1948

"A simple method of evaluating skill in badminton performance."

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Thesis

"A SIMPLE METHOD OF EVALUATING SKILL IN BADMINTON PERFORMANCE."

Submitted by

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Acknowledgment

The writer wishes to express sincere appreciation to Dr. G. Lawrence Rarick, for his assistance in directing this study.

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INTRODUCTION

INTRODUCTION

In recent years much emphasis has been placed upon evaluating pupil performance in the many basic skills taught in our public schools. The field of physical education has recognized the need for developing objective means of measuring and evaluating pupil growth in motor skills.

We recognize that we are in an era where games are taught and played from a reasonably scientific standpoint. Efforts are continually being made to improve performance by concentrating upon refinements in the basic skill of the games. Therefore there is a need for evaluating the individual not only in the light of his total game performance, but also in respect to the specific skill involved.

The schools that teach skill courses are confronted with the problem of grading individual skill objectively. As McCloy[1] states:

> There is a definite need for objective methods of measuring achievement in specific sports, skills, and activities. Such tests are needed for measuring progress in skills for various activities, especially the unit skills of which the sports themselves are compounded, and for the purpose of grading the learners. The shortcoming of most achievement tests has been that they are too time-consuming, and, as a result, ratings have generally been used instead. While ratings by competent observers may be highly reliable, they are not as satisfactory, either to the pupil or teacher, as a well-formulated, specific test.

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1 Charles Harold McCloy, Tests and Measurements in Health and Physical Education, New York: F.S.Croft & Co.,1944,pp.169-70.

Recognizing that there is a need for developing a device which will be of assistance to teachers in measuring the performance level of pupils as well as for purposes of grading, the writer has devised the badminton test herein described.

Courses have been taught in Beginning Badminton for the past eight years at Western Carolina Teachers College and the problem of grading skills has been in the past accomplished only on a subjective basis.

In making this test for Western Carolina Teachers College students, the service, clear and drop shots are used. Not only are these shots employed with the object of testing, but also as an aid in finding and improving the player's weaknesses.

1) Statement of Problem

This study is concerned with developing a test to evaluate badminton performance.

2) Purpose of Study

The main purpose of this study is to evaluate the performance of the individual and to assist the instructor in determining the strong and weak points of his game so that the student under the guidance of the instructor might improve the quality of his game.

The test in this study was constructed especially for this purpose.

3) Review of Literature

Of all the books and many articles that have been written on the subject of badminton only the following had any information pertaining to badminton skill.

The Official Badminton Guide For Women[1] listed several practical formations for the short serve, long serve, net shots, drives, and clears. However, these are merely suggestions with no means of grading or scoring these skills.

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1 Official Badminton Guide, New York: A. S. Barnes and Company, 1940-45, pp. 23-27.

Clarke[1] reviews the only two sources that could be found dealing with skill tests in Badminton.

> Edgren and Robinson have constructed a badminton test for boys. Their work, however, is entirely empirical. The individual elements selected include service test, lob strokes and smash. For women, Gladys Scott and her committee have constructed a fairly satisfactory badminton test which consists of a service test and a clear test.
>
> The Service Test. The subject serves twenty birds at the target diagrammed below and described as follows: a) A clothesline rope is stretched twenty inches directly above the net and parallel to it. b) A series of four arcs is drawn within the right service court at distances of twenty-two inches, thirty inches, thirty-eight inches, and forty-six inches from the intersection points of the short service line and the center line. (The use of different colored lines helped in scoring.) Scoring: Zero is recorded for each trial that fails to go between the rope and net or that fails to land in the service court for the doubles games. Score each of the other birds as shown in the diagram. Any bird landing on a line dividing two scoring areas shall receive the higher score. The score of the entire test is the total of twenty trials. Illegal serves shall be repeated.

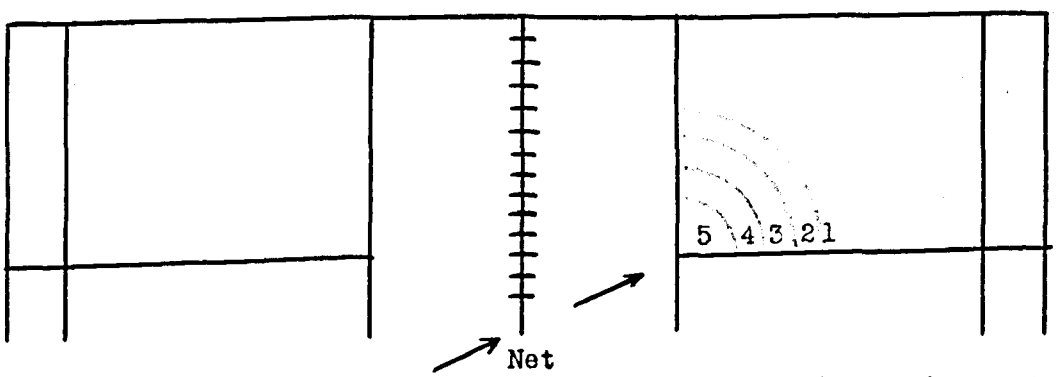


Diagram #I Target for the Service Test (Scott)

1. Clarke, Henry Harrison, The Application of Measurement of Health and Physical Education, New York: Prentice-Hall, Inc., 1945, pp. 264-66.

The Clear Test. The subject returns a serve, attempting to score on the target diagrammed below and described as follows: a) A clothesline rope is stretched across the court fourteen feet from the net and parallel to it, eight feet from the floor. b) The following floor markings are made: 1) a line across the court two feet nearer the net than the rear service line in the doubles game. 2) A line across the court two feet farther from the net than the rear service line in the singles game. The subject stands between the two square marks X and Y, which are two inches square and located eleven feet from the net and three feet from the center line. The service shall be made from the intersection of the short line and the center line on the target side of the net. The bird must cross the net with enough force to carry it to the line between the two squares before it touches the floor. As soon as the bird is hit, the subject may move about as she wishes. Scoring: A zero is recorded for each trial that fails to go over the rope or that fails to land on the target. Score each of the other birds as shown in the diagram. Any bird landing on a line dividing two scoring areas shall receive the higher score. The score on the entire test is the total of twenty trials. It is considered a foul and the trial is repeated if the stroke is "carried" or "slung".

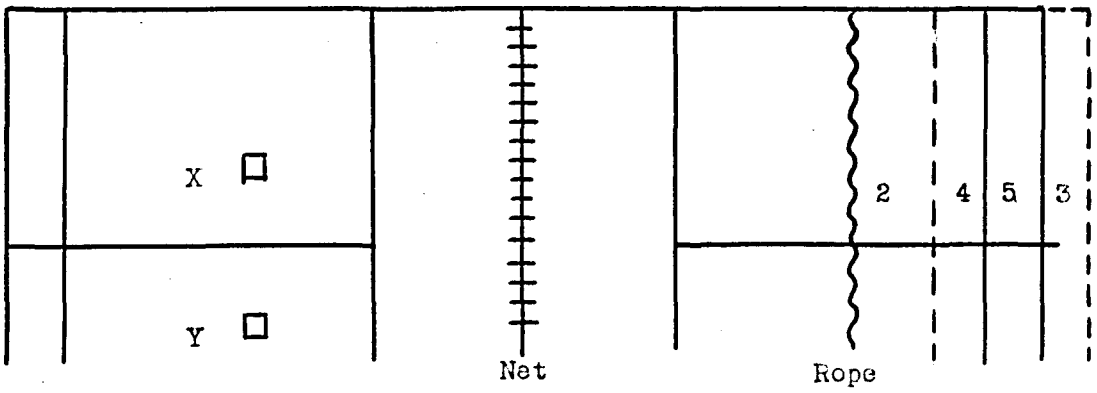


Diagram #II Target for Clear Test (Scott)

PROCEDURE

1) Method of Collecting Data

Thirty-six college students, thirty-two men and four women participated in the tests. The group was relatively homogeneous in regard to their background and experience in the game of Badminton. Some of them had participated to a limited extent in Beginning Badminton Courses at the College, others had played at Y. M. C. A's and a few had some badminton competition in the Armed Forces. This homogeneous group played every Saturday afternoon for eight weeks with each individual challenging the other. About two hundred matches were played using four courts, each playing approximately the same number of games. At the termination of group playing each individual was rated on a percentage basis according to the number of matches won and lost.

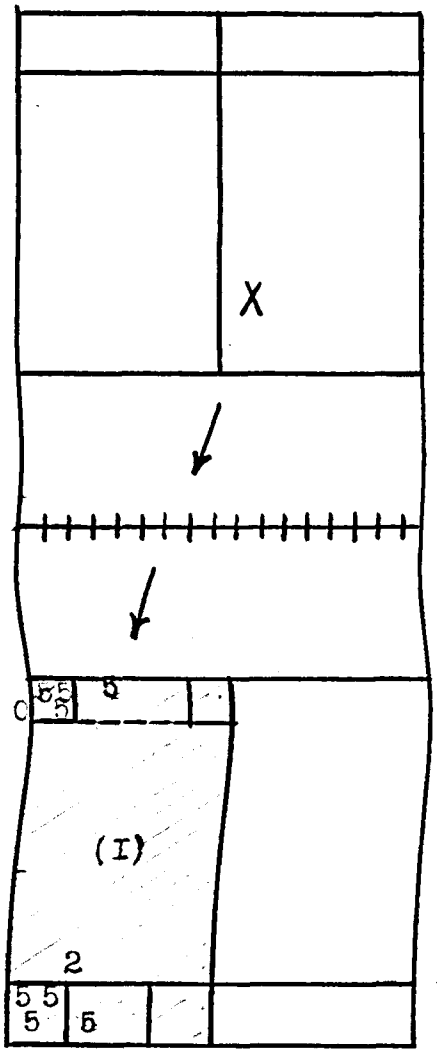
From this ranking a ladder tournament was established in which an individual was allowed to challenge a player two positions above his own. This method of playing was carried on for ten weeks so that each individual would be placed according to his playing ability. Following this the skill tests were given to each individual. In order to establish the reliability of the test each of the thirty-six persons was retested. Some students took both tests; one following the other. The remaining students had from a few days to a months' lapse of time between tests due to their class schedules. No practicing was allowed between tests. A standard score sheet was used on which every shot was recorded, showing the type of

shot and placement of the bird. (See Diagram#III.) The same instructor gave all the tests so that there would be less variation in the way the shots were set up for the player.

From the Standard Score Sheet a permanent record sheet was made. (See Table#V.) This indicated the rank and scores on both tests for all individuals.

Name - Frank Hardin

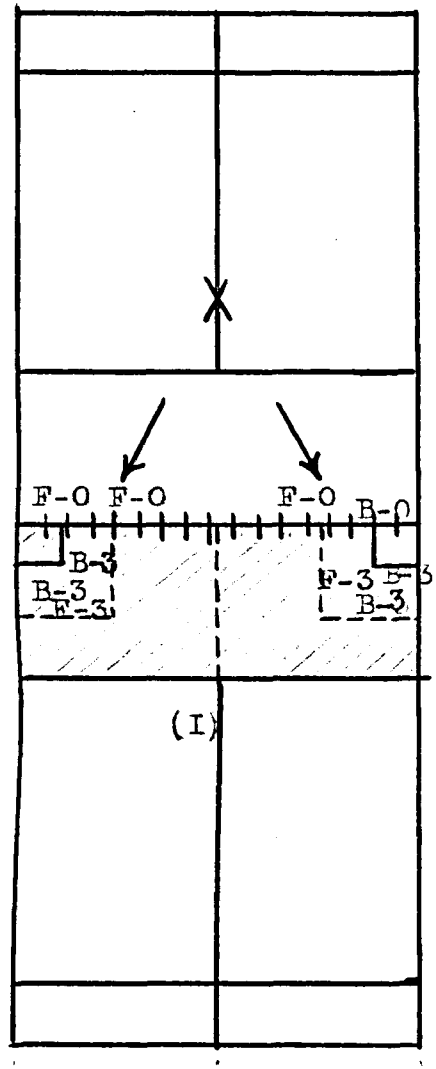
SERVICE TEST



TOTAL SCORE 40

Date April 12, 1947

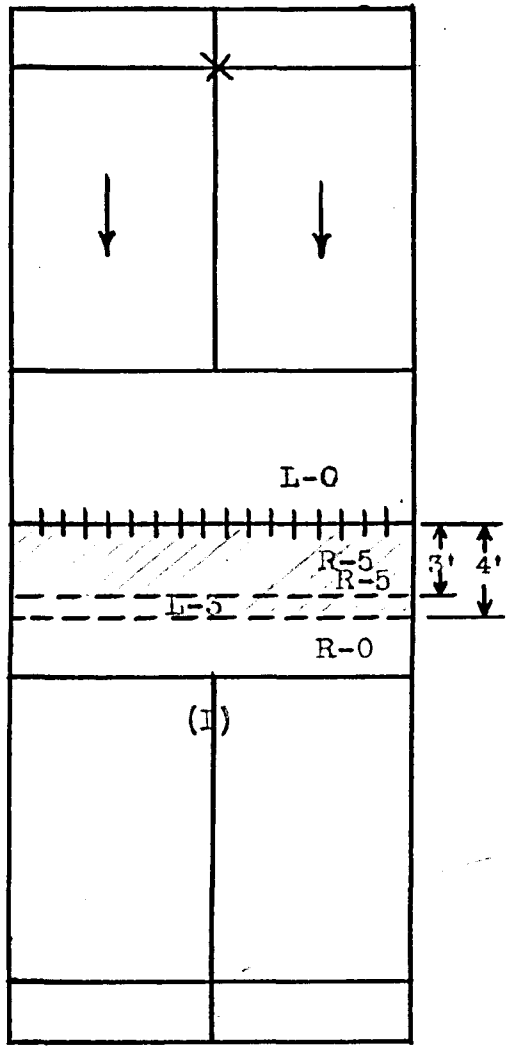
DROP SHOT MID-COURT



TOTAL SCORE 18

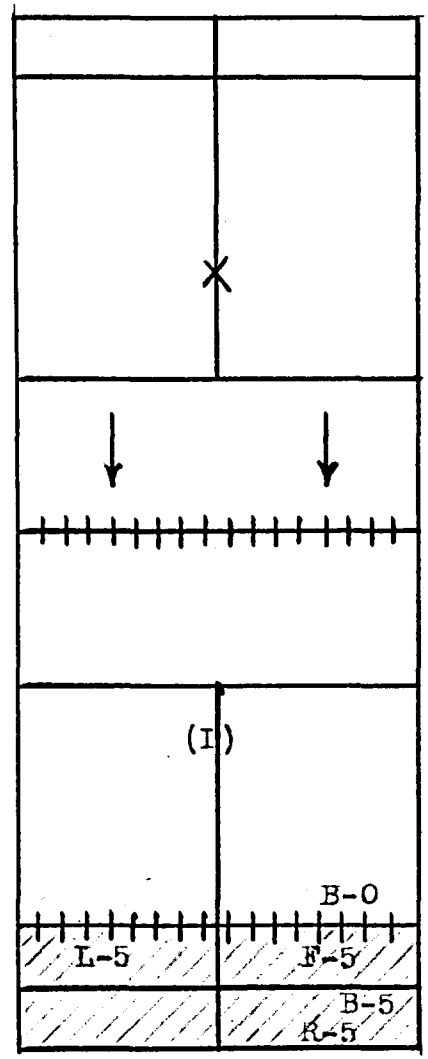
DIAGRAM #III STANDARD SCORE SHEET

DROP SHOT BACK-COURT



TOTAL SCORE 13

CLEAR SHOT

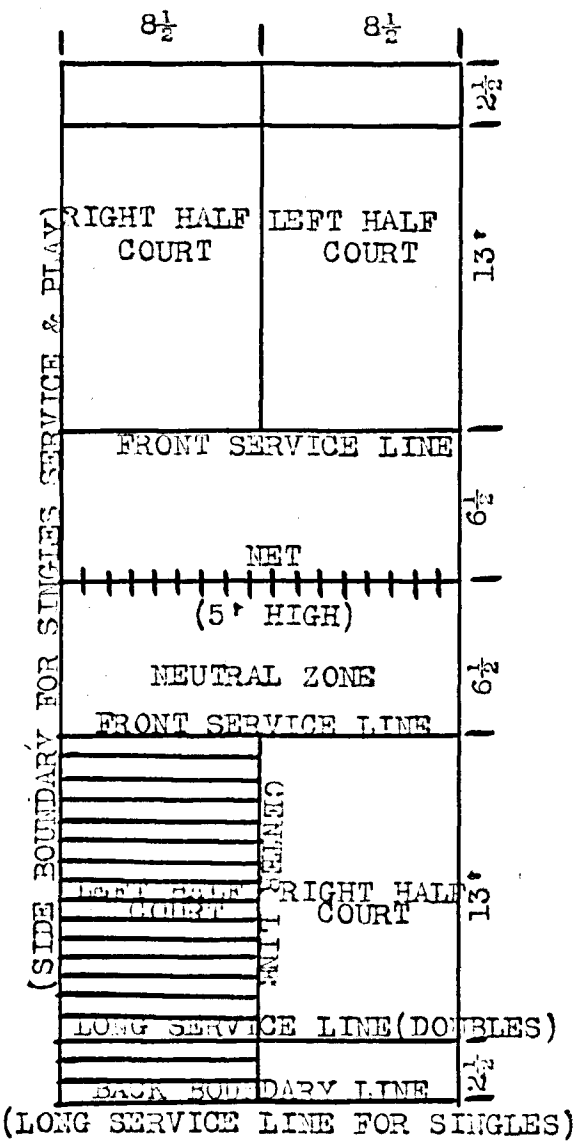


TOTAL SCORE 20

DIAGRAM III (Continued) STANDARD SCORE SHEET

2) Description of Test

This skill test is divided into four parts: Service test; Clear test; Drop Shot from Mid-court; Drop Shot from Back-Court. The administration of the test takes approximately fifteen to twenty minutes, allowing a few minutes for a warm-up to relax the wrists, train the eyes on the bird, and gain the feel of the racket. The four parts of the test were given in succession without rest. Equipment needed: two nets, indoor birds (new), gut rackets, the badminton singles court (See Diagram IV) and score sheet as shown in the drawing. Four target areas were made from corregated cardboard cut out to the proper dimensions. Two of the targets were 20" x 20" and the other two 30" x 30" with number value painted on them. These cardboards are easily placed and simplify the preparations for the testing. They also facilitate scoring, giving a thudding sound when hit by the bird. The other lines shown in diagrams 5 to 8 were marked by chalk.

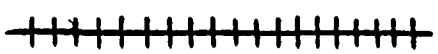


SINGLES SERVICE & RECEIVING COURT

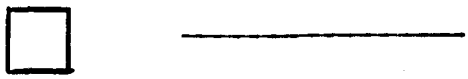
DIAGRAM #IV REGULATION SINGLES COURT FOR BADMINTON

TABLE I - CODE FOR THE TESTS

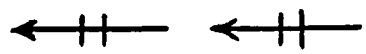
---------- imaginary line (chalk line)

 net

 20" cardboard target

 30" cardboard target

 direction of bird

 direction a player moves

X ———— position of player for test

(I) ———— position of instructor giving the test

5, 4, 3, 2, 1 ———— color numbers indicate value of target area

F - front

B - behind

R - right - forehand

L - left - backhand

Shaded area indicates target area used in test.

player in this test is referred to as the individual taking the test

trial may mean 1. serve
2. shot
3. try

Part I

Service Test

The first section of the test deals with the service. Davidson[1] states in his film "Serving is the greatest art in badminton because the server is the only one that can score."

Phillips[2] says that the rules of the game require an underhand serve, which results in a soft easily handled shot. This immediately puts the server on the defense. It is for this reason that Phillips stresses the importance of accuracy in serving.

It is generally assumed that there are two basic serves in badminton. These are: (1) the short serve generally used in a game of doubles, and (2) the long high serve used in a game of singles.

"The flight of the shuttlecock in the long serve is such that the shuttle flies high toward the long service line and drops perpendicularly, landing in the court. The preferred placements are the back corners of the service court."[3]

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1 Kenneth Davidson, "Lets Play Badminton", Victor Surgical Gut Co., 4501 Packers Ave., Chicago 9, Illinois (Film).

2 Marjorie Phillips, "Teaching the Badminton Serve to Beginners", Jl Health & Phys. Ed., Vol. 14: Dec. 1943, p. 531.

3 Ibid.

The flight in the short service is such that the shuttle just clears the net, and lands on the other side, just inside the short service line. The two preferred spots of placement are the front corners of the service court. "All serves should be played for corners".[1] The short service requires a delicate stroke and must be executed with care.

This test takes into consideration these factors:

1. The deep serve to the back court.
2. The front service court.

Assuming in this test that the receiver is right-handed the higher value target areas read from left to right. For a left-handed receiver the values reverse. In his teaching, the student has been taught to hit to his opponent's weakest spot.

Example: If his opponent is a right-handed player, generally speaking, his left or back-hand will be his weak stroke, therefore target areas on his left side are given greater values, as shown in Diagram #V.

Equipment needed for service test: a net stretched across the center of the court, two badminton rackets and two new birds. The regulation singles court with two 20" x 20" cardboard targets in the front two corners of the service area and the remaining area between these two targets form the third area in the front court. Reading from left to right the front target

1 Howard B. Holman, "Badminton", Recreation, Vol. 31, July, 1937, p. 254.

the front court. Reading from left to right the front target areas are valued at 5, 3, 4.

In the back court between the long lines for singles and doubles, two 30" x 30" targets are used in opposite corners of the service area. The remaining proportion between these two targets is the third area. Reading from left to right the back targets are valued at 5, 4, 3.

The remaining part of the service area carries a value of 2.

Any shot landing outside the service court is considered a shot but no credit is given.

The player taking the test ordinarily places himself in a position about five feet in back of the front service line, and next to the center line in the service area diagonally opposite the target. The instructor should stand in the center of the service area as though in a defensive position. (See Diagram #V).

The instructor's function in the court more nearly simulates a game situation and also facilitates returning of the bird. The player is allowed ten shots - five at the front area and five at the back area, alternating every other shot front and back. The reason for alternating shots is the probability of getting the range on the target.

No score is allowed for any shot which fails to hit in the service area. Any bird landing within the area or on a line is scored as shown in Diagram #V. The score for the entire service

test is the total of ten trials, with a possible score of fifty.

Target marking, the number of trials, and how to alternate shots is explained to the student before he takes the test.

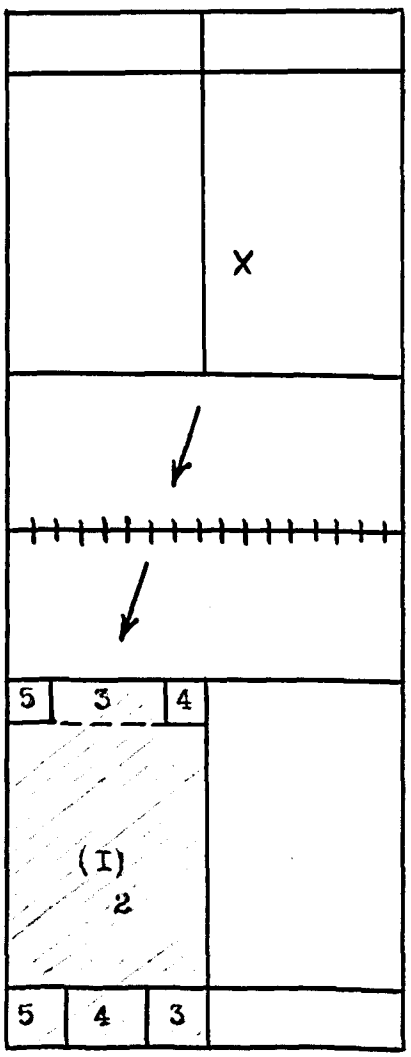

DIAGRAM #V SERVICE TEST

Part II

Clear Test

Generally speaking, the high clear, or lob, is mainly a defensive shot. In this test we used the fore-hand and back-hand clear shot. This shot is played high and deep to the opponent's back line or court. "This shot is usually the down-fall of many beginners as they do not play these clears deep enough."[1]

They are used mainly for defensive play in order that one may gain an advantageous position in the court. "Good depth in hitting shuttle to back court is essential to good badminton."[2]

For this test we need the regular single court with the net across the center, and another net stretched across the court seventeen feet from the center net and five feet from the back out-of-bounds line, parallel to it and at the same height as the center, or regulation net.

The student places himself in the center of the court midway along the center line. The instructor should stand on the intersection of the short service line and the center line on the same side of the net as the targets and serve the bird to the player. The player is given five trials.

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1. Kenneth R. Davidson, "Watch the Birdie", Jl. of Health and Physical Education, Vol. 8: April, 1937, pp. 240-242.

2 Davidson, Op. Cit., (Film).

The purpose of this test is to place all shots behind the back net and in bounds. In order to score the bird must clear the back net and land in that area of the court between the back net and the base line. (See Diagram #VII). Five points are given for each shot landing in this area, making a total possible score of twenty-five points on this part of the test.

In each trial the player assumes a stationary position, standing on the center line until after the bird is hit. The first of the five trials served by the instructor is to the front of the player, making him come up for the shot, (position A). The next shot is placed directly behind the player, requiring him to go back, (position B). The third trial is to the right of the player, and in this instance he has to make a fore-hand recovery, (position C). Following this shot the next trial is to the player's left side, thus requiring the use of a back-hand stroke, or clear (position D). The last shot the instructor repeats any shot of the other four trials which might have been missed.

The player should be told the type shots he will have to make on this test, and that he is to place the bird in an area behind the back net and inside the back boundary line. (See Diagram #VI).

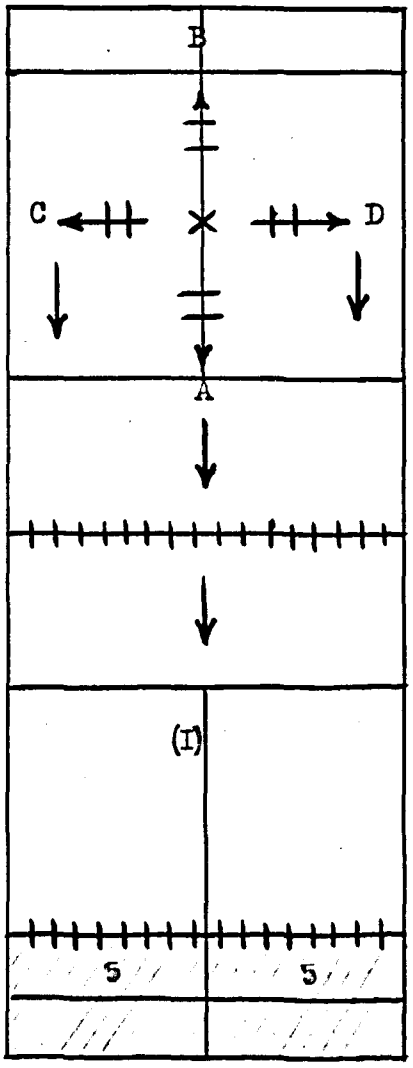

DIAGRAM #VI CLEAR TEST

Part III

Drop Shot from Mid-Court

The drop shot is most effective when mixed with a change of pace, and it is important in the mastering of net play. The drop shot should just clear the net, and requires a delicate touch, no matter from what position the shot is played. Most beginners use the drop shot to excess: thus it loses its effectiveness.

In this test the drop shot is taken from mid-court. Here again the singles court and the neutral zone between the net and the front service line are used. The neutral zone is divided in half by extending the center line to the net, thus making a right and left half court of the front court area. Two 20" x 20" targets are used in the two corners flush with the net. A line is drawn four feet from the net, parallel to the net, and two lines perpendicular to this, four feet in from each side line. The third area is formed by the extending of the center line. into the front court area. (See Diagram #VII).

To take this test the player places himself at the mid-court line at the intersection of the front service line, while the instructor serves trials from a like position on the other side of the net. Ten trials are given. The player being tested uses a fore-hand and back-hand net drop shot. The instructor serves and designates what shot he wants used and to which half court it is to be placed. The player begins with a fore-hand to left

court, then a back-hand to right court, continually alternating courts. Following is an example of the procedure to be used:

Example:

Left court	-	Right court
Fore-hand	→	Back-hand
Back-hand	→	Fore-hand
Fore-hand	→	Back-hand
Back-hand	→	Fore-hand
Fore-hand	→	Back-hand

The bird must land in the court half which the instructor has designated and in one of the three target areas. (See Diagram #VII). Here again, a score of fifty can be made for ten trials.

Be sure the player is clear on the alternating of shots. He should be cautioned to remember to hit the bird at its greatest height and use very little wrist action. It is best to hit diagonally along the net rather than to use a hair-pin drop. Keep the bird low, close to the net and use a delicate touch.

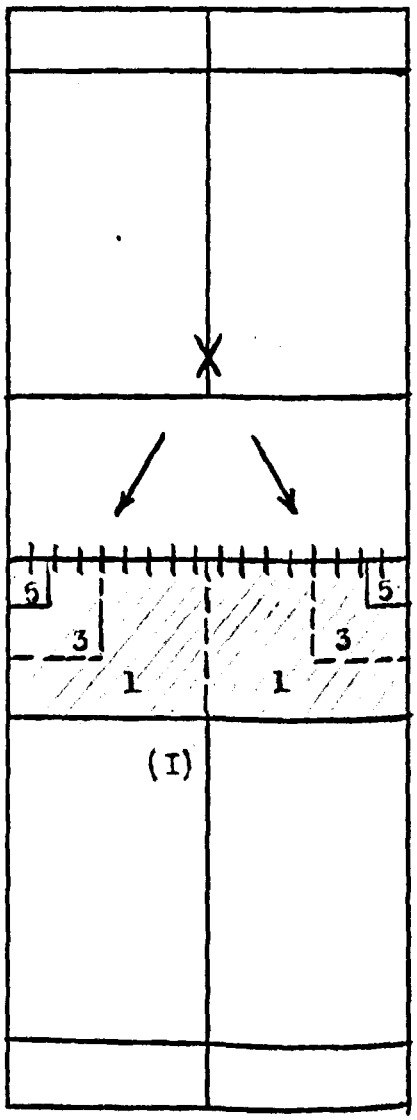

DIAGRAM #VII MID-COURT DROP SHOT

Part IV

Drop Shot from Back Court

Because of the peculiar fall of the "bird" the drop shot is deadly in Badminton[1]

The idea is not so much to win a point as it is to feint him (the player) off balance with a sudden change of pace.[2] This causes the opponent to hit up.

By and large, the drop shot is not used to score an ace but a method of forcing the opponent to set the bird up so a smash is inevitable on the next shot. This substantiates what Forgie[3] says: "The smash is the main point getter.

For this test the fore-hand and back-hand drop shot from the back court was used, placing the bird just over the net.

Equipment to be used for this test is the single court for badminton, with the regular net stretched across the center of court. Two lines are drawn parallel to the net, one four feet and the other three feet from the net.

The player places himself on the long line for doubles and at the intersection of the mid-court line. The instructor serves from the front service line as in tests two and three. The player is given five trials, alternating each shot right

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1 Literary Digest, Jan. 25, 1936, p. 38.

2 Hugh Forgie, "Place the Bird Where You Want It", Scholastic, Vol. 39; Dec. 1, 1941, p. 38.

3 Ibid.

and left, three to his fore-hand and two to his back-hand.

Example:

Right	-	Left
Fore-hand	→	Back-hand
Fore-hand	←	Back-hand
Fore-hand	→	

Each time make him move to right or left for each trial.

Any badly hit bird, that is that the instructor felt was too far off, was taken over.

Here again as in the other tests, the reason for the alternation of serves is to keep the player from getting adjusted to one stroke.

The bird had to be hit on the other side of the net from the player and between the four foot line and the net. (See Diagram #VIII). Any bird hitting in the three foot area counted five points, and a bird that hit in the one foot area between the three and four foot line counted three points. Birds falling in front of the net or beyond the four foot line counted nothing, the total possible score being twenty-five points.

The player should be told the importance of getting position on the bird and that the bird must drop just on the other side of the net.

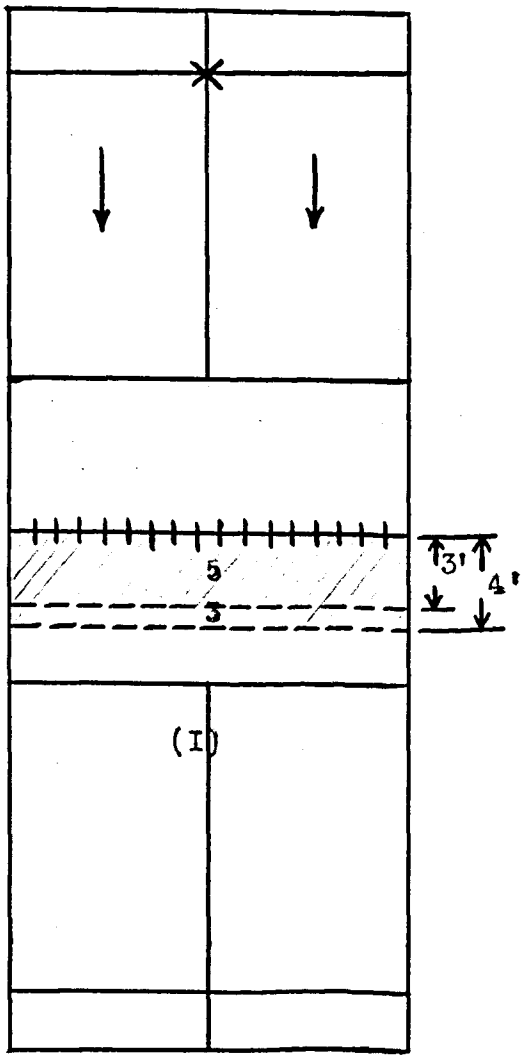

DIAGRAM #VIII DROP SHOT FROM BACK COURT

3) Statistical Procedure

The Rank difference method was used in this study for two reasons: 1) The number of subjects used was small.

2) The criterion used to validate the test was based on the relative rank in badminton ability from poorest to best as determined by a ladder tournament extending over a period of ten weeks.

Mills[1] states:

"The coefficient of rank correlation is appropriate where it is possible to rank individuals, or other entities, on the basis of abilities or qualities not open to exact measurement."

Intercorrelations were run between the four parts of the first test to see if the individual tests were testing the same or different skills.

In order to check the extent to which learning may have occurred between the first and second administration of the tests the critical ratio was computed. It is recognized that in a test-retest situation the problem of learning is usually involved.

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1 Frederick Cecil Mills, Statistical Methods Applied to Economics and Business, New York: Henry Holt and Co., 1938, p. 378.

ANALYSIS OF DATA

III

Analysis of Data

Reliability of Test: The test-retest procedure was used. The correlation between the composite score of the test battery given the first time and the scores made upon a retest were computed by the rank difference method. The reliability coefficient of this test .80 is fairly high but when compared with Scott's Badminton Achievement Test[1] which was given many times and had a range of reliability coefficient .77 to .98 this test correlation of reliability is low by comparison.

Intercorrelation of Test Scores: To ascertain whether or not the various parts of the tests (T_1, T_2, T_3 and T_4) might be testing the same skills, intercorrelations were run between the aggregate totals of each of the four individual parts.

TABLE II

Intercorrelations of the first test.

Service test$_1$	vs	Clear Test$_1$	Rho.	.60
Service test$_1$	vs	Mid Court Drop Shot$_1$	Rho.	.30
Service test$_1$	vs	Back Court Drop Shot$_1$	Rho.	.63
Clear test$_1$	vs	Mid-Court Drop Shot$_1$	Rho.	.41
Clear test$_1$	vs	Back Court Drop Shot$_1$	Rho.	.41
Mid-Court Drop Shot$_1$	vs	Back Court Drop Shot$_1$	Rho.	.43

1 Gladys M. Scott, "Achievement Examination in Badminton", Research Quarterly, Vol. 12: May, 1941, pp. 242-253.

Although all correlations are positive none of them are sufficiently high to indicate that the four parts of the test battery are testing exactly the same attributes. Therefore, all four items were left in the battery with the feeling that a deletion of any one item might lower the value of the test.

In the intercorrelation between the tests which varied from Rho. .30 to Rho. .63, the greatest differences are shown between Service Test and Drop Shot from Mid-Court. This might be explained by the fact that in the Service Test the impetus of the bird starts from the individual, while in the Mid-Court Drop Shot Test the impetus starts with the instructor. Also while in the Mid-Court Drop Shot test the person has to hit the bird to a designated spot while in flight and in the Service Test all he has to do is to direct the bird to a certain target area by hitting the bird out of his hand.

Greatest similarity was shown between Service Test and Clear Test (Rho. .60) and Service Test and Drop Shot from Back Court (Rho. .63). These similarities may be partly explained by the fact they all take into practice the basic fore-hand and back-hand stroke with a follow-through action, whereas the drop shot at the net is merely a touch shot with no follow-through. The author feels that the difference between these tests of greatest similarity and the drop shot test at the net were measuring different skills along with the fact that these strokes are used more often in badminton play.

Validity

To determine the validity of the test the aggregate total of the test-retest score was correlated with the criteria by the Rank Difference method. This validity coefficient of .86 compares favorably with a validity coefficient of .85 found by Scott. Comparison of technique used in obtaining validity shows that Scott's correlation of .85 was obtained in a preliminary study between the test and a combination of subjective estimates and standings in tournament play. In this study the validity was based on a single criterion.

This indicates that the test has considerable value as a predictor of badminton ability depending upon the confidence one places in the criterion.

Critical Ratio:-

A critical ratio of 2.576 was chosen as indicative of a significant difference between performance on first and second test - this is the one per cent level of significance.[1]

From the result of the data a critical ratio of 5.49 between the performance on the first and second administration of the test, indicates a significant increase in performance between the first and second administration of the test. Because of the nature of the motor skills measured by this test

1 Op. Cit., Mills, p. 471.

it is possible that much of the increase is due to learning. The reliability .80 indicates that the learning which may have taken place occurred in approximately the same proportion among the individuals tested. This high critical ratio therefore does not necessarily invalidate the test. Continued investigation with the instrument might indicate a pattern of growth in some of the basic badminton skills.

Further investigation might furnish additional data concerning the reliability of test, which at present has a forecasting efficiency of approximately 40 per cent better than chance,[1] indicating that at 40 per cent of the time prediction of a person's performance on this test will be identical, 60 per cent of the time a pure chance factor will be in operation.

The similarity between Standard Deviation of the first and second test (13.06 and 13.36) indicates no variation in the homogeneity and the heterogeneity of the groups.

The decrease in Range from 62-46 (see Table #5) indicates extreme scores tend to regress more to the mean.

---

1 Harry A. Greene, Albert N. Jorgensen, Raymond Gerberich, Measurement and Evaluation in the Secondary Schools, New York: Longman, Greene & Co., 1942, p. 563.

Table III

(Results in performance between $Test_1$ and $Test_2$.)

Tests	No.	Mean	S.D.	S.E. M	Diff M	S.E. diff	C.R.	Range	Range diff
Test 1	36	72.95	13.06	3.18	17.10	3.11	5.49	62	16
Test 2	36	90.05	13.37	2.23				46	(de-crease)

SUMMARY AND CONCLUSION

Summary and Conclusion

The writer was an instructor the past year at Western Carolina Teachers College and taught classes in beginning badminton, which included teaching of the fundamentals of badminton and has been continuously confronted with the problem of grading these skills.

Therefore, the purpose of this test was concerned with the testing and grading skills in badminton and evaluating the performance of the individual.

The test was devised to use a minimum amount of time (fifteen to twenty minutes), inexpensive cost of equipment merely including rackets, birds, nets and singles court, to be interesting to practice, and to show development of skill. The test consists of four parts using the basic strokes or shots, Service, Drop Shot and clear or lob.

The Service Test was used to emphasize the two basic serves in badminton, the short serve generally used in doubles and the long high service used in a game of singles. The Clear Test which used the clear or lob shot played mostly as a defensive shot to gain advantageous position on opponent by placing the shot high and deep to the opponent's back line or court. In this test we bring into practice the mid-court Drop-Shot, using a delicate touch, keeping the bird low, close to the net. This is important in the individual's net game. The

fourth test is one which also uses the Drop-shot, but from back court. Back Court Drop Shot is important if used against a player who hits from and constantly stays in, the back court, can be used as a change of pace.

Equipment needed for test - two nets, gut rackets, indoor birds, official score sheet, and the singles court. Cardboard targets can be made which are used in this test.

Thirty-six college students of equal playing ability were selected for this test. This homogeneous group first played every Saturday, challenging one another for eight weeks, at the end of which time, each was placed in a ladder tournament according to the number of matches won and lost.

The ladder tournament was played for about ten weeks, until all had been retested, with an individual being allowed to challenge two positions above his.

No practicing was allowed between tests and the time of retesting varied from one day to four weeks.

The same person gave all the tests and any bird that was difficult for player to play was taken over.

The Conclusion:-

1) In comparison with Scott's test, which is the only other skill test in badminton stating reliability and validity of .77 to .98 and .85 respectively, this test rates very favorably with a reliability correlation of .80 and a validity of .86. This test having a larger sampling of performance enables one to place more credence in its results.

In comparing this test with a fairly recognized study in a motor skill test in tennis (Dyers Backboard Test in Tennis) shows a reliability of .90 and the validity from .85 to .90 based on expert ratings and on a round-robin tournament. This comparison is equally satisfactory.

Using Greene, Jorgensen and Gerberich table of forecasting efficiency this instrument has a predicting value of badminton ability of 40 per cent better than chance.

2) The intercorrelation of the parts of the test were low enough to show the test measures different skills.

3) Although critical ratio of 5.49 indicates that learning took place, it does not invalidate test.

4) The decrease in Range indicates that scores tend to regress more to the mean.

5) The mean score was found to check the test further and a mean difference of 17.10 was found to show that some learning took place.

Not only does the test have a testing technique but also a teaching technique.

"Caution must be exercised to see that the fundamental shots are learned first before intricate or trick shots are even thought of.[1]

It is hoped that results of this study will assist Physical Education instructors in furthering the interest of the student in playing badminton skillfully and to evaluate their efforts.

---

1 Kenneth R. Davidson, "Watch the Birdie".

LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

Limitations and Suggestions for Further Research

Limitations

1. This test does not test the player's attitude.
2. There was a lack of uniformity in the time between retaking of tests.
3. Could have had more shots for each test and might have received a higher reliability.
4. There may be some possible dispute about the numerical value given to certain target areas.
5. In the Service Test there was no exact position for the player to serve from.
6. This is a test of accuracy and lacks the game condition and play thereof.
7. No control over the flight of the bird is possible.
8. This test does not take into consideration what the player does with his body in executing a shot (foot-loose, follow-through, position, stroke, balance, etc.).
9. Can only be used once the individuals have learned the badminton skills.
10. There may be a question of the instructor's consistency in hitting the bird in the same manner each time. The principle of using certain strokes is the important item, thus the fundamentals are still there - eye on the bird, position, and the stroke.

11. This group was only retested once.

12. The test did not include a Smash shot.

Suggestions For Further Research

1. Test every month for a period of a year and correlate rank.
2. Conduct a similar test between high school girls and boys.
3. Set up norms for High School, College and adult players.
4. Another test for more advanced players.
5. Make test which can test a large group of individuals at different intervals.
6. Construct a test that would require less time to take.

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APPENDIX

TABLE IV

	Z TOTAL	S.T.	P.T.	D.S. M.C.	D.S. B.C.	TOTAL	S.T.	P.T.	D.S. M.C.	D.S. B.C.	TOTAL
1.Hardin	199	40	20	18	13	91	38	25	27	18	108
2.McDonald	202	34	25	16	18	93	40	25	23	21	109
3. Claxton	208	37	25	19	23	104	35	25	24	20	104
4.Plyler	184	32	25	16	15	88	37	25	19	15	96
5.Melvin	198	30	25	18	16	89	37	25	22	25	109
6.Andrews	172	30	15	18	11	74	36	20	24	18	98
7.Hartshorn	181	31	15	16	11	73	44	25	21	18	108
8.Hensley	166	30	15	15	11	71	37	20	22	16	95
9.Pressley	188	29	25	17	14	85	41	25	21	16	103
10.Ellis	189	30	15	25	15	85	37	25	24	18	104
11.Clark	159	22	15	16	14	67	36	20	21	15	92
12.Powell	174	29	20	14	10	73	42	20	21	18	101
13.Rex	178	32	20	15	13	80	37	25	23	13	98
14.Cunning-ham	194	32	20	23	13	88	38	25	22	21	106
15.Monroe	164	26	25	19	8	78	27	25	19	15	86
16.Griffin	152	23	15	13	10	61	34	20	19	18	91
17.Barnhorst	178	27	20	18	11	76	37	25	19	21	102
18.Everheart	138	22	15	17	10	64	23	20	18	13	74
19.Neill	172	29	20	18	11	78	31	25	20	18	94
20.Beer	168	32	20	14	16	82	28	25	18	15	86
21.Anderson	149	29	20	12	8	69	32	20	15	13	80
22.Colagerakis	180	29	15	15	23	82	36	20	23	19	98
23.Collins	153	30	15	13	13	71	31	15	21	15	82
24.Wingo	152	28	15	13	11	67	32	20	20	13	85
25.Pennell	153	25	15	15	11	66	32	20	20	15	87
26.Atkinson	153	19	15	16	11	61	30	20	22	20	92
27.Franklin	160	20	15	17	13	65	31	25	21	18	95
28.Harris	153	30	15	11	13	69	27	25	17	15	84
29.Hunt	154	20	15	21	11	67	31	25	21	10	87
30.Bennes	149	23	15	12	11	61	33	20	20	15	88
31.Duke	148	27	15	15	13	70	24	20	16	18	78
32.Jordan	109	22	10	7	3	42	26	20	11	10	67
33.Barnwell	124	23	15	11	8	57	26	15	18	8	67
34.Lyda	119	20	15	12	9	56	23	15	14	11	63
35.Weir	129	20	20	10	8	58	21	20	19	11	71
36.Terrell	116	17	5	15	10	47	27	20	14	8	69
	5865	979	630	560	439	1608	1177	790	719	571	3157

TABLE V

Correlation of $Test_1$ with $Test_2$ for Reliability.

TEST I	TEST II	RK TEST 1	RK TEST 2	RKD	RKD
91	108	3	3.5	.5	.25
104	104	1	6.5	5.5	30.25
93	109	2	1.5	.5	.25
88	96	5.5	14.	8.5	72.25
89	109	4.	1.5	2.5	6.25
74	98	15.	12.	3.	9.
73	108	16.5	3.5	13.	169.
71	95	18.5	15.5	3.	9.
85	103	7.5	8.	.5	.25
85	104	7.5	6.5	1.	1.
67	92	24.	18.5	5.5	30.25
73	101	16.5	10.	6.5	42.25
80	98	11.	12.	1.	1.
88	106	5.5	5.	.5	.25
78	86	12.5	24.5	12.	144.
61	91	30.	20.	10.	100.
76	102	14.	9.	5.	25.
64	74	28.	31.	3.	9.
78	94	12.5	17.	4.5	20.25
82	86	9.5	24.5	15.	225.
69	80	21.5	29.	7.5	56.25
82	98	9.5	12.	2.5	6.25
71	82	18.5	28.	9.5	90.25
67	85	24.	26.	2.	4.
66	87	26.	22.5	3.5	12.25
61	92	30.	18.5	11.5	132.25
65	95	27.	15.5	11.5	132.25
69	84	21.5	27.	5.5	30.25
67	87	24.	22.5	1.5	2.25
61	88	30.	21.	9.	81.
70	78	20.	30.	10.	100.
42	67	36.	34.5	1.5	2.25
57	67	33.	34.5	1.5	2.25
56	63	34.	36.	2.	4.
58	71	32.	32.	0.	0.
47	69	35.	33.	2.	4.
1608	3157				1554.00
		1.00			6
	Reliability	.20		46620	)9324.00
	Rho.	.80			

TABLE VI
(Correlation of sum of T_1 and T_2 with the ranked criteria.)

RK	TOTAL OF (2) TESTS SCORE	RK TOTAL TEST SCORE	RKD	RKD_2
1	199	3.	2.	4.
2	202	2.	0.	0.
3	208	11	2.	4.
4	184	8.	4.	16.
5	198	4.	1.	1.
6	172	14.5	8.5	72.25
7	181	9.	2.	4.
8	166	17.	9.	81.
9	188	7.	2.	4.
10	189	6.	4.	16.
11	159	20.	9.	81.
12	174	13.	1.	1.
13	178	11.5	1.5	2.25
14	194	5.	9.	81.
15	164	18.	3.	9.
16	152	26.5	10.5	110.25
17	178	11.5	5.5	30.25
18	138	31.	13.	169.
19	172	14.5	4.5	20.25
20	168	16.	4.	16.
21	149	28.5	7.5	56.25
22	180	10.	12.	144.
23	153	23.5	15.	.25
24	152	26.5	2.5	6.25
25	153	23.5	1.5	2.25
26	153	23.5	2.5	6.25
27	160	19.	8.	64.
28	153	23.5	4.5	20.25
29	154	21.	8.	64.
30	149	28.5	1.5	2.25
31	148	30.	1.	1.
32	109	36.	4.	16.
33	124	33.	0.	0.
34	119	34	0.	0.
35	129	32	3.	9.
36	116	35	1.	1.
				1115.00

Validity 1.00 − .14 = Rho. .86

46620) 6 / 669 0 00

TABLE VII

(Intercorrelation of Service $Test_1$ with Clear $Test_1$.)

SERVICE $TEST_1$	CLEAR $TEST_1$	SERVICE $TEST_1$	CLEAR $TEST_1$	RKD	RKD^2
40	20	1.	11.	10.	100.
34	25	3.	3.5	.5	25
37	25	2.	3.5	1.5	2.25
32	25	5.5	3.5	2.	4.
30	25	11.5	3.5	8.	64.
30	15	11.5	25.	13.5	182.25
31	15	8.	25.	17.	289.
30	15	11.5	25.	13.5	182.25
29	25	17.	3.5	13.5	182.25
30	15	11.5	25.	13.5	182.25
22	15	29.	25.	4.	16.
29	20	17.	11.	6.	36.
32	20	5.5	11.	5.5	30.25
32	20	5.5	11.	5.5	30.25
26	25	23.	3.5	19.5	380.25
23	15	26.	25.	1.	1.
27	20	21.5	11.	9.5	90.25
22	15	29.	25.	4.	16.
29	20	17.	11.	6.	36.
32	20	5.5	11.	5.5	30.25
29	20	17.	11.	6.	36.
29	15	17.	25.	8.	64.
30	15	11.5	25.	13.5	182.25
28	15	20.	25.	5.	25.
25	15	24.	25.	1.	1.
19	15	35.	25.	10.	100.
20	15	32.5	25.	7.5	56.25
30	15	11.5	25.	13.5	182.25
20	15	32.5	25.	7.5	56.25
23	15	26.	25.	1.	1.
27	15	21.5	25.	3.5	12.25
22	10	29.	35.	6.	36.
23	15	26.	25.	1.	1.
20	15	32.5	25.	7.5	56.25
20	20	32.5	11.	21.5	462.25
17	5	36.	36.	0.	0.
					3126.50
					6
				46620	18759.00

	1.00
	.40
Rho.	.60

TABLE VIII

(Intercorrelation of Service Test$_1$ with Drop Shot from Mid-Court

SERVICE TEST	DROP SHOT FROM MID-COURT$_1$	RK SERVICE TEST$_1$	RK MID-COURT DROP SHOT$_1$	RK D	RK D^2
40	18	1.	8.	7.	49.
34	16	3.	16.	13.	169.
37	19	2.	4.5	2.5	6.25
32	16	5.5	16.	10.5	110.25
30	18	11.5	8.	3.5	12.25
30	18	11.5	8.	3.5	12.25
31	16	8.	16.	8.	64.
30	15	11.5	21.5	10.	100.
29	17	17.	12.	5.	25.
30	25	11.5	1.	10.5	110.25
22	16	29.	16.	13.	169.
29	14	17.	25.5	8.5	72.25
32	15	5.5	21.5	16.	256.
32	23	5.5	2.	3.5	12.25
26	19	23.	4.5	18.5	342.25
23	13	26.	28.	2.	4.
27	18	21.5	8.	13.5	182.25
22	17	29.	12.	17.	289.
29	18	17.	8.	9.	81.
32	14	5.5	25.5	20.	400.
29	12	17.	31.	14.	196.
29	15	17.	21.5	4.5	20.25
30	13	11.5	28.	16.5	272.25
28	13	20.	28.	8.	64.
25	15	24.	21.5	2.5	6.25
19	16	35.	16.	19.	361.
20	17	32.5	12.	20.5	420.25
30	11	11.5	33.5	22.	484.
20	21	32.5	3.	29.5	870.25
23	12	26.	31.	5.	25.
27	15	21.5	21.5	0.	0.
22	7	29.	36.	7.	49.
23	11	26.	33.5	7.5	56.25
20	12	32.5	31.	1.5	2.25
20	10	32.5	35.	2.5	6.25
17	15	36.	21.5	14.5	210.25
					5499.50
					6
	1.00			46620	32997.00
	.70				
Rho.	.30				

TABLE IX
(Intercorrelation of Service Test$_1$ with Drop Shot Back Court.)

SERVICE TEST$_1$	DROP SHOT BACK COURT$_1$	RK SERVICE TEST$_1$	RK DROB SHOT BACK COURT$_1$	RK D	RKD^2
40	13	1.	13.	12.	144.
34	18	3.	3.	0.	0.
37	23	2.	1.5	.5	.25
32	15	5.5	6.5	1.	1.
30	16	11.5	4.5	7.	49.
30	11	11.5	21.5	10.	100.
31	11	8.	21.5	13.5	182.25
30	11	11.5	21.5	10.	100.
29	14	3.	8.5	5.5	30.25
30	15	11.5	6.5	5.	25.
22	14	29.	8.5	20.5	420.25
29	10	17.	28.5	11.5	132.25
32	13	5.5	13.	7.5	56.25
32	13	5.5	13.	7.5	56.25
26	8	23.	33.5	10.5	110.25
23	10	26.	28.5	2.5	6.25
27	11	21.5	21.5	0.	0.
22	10	29.	28.5	.5	.25
29	11	17.	21.5	4.5	20.25
32	16	5.5	4.5	1.	1.
29	8	17.	33.5	16.5	272.25
29	23	17.	1.5	15.5	240.25
30	13	11.5	13.	1.5	2.25
28	11	20.	21.5	1.5	2.25
25	11	24.	21.5	2.5	6.25
19	11	35.	21.5	14.5	210.25
20	13	32.5	13.	19.5	380.25
30	13	11.5	13.	1.5	2.25
20	11	32.5	21.5	11.	122.
23	11	26.	21.5	4.5	20.25
27	13	21.5	13.	9.5	90.25
22	3	29.	36.	7.	49.
23	8	26.	33.5	7.5	56.25
20	9	32.5	31.	1.5	2.25
20	8	32.5	33.5	1.	1.
17	10	36.	28.5	7.5	56.25
					2948.00
					6
	1.00			46620	)17688.00
	.37				
Rho.	.63				

TABLE X
(Intercorrelation of Clear Shot$_1$ with Drop Shot Mid-Court.)

CLEAR TEST$_1$	DROP SHOT MID-COURT$_1$	CLEAR TEST$_1$	DROP SHOT MID-COURT$_1$	RK D	RK D^2
20	18	11.	8.	3.	9.
25	16	3.5	16.	12.5	156.25
25	19	3.5	4.5	1.	1.
25	16	3.5	16.	12.5	156.25
25	18	3.5	8.	4.5	20.25
15	18	25.	8.	17.	289.
15	16	25.	16.	9.	81.
15	15	25.	21.5	3.5	12.25
25	17	3.5	12.	8.5	72.25
15	25	25.	1.	24.	576.
15	16	25.	16.	9.	81.
20	14	11.	25.5	14.5	210.25
20	15	11.	21.5	14.5	210.25
20	23	11.	2.	9.	81.
25	19	3.5	4.5	1.	1.
15	13	25.	28.	3.	9.
20	18	11.	8.	3.	9.
15	17	25.	12.	13.	169.
20	18	11.	8.	3.	9.
20	14	11.	25.5	14.5	210.25
20	12	11.	31.	20.	400.
15	15	25.	21.5	3.5	12.25
15	13	25.	28.	3.	9.
15	13	25.	28.	3.	9.
15	15	25.	21.5	3.5	12.25
15	16	25.	16.	9.	81.
15	17	25.	12.	13.	169.
15	11	25.	33.5	8.5	72.25
15	21	25.	3.	22.	484.
15	12	25.	31.	6.	36.
15	15	25.	21.5	3.5	12.25
10	7	35.	36.	1.	1.
15	11	25.	33.5	8.5	72.25
15	12	25.	31.	6.	36.
20	10	11.	35.	24.	576.
5	15	36.	21.5	14.5	210.25
					4656.50
					6
				46620	)27939.00

1.00
.59
Rho. .41

TABLE XI

(Intercorrelation of Clear Test$_1$ with Drop Shot Back Court.)

CLEAR TEST$_1$	DROP SHOT BACK-COURT$_1$	RK CLEAR TEST$_1$	RK DROP SHOT BACK COURT$_1$	RK D	RK D^2
20	13	11.	13.	2.	4.
25	18	3.5	3.	.5	.25
25	23	3.5	1.5	2.	4.
25	15	3.5	6.5	3.	9.
25	16	3.5	4.5	1.	1.
15	11	25.	21.5	3.5	12.25
15	11	25.	21.5	3.5	12.25
15	11	25.	21.5	3.5	12.25
25	14	3.5	8.5	5.	25.
15	15	25.	6.5	18.5	342.25
15	14	25.	8.5	16.5	272.25
20	10	11.	28.5	17.5	306.25
20	13	11.	13.	2.	4.
20	13	11.	13.	2.	4.
25	8	3.5	33.5	30.5	930.25
15	10	25.	28.5	3.5	12.25
20	11	11.	21.5	10.5	110.25
15	10	25.	28.5	3.5	12.25
20	11	11.	21.5	10.5	110.25
20	16	11.	4.5	6.5	42.25
20	8	11.	33.5	22.5	506.25
15	23	25.	1.5	23.5	552.25
15	13	25.	13.	12.	144.
15	11	25.	21.5	3.5	12.25
15	11	25.	21.5	3.5	12.25
15	11	25.	21.5	3.5	12.25
15	13	25.	13.	12.	144.
15	13	25.	13.	12.	144.
15	11	25.	21.5	3.5	12.25
15	11	25.	21.5	3.5	12.25
15	13	25.	13.	12.	144.
10	3	35.	36.	1.	1.
15	8	25.	33.5	8.5	72.25
15	9	25.	31.	6.	36.
20	8	11.	33.5	22.5	506.25
5	10	36.	28.5	7.5	56.25
					4593.75
					6
				46628	27562.50

	1.00
	.59
Rho.	.41

TABLE XII

(Intercorrelation of Drop Shot Mid-Court with Drop Shot Back Court.)

DROP SHOT MID-COURT$_1$	DROP SHOT BACK COURT$_1$	RK DROP SHOT MID-COURT$_1$	RK DROP SHOT BACK COURT$_1$	RK D	RK D^2
18	13	8.	13.	5.	25.
16	18	16.	3.	13.	169.
19	23	4.5	1.5	3.	9.
16	15	16.	6.5	9.5	90.25
18	16	8.	4.5	3.5	12.25
18	11	8.	21.5	13.5	182.25
16	11	16.	21.5	5.5	30.25
15	11	21.5	21.5	0.	0.
17	14	12.	8.5	3.5	12.25
25	15	1.	6.5	5.5	30.25
16	14	16.	8.5	7.5	56.25
14	10	25.5	28.5	3.	9.
15	13	21.5	13.	8.5	72.25
23	13	2.	13.	11.	121.
19	8	4.5	33.5	29.	841.
13	10	28.	28.5	5.	.25
18	11	8.	21.5	13.5	182.25
17	10	12.	28.5	16.5	272.25
18	11	8.	21.5	13.5	182.25
14	16	25.5	4.5	21.	441.
12	8	31.	33.5	2.5	6.25
15	23	21.5	1.5	20.	400.
13	13	28.	13.	15.	225.
13	11	28.	21.5	6.5	42.25
15	11	21.5	21.5	0.	0.
16	11	16.	21.5	5.5	30.25
17	13	12.	13.	1.	1.
11	13	33.5	13.	20.5	420.25
21	11	3.	21.5	18.5	342.25
12	11	31.	21.5	10.5	110.25
15	13	21.5	13.	8.5	72.25
7	3	36.	36.	0.	0.
11	8	33.5	33.5	0.	0.
12	9	31.	31.	0.	0.
10	8	35.	33.5	1.5	2.25
15	10	21.5	28.5	7.	49.
					4479.00
					6
		1.00		46620	) 26874.00
		.57			
	Rho.	.43			

TABLE XIII

MEAN SCORE OF TEST 1

Class Interval	Mid Pt.	f.	d.	fd.	fd^2
102-106	104.5	1	7	7	49
97-101	99.5	0	6	0	0
92-96	94.5	1	5	5	25
87-91	89.5	4	4	16	64
82-86	84.5	4	3	12	36
77-81	79.5	3	2	6	12
72-76	74.5	4	1	4	4
67-71	69.5	8	0	-50	-
62-66	64.5	3	-1	-3	3
57-61	59.5	5	-2	-10	20
52-56	54.5	1	-3	-3	9
47-51	49.5	1	-4	-4	16
42-46	44.5	1	-5	-5	25
				-25	263

$$- \frac{263}{36} - .69^2 \times 5$$

$$7.30 - .4761 \times 5$$

$$6.8239 \times 5$$

$$2.612 \times 5$$

13.060 S.D.

S.E. 21175
M
1

36 | 1.25

c | .69
i | 5
ci | 3.45

AsM | 69.5
M | 72.95

TABLE XIV

MEAN SCORE OF TEST II

Class Interval	Mid. Pt.	f.	d.	fd.	$fd.^2$
108-112	109.5	4	5	20	100
103-107	104.5	4	4	16	64
98-102	99.5	5	3	15	45
93-97	94.5	4	2	8	16
88-92	89.5	4	1	4	4
83-87	84.5	6	0	6.3	-
78-82	79.5	3	-1	-3	3
73-77	74.5	1	-2	-2	4
68-72	69.5	2	-3	-6	18
63-67	64.5	3	-4	-12	48
				-23	302

$\frac{302}{36} - 1.11^2$

$8.38 - 1.2321 \times 5$

7.1479×5

2.673×5

13.365 S.D.

S.E. 2.226

M_{II}

36 40.

c $\frac{1.11}{5}$
i

5.55

AsM 8405

M 90.05