, "A Comparison of the Efficacy of the Whole Method and of the Whole-Part-Whole Method of Teaching Track Activities" (unpublished Master's thesis, University of Iowa, Iowa City, 1932).

<sup>3</sup>Clyde Knapp and E. Patricia Hagman, Teaching Methods for Physical Education (New York, Toronto, and London: McGraw-Hill Book Company, Inc., 1953), p. 118 citing Dorothy L. Stahmer, "The Whole versus the Part Method in the Teaching of Swimming" (unpublished Master's thesis, University of Illinois, Urbana, 1932).

A study by Barton utilized the maze in the learning of motor skills by two different methods. By the whole method the learners always started at the entrance of the maze and continued in random effort until they completed the maze. By the part method the subjects learned each quarter separately in regular order, and then combined into a single unit and relearned as a whole. The results showed strong evidence that for maze learning, which is motor learning, the part method was more efficient.<sup>4</sup>

Shay studied the superiority of the whole or part methods of learning gymnastics by choosing the kip on the horizontal bar as the gymnastic exercise. The control group was taught by the whole method of learning, and the entire exercise was attempted at each trial. The experimental group, working with the progressive-part procedure, learned each of the movements in sections. The results of the study indicated that the whole learning method is superior to the part method in learning the kip on the horizontal bar.<sup>5</sup>

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<sup>4</sup>J. W. Barton, "Smaller vs Larger Units in Learning the Maze," Journal of Experimental Psychology, IV (September, 1921), pp. 418-429.

<sup>5</sup>Clayton T. Shay, "The Progressive-Part vs the Whole Method of Learning Motor Skills," The Research Quarterly, V (December, 1934), pp. 62-67.

A study of whole and part methods was done by Knapp and Dixon. Two groups were equated on the basis of athletic experience in juggling. Both groups were divided to form two sections within each group. One section in group one used only the whole method of practice. The second section of group one was required to follow a fairly rigid procedure of practice. One section of group two was required to use only the whole method. The subjects in the second section of group two were permitted to freely choose their practice method. The results showed that equated groups learn juggling more rapidly by the whole method than by the rigid part-whole method or by a very flexible part-whole method.<sup>6</sup>

Woodworth states that ". . .in a practical situation it is probably best to start with the whole method while feeling free to concentrate at any time on a part where something special is to be learned."<sup>7</sup> John McGeoch also stresses the same point by suggesting ". . .employ the whole method with special attention to and repetition of difficult or

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<sup>6</sup>Clyde G. Knapp and W. Robert Dixon, "Learning to Juggle: II. A Study of Whole and Part Methods," The Research Quarterly, XXIII (December, 1952), pp. 398-401.

<sup>7</sup>Robert S. Woodworth, Experimental Psychology (New York: Henry Holt and Company, 1938), p. 223.

important parts as one goes along, thus combining the whole method with a form of the part method."<sup>8</sup>

Hartman states the following in answer to the part and whole method of learning motor skills:

Every distinctive motor skill--dancing, pole vaulting, skiing, etc.--has a characteristic structure and that the heart of such learning is in the vivid sensory perception of this structure and its reproduction in the pattern of movement of the body of the learner.<sup>9</sup>

From the review of literature no studies to determine the superiority of the whole or part method of learning badminton were found. There is a specific pattern for learning almost every motor skill; therefore, the teacher may expect repeated and inevitable patterns for learning of motor skills, within sports and between sports.

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<sup>8</sup>John A. McGeech, The Psychology of Human Learning (New York: Longmans, Green, and Company, 1945), p. 196.

<sup>9</sup>George W. Hartman, Educational Psychology (New York: American Book Co., 1941), p. 304.

## CHAPTER III

### PROCEDURES OF THE STUDY AND ANALYSIS AND INTERPRETATION OF DATA

The purpose of this study was to determine the effectiveness of two methods of teaching badminton. To realize this purpose it was necessary (a) to select two groups; (b) to determine the equality of the groups; (c) to present and practice badminton skills; (d) to develop a badminton performance rating scale and chart; and (e) to compare the test results of the group who were taught badminton by the traditional method with the group who were taught badminton by the skill test method.

#### I. SELECTION OF GROUPS

Twenty-seven freshman, sophomore, and junior women students enrolled in two regular scheduled physical education badminton activity classes at Kansas State Teachers College, Emporia, were used as subjects. One class, composed of fourteen subjects, was taught by the traditional method and was designated as the control group. The second class of thirteen students was taught by the skill test method and was designated as the experimental group.

The personnel of each group was determined by voluntary class selection by the students within the usual



time and schedule limitations that are present in college enrollment procedures. Selection of specific activities to meet the four semester requirement in physical education at Kansas State Teachers College is optional for each woman student.

The students in the classes were given a questionnaire prior to the study to determine their previous experience in badminton. The questionnaire and the results for the two classes may be found in Appendix A, page 30. All subjects were limited in experience and would be classified as novice players.

## II. EQUATION OF THE GROUPS

Prior to the instructional phase of this study, the Scott Motor Ability Test was administered to each class to determine the equality of the group in motor ability. The detailed description of the test may be found in Appendix B, page 32. This test was selected because it was designed to measure general motor ability through use of three skill items: (1) obstacle race, (2) basketball throw, and (3) standing broad jump. The three test items were used rather than the four test items because of the lack of time and wall space available. The test has a multiple correlation of .87 for validity and a reliability of .90, which shows an excellent coefficient of correlation.

The Lockhart and McPherson Badminton Test was administered prior to the instructional period of this study to all of the subjects to determine the badminton playing ability of each group. This test described in Appendix C, page 36, was designed to measure badminton playing ability. The test was selected because it required no specific equipment, involved only one player, needed a small amount of wall space, and tested many subjects simultaneously. The Lockhart and McPherson Badminton Test has a validity of .90 and a reliability of .90.

In appraising the value of the Scott Motor Ability Test and the Lockhart and McPherson Badminton Test, an analysis was made to determine if the tests were devised scientifically. This was accomplished through the application of two general evaluative criteria, scientific authenticity and administrative feasibility. The criteria used to evaluate a test in terms of scientific value are reliability, objectivity, and validity. In order for a test to meet the criteria of administrative feasibility it must be economical in terms of cost and time required for administration. The Scott Motor Ability Test and the Lockhart and McPherson Badminton Test met the two general evaluative criteria for this study.

### III. INTRODUCTION AND PRACTICE OF BADMINTON SKILLS

The control group of fourteen women spent two days a week for ten weeks, a total of fifteen hours, learning the basic skills of badminton. The basic skills taught were (1) grip, (2) short serve, (3) long high serve, (4) overhead clears, (5) underhand clears, (6) drop shots, (7) net shots, (8) smash shots, (9) drives, (10) court positions, (11) footwork, (12) placement of shots, and (13) singles and doubles strategy. During the first week the basic skills of grip, serves, and placement of serves were presented by having the subjects work with partners on the courts. The next six weeks the subjects were presented the basic skills of clears, footwork, drop shots, net shots, smash shots, drives, court positions, and singles and doubles strategy. To complete each class period the students were placed in game situations of doubles and singles. The last three weeks of the study were devoted to playing a round robin tournament of doubles and singles. Detailed lessons for the control group may be found in Appendix D, page 39.

The experimental group of thirteen women spent two days a week for six and one-half weeks on skill tests and three and one-half weeks playing the game, a total of fifteen hours, learning the basic skills of badminton. During the first six and one-half weeks the skills were practiced by use

of skill tests, which were marked on the six courts. A description of the skill tests and the floor patterns of the six badminton courts used for the skill tests may be found in Appendix F, page 50. The basic skills taught through the use of skill tests were (1) short serve, (2) long high serve, (3) overhead clears, (4) underhand clears, (5) footwork by using a diagonal and shuttle run, (6) drop shots, (7) net shots, (8) smash shots, and (9) wrist action by using a wrist volley test. Courts one through six were used for the shuttle run, diagonal run, net shots, and drop shots. Courts two, three, five and six were used for the serves, clears, and smash shots.

The subjects worked with partners at all times and rotated to the marked badminton courts to practice the skills. The subjects' scores and times each day were recorded on a chart. The chart was used to motivate the students to improve their scores and to inform the students of their improvement in relation to the other members of the class. For the remaining three and one-half weeks the students were placed in game situations of doubles and singles. Details of the day by day lessons for the experimental group may be found in Appendix E, page 44.

#### IV. DEVELOPMENT OF A BADMINTON PERFORMANCE RATING CHART AND SCALE

No badminton performance rating chart or scale suitable to the study was available from the literature, therefore one was developed to determine the badminton playing ability of subjects after ten weeks of instruction. The badminton performance rating chart was based on a scale of one through five. A rating of five was superior, four was good, three was average, two was fair, and one was poor. The badminton performance rating chart consisted of ten divisions which were as follows: (1) grips, (2) accuracy of placement, (3) backswing, (4) bird contact, (5) follow-through, (6) weight shift, (7) service, (8) preparing to receive, (9) getting into position, and (10) footwork. The chart and scale may be found in Appendix G, page 68.

To determine the validity of the badminton performance rating chart and scale a pilot study was conducted in a third badminton activity class taught by another instructor at Kansas State Teachers College. Eighteen subjects were in the pilot study. A round robin tournament was played to determine the rank order of each student in badminton playing ability. A board consisting of three judges rated the playing ability of each student through use of the badminton performance rating chart and scale. The judges included the investigator,

the instructor of the class, and a senior major student assisting in the class. The first nine subjects from the tournament rank order listing were judged one day, the remaining nine were judged the next class meeting. The judges were given the badminton performance rating chart and scale one week prior to the judging in order to become familiar with this instrument for determining badminton playing ability.

Pearson's zero order correlation coefficient between the judges' rating and the rank order of players was used to determine the validity of the badminton performance rating chart. A validity of .93 was found. Opinions pertaining to the badminton performance rating chart and scale were obtained from the three judges. All judges felt the chart and scale were an acceptable means of evaluation.

#### V. ANALYSIS AND INTERPRETATION OF DATA

The statistical technique used to determine the effectiveness of two methods of instructing badminton was the significance of the difference between the means of the groups. To use this technique it was necessary to find the mean, standard deviation, and standard error of the difference between means in small independent samples. The t-ratio was then applied to determine the significance of the difference of t for each group. The level of confidence used for the study was .05. For twenty-five degrees of freedom a t of 2.06

must be obtained at the .05 per cent level of confidence for the findings to be considered significant.

Two tests, the Scott Motor Ability Test and the Lockhart and McPherson Badminton Test, were administered to the experimental group and the control group at the beginning of the study to determine the equality of the groups in motor ability and badminton playing ability.

The scores for the obstacle race, basketball throw and standing broad jump of the Scott Motor Ability Test, were converted into T-scores with the highest score representing the best score. The results of the test may be found in Appendix H, page 71. The results of the Lockhart and McPherson Badminton Test were established from the raw scores and may be found in Appendix I, page 72.

The means, standard deviations, standard error of the means, and t-ratios were computed for each group and may be found in Table I, page 18. The standard error of the difference between means was computed to ascertain the significant difference of the means. The t-ratio for the Scott Motor Ability Test was .31 which was not significant at the .05 level of confidence. The t-ratio for the Lockhart and McPherson Badminton Test was 1.45 which was not significant at .05 level of confidence. Therefore, the two groups were considered equal in initial motor ability and badminton playing ability for the purpose of this study.

After both groups had received ten weeks of instruction in learning the basic skills of badminton, a board consisting of three judges rated each subject in a game situation to determine group improvement. The judges graded the badminton playing ability of the twenty-seven subjects on a one to five point scale. The badminton performance rating chart and scale were used to rate each student. Half of the control and experimental group was judged one day, the remaining half was judged the next class period. Three women physical education teachers at Kansas State Teachers College were selected to judge the badminton playing ability of the subjects.

TABLE I

MEAN, STANDARD DEVIATION, STANDARD ERROR OF THE MEAN  
AND T-RATIO OF THE TESTS TO DETERMINE THE  
EQUALITY OF THE CONTROL AND  
EXPERIMENTAL GROUP

Test	M*		SD*		SE*	T- ratio
	Cont.	Exp.	Cont.	Exp.		
Scott Motor Ability Test	155.86	159.69	34.10	28.03	12.53	.31
Lockhart and McPherson Bad- minton Test	40.43	49.00	12.00	17.06	5.86	1.45

\*Note: The abbreviations used in this table and in Table II and Table III following are interpreted as follows: M = mean; SD = standard deviation; and SE = standard error of the mean.

The judges used for this study had considerable previous experience in teaching badminton. The judges were given the



badminton performance rating chart and scale one week prior to the judging to study the method used to rate each student.

The results of the judges' ratings may be found in Appendix J, page 73. The mean, standard deviation, standard error of the mean, and t-ratio was computed for each group and may be found in Table II. The t-ratio of .007 does not reach the .05 level of confidence; therefore, the mean difference was marked "not significant."

TABLE II

MEAN, STANDARD DEVIATION, STANDARD ERROR OF THE MEAN,  
AND T-RATIO OF THE SCORES MADE ON THE BADMINTON  
PERFORMANCE RATING CHART BY THE CONTROL  
AND EXPERIMENTAL GROUP

Test	M		SD		SE	T-ratio
	Cont.	Exp.	Cont.	Exp.		
Badminton Performance Rating Chart	73.71	73.77	16.85	22.11	7.83	.007

The Lockhart and McPherson Badminton Test was administered again to both groups at the close of the instruction period to determine group learning and improvement. The results of the final performance scores and the net gain of each student on the Lockhart and McPherson Badminton Test may be found in Appendix I, page 72. The means, standard deviations, standard error of the means, and t-ratios were computed for each group on the final performance scores and net gain of the Lockhart and McPherson Badminton Test,

and are presented in Table III. The  $t$  for the second administration of the Lockhart and McPherson Badminton Test was .26 which was not significant at the .05 level of confidence. The large standard deviation, in comparison with the mean, indicates that the data are variable and hence heterogeneous, whereas the small deviation shows that the group is quite homogeneous. In this situation the extreme difference between the standard deviation is apparently due to the fact the experimental group practiced the wall volley each day and the control group did not practice the wall volley test during the ten weeks of instruction.

TABLE III

MEAN, STANDARD DEVIATION, STANDARD ERROR OF THE MEAN,  
AND T-RATIO OF THE SECOND ADMINISTRATION AND  
NET GAIN SCORES MADE ON THE LOCKHART  
AND MCPHERSON BADMINTON TEST

Lockhart & McPherson Badminton Test	M		SD		SE	T- ratio
	Cont.	Exp.	Cont.	Exp.		
Second administration	75.64	73.62	20.26	6.29	7.73	.26
Net gain	35.21	24.62	20.02	12.50	6.74	1.57

The final performance scores obtained from the Lockhart and McPherson Badminton Test were compared with the initial performance scores to ascertain the net gain. The net gain of each student was used as another method to determine if there were any differences in group improvement. The  $t$  was 1.57 and does not reach the .05 level of

confidence. Therefore, the mean difference was marked "not significant."

The critical value of  $t$  is 2.06 for the 5 per cent level of significance in this study. Referring to Tables II and III, pages 19 and 20 respectively, all of the computed  $t$ 's did not exceed 2.06; therefore, these  $t$ 's were not significant. When a statistically significant difference was not obtained it may be inferred that under similar conditions the same results would be expected.

## CHAPTER IV

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY

#### I. SUMMARY

The purpose of this study was to determine the effectiveness of two methods of teaching badminton. One group was instructed through use of skill tests and the second group was instructed in the traditional game play method. The Scott Motor Ability Test was administered to twenty-seven college women who were involved in this experiment. The test was given at the beginning of the study for the purpose of measuring the present status of motor ability. The Lockhart and McPherson Badminton Test was also administered to all of the subjects at the beginning of the study to determine the initial badminton playing ability of each group.

One group, designated as the control group, consisted of fourteen subjects and was given instruction for learning the basic skills of badminton in a game situation. The experimental group, consisting of thirteen subjects, was given instruction for learning the basic skills of badminton through use of skills tests prior to a game situation.

In a pilot study conducted at Kansas State Teachers College eighteen subjects were used to determine the validity of the badminton performance rating chart and scale used in the study.

Data for the study were collected from twenty-seven women students enrolled in two regularly scheduled physical education badminton activity classes at Kansas State Teachers College, Emporia, Kansas. The results were determined from the scores made by the subjects on the badminton performance rating chart and scale and the retesting of the Lockhart and McPherson Badminton Test. On both tests the statistical method used was the significance of the difference between means by finding the standard error of the difference between means in small independent samples. The mean score on the badminton performance rating chart was 73.71 for the control group and 73.77 for the experimental group. The second administration of the Lockhart and McPherson Badminton Test gave a mean score of 75.64 for the control group and 73.62 for the experimental group. The final test scores of the Lockhart and McPherson Badminton Test were compared with the initial test scores to ascertain the net gain. The mean score was 35.21 for the control group and 24.62 for the experimental group. Since the  $t$  does not reach the acceptable level .05, the obtained mean difference must be marked "not significant" for the difference in learning between the skill

test method and the traditional method of instructing badminton.

## II. CONCLUSIONS

Within the limitations of this study, the badminton skill test method used with the experimental group did not produce a higher level of attained badminton skill than the traditional method used by the control group, therefore the study indicated no difference in the effectiveness of the two methods of teaching badminton.

At the 20 per cent level of confidence there is evidence that the control group gained more badminton playing ability, when comparing the final test scores of the Lockhart and McPherson Test with the initial test scores to ascertain the net gain.

Through observation it was noted that the experimental group appeared to enjoy the badminton skill tests and worked hard to improve their individual scores.

The resulting validity of .93 for the pilot study indicated that the badminton performance rating chart and scale may be used as a valid measure of badminton playing ability.

### III. RECOMMENDATIONS FOR FURTHER STUDY

It is recommended that further studies be conducted shortening the time used for the skill tests and lengthening the time in the actual playing of the game.

It is recommended that further studies be conducted in other schools and at different age levels.

It is recommended that a further study might encompass the utilization of knowledge tests in comparing group improvement.

The author recommends the utilization of the badminton performance rating chart and scale in future studies and in grading students.

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# CONTENTS

1. Introduction

2. and how  
(a)

3. and

4. played

5. 20  
6.

7. played

8. 10  
9.

10. 2

11. 20, 10, 10, 10, 10

## APPENDICES

APPENDIX A

BADMINTON QUESTIONNAIRE

QUESTIONS:

1. Have you had a course in badminton?  
Yes \_\_\_\_\_ No \_\_\_\_\_
2. If so, when and how many courses?  
When \_\_\_\_\_ (a) How many \_\_\_\_\_ (b)
3. Have you taken skill tests in badminton?  
Yes \_\_\_\_\_ No \_\_\_\_\_
4. Have you played badminton for recreation?  
Yes \_\_\_\_\_ No \_\_\_\_\_
5. Have you played badminton in an intramural program?  
Yes \_\_\_\_\_ No \_\_\_\_\_
6. Do you know a few of the basic strokes used in badminton?  
Yes \_\_\_\_\_ No \_\_\_\_\_
7. Do you know the positions for serving and receiving in singles and doubles?  
Yes \_\_\_\_\_ No \_\_\_\_\_
8. Do you know the court boundaries for singles and doubles?  
Yes \_\_\_\_\_ No \_\_\_\_\_
9. Do you know how to score a game of badminton for singles and doubles?  
Yes \_\_\_\_\_ No \_\_\_\_\_
10. Do you classify yourself as a beginner or an intermediate player?  
Beginner \_\_\_\_\_ Intermediate \_\_\_\_\_

The students that answered questions 6, 7, 8, and 9 "yes" were asked to give specific information in regard to the question. The questionnaire showed all students to be limited in experience.



## APPENDIX B

### SCOTT MOTOR ABILITY TEST\*

#### PURPOSE

This test is designed to measure the present status of high school and college women in terms of motor ability.

#### SEX AND AGE LEVEL

High school and college women.

#### OBSTACLE RACE

#### TEST ITEMS AND EQUIPMENT

The space needed is 55 feet by 12 feet; equipment needed, three jump standards and a cross bar at least 6 feet long; lines on the floor (see Figure 1, page 33).

#### LEADERSHIP

One timer, one recorder, and one scorer.

#### DESCRIPTION OF TEST

Start in a back-lying position on the floor with the heels at line a. On the signal, Ready, Go! get up and start running toward j. As you come to each square on the floor, step on it with both feet. Run twice around j, turn back to d, go under the cross bar, get up on the other side, run to line e and continue running between line b and e until you come to e for the third time.

#### SCORING

The score is the number of seconds (to nearest .1 second) that is required to run the course.

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\*M. Gladys Scott and Esther French, Measurement and Evaluation in Physical Education (Dubuque, Iowa: Wm. C. Brown Company, 1959), pp. 342-48.

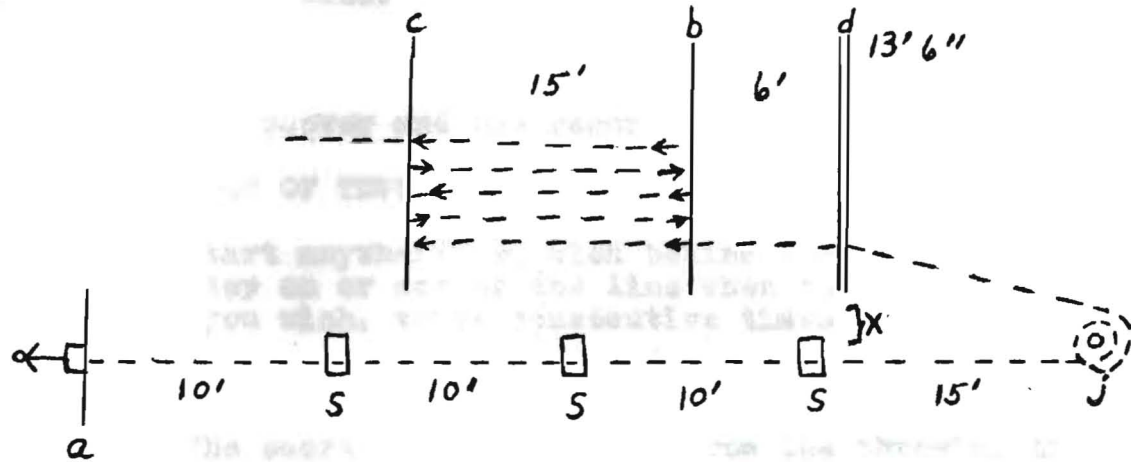


Figure 1. Floor markings for obstacle race

- a = starting line
- b = line for shuttle
- c = finish line
- d = cross-bar (18 inches high)
- j = jump standard
- s = spot on floor (12 x 18 inches)
- = path of runner
- x = distance from end of cross-bar to line of inner sides of spots, 4 feet 4 inches

**BASKETBALL THROW****TEST ITEMS AND EQUIPMENT**

Space needed is about 80 feet long and 20 feet wide, a throwing line marked about 8 feet from one end of the course and parallel lines every 5 feet beginning 15 feet in front of the throwing line.

**LEADERSHIP**

One scorer and one recorder.

**DESCRIPTION OF TEST**

Start anywhere you wish behind the throwing line, but do not step on or across the line when throwing. Throw in any way you wish, three consecutive times.

**SCORING**

The score is the distance from the throwing line to the spot where the ball touches the floor. Only the longest throw counts.

**STANDING BROAD JUMP****TEST ITEMS AND EQUIPMENT**

The test requires mats at least 7 1/2 feet long and the lines may be marked in 2-inch intervals. If the mat is marked in 2-inch intervals, it eliminates the need to measure each jump with a tape.

**LEADERSHIP**

One scorer and one recorder.

**DESCRIPTION OF TEST**

The subject toes the starting line which is marked on the mat, and springs forward from both feet. The nearest point touched by any part of the body, at right angles to the take-off line, is his jump. Measurements are taken to the nearest inch.



## SCORING

The score is the distance from the edge of the take-off starting line to the nearest heel (or to the nearest part of the body if the balance is lost). The best of three trials will be counted.

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## APPENDIX C

### LOCKHART AND MCPHERSON BADMINTON TEST\*

#### PURPOSE

The test is designed to measure the present badminton playing ability and is used as a means of classification.

#### SEX AND AGE LEVEL

College women.

#### TEST ITEMS AND EQUIPMENT

The equipment consists of a badminton racket, shuttlecock, wall space 10 feet high and 10 feet in length, stop watch, score sheets, 1-inch net line marked on the wall 5 feet above and parallel to the floor, starting line drawn on the floor 6 1/2 feet from the base of the wall, and a restraining line marked on the floor 3 feet from the base wall and parallel to the starting line. (See Figure 1, page 38)

#### LEADERSHIP

One timer, (gives the signal, "Ready-Go" and "Stop"), one scorer, (counts the number of legal hits), and one recorder, (makes a record of the number of legal hits that are made).

#### DESCRIPTION OF TEST

The player taking the test stands behind the starting line holding the badminton racket in one hand and the shuttlecock in the other. On the signal "Ready-Go," the shuttlecock is served in a legal manner against the wall on or above the net line. The shuttlecock is played as many times as possible against the wall in 30 seconds. Three trials are given each player. Rest is allowed between trials. Before the first trial a practice period of 15 seconds is given.

Only shuttlecocks hitting on or above the net line are considered good; one point is counted for each such good hit.

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\*Aileene Lockhart and Frances McPherson, "The Development of a Test of Badminton Playing Ability," The Research Quarterly, XX (December, 1949), pp. 402-05.

After the shuttlecock has been served the player may move up to the restraining line if she wishes. If the restraining line is crossed, the hit is not counted but the shuttlecock is still in play. If the bird is missed or gets out of control, the player must retrieve it and continue by putting the shuttlecock back in play with a serve from behind the starting line.

#### SCORING

The scoring is the sum of the number of legal hits made on or above the backboard net line in the three trials.

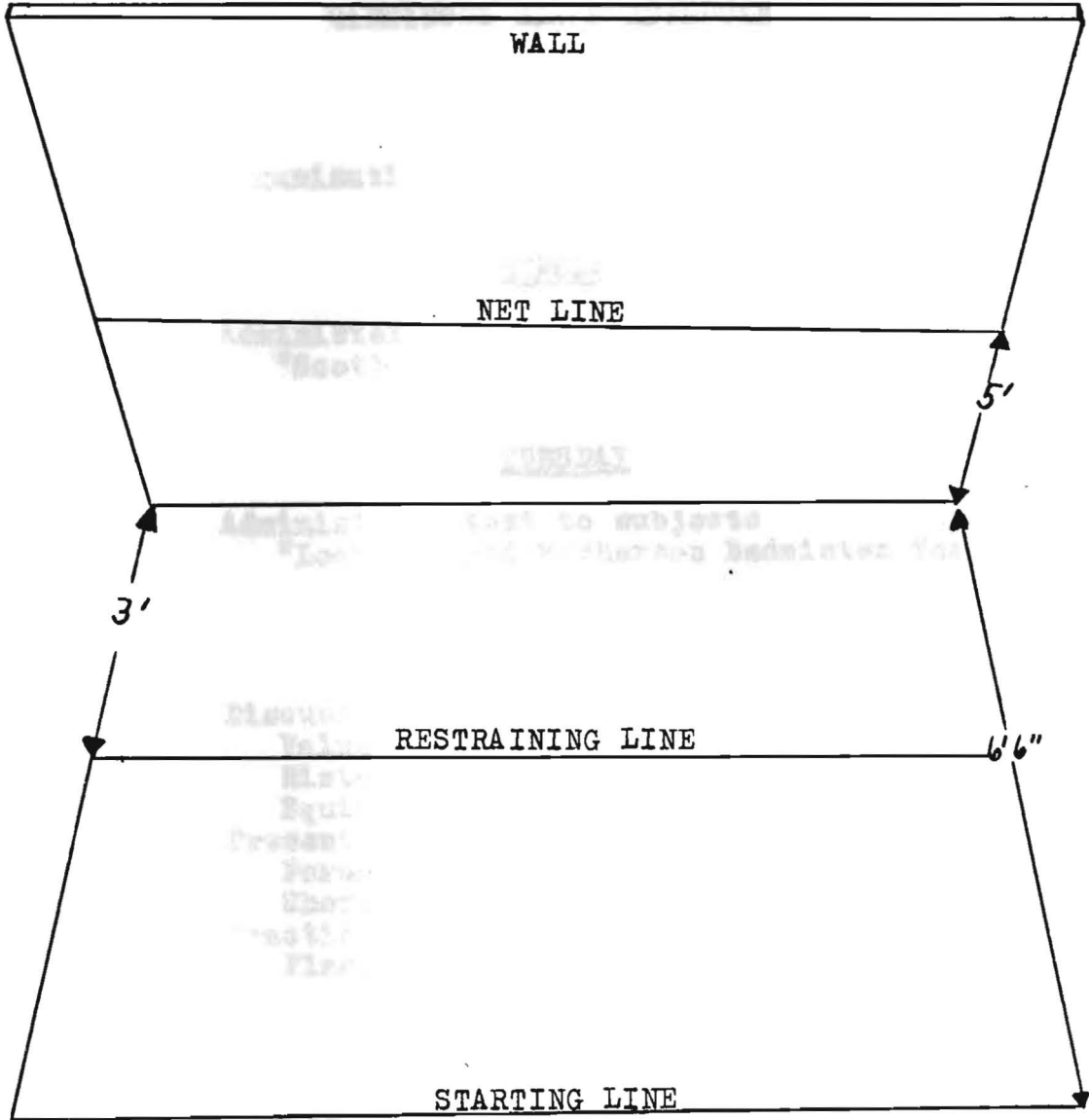


Figure 1. Diagram of court markings for Lockhart and McPherson Badminton Test

APPENDIX D

CONTROL GROUP

BADMINTON CLASS SCHEDULE

Week

TUESDAY

1 Organizational procedures

THURSDAY

Administered test to subjects  
"Scott Motor Ability Test"

2

TUESDAY

Administered test to subjects  
"Lockhart and McPherson Badminton Test"

THURSDAY

Discussion of badminton  
Values  
History  
Equipment  
Present skills  
Forehand grip  
Short-serve--singles and doubles  
Practice skills  
Placement of short serve on courts

3

TUESDAY

Review skills  
Forehand grip  
Short serve--singles and doubles  
Present skills  
Long high serve--singles and doubles  
Practice skills  
Placement of serves--short and long

WeekTHURSDAY

3

Review skills  
 Grip  
 Serves--short and long  
 Present skills  
 Clears--forehand, backhand, underhand  
 Practice skills  
 Serves and rally with clears

4

TUESDAY

Review skills  
 Serves  
 Clears  
 Present skills  
 Footwork for clears  
 Overhead drop  
 Practice skills  
 Serves and rally with clears and drops

THURSDAY

Review skills  
 Serves  
 Clears  
 Drops  
 Footwork  
 Present skills  
 Game--parallel play  
 Scoring  
 Rules  
 Proper court position--serving and receiving  
 Practice skills  
 Play doubles--parallel play

5

TUESDAY

Review skills  
 All strokes  
 Practice skills  
 Parallel play

Week

5

THURSDAY

Present skills  
 Net shots--straight, cross-court, underhand at  
 the net  
 Practice skills  
 Net shots with partners  
 Parallel play

6

TUESDAY

Review skills  
 Net shots--straight, cross-court, underhand  
 Practice skills  
 Parallel play  
 Singles--placement, positions, openings,  
 strategy

THURSDAY

Present skills  
 Smash  
 Practice skills  
 Smash with partners on the courts  
 Singles

7

TUESDAY

Review skills  
 Smash shots  
 Net shots  
 Present skills  
 Game--up and back play, forecourt 1/3,  
 backcourt 2/3

THURSDAY

Present skills  
 Drives (briefly)--forehand and backhand  
 Practice skills  
 Game--up and back play

Week

8

TUESDAY

Practice skills  
Singles  
Up and back game

THURSDAY

Practice skills  
Singles--matches  
Up and back game--matches

9

THURSDAY

Review skills  
All strokes  
Present skills  
Tournament play--select teams

10

TUESDAY

Round Robin Tournament--doubles

THURSDAY

Round Robin Tournament--doubles

11

TUESDAY

Round Robin Tournament--doubles

THURSDAY

Round Robin Tournament--singles

12

TUESDAY

Round Robin Tournament--singles

THURSDAY

Round Robin Tournament--singles



Week

13

TUESDAY

Badminton Performance Rating Chart  
Subjects rated by three judges

THURSDAY

Badminton Performance Rating Chart  
Subjects rated by three judges

14

TUESDAY

Administered test to subjects  
"Lockhart and McPherson Badminton Test"

The control group spent ten weeks for a total of fifteen hours working on the basic skills of badminton in a game situation.

Discussed  
Vols  
Mats  
Eggs  
Vols  
Eggs  
A  
C  
Present  
Pecan  
Sugar  
Cocoa  
Cocoa

APPENDIX E

EXPERIMENTAL GROUP

BADMINTON CLASS SCHEDULE

Week

1

MONDAY

Organizational procedures

FRIDAY

Administered test to subjects  
"Scott Motor Ability Test"

2

MONDAY

Administered test to subjects  
"Lockhart and McPherson Badminton Test"

FRIDAY

Discussion of badminton

Values

History

Equipment

Floor markings

Divide class into squads--A,B,C,D,E,F

A--2            D--2

B--2            E--2

C--2            F--3

Present skills

Forehand grip

Short serve test--singles and doubles

Shuttle test

Practice skills

Ten short serves--Court II, III--A B C

Court V, VI--D E F

Shuttle test--as a group on all courts

Week

3

MONDAY

## Review skills

Five short serves--Court II, III--D E F  
 Court V, VI--A B C

Shuttle test--group

## Present skills

Long high serve--singles and doubles

## Practice skills

Ten long high serves--singles and doubles  
 Court II, III--A B C  
 Court V, VI--D E F

FRIDAY

## Present skills

Wrist volley

Diagonal run

Clears--forehand, backhand

## Practice skills

Diagonal run--group

Ten clears--Court II, III--A B C  
 Court V, VI--D E F

4

MONDAY

## Practice skills

Squads rotate every eight minutes by the following way: Court I to II, II to III, III to IV, IV to V, V to VI, VI to I

Court I----A----Wrist volley, diagonal run

Court II---B----20 long high serve singles  
 10 short serve doubles and singles

Court III--C----20 long high serve doubles  
 10 short serve doubles and singles

Court IV---D----Shuttle run

Court V----E-----20 clears--forehand and backhand

Court VI---F-----20 clears--forehand and backhand

Week

4

FRIDAY

Review skills  
 Diagonal run--group  
 Present skills  
 Clears--underhand  
 Practice skills  
 Squads rotate every five minutes  
 Court I----A----Wrist volley  
 Court II---B-----20 long high serve singles  
                                   10 short serve doubles and  
                                   singles  
 Court III--C-----20 long high serve doubles  
                                   10 short serve doubles and  
                                   singles  
 Court IV---D-----Shuttle run  
 Court V----E-----20 clears--underhand  
 Court VI---F-----20 clears--overhead

5

MONDAY

Practice skills  
 Squads rotate every fifteen minutes--record  
 scores  
 Court I----A----Wrist volley  
 Court II---B-----20 long high serves singles  
 Court III--C-----20 short serves  
 Court IV---D-----Shuttle run  
 Court V----E-----20 clears  
 Court VI---F-----Diagonal run

FRIDAY

Practice skills  
 Finish taking the tests

6

MONDAY

Present skills  
 Overhead drops  
 Net shots--straight, cross-court, underhand  
 Practice skills  
 All courts--drop shots, 15 minutes  
 All courts--net shots, 15 minutes

Week

6

FRIDAY

## Review skills

Shuttle run--group

All courts--20 drop shots

All Courts--20 net shots

## Present skills

Smash

## Practice skills

Squads rotate every fifteen minutes--record  
scores--change squads

Court I----A----Wrist volley

Court II---B----20 short serves

Court III--C----20 long high serves doubles

Court IV---D----20 drop and net shots

Court V----E----20 smash shots

Court VI---F----20 clears

7

MONDAY

## Practice skills

Finish taking the tests

FRIDAY

## Practice skills

Clears and smash shots--Squads rotate every  
fifteen minutes

Court II----Clears

III---Clears----A B C

Court V-----Smash----D E F

VI----Smash

8

MONDAY

## Practice skills

Squads rotate every fifteen minutes--record  
scores--change squads

Court I----A----Wrist volley

Court II---B----20 long high serves singles

Court III--C----20 short serves

Court IV---D----20 drop and net shots

Court V----E----20 smash shots

Court VI---F----20 clears

Week

8

FRIDAY

Practice skills  
Finish taking the tests

9

MONDAY

Present skills  
Game--up and back play  
Scoring  
Rules  
Proper court position--serving and receiving  
Strategy  
Practice skills  
Up and back play

10

MONDAY

Practice skills  
Up and back play--doubles

FRIDAY

Practice skills  
Up and back play--doubles

11

MONDAY

Practice skills  
Up and back play--doubles  
Singles

FRIDAY

Practice skills  
Singles--matches

12

MONDAY

Practice skills  
Singles--matches

Week

12

FRIDAY

Practice skills  
Doubles--matches

13

MONDAY

Badminton Performance Rating Chart  
Subjects rated by three judges

FRIDAY

Badminton Performance Rating Chart  
Subjects rated by three judges

14

MONDAY

Administered test to subjects  
"Lockhart and McPherson Badminton Test"

Figure 1

The experimental group spent six and one-half weeks working on the basic skills of badminton by using skill tests and three and one-half weeks in a game situation for a total of fifteen hours.

## APPENDIX F

### EXPERIMENTAL GROUP SKILL TESTS IN BADMINTON\*

#### I. SHUTTLE TEST

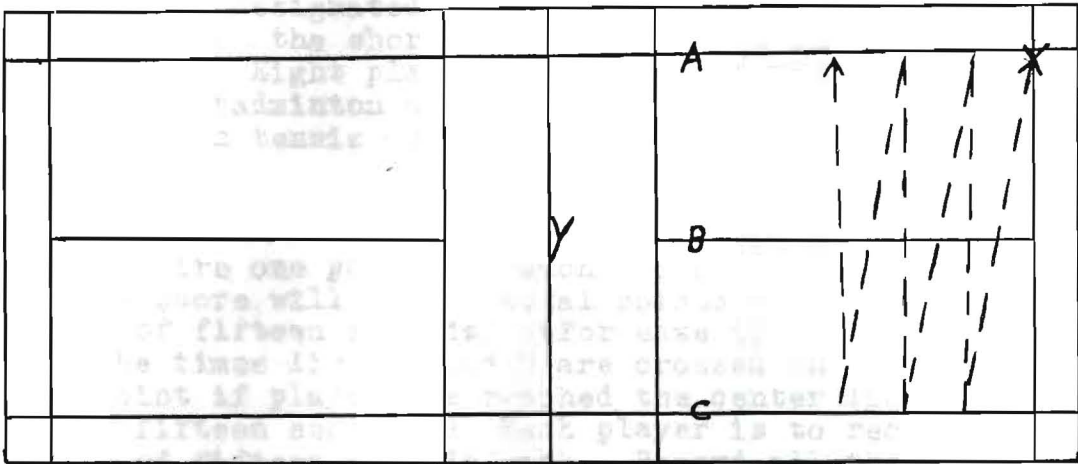


Figure 1. Path of player in shuttle test

#### EQUIPMENT

One stop watch and one racket.

#### FLOOR MARKINGS (See Figure 1)

Use the side boundary lines (singles) and the center line of a regulation badminton court. Call one boundary line A and the opposite one C. Call the center line B.

#### DESCRIPTION OF TEST

The player to be tested shall stand facing the net on a spot marked X on the side boundary line (singles), called A, at the intersection of the back doubles service court line

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\*Esther French and Evelyn Stalter, "Study of Skill Tests in Badminton for College Women," The Research Quarterly, XX (October, 1949), pp. 265-72.



and the side boundary line (singles) with racket in hand. On signal, she uses sliding steps in a direction parallel to the back doubles service court line to the opposite side boundary line (singles), called C, or runs and turns with a pivot (so the body will always be in position to return a shuttle sent to her forehand side) and returns to line A, moving back and forth between lines A and C for a period of fifteen seconds. The scorer, designated as Y in the diagram, shall stand anywhere between the short service line and the net with back toward net. Eight players may be tested at one time on four regulation badminton courts, a space approximately that of a regulation tennis court.

SCORING

Score one point for each crossing of lines B, C, and A. The score will be the total points of crossing for a period of fifteen seconds. (For ease in recording, count only the times lines A and C are crossed and credit one-half of a point if player has reached the center line, B, at the end of fifteen seconds.) Each player is to receive four trials of fifteen seconds each. Record all the trials. The final score is the total of the four trials. The scorer and player to be tested are to alternate, assuring each of a rest period between trials.

II. DIAGONAL TEST

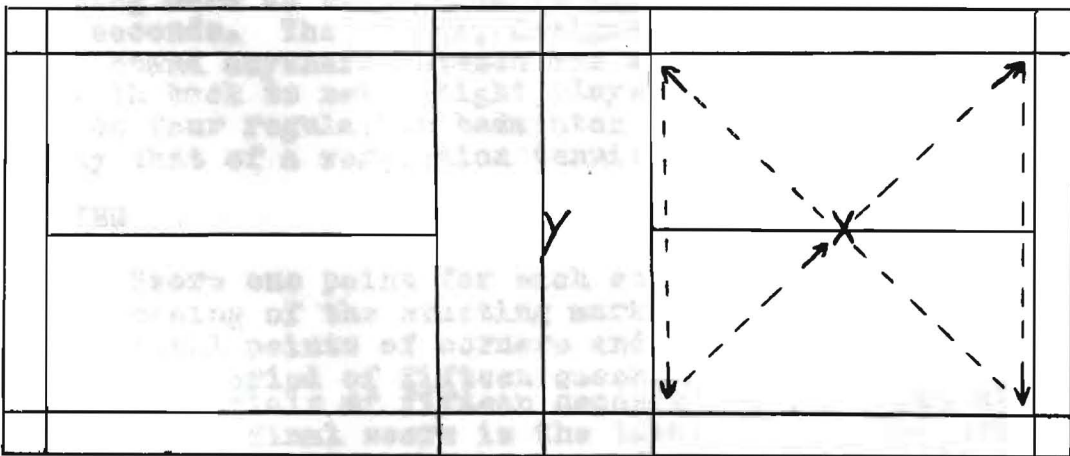


Figure 2. Path of player in diagonal test

## EQUIPMENT

One stop watch and one racket.

## FLOOR MARKINGS

Use the corners formed by the side boundary lines (singles) of a regulation badminton court where they intersect with the short service line and with the back line of the doubles service court. Mark an X on the center line midway between the short service line and the back line of the doubles service court.

## DESCRIPTION OF TEST

The player to be tested shall stand facing the net on a spot marked X on the center line midway between the short service line and the back doubles service court line with racket in hand. On signal, he runs diagonally right and forward to the intersection of the side boundary line (singles) and the short service line to the intersection with the opposite side boundary line (singles); turns with a pivot (so the body will always be in position to return a shuttle sent to his forehand side); runs diagonally across the starting mark, called X, to rear right to the intersection with the opposite side boundary line (singles) with the back doubles service court line; turns with a pivot turn and runs parallel to the back service line (doubles); turns with a pivot and runs diagonally to front right corner crossing starting mark as test is to be continued for a period of fifteen seconds. The scorer, designated as Y on the diagram, shall stand anywhere between the short service line and the net with back to net. Eight players may be tested at one time on four regulation badminton courts, a space approximately that of a regulation tennis court.

## SCORING

Score one point for each corner and credit a point for each crossing of the starting mark, called X. The score will be the total points of corners and crossings of the starting mark for a period of fifteen seconds. Each player is to be given four trials of fifteen seconds each. Record all the trials. The final score is the total of the four trials. The scorer and player to be tested are to alternate, assuring each of a rest period between trials.

### III. WRIST VOLLEY TEST

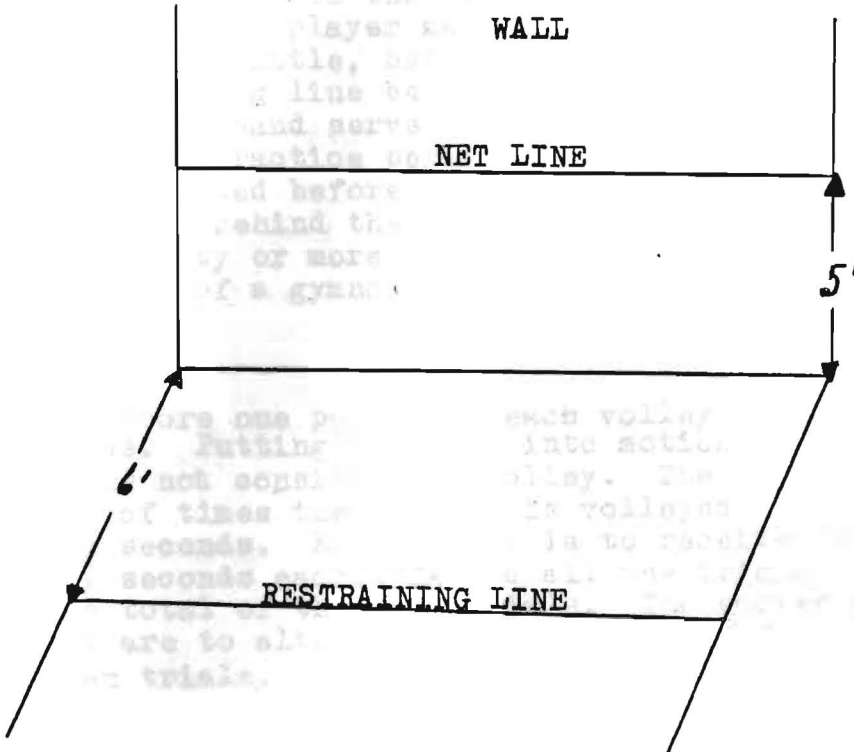


Figure 3. Floor markings for wrist volley test

#### EQUIPMENT

One stop watch, one tightly strung badminton racket, and one new badminton shuttle.

#### FLOOR MARKINGS

The target is an unobstructed wall of wood construction with a space 12-15 feet wide continuing upward from the floor toward the ceiling with a 1-inch net line marked on the wall 5 feet above and parallel to the floor. A restraining line 1 1/2 inches wide is to be drawn on the floor parallel to and six feet from the wall. Include the 1 1/2 inches of the restraining line in the six-foot distance from the wall.

#### DESCRIPTION OF TEST

The player to be tested shall stand behind the six-foot restraining line facing the wall with racket and shuttle in

hand. On signal, he serves the shuttle with an underhand serve against the wall and volleys it on or above the net line for a period of thirty seconds. Strokes made while the player is closer to the wall than the restraining line shall not count. The player may cross the restraining line to recover the shuttle, but he must return to a position behind the restraining line before putting shuttle into play again with an underhand serve. Any stroke may be used. Allow a five-minute practice period before testing. The test should be demonstrated before the students practice. The scorer shall stand behind the player being tested and slightly to her side. Twenty or more players can be tested at one time along four sides of a gymnasium.

SCORING

Score one point for each volley made on or above the net line. Putting the bird into motion with an underhand serve is not considered a volley. The score is the total number of times the shuttle is volleyed against the wall in thirty seconds. Each player is to receive four trials of thirty seconds each. Record all the trials. The final score is the total of the four trials. The scorer and player to be tested are to alternate, assuring each of a rest period between trials.

IV. SMASH TEST

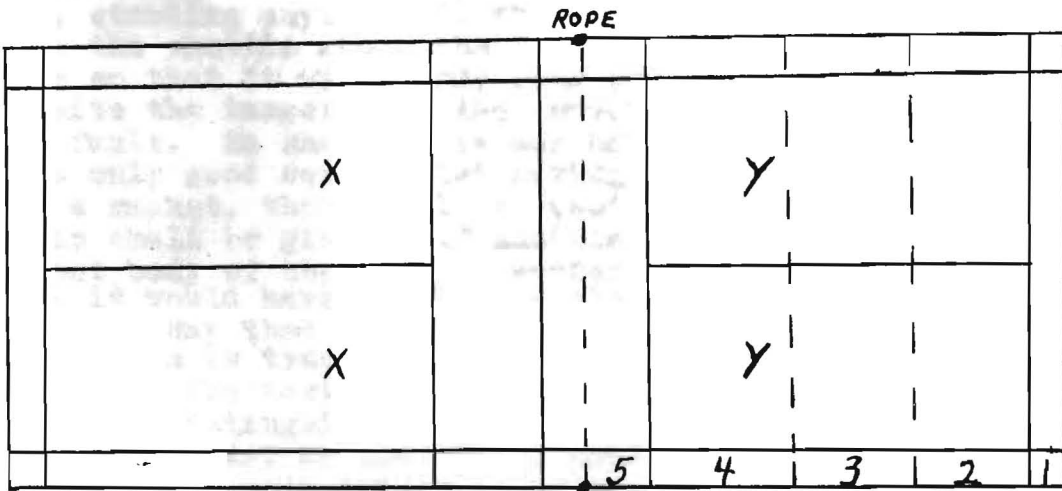


Figure 4. Floor markings for smash test

## EQUIPMENT

A clothesline rope stretched seven feet high parallel to and two feet from the net on the same side as the target. A tightly strung badminton racket and at least five new badminton shuttles for each player being tested.

## FLOOR MARKINGS (see Figure 4, page 54)

Use the short service line and the back doubles service line of a regulation badminton court, also the back service line (singles). Draw two lines  $1\frac{1}{2}$  inches wide parallel to and one-third and two-thirds respectively of the distance between the short service line and the back doubles service line. The lines shall be painted with green paint to increase accuracy of scoring. Number the areas of the target five, four, three, two, and one consecutively beginning with the area nearest the net through to the back service line (singles).

## DESCRIPTION OF TEST

The player to be tested, called X, shall stand anywhere behind the short service line on the court opposite the target and receive twenty shuttles (consecutively or divided into two groups of ten), which he will try to smash between the clothesline rope and the net, aiming for the area marked five on the target. The shuttles shall be served to the player being tested by a player, designated as Y in the diagram, standing anywhere in the service court area, who must serve the shuttle above the clothesline rope with enough force so that it will carry back to the short service line opposite the target. If the server hits the rope, it shall be a fault. He shall serve another. The player to be tested plays only good serves, but having once touched a shuttle with a racket, that shall be considered a trial. Twenty trials shall be given. If shuttle is smashed so as to contact body of the server, scorer shall estimate the area in which it would have fallen. A shuttle smashed into the net in such a way that it crosses it and falls into the target is counted, as is true in the game. Two practice trials shall be given. The test should be demonstrated and the scorers taught to distinguish between a drop shot and a smash. The server shall act as scorer and shall call out the score of each of the twenty trials to be recorded by an assistant. One assistant can record for two players being tested at one time on a regulation badminton court. (Target includes entire court for each girl).

The area between the net and the short service line counts five points, the remaining areas count four, three, two, and one respectively counting from the short service line to the back service line (singles). Shuttles landing on a line shall be given the value of the higher area.

SCORING

Score each shuttle in accordance with the area in which the cork portion of the shuttle first hits. Record all twenty trials, including those in which the shuttle is returned above the rope instead of between the rope and the net. The final score shall be the total value of the twenty trials. Students shall work in groups of two, one as server and one as the player being tested and then change positions at the end of the test.

V. CLEAR TEST

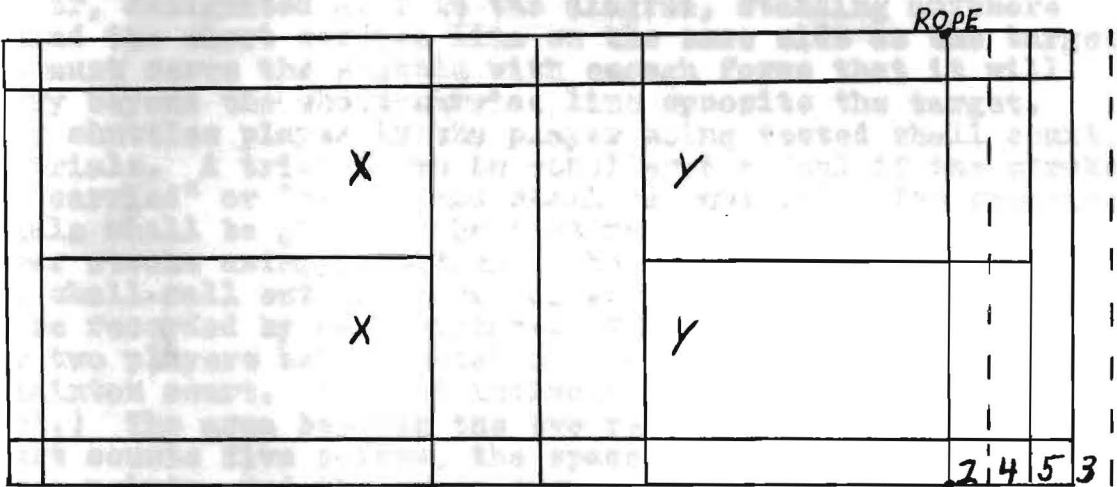


Figure 5. Floor markings for clear test

EQUIPMENT

A clothesline rope stretched across the court 14 feet from the net and parallel to it at a height of eight feet from the floor on the same side as the target. A tightly strung badminton racket and at least five new badminton shuttles for each player being tested.

## FLOOR MARKINGS (see Figure 5, page 56)

Construct a line  $1\frac{1}{2}$  inches wide two feet nearer the net than the rear service line and parallel to it. On the same side of the net construct a line two feet farther from the net than the rear service line (singles) and parallel to it. Measure from the exact center of the line. Extend lines from one outer alley line to the other outer line. The lines of the target shall be painted green to increase accuracy in scoring.

## DESCRIPTION OF TEST

The player to be tested, called X, shall stand anywhere behind the short service line on the court opposite the target and receive twenty shuttles (consecutively or divided into two groups of ten), which he will try to send by means of a clear stroke above the rope so that the shuttle lands on the target. The shuttles shall be served to the player being tested by a player, designated as Y in the diagram, standing anywhere behind the short service line on the same side as the target, who must serve the shuttle with enough force that it will carry beyond the short service line opposite the target. Only shuttles played by the player being tested shall count as trials. A trial is to be considered a foul if the stroke is "carried" or "slung" and shall be repeated. Two practice trials shall be given. The instructor shall demonstrate a clear stroke using good form. The server shall act as scorer and shall call out the score of each of the twenty trials to be recorded by an assistant. One assistant can record for two players being tested at one time on a regulation badminton court. (Target includes entire court for each girl.) The area between the two rear lines of the regulation court counts five points, the space just behind it counts three points, and the space just in front of the two rear lines of the regulation court counts four points. Any shuttle going over the rope but failing to reach the target counts zero. Shuttles landing on a line shall be given the value of the higher area.

## SCORING

Score each shuttle in accordance with the area in which the cork portion of the shuttle first hits. Record all twenty trials. The score shall be the total value of the twenty trials. Students shall work in groups of two, one as server and one as the player being tested and then change positions at end of the test.

## VI. SHORT SERVE TEST--SINGLES AND DOUBLES

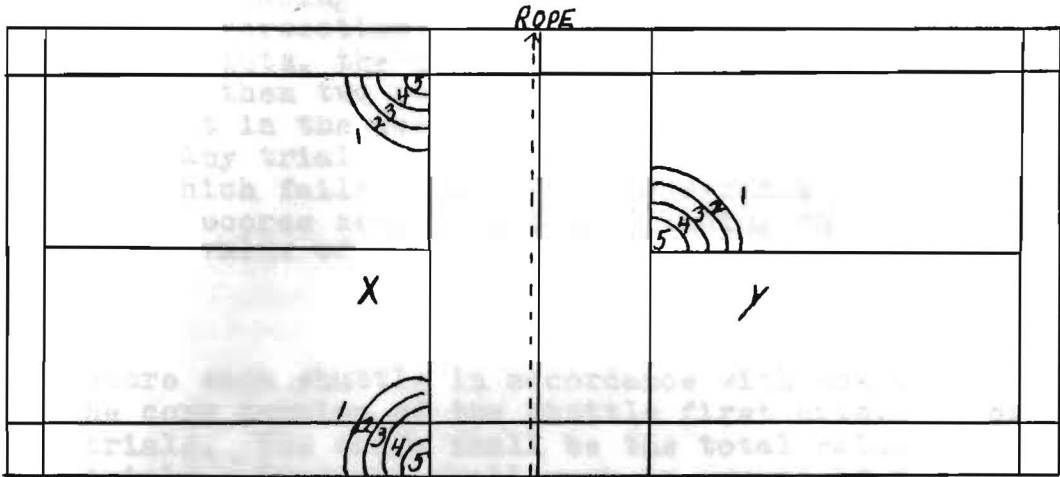


Figure 6. Floor markings for short serve test singles and doubles

## EQUIPMENT

A clothesline rope stretched 20 inches directly above the net and parallel to it attached to the same standards as the net. A tightly strung badminton racket and at least five new badminton shuttles for each player being tested.

## FLOOR MARKINGS (see Figure 6)

Use the intersection of the short service line and the center line as a midpoint, describe a series of arcs  $1\frac{1}{2}$  inches wide in the right service court at distances of 22 inches, 30 inches, 38 inches, and 46 inches from the midpoint, measurement including the width of the  $1\frac{1}{2}$  inch line. Extend these arcs from the short service line to the center line. The lines of the target shall be painted green to increase accuracy in scoring.

## DESCRIPTION OF TEST

The player to be tested, called X, shall stand anywhere in the service area diagonally opposite the target and serve twenty shuttles (consecutively or divided into two groups of ten), which he will try to send through the space between the rope and the net in such a manner that they land in the right service court for the doubles game. An illegal serve is considered a fault, and the trial must be repeated. The scorer,



designated as Y in the diagram, shall stand nearer the center of the left service court on the same side of the net with the target and facing the target. The corner of the target nearest the intersection of the service line and center line counts five points, the next space, four points, the next three points, then two points, and any shuttle landing off the target but in the service area for the doubles game counts one point. Any trial which fails to go between the rope and the net or which fails to land in the service court for the doubles game scores zero. Shuttles landing on a line shall be given the value of the higher area.

SCORING

Score each shuttle in accordance with the area in which the cork portion of the shuttle first hits. Record all twenty trials. The score shall be the total value of the twenty trials. Students shall work in groups of two, one as server and one as the player being tested and then change positions at end of the test.

VII. LONG HIGH SERVE TEST--SINGLES AND DOUBLES

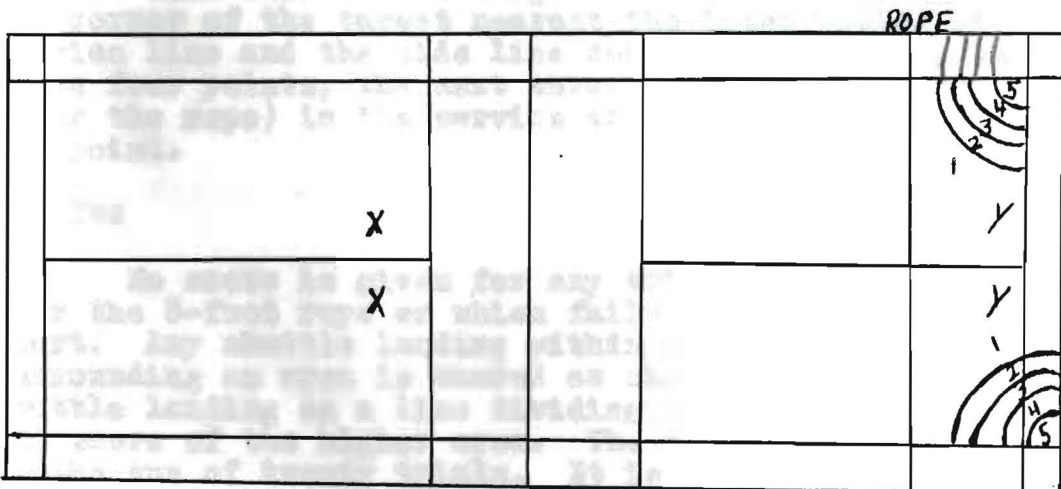


Figure 7. Floor markings for long high serve test.  
 Right court for long high serve doubles  
 Left court for long high serve singles

## EQUIPMENT

A clothesline rope stretched across the court 14 feet from the net and parallel to it, at a height of 8 feet from the floor.

## FLOOR MARKINGS

Using the intersection of the long service line and the left side boundary line for singles as a midpoint, describe a series of arcs in the left service court at distances of 22 inches, 30 inches, 38 inches, and 46 inches from the midpoint, the measurement including the width of the 2-inch line. Extend these arcs from the long service line to the side line, as indicated in the diagram. (see Figure 7, page 59). The lines are painted green to increase accuracy in scoring.

## DESCRIPTION OF TEST

The player being tested stands any place in the service area diagonally opposite the target, and serves twenty times, attempting to send the shuttle over the rope in such a manner that it will land in the target at the rear of the left court. The corner of the target nearest the intersection of the service line and the side line counts five points, the next space four points, the next three, then two, and any shuttle (over the rope) in the service area outside the target counts one point.

## SCORING

No score is given for any trial which fails to go over the 8-foot rope or which fails to land in the service court. Any shuttle landing within an area or on the line surrounding an area is scored as shown in the diagram. Any shuttle landing on a line dividing two scoring areas receives the score of the higher area. The score for the entire test is the sum of twenty trials. It is considered a foul and the trial is repeated if the serve is illegal.

## VIII. NET SHOTS\*

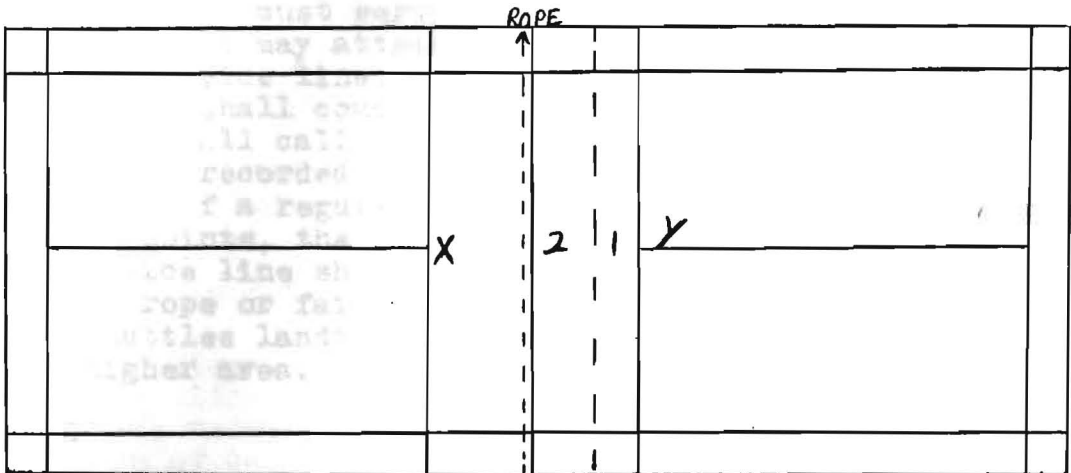


Figure 8. Floor markings for net shots

## EQUIPMENT

A clothesline rope stretched 20 inches directly above the net and parallel to it attached to the same standards as the net. A tightly strung badminton racket and badminton shuttles.

## FLOOR MARKINGS (see Figure 8)

Use the center line of a regulation badminton court and extend a line two feet back from the center line across the court.

## DESCRIPTION OF TEST

The player to be tested, called X, shall stand anywhere in front of the short service line on the court opposite the target and receive twenty shuttles (consecutively or divided into two groups of ten), which he will try to send by means of a net stroke below the rope so that the shuttle lands on the target. The shuttles shall be served to the player being

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\*Tests eight and nine were made and administered by the author.

tested by a player, designated as Y in the diagram, standing anywhere behind the short service line on the same side as the target, who must serve the shuttle so that the player taking the test may attempt a net shot without moving behind the short service line. Only shuttles played by the player being tested shall count as trials. The server shall act as scorer and shall call out the score of each of the twenty trials to be recorded by an assistant. The area between the center line of a regulation court and two feet back shall count two points, the space just behind it and back to the short service line shall count one point. Any shuttle going above the rope or failing to fall within the target counts zero. Shuttles landing on a line shall be given the value of the higher area.

**SCORING**

Score each shuttle in accordance with the area in which the cork portion of the shuttle first hit. Record all twenty trials. The score shall be the total value of the twenty trials. Students shall work in groups of two, one as server and one as the player being tested and then change positions at end of the test.

**IX. DROP SHOTS**

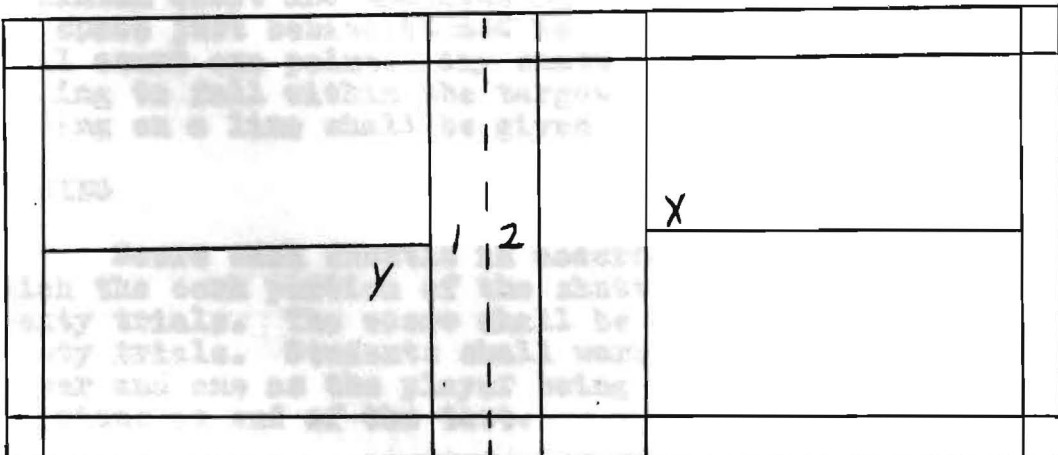


Figure 9. Floor markings for drop shots

## EQUIPMENT

A tightly strung badminton racket and badminton shuttles.

## FLOOR MARKINGS (see Figure 9, page 62)

Use the center line of a regulation badminton court and extend a line two feet back from the center line across the court.

## DESCRIPTION OF TEST

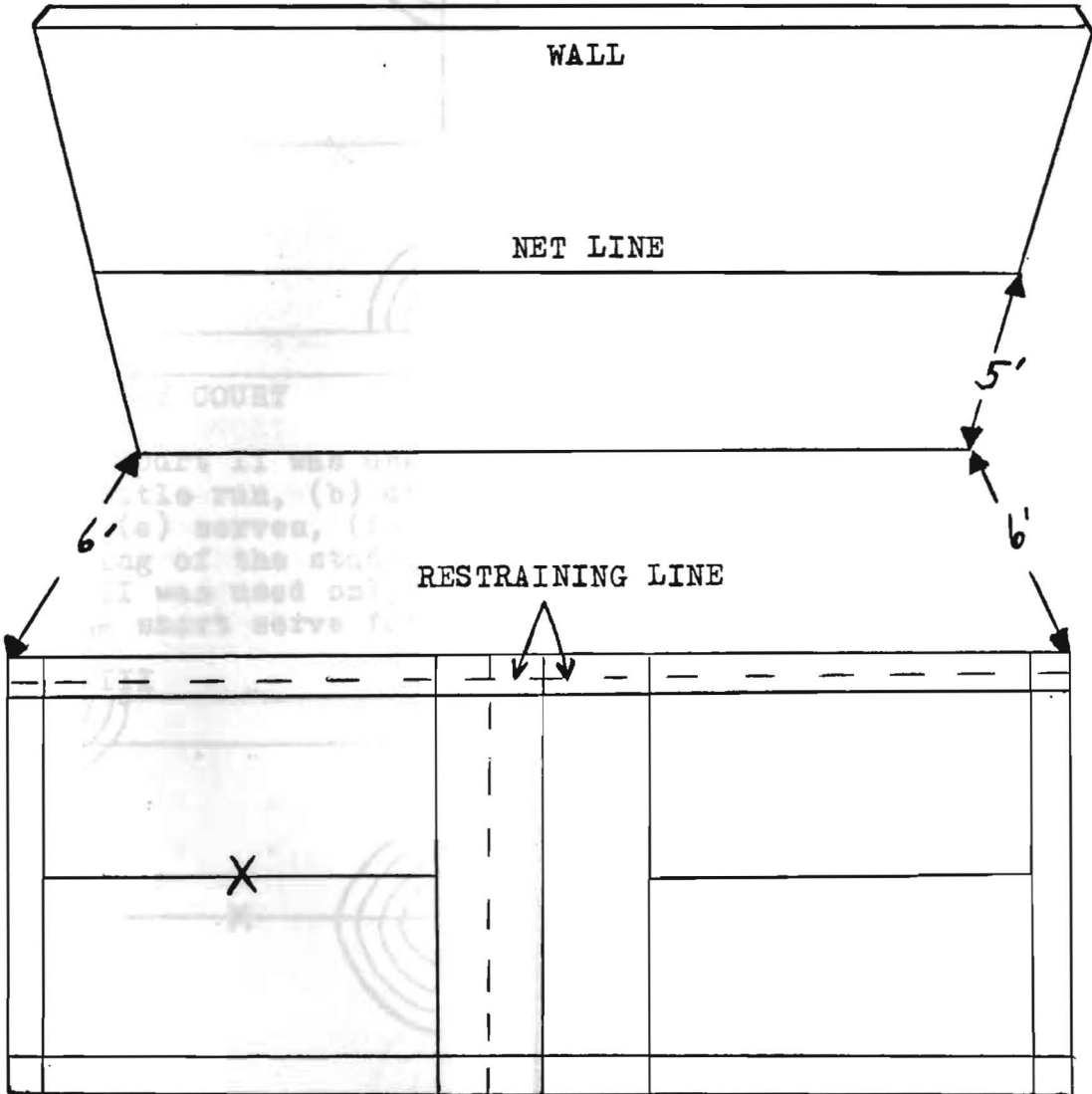
The player to be tested, called X, shall stand anywhere behind the short service line on the court opposite the target and receive twenty shuttles (consecutively or divided into two groups of ten), which he will try to send by means of a drop stroke across the net so that the shuttle lands on the target. The shuttles shall be served to the player being tested by a player, designated as Y in the diagram, standing anywhere behind the short service line on the same side as the target, who must serve the shuttle with enough force that it will carry beyond the short service line opposite the target. Only shuttles played by the player being tested shall count as trials. The server shall act as scorer and shall call out the score of each of the twenty trials to be recorded by an assistant. The area between the center line of a regulation badminton court and two feet back shall count two points, the space just behind it and back to the short service line shall count one point. Any shuttle going across the net but failing to fall within the target counts zero. Shuttles landing on a line shall be given the value of the higher area.

## SCORING

Score each shuttle in accordance with the area in which the cork portion of the shuttle first hit. Record all twenty trials. The score shall be the total value of the twenty trials. Students shall work in groups of two, one as server and one as the player being tested and then change positions at end of the test.

## EXPERIMENTAL GROUP FLOOR PATTERN

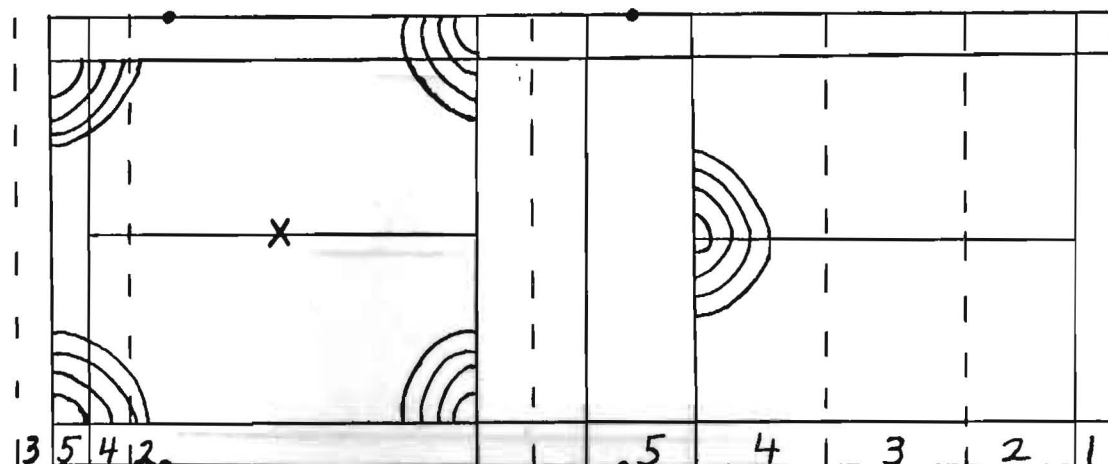
COURT I



## USE OF THE COURT

Court I was used to practice the following skills (a) shuttle run, (b) diagonal run, (c) net shots, (d) drop shots, and (e) wrist volley at the beginning of the study. After all skills were practiced Court I was used only for the wrist volley and diagonal run.

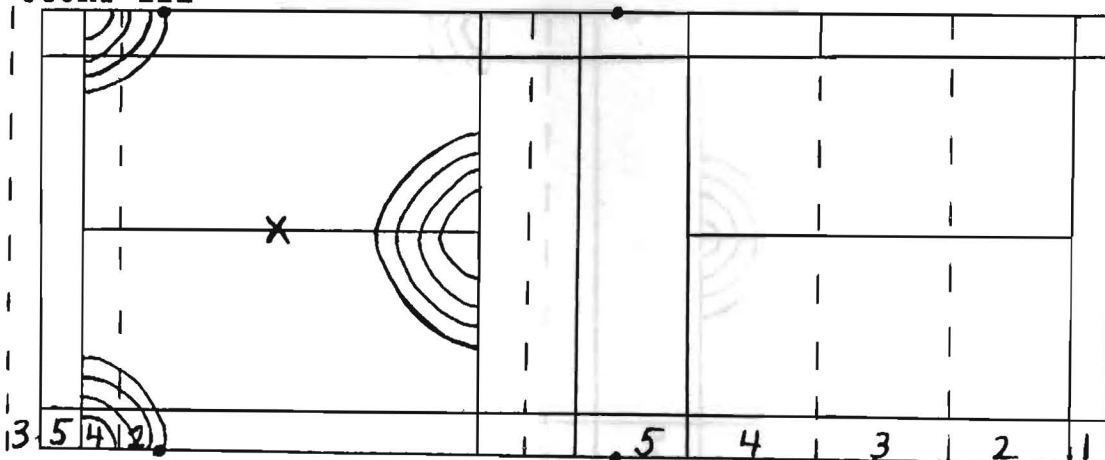
## COURT II



USE OF THE COURT

Court II was used to practice the following skills (a) shuttle run, (b) diagonal run, (c) net shots, (d) drop shots, (e) serves, (f) clears, and (g) smash shots at the beginning of the study. After all skills were practiced Court II was used only for the long high serve in singles and the short serve for doubles and singles.

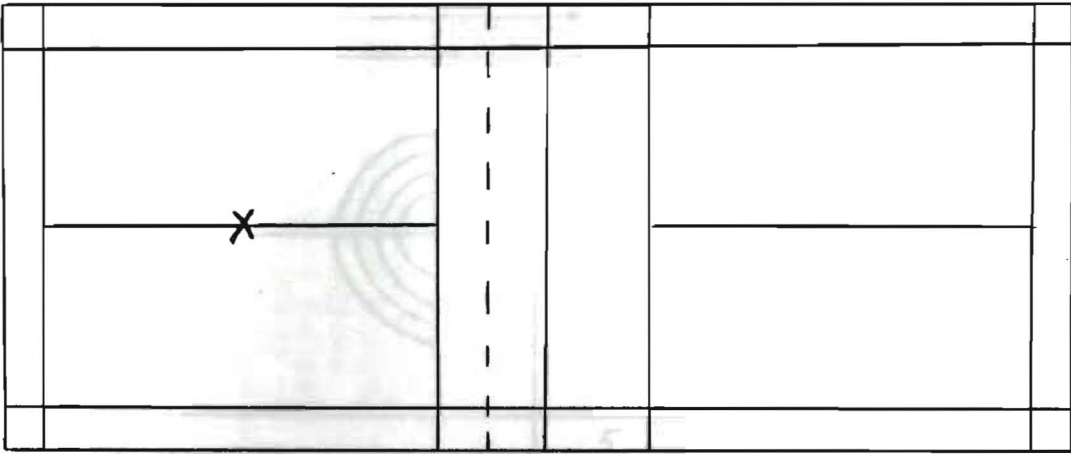
## COURT III



USE OF THE COURT

Court III was used to practice the following skills (a) shuttle run, (b) diagonal run, (c) net shots, (d) drop shots, (e) serves, (f) clears, and (g) smash shots at the beginning of the study. After all skills were practiced Court III was used only for the long high serve in doubles and the short serve for doubles and singles.

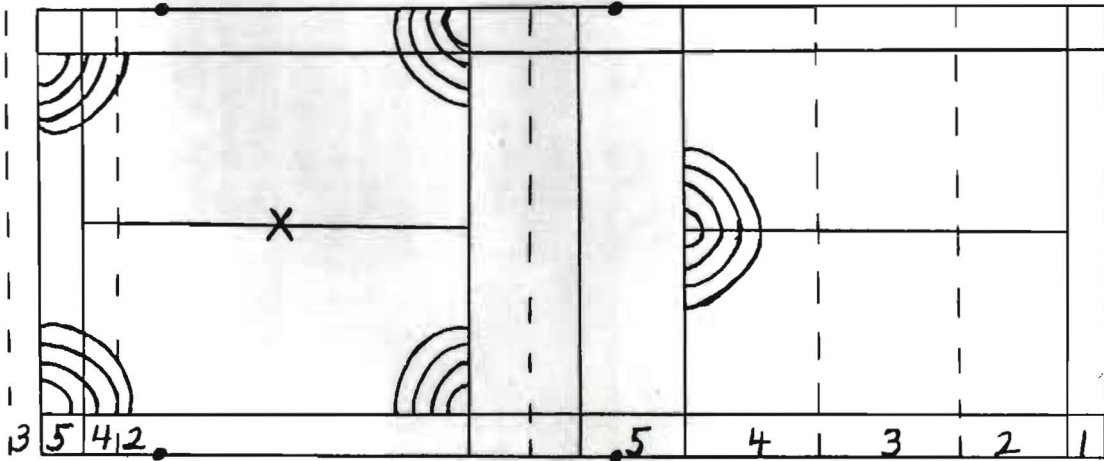
COURT IV



USE OF THE COURT

Court IV was used to practice the following skills (a) shuttle run, (b) diagonal run, (c) net shots, and (d) drop shots at the beginning of the study. After all skills were practiced Court IV was used only for the net shots, drop shots, and shuttle run.

COURT V

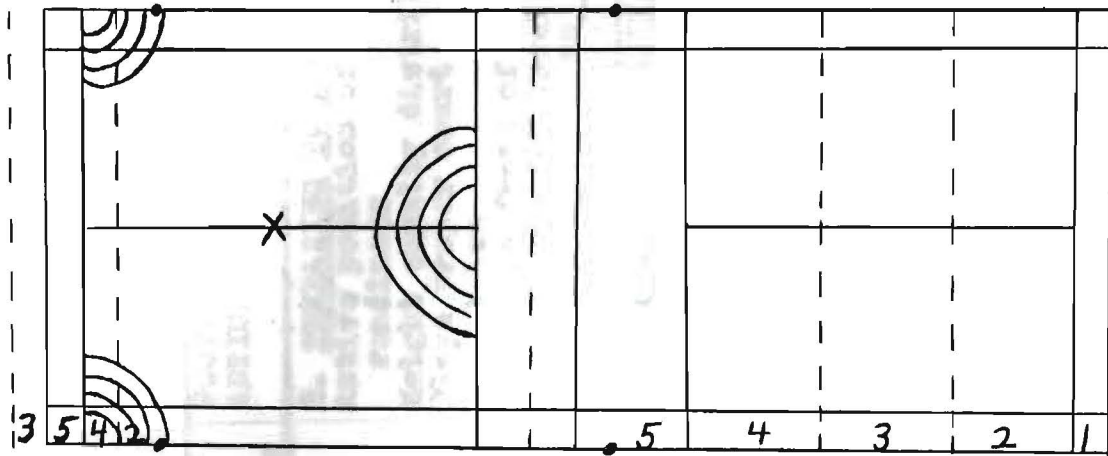


USE OF THE COURT

Court V was used to practice the following skills (a) shuttle run, (b) diagonal run, (c) net shots, (d) drop shots, (e) serves, (f) clears, and (g) smash shots at the beginning of the study. After all skills were practiced Court V was used only for the clears.



## COURT VI



## USE OF THE COURT

Court VI was used to practice the following skills (a) shuttle run, (b) diagonal run, (c) net shots, (d) drop shots, (e) serves, (f) clears, and (g) smash shots at the beginning of the study. After all skills were practiced Court VI was used only for the smash shots.

BADMINTON PERFORMANCE RATING CHARTRATING SCALE

5--SUPERIOR

4--GOOD

3--AVERAGE

2--FAIR

1--POOR

<u>GRIP AND ACCURACY</u>		<u>STROKE EXECUTION</u>		<u>FOOTWORK, TIMING, COURT POSITION, ANTICIPATION</u>	
Comments		Comments		Comments	
<u>1. GRIP</u> Relaxed grip--spread fingers; index finger down. Forefinger & thumb control Little finger on butt Hand shake grip RATING ____		<u>3. BACKSWING</u> Backswing taken from waist Lead backhand with racket head Forward swing with wrist Take backswing before bird arrives RATING ____		<u>8. PREPARING TO RECEIVE</u> Active position of readiness Weight equally distributed Plays proper court position Racket in front of body at waist level RATING ____	
<u>2. ACCURACY PLACEMENT</u> Bird hit to corners Consistently hits in bounds Makes openings RATING ____		<u>4. BIRD CONTACT</u> Bird met over the forward foot Force given with the wrist snap RATING ____		<u>9. GETTING INTO POSITION</u> Pivots and moves toward the bird Uses gliding steps RATING ____	
		<u>5. FOLLOW-THROUGH</u> Full follow-through (except net & drop shots) Swing continuous in direction of shot RATING ____		<u>10. FOOTWORK</u> Has flexible base Weight on balls of feet Feet set first, then hits RATING ____	

BADMINTON PERFORMANCE RATING CHART (continued)

GRIP AND ACCURACY  Comments	STROKE EXECUTION Overhead-Underhand-Drive- Smash-Drop  Comments	FOOTWORK, TIMING, COURT POSITION, ANTICIPATION  Comments
<p><u>GENERAL OVER-ALL EVALUATION</u> (A single rating not to be included in the 10 divisions)</p> <p>Strong, proper, &amp; smooth strokes Well-coordinated effort Alert position of body Consistent in placement of bird</p> <p align="right">RATING _____</p>	<p><u>6. WEIGHT SHIFT</u> Body at right angles to net Weight transferred from rear to front foot Knees and hips flexed RATING _____</p> <hr/> <p><u>7. SERVICE</u> Grip Stance Impact &amp; follow-through Flight of bird Variety of shots-long, short, right, left RATING _____</p>	<p>DATE _____</p> <p>JUDGE _____</p> <p>STUDENT _____</p> <p>TOTAL RATING _____</p>

BADMINTON PERFORMANCE RATING SCALE

5---SUPERIOR

1. Very alert assumption of proper body position; eye on bird
2. Strong, proper, and smooth mechanic; backswing, point of contact, follow-through, grip
3. Well-coordinated effort with ease in weight shift and body pivot
4. Always accurate and consistent in placement of the bird

4---GOOD

1. Usually assumes proper body position
2. Slight weakness in proper stroke mechanics; backswing, point of contact, follow-through, grip
3. Good coordination with proper weight shift, and body pivot
4. Usually plays to the corners, in bounds, and makes openings

3---AVERAGE

1. Occasionally assumes satisfactory body position
2. Satisfactory stroke mechanics with some weakness in the backswing, point of contact, follow-through, grip
3. Satisfactory coordination with weight shift, and some body pivot
4. Sometimes successful in playing the corners, and in bounds, occasionally makes openings

2---FAIR

1. Hesitant in foot work and in assuming proper body position; little regard for the bird
2. Considerable weakness shown in the stroke mechanics; backswing, point of contact, follow-through, grip
3. Deficient coordination; inadequate weight shift and body pivot
4. Seldom plays to the corners, consistently hits out-of-bounds and quite weak in making openings

1---POOR

1. Improper footwork and position; eye not on bird
2. Unsatisfactory stroke mechanics; inadequate backswing, point of contact, follow-through, grip
3. Lacking coordination; no sign of weight shift and proper body pivot
4. Never plays the corners, no sign of making openings, hits out-of-bounds

APPENDIX H

RESULTS OF THE SCOTT MOTOR ABILITY TEST

Name	Raw scores			T-score*
	Obstacle race	Standing broad jump	Basketball throw	
I. CONTROL GROUP				
Ollek	20.2	6' 5"	52'	204
Manz	20.2	5' 8"	62'	201
Meyer	21.9	6' 0"	50'	188
Davis	20.6	5' 8"	45'	184
Hartman	20.2	5' 9"	39'	182
Anderson	24.4	5' 0"	59'	170
Franz	22.2	5' 9"	31'	162
Houk	22.1	5' 4"	32'	157
Strader	22.1	5' 0"	33'	153
Eutterworth	24.8	4' 10"	36'	145
Bryan	26.8	4' 2"	29'	117
Hendrickson	25.4	3' 10"	26'	115
Carter	29.0	3' 8"	31'	108
Browleewe	28.1	3' 10"	21'	96
Total				2182
Mean				155.86
II. EXPERIMENTAL GROUP				
Hamman	21.0	6' 9"	54'	204
McNitt	20.2	5' 7"	54'	193
Totten	21.0	5' 7"	55'	188
Childs	21.6	5' 2"	62'	185
Lampe	24.5	4' 11"	68'	174
Miner	21.6	4' 11"	42'	165
Naylor	24.5	5' 8"	44'	165
Armstrong	23.2	4' 10"	47'	162
Armbrust	25.5	4' 2"	43'	140
Fried	26.9	4' 7"	41'	138
Wenger	28.5	4' 3"	37'	123
Bloeker	28.8	4' 6"	32'	121
Dale	27.4	4' 2"	30'	118
Total				2076
Mean				159.69

\*The total mean scores represent the sum of the raw scores of the obstacle race, basketball throw, and standing broad jump after they were converted into T-scores.

## APPENDIX I

### RESULTS OF THE INITIAL, FINAL AND NET GAIN OF THE LOCKHART AND MCPHERSON BADMINTON TEST

Name	Raw scores		Net gain
	Initial test	Final test	
<b>I. CONTROL GROUP</b>			
Anderson	45	52	7
Browleewe	14	27	13
Bryan	38	76	38
Butterworth	47	79	32
Carter	44	92	48
Davis	46	73	27
Franz	40	65	25
Hartman	38	94	56
Hendrickson	49	64	15
Houk	22	89	67
Manz	38	115	77
Meyer	36	78	42
Oliek	68	95	27
Strader	41	60	19
Total	566	1059	493
Mean	40.43	75.64	35.21
<b>II. EXPERIMENTAL GROUP</b>			
Armbrust	46	62	16
Armstrong	58	79	21
Blocker	21	47	26
Childs	74	93	19
Dale	42	90	48
Fried	49	67	18
Hamman	27	55	28
Lampe	51	61	10
McNitt	53	88	35
Miner	88	108	20
Naylor	44	63	19
Totten	49	100	51
Wenger	35	44	9
Total	637	957	320
Mean	49.00	73.62	24.62

## APPENDIX J

## RESULTS OF THE JUDGES' RATINGS

CONTROL GROUP		EXPERIMENTAL GROUP	
Name	Total rating*	Name	Total rating*
Davis	108	McNitt	108
Strader	89	Childs	101
Manz	86	Lampe	98
Ollek	85	Miner	95
Meyer	84	Armstrong	83
Hartman	83	Totten	79
Franz	81	Hamman	76
Butterworth	76	Naylor	74
Houk	69	Armburst	62
Carter	62	Wenger	47
Hendrickson	57	Fried	47
Anderson	56	Dale	45
Bryan	51	Blocker	44
Browleewe	46		
Total	1033		959
Mean	73.71		73.77

\*The scores represent the sum total of the ratings of three judges for each student.