CHAPTER III
RESEARCH METHODOLOGY

3.1 Introduction: -

There are number of types of researches as mentioned in methodology of researcher they are Descriptive research, in descriptive research the Historical research philosophy cal research survey methods, and case study are included. Experimental research this research which the scholar had undertaken the experimental research. For studying any experimental and other type of research the scholar has to select the samples for his research study then he has to decide how he will get data what are the sources of data. After collecting data he has to apply various statistical procedures to find out the effect of his experiment in this way researcher conduct his study. As this study which researcher selected was experimental study. The scholar adopted following methodology for his research study.

The scholar had given below the various badminton skill test.

3.2 Selection of subjects for the study:-

This study was related to the boy’s and girl’s badminton players of university who participated in inter-collegiate badminton tournaments of their universities therefore the scholar selected the 100 girls and 100 boy’s badminton players who participated in intercollegiate badminton competitions from Sant Gadge Baba Amravati University and Rashtrasant Tukdoji Maharaj Nagpur University previously known as (Amravati University and Nagpur University.)
3.3 Sources of Data: -

These subjects were the sources of data and the study was related to the skill status of badminton boys and girls players participated in inter collegiate tournaments, therefore to test the skill status the scholar adopted Miller wall volley test as a source of data for his study. He conducted the Miller wall volley test o all the 400 players of SGB Amravati University badminton players and RTM Nagpur University players in 12 months time. The scholar trained 5 badminton players for testing badminton skills of the selected boys and girls.

The sholar selected Miller wall volley test for Badminton players.

Following Skill tests on badminton:-

Skill tests on badminton, numbers of test items are available. Some important among them are as follows.

The sholar selected Miller wall volley test for Badminton players.

1. French Short Serve Test
2. Miller Wall Volley Test
3. French-Stalter Badminton Test
4. Badminton Smash Test
5. The Poole Long Serve Test
6. The Poole Forehand Clear Test
7. The Poole Backhand Clear Test
8. Scott and Fox Long Serve Test
9. French Clear Test
10. Lockhart McPherson Badminton Test

Test Administration
Purpose: To measure the ability to serve accurately and low.

Facilities and Equipments: Badminton court, rope, shuttlecocks, racket, and floor markings. The circular lines are 1 inches wide and the width of them is included in the amount of each radius. The uses of different colors for the circles make scoring more accurate. One score and some assistants.

Procedure: The player stands in the regulation right court for serving and serves 20 times into the opposite right service court for the doubles game. The shuttlecock must go under the rope placed 20 inches above the net and parallel to it and must otherwise be a legal serve. The serves should be taken in groups of at least 5 and preferably 10 if there is a sufficient number of a shuttlecock.

Scoring: Score each serve by the numerical value of the area in which it first lands. Shuttlecocks that land on a line will score the higher value. Serves that fail to go between the rope and net, that are out of the bounds of the right service court for doubles, and that are not executed legally, will score zero. The final score is the total of the values made on 20 serves.
Figure No. 3.1

French Short Serve Test

SERVER

ROPE 20” ABOVE NET AND PARALLEL

22” 30” 35” 48”

SCORER

20” ROPE

20” ROPE
2. Miller Wall Volley Test :-

Frances A. Miller found that both the men’s and women’s finalists employed clears more than any other stroke in all of their games. After analyzing movies of the various types of clears, she devised a badminton test based on this stroke.

Test Administration

**Purpose:** To measure the ability to use the clear shot in badminton.

Age level and sex: Developed for college men and women. Appropriately for secondary school students, especially if the restraining line is placed at 8 feet from the wall.

Facilities and Equipments: Wall a 1-inch is extended across the wall $7\frac{1}{2}$ feet from the floor and parallel to it. The width of the wall space should be at least 10 feet and the height preferably 15 feet or higher, shuttle cocks, rackets, score sheet, helpers and stop watches.

**Procedure:** A 1-minute practice should be given before the first trial, but not between trials. A short rest period should be allowed between trials. Owing to the fact that a subject encounters difficulty when trying to look at the line on the floor while watching the shuttlecock, it is suggested that a chalk line 3 inches back from the 10-foot line be added, and the subject told to stay behind that line if possible. This allows the foot to slide as much as 3 inches without penalizing the person being tested. Also the scorer should say back whenever the subject consistently goes over the line. Any stroke may be used to keep the shuttlecock in play. A carried bird or a double hit is counted as good if the hit eventually goes on or over the 7 ½ foot wall line.
**Instructions:**

On the signal, “Ready, go”, the subject serves the shuttlecock in a legal manner against the wall from behind the 10-foot floor line. The serve puts the shuttlecock in a position to be rallied with a clear on each rebound. If the serve hits on or above the $7^{1/2}$ foot wall line, that hit counts as 1 point and each following rebound hit, made on or above the $7^{1/2}$ foot wall line when the subject is behind the 10-feet floor line, counts as 1 point. The hit is not counted if any part of the foot goes over the 10-foot restraining line. The hit is not counted if the shuttlecock goes below the $7^{1/2}$ foot wall line. However, either in the case of the foot going over the restraining line or the shuttlecock going below the wall line the subject is permitted to keep the shuttlecock in play. The subject may step in front of the restraining line to keep the shuttlecock in play, but its failing to follow the specification do not count. The shuttlecock may be stopped at any time and restarted with a legal service from behind the 10 feet floor line. If the shuttlecock is missed or falls to the floor, the subject picks up the same shuttlecock as quickly as possible, gets behind the restraining line, and puts the shuttlecock into play with a legal service.

**Scoring:**

An Accumulative number of hits made within 30 seconds is the score for each individual trial. Three, 30 second trials are given. The score consists of the sum of 3 trials.
Figure No. 3.2
Illustration of Miller wall-volley test for badminton skill
3. French-Stalter Badminton Test

French and Evelyn Stalter constructed French-Stalter Badminton Test. It contains two test items measure. 1. Serve test and 2. Clear test. The reliability coefficient ranging from 0.77 to 0.98 were obtained.

Serve Test
Test Administration
Purpose: To measure the ability to serve and its accuracy.

Facilities and Equipments: A badminton court, markings, shuttlecocks, racket, score sheet, and helpers.

Procedure: The subject serves 20 birds at the target diagrammed in figure and described as follows: (a) a clothesline rope is stretched 20 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 22 inches, 30 inches, 38 inches, and 46 inches from the intersection point of the short service line and the center line (the use of different colored lines help in scoring).

Scoring: Zero is recorded for each trial that fails to go between the rope and the net or that fails to land in the service court for the doubles game. Score each of the other birds as shown in the figure. 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 20 trials. Illegal serves shall be repeated.
The Clear Test

Test Administration

Purpose: To measure the ability to return the ball on the values of the score (markings).

Age level and sex: Satisfactory for college women.

Facilities and Equipment: A badminton court, markings, shuttlecocks, racket, score sheet, and helpers.

Procedure: The subject returns a serve, attempting to score on the target shown in the figure and described as follows: (a) a clothesline rope is stretched across the court 14 feet from the net and parallel 8 feet from the floor. (b) the following floor markings are made, 2 lines across the court and 4 feet nearer the net than the rear service line in the doubles game, and a line across the court 2 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 2 inches square and located 11 feet from the net 3 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.

The following grading plan for the badminton skill test was proposed:
Table: No 3.1

Grading plan for the Badminton skill test.

<table>
<thead>
<tr>
<th>Beginners</th>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>115-145</td>
</tr>
<tr>
<td>B</td>
<td>85-114</td>
</tr>
<tr>
<td>C</td>
<td>40-84</td>
</tr>
<tr>
<td>D</td>
<td>15-39</td>
</tr>
<tr>
<td>F</td>
<td>0-14</td>
</tr>
<tr>
<td>A</td>
<td>170-180</td>
</tr>
<tr>
<td>B</td>
<td>110-169</td>
</tr>
<tr>
<td>C</td>
<td>55-109</td>
</tr>
<tr>
<td>D</td>
<td>25-54</td>
</tr>
<tr>
<td>F</td>
<td>0-24</td>
</tr>
</tbody>
</table>

**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 20 trials. If the stroke is “carried” or “slung”, it is considered a foul, and the trial is repeated.
4. **Badminton Smash Test**

**Test Administration**

**Purpose:** To measure ability in the overhead smash skill in badminton utilizing the Johnson badminton Set-up Machine.

**Facilities and Equipments:** A Johnson Badminton Set-up Machine (Motor or manual) is needed along with a tightly strung badminton racket and several birdies. The following figure shows lines and points that should be marked with chalk or tape on the court. The machine should be placed 13 feet from the net, with the arm rotating belt parallel to the net.

**Procedure:** The Subject will stand below the dropping point of the machine and facing the net. After seven practice trials, the student is to smash the bird into the scoring areas along either side line. Trials taken without reasonable speed and force are incorrect and must be repeated for scoring purposes.

**Scoring:** Ten trials are allowed for score and the maximum score possible is ten points. (See scoring table).
Badminton Smash Test
Percentile Scores Based on Sex
Table No 3.2
Badminton Smash Test

<table>
<thead>
<tr>
<th>Percentile</th>
<th>Sex</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100&lt;sup&gt;th&lt;/sup&gt;</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>95&lt;sup&gt;th&lt;/sup&gt;</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>90&lt;sup&gt;th&lt;/sup&gt;</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>80&lt;sup&gt;th&lt;/sup&gt;</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>70&lt;sup&gt;th&lt;/sup&gt;</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>60&lt;sup&gt;th&lt;/sup&gt;</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>50&lt;sup&gt;th&lt;/sup&gt;</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>40&lt;sup&gt;th&lt;/sup&gt;</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>30&lt;sup&gt;th&lt;/sup&gt;</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>20&lt;sup&gt;th&lt;/sup&gt;</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*Table taken from practical measurements for evaluation in physical education by Barry L. Johnson and Jack K. Nelson, P. 262.

**Directions:** (a) The student should be informed immediately when an incorrect stroke is to be repeated. (b) If a repeated trial is also incorrect, the trial is scored as
zero. (c) The shuttle skirt should be placed skirt down in the cups of the machine so as to allow the bird a quick rotation to the tip down position of the smash shot.

5. The Poole Long Serve Test

Test Administration

**Purpose:** To measure ability to serve high and deep to the rear of the court.

**Age level and sex:** Test may be used with high school and college students of both sexes.

**Facilities and Equipments:** The court is marked as shown in the figure. Four lines have to be drawn which are indicated by the dotted lines in the figure. One line is drawn 2 inches behind and parallel to the back boundary line. A second line is drawn parallel to and 16 inches closer to the net than the first drawn line.

This places the second drawn line 14 inches from the back boundary line and 16 inches in back of the doubles long service line. The third line is drawn 16 inches in depth as indicated in the figure. It should be noted that the 5-point zone extends 2 inches beyond the back boundary line. A 15-by-15 inch square is drawn 11 feet from the net in the middle of the service court (o). Two rackets preferably twelve shuttles, in good condition, a score sheet and helpers are needed for the test.

**Procedure:** The subject stands anywhere in the right service court (x) and serves twelve shuttles. The server attempts to serve over the extended racket of a student who stands in the square (O) in the target court. This student acts as the “opponent” and assists in the scoring by yelling “low” for any shuttle which does not go over his racket.
Table: No3.3
Poole’s Long Serve Test Scoring Scale

<table>
<thead>
<tr>
<th>Preliminary skill test</th>
<th>Performance level</th>
<th>Final skill test</th>
</tr>
</thead>
<tbody>
<tr>
<td>26 Above</td>
<td>Advanced</td>
<td>30 Above</td>
</tr>
<tr>
<td>17-25</td>
<td>Intermediate</td>
<td>20-29</td>
</tr>
<tr>
<td>0-16</td>
<td>Beginner</td>
<td>0-19</td>
</tr>
</tbody>
</table>

**Scoring:** The scorer stands at point Z in the figure. Each serve is scored according to the zone in which the shuttle hits. The best ten out of twelve serves are totaled. A perfect score would be fifty. Shuttles hitting on the line are given the higher point values. One point is deducted for any shuttle that fails to clear the upheld racket of the player at O.

**Directions:** (a) Only legal serves are scored. (b) The height of the player O who extends the racket over his head is of little consequence. Naturally, extremes should be avoided. (c) Poole believed that this represented a more game like situation than the use of a rope and that it sacrificed very little objectivity. In addition, it facilitates the test administration in terms of equipment and economy of time. If the tester wishes to use a rope, poole recommends that it be 9 feet high and placed 11 feet from the net. (d) The 2-inch zone beyond the back boundary line was included in the maximum point zone because it was believed that an opponent would ordinarily play any shot that close to the base line. (e) In order to expedite the test administration, the test could be shortened to the best six out of eight trials. It was found that this scoring method correlated. 95 with the ten out of twelve scoring system.

6. The Poole Forehand Clear Test
Test Administration

**Purpose:** To measure the player’s ability to hit the forehand clear from his back court high and deep into the opponent’s court.

**Sex and Age Level:** The test may be used with high school and college students of both sexes.

**Facilities and Equipments:** The court with scoring zones is marked as shown in the figure. One line is drawn parallel to and halfway (6 1/2 feet) between the short service line and the doubles long service line. Another line is marked 6 inches beyond the back boundary line. A 15-by-15 inch square is drawn 11 feet from the net astride the center line (O in figure). On the other side of the court a 15-by-15 inch square is drawn at the intersection of the doubles long service line and the center line (X in the figure). Two rackets and preferably twelve shuttles in good condition are needed. A score sheet and some helpers are also needed.

**Procedure:** The subject stands with his right foot in the X square (assuming he is right-handed), holding his racket face up. The shuttle is placed feathers down on the forehand side of the racket. He then tosses the shuttle into the air and hits an overhead forehand clear of his opponent’s racket and deep into the opponent’s court. His right foot should stay in contact with the X square until the shuttle has been struck. A player stands at point O with his racket extended overhead. He calls out “low” if any shuttle does not go over his racket. Twelve clears are attempted.

**Scoring:** The point value of the zone in which the shuttle hits is recorded on the score sheet for each attempt. The best ten out of twelve shots are totaled. A perfect score would be forty. Shuttles hitting on the line are given the higher point values. One point is deducted for any shuttle which fails to clear the racket or the player O.

**Directions:** (a) Most of the pointers listed for the long service test apply also for this test. (b) The tossing of the shuttle by the subject is a skill that needs some practice; however, it has been demonstrated that any beginner can quickly acquire
this skill. It was felt that this feature of the test (not utilizing a second person to
serve shuttles to the subject) increases the objectivity of the test considerably and
also facilitates the test administration. (c) The tossing and ability of the shuttle also
serves as a drill that the student can practice by himself on or off the court from the
first day of class. (d) If desired, the test can be shortened to the best six out of eight
trials. This correlated. 96 with the best ten out of twelve score.

7. The Poole Backhand Clear Test

Test Administration

Purpose: To measure the player’s ability to hit a backhand clear from his back
court high and deep into the opponent’s court.

Age level and sex: High school and college males and females.

Facilities and Equipments: Same as for the forehand clear test (See the figure).

Procedure: Same as for the forehand clear with the following exception. The
subject stands with his left foot in the x square. He places the shuttle on the
forehand side of the racket, tosses it into the air, and then executes a backhand
clear shot deep into the opponent’s court. Twelve trials are given.

Scoring: Same as for the forehand clear test.

Directions: (a) Same as for the forehand clear test. The tossing skill needs
practice. It was found that placing it on the forehand side of the racket was easier
to perform for the backhand clear than placing it on the backhand side to the
racket. (b) If desired, the test can be shortened to the best six out of eight trials.
This correlated. 94 with the best ten out of twelve score.

8. Scott and Fox Long Serve Test

Test Administration

Purpose: To measure ability to serve high and deep to the rear of the court.
Age level and sex: May be used for both sexes. College and or high school level.

Facilities and Equipments: Extra standards are needed from which a rope can be stretched across the court at a height of 8 feet and at a distance of 14 feet from the net. A tightly strung racket and at least five shuttles in good condition are needed for the test. With chalk or washable paint, arcs are drawn outward from the intersection of the left singles side line and the long service line. The arcs are drawn at distances 22, 30, 38 and 46 inches from the mid point. Each distance includes the width of the 2-inch lines.

Procedure: The subject (A) stands in the service court diagonally opposite the target and attempts to serve over the rope into the corner of the court containing the target zones. The shuttle must pass over the rope in order to serve points. Only legal serves count as trials. The target zones are marked according to the point values shown in the figure. Twenty shuttles are served.

Scoring: Any shuttle falling on a line is given the hither point value. The score for the entire test is the total of the twenty trials. Fouls are repeated. The score (B) should stand so that he can determine whether or not the shuttle passed over the rope as well as to see where the shuttles hit. Scores are called out to a recorder.

9. French Clear Test

Test Administration

Purpose: To measure power necessary to successfully execute the clear shot in badminton.

Age level and sex: College women (but can be used with men).

Facilities and Equipments: A clothesline rope is stretched across the court at a height of 8 feet, at a distance of 14 feet from the net. At least five shuttlecocks a tightly strung racket, and floor markings with lines 1 ½ inches wide drawn on the floor as shown in the figure.
**Procedure:** The subject (A) stands behind the short service line on the court opposite the target. Small marks are drawn in each service court 11 feet from the net and 3 feet from the center line. An experienced player (B) (or perhaps the instructor) serves to the subject who stands between the two marks. A total of twenty shuttles are served to each subject, who attempts to return each shuttle with a clear shot that goes over the rope and preferably, lands near the end line. The twenty shuttles may be given consecutively or in groups of ten. A serve to the subject should fall between the two marks. If it does not go that far, or falls outside the marks the subject is not supposed to return, it. Thus, the subject does not have to play a poorly placed shuttle; only those shuttles played by the subject count as trials. The subject repeats any trial in which a foul is committed, such as when a stroke is carried or slung, or in the event that the shuttle hits the rope. The instructor demonstrates, and two practice trials are then given. The target extends from side to side, thus the subject does not have to confine his shots to half the court. The point values are shown in the figure.

**Scoring:** The server also acts as the scorer, calling out the point value for each shuttle. The score is the total points for the twenty trials. An assistant records the scores. Any shuttle landing on a line receives the hither point value. Only those shuttles passing over the rope count for score.

**10. Lockhart –McPherson Badminton Test**

Aileene Lockhart and Frances A. McPherson proposed a badminton test for college a woman, which consists of volleys a shuttlecock against a wall. While intended for college women, Mathews has reported that it is equally satisfactory for college men. The test and retest reliability correlation for the volleying test was 0.90.

**Test Administration**

**Purpose:** To measure badminton volleying ability.
**Age level and sex:** College women (satisfactory for college men).

**Facilities and Equipments:** An unobstructed wall space, at least 10 feet high and 10 feet wide as needed, a net line is marked 5 feet above and parallel to the floor, two floor lines parallel to the wall are necessary, a starting line is drawn 6\(\frac{1}{2}\) feet from the wall and a restraining line is drawn 3 feet from the wall, badminton racket, shuttlecock, stopwatch and score sheet are needed.

**Procedure:** To start the test, the subject stands behind the starting line with a badminton racket in one hand and a shuttlecock in the other; on the signal to “start”, she serves the shuttlecock against the wall above the net line. The shuttlecock is volleying against the wall as many times as possible in 30 seconds; three trials are given interspersed with short rests of about a half minute. The subjects score is the total number of legal hits made for the three trials. A legal hit is one made on or above the net line without crossing the restraining line in making the play. If the shuttlecock is missed, the player must retrieve it and put it back in play with a serve from behind the starting line.

**Scoring:** The score is the total number of legal hits made on or above the net line in the time allowed.

1. **Short Serve (French)**

   **Equipment:**
   1. A clothesline rope stretched 20 inches directly above the net and parallel to it, attached to the same standards as the net. New shuttles and tightly strung rackets.
   2. Floor markings

   Using the intersection of the short service line and the center line as a midpoint, describe a series of arcs in the right 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 short service line to the center line, as indicated in the diagram (Figure 6.1). The lines should be painted in different colors to increase accuracy in scoring. Showcard paint, which can be washed from the floor, is suggested.

**Test:**

The player being tested any place in the right service area diagonally opposite the target, and serves twenty times, attempting to send the shuttle through the space between the rope and the net in such a manner that it lands in the right 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 short service line and center line counts 5 points, next space 4 points, the next 3, then 2 and any shuttle off the target but in the service area for the doubles games counts 1 point.

**Scoring:**

No score is given for 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. 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 total of twenty trials. It is considered a foul and the trial is repeated if the serve is illegal. (For definition of legal serve, see American Badminton Association rules.)

**Reliability:**

For twenty-nine majors in physical education, State University of Iowa, the coefficient was 88 using the odd-even method of reliability, stepped up by application of the Spearman-Brown Prophecy Formula. For another group of 268 freshman and sophomore women the coefficient was was 68 by this method. For
fifty-nine majors in physical education at Illinois State Normal University (Players with less experience), a reliability of 51 was obtained using the same method. The difference in amount of playing experience doubtless explains the difference in coefficients.

**Validity:**

The validity of the test was found to be 66 when correlated with a criterion of tournament rankings (ladder tournament carried on throughout twenty class periods) at the State University of Iowa. For the fifty-nine students at Illinois State Normal University, a coefficient of 41 was found with a criterion of subjective ratings. For the group of 263 players, the coefficient between their test score and judges’ ratings of playing ability in the game was .51.

**T- Scales:**

A scale is presented in Table 6.2 from data obtained in college classes, most students being freshmen. The students were in their first term of badminton instruction and the test was given at the end of about twenty-five hours of instruction.

**Comments:**

This test is intended as a measure of accuracy of placement and the ability to serve the shuttle in a low flight. It is easy to administer but unless testing stations can be set up off the courts so that it does not interfere with play on the courts, it is time-consuming. (See Chapter 3 for suggestions.) The test should not be administered until the majority of players are quite skillful in making short, low serves; in fact, it is highly unreliable before that time. The serve is probably a more important skill for advanced players than for beginners.
2. **Long Serve (Scott and Fox)**

**Equipment:**

1. 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.

2. **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. (Figure 6.1) The lines should be painted in different colors to increase accuracy in scoring. Showcard paint, which can be washed from the floor, is suggested.

**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 5 points, the next space 4 points, the next 3, then 2, and any shuttle (over the rope) in the service area outside the target counts 1 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.

**Reliability:**
Coefficients have been computed on two different groups of freshman and sophomore women at the University of Iowa. For a group of forty-five the was 62 on odd-even trial, .77 when corrected by the Spearman-Brown formula. On a much larger group of 332 players the coefficients were .52 and .68 on the respective computations.

**Validity:**
The validity computed on the forty-five subjects at the University of Iowa was .54 when correlated with subjective ratings make by three judges during play.

**T-Scale:**
The T-Scale on this test is on ninety-one freshman and sophomore women at the University of Iowa. The test was taken after about twenty-five hours of instruction.

**Comments:** This test is designed to measure ability to place the serve high and to the rear of the court. From the standpoint of logic concerning different abilities involved in the two serve tests, it might seem desirable in some instances to use both tests. The dissimilarity is further borne out by the intercorrelation (r=.31) between the two tests.

**3. Clear Test No. 1 (French)**
**Equipment:**
1. 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.

2. Floor markings
   a) Construct a line 2 feet nearer the net than the rear service line in the doubles game and parallel to it. Measure from the exact center of the line. Extend this line from one outer alley line to the other outer alley line.
   b) On the same side of the net, construct a line 2 feet farther from the net than the rear service line in the singles game and parallel to it. Measure from the exact center of the line. Extend this line from one outer alley line to the other outer line. The lines should be painted different colors to increase accuracy in scoring.
   c) On the opposite side of the net, draw marks 2 inches square at spots indicated on the diagram as X and Y. The center of X should be 11 feet from the net and 3 feet from the center line toward the left side line. The center of Y should be 11 feet from the net and 3 feet from the center line toward the right side line. In measuring from the center line, use the exact center of the line.

Test:

The player being tested stands between the two square marks on the court opposite the target. The person giving the tests (player with considerable experience) stands on the intersection of the short service line and the center line on the same side of the net as the target and serves the shuttle to the player being tested. The shuttle must cross the net with enough force to carry it as far as the two squares before it touches the floor. If it does not go that far as the two squares before it touches the floor. If it does not go that far or is outside the space between the two squares, the player being tested should not play it. The player being tested may move any place he wishes as soon as the shuttle has been hit to him. Only
shuttles played by the player being tested count as trials. The player attempts to send the shuttle by means of a clear stroke above the rope so that the shuttle lands on the target. Twenty trials are allowed. The person giving the test should call out the score of each trial, to be recorded by an assistant. The area between the two rear lines of the regulation court counts 5 points, the space just behind it counts 3 points, and the space just in front of the two rear lines of the regulation court counts 4 points. Any shuttle going over the rope but failing to reach the target counts 2 points. This test can be given to two players at once on the same court, placing the squares 6 feet from the centerline and each player taking one side of the court.

**Scoring:**

No score is given for any trial failing to go over the rope or failing to land in the court in the space behind the rope and on the target, as indicated on the diagram. Any shuttle landing within and area or on the line surrounding the 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 total of twenty trials. It is considered a foul and the trial is repeated if the stroke is “carried” or “slung”. (See official American Badminton Association rules for interpretation of terms).

**Reliability:**

For the same subjects from University of Iowa as in the Short Serve Test, was .96 by odd-even method, stepped up with Spearman-Brown formula. For the other group at the University of Iowa, forty-five cases, it was .77 by the same method; and for a third group, forty-five cases, r was 83. For the same subjects from Illinois State Normal University as in the serve test, .70.
Validity:

At Iowa, with criterion of tournament rankings the validity was, .60; with subjecting ratings of playing ability, .40; at Normal, with the criterion of subjective ratings, .50.

T-Scale:

The scale is presented in Table 6.2. It was constructed from combined data from Illinois State Normal University and University of Iowa. The subjects were freshman and sophomore college students.

Comments:

This test is intended as a measure of power. After the players have practiced the test, the markers X and Y can be ignored and two players can be tested at the same time on the same court. This test is well liked as a practice device. Since power is a factor in general motor ability scores made on the Badminton Clear Test were correlated with the scores made on Scott General Motor Ability Test Battery A to determine the extent of relationship. The low correlation of .36 was obtained for the ninety-four cases in the study.

4. Clear Test No. 2 (Miller)

Equipment:

1) Tightly strung rackets, new shuttlecocks, stop watch.

2) Floor markings

A straight line 10 feet from the wall is extended the length of the wall distance and parallel to the wall.

3) Wall markings
A 1-inch line is extended across the wall 7 1/2 feet from the floor and parallel to the floor. The width of the wall space should be at least 10 feet and the height preferably 15 feet or higher.

**Test:**

The subject is permitted a one-minute practice period before the first trial. On the signal “ready, go” the subject serves the shuttlecock in a legal manner against the wall from behind the 10-foot floor line. The serve puts the shuttlecock in a position to be rallied with a clear on each rebound. If the serve hits on or above the 7 1/2 foot wall line, that hit counts as one point and each following rebound hit made on or above the 7 1/2 foot wall line, when the subject is behind the 10-foot floor line, counts as one point. The hit is not counted if any part of a foot goes over the 10-foot restraining line. The scorer should say “back” whenever the subject consistently goes over the line. The hit is not counted if the shuttlecock goes below the 7 1/2 foot wall line. However, if either the foot goes over the 10-foot line or the shuttlecock hits below the 7 1/2 foot line, the subject is permitted to keep the shuttlecock in play. The bird may be stopped at any time and restarted with a legal service from behind the 10-foot line. If the shuttlecock is missed and falls to the floor, the subject picks it up quickly as possible, gets behind the 10-foot line, and puts the shuttlecock into play with a legal service.

**Scoring:**

Three trials of 30 seconds each are given and the score consists of the sum of the three trials.

**Reliability:**
By test-retest method, .94. A week or less intervened between tests. One hundred college women subjects of all ranges of ability were tested and included in the reliability study.

**Validity:**
To determine the validity the scores of twenty players on the clear test were correlated with the results of a round-robin tournament. The resulting coefficient was .83.

**Comments:**
The compare the validity of this test to the validity of Clear Test #1, it would be necessary to use the same criterion and administer both tests to the same subjects. Miller made a careful study of the number of times services, drop shots, clears, smashes, drives, and half-court drives were used during an amateur badminton tournament finals in both men’s and women’s singles and found that the finalists used clears more often than any other stroke. A cinematographical analysis of the clear shot was made to ascertain the proper distance from the wall.

4) **Wall Volley No. 1 (Stalter)**

**Equipment:**
1. New shuttles, tightly strung rackets, stop watch.
2. Floor markings
   Construct a restraining line parallel to and 6 feet from the wall, including the width of the line in the 6-feet distance from the wall.
3. Wall space
Use an unobstructed wall with smooth brick construction with a space of from 12 to 1 foot in width for each testing station and a height of at least 15 feet.

Test:

The player to be tested stands behind the 6-foot restraining line facing the wall with racket and shuttle in hand. On signal he sends the shuttle with an underhand serve against the wall and volleys it on each rebound for a period of thirty seconds. Strokes made while the player is touching the floor nearer the wall than the restraining line do not count. The player may cross the restraining line to recover the shuttle but he must return to behind the line before putting the shuttle into play again with an underhand motion. Any stroke may be used; hard driven. Forehands or backhands with good wrist action seem to produce the best results. The test should be demonstrated and a practice period should be allowed before any data are collected. (This wall practice can be used advantageously throughout the season by players waiting turns to get on the courts; if this has been done, the practice period on the testing day need not exceed one trial for each player.) The scorer stands behind the player and slightly to one side. The need for repeating trials due to foot faults can be minimized if the scorer immediately corrects the position of and player who steps on or over the restraining line. Twenty or more players can be tested at one time along the four walls of the usual sized gymnasium. Four trials are allowed for each player, recording all scores. The scorer and player to be tested should alternate to assure each of a rest period between trials.

Scoring:
One point is scored for each volley against the wall. Putting the shuttle into motion with an underhand serve is not to be considered a volley. The score for the test is the total of the four trials.

**Reliability:**
Correlation by the odd-even method was .71; .83 when stepped up with the spearman-Brown formula. The subjects were fifty-nine women major students at Illinois State Normal University. Correlation of First and second trials yielded an r of .75 stepped up to .90; subjects were 368 freshman and sophomore women at the University of Iowa. In another group of forty-five students the co-efficient was .92 by the above computations.

**Validity:**
The validity was .52 with a criterion of combined subjective ratings at Illinois State Normal University; .78 with the forty-five Iowa students when scores were correlated with a subjective rating of playing ability.

**T-Scale:**
See Table 6.2, the scale was constructed on data obtained from ninety-one freshman and sophomore college women at the end of about twenty-five hours of instruction.

**Comments:**
This test is believed to measure wrist strength. It provides a wide range of scores and is economical of time for administration. The intercorrelation with the clear test administered to the same groups was .36 in each case. While the validity
is not high, this test contributes enough to be included in the recommended batteries as will be shown later.

**Wall Volley No. 2 (Lockhart and McPherson)**

**Equipment:**

1. **New shuttlecocks (birds), tightly strung rackets, stop watch.**

2. **Floor markings**
   
   Construct a starting line on the floor 61-2 feet from the base of the wall and parallel to the wall; a restraining line three feet from the wall and parallel to the starting line.

3. **Wall markings**
   
   Construct a 1-inch wide net line on the wall 5 feet above and parallel to the floor. The wall space should be 10 feet high and 10 feet in length.

**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 signal, he serves the shuttlecock 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 thirty seconds. Three trials are given to each player, with rest permitted between trials and a practice period of fifteen seconds is given before the first trial. Only hits on or above the net line are considered good. After the shuttlecock has been served, the player may move up to the restraining line if he 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 it in play with a serve from behind the starting line.
Scoring:
The score is the number of legal hits made on or above the backboard net line in the three trials.

Testing personnel:
A scraper who stands on the target side of the net out of the way of the flight of the shuttlecock.

3.4 Experimentation:
The scholar with the help of the assistants marked the wall inside the closed badminton court. Miller wall volley test for badminton skill test was developed in the year 1951 to measure basic badminton skill of clears (Shots hit high and deep in the opponent court) upon both men and women. Miller made a careful study of the number of times services, drop, shots, clears, smashes, drives, and half-court drives were used during an amateur badminton tournament finals in both men’s and women’s singles and found that the finalists used clears more often than any other stroke. A cinematographical analysis of the clear shot was made to ascertain the proper distance from the wall.

Equipment:
A stop watch, sponge, shuttle cock, badminton rackets, marking tape or chalk and a staircase to marks the wall, scour sheet etc.

Test Area:
A wall measuring at least 10 feet wide and 15 feet in height is marked with horizontal lines one inch wide and parallel to the floor. The first line is marked at the height of 7 feet 6 inches from the floor. A line is also marked on the floor at the distance of 10 feet away from the wall.

Miller wall volley test for badminton wall marking.

Test Administration:

A subject is allowed one minute practice of putting a sponge-ended shuttlecock into play with a legal serve from behind 10 feet the after getting instruction from the tester. The subject is now to volley the shuttle cock against the wall above the 7.5 feet line as many times as possible in 30 seconds of time. The subject is required to start with a legal serve from behind 10 feet restraining time. The three trials of 30 seconds each are given with all east 30 second intervals between each trial.

Scoring:

The sum of the number of times the shuttle cock is volleyed against the wall during all the three trials provides the score of the test. The rebound is counted when shuttle cock is hit legally from behind the 10 feet restraining line and the wall above the 7.5 lime.

3.5 Collection of data:

To collect the data of wall volley skill of badminton 10 groups of SGB Amravati University 10 players each were prepared and 2 groups were called for the Miller wall volley test from 7.30 am. to 9.30 a.m. in the morning in this way in three months time all the 10 groups of girls badminton players were tested by
Miller wall volley test of skill of badminton scores were recorded. Then the 10 groups of girl’s players of badminton of Tukdoji Maharaj Nagpur University were prepared and their scores of skill by miller wall volley test were collected in 3 months time. With the help of the assistant scholar conducted Millera’s wall volley test of skill of badminton for the Sant Gadge Baba Amravati University and Rashtrasant Nagpur university boys player in 6 months time. The scores of Miller’s wall volley test of girls inter collegiate badminton players of SGB Amravati University and Girls if RTM Nagpur University were tabulated for the statistical analysis. The scores of Miller’s wall volley test of boys intercollegiate badminton players of SGB Amravati University and RTM Nagpur University were collected and tabulated for statistical analysis. For the statistical analysis the scholar selected coefficient correlation between scores of girls of SGB Amravati University and Girls of RTM Nagpur University badminton players by using the Formula

\[ r = \frac{\sum (x - x)(y - y)}{\sqrt{\sum (x - x)^2 \sum (y - y)^2}} \]

Where \( r = 15 \) coefficient correlation
\( \Sigma X = \text{Sum of the scores of SGB Amravati University Girls/boys} \)
\( X = \text{Mean of SGB Amravati University Girls/boys} \)
\( \Sigma Y = \text{Sum of the scores of RTM Nagpur University Girls/boys} \)
\( Y = \text{Mean of Girls/boys of RTM Nagpur University} \).
Also to compare the skill status of SGB Amravati University Girls/boys badminton skills and RTM, Nagpur University Girls/boys. The ‘t’ value between the scores means and sd. were calculated by using the formula.

\[ t = \frac{(x-y)}{\sqrt{(sd_1)^2 + (sd_2)^2}} \]

\[ \frac{n-1.1}{n-1} \]

Where \( x \) = mean of the scores of skill tested by Miller wall volley test of girls/boys of SGB Amravati University.

\( Y \) = Mean of scores of skill tested by Miller wall volley test RTM Nagpur University Girls/boys.

Sd1 = Standard deviation of scores of SGB Amravati University Girls & boys

Sd2 = Standard deviation of scores of RTM Nagpur University Girls/boys.

In this way the scores of Girls/boys Inter collegiate badminton players of SGB RTM Universities were collected and tabulated and ‘r’ (Coefficient of correlation) and ‘t’ value calculated to test the hypothesis.

List of badminton players selected from various cities of SGB Amravati University and RTM Nagpur University are given in tables below.
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of cities of SGB Amravati University from Badminton players were selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Akola</td>
</tr>
<tr>
<td>2</td>
<td>Akot</td>
</tr>
<tr>
<td>3</td>
<td>Amravati</td>
</tr>
<tr>
<td>4</td>
<td>Badnera</td>
</tr>
<tr>
<td>5</td>
<td>Darapur</td>
</tr>
<tr>
<td>6</td>
<td>Darwah</td>
</tr>
<tr>
<td>7</td>
<td>Khamgoan</td>
</tr>
<tr>
<td>8</td>
<td>Malkapur</td>
</tr>
<tr>
<td>9</td>
<td>Nandura</td>
</tr>
<tr>
<td>10</td>
<td>Shegoan</td>
</tr>
<tr>
<td>11</td>
<td>Washim</td>
</tr>
<tr>
<td>12</td>
<td>Yavatmal</td>
</tr>
</tbody>
</table>
Table No. 3.5

RTM Nagpur University List of affiliated colleges of various cities from where Badminton players were selected.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of cities of RTM Nagpur University from badminton players were selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nagpur</td>
</tr>
<tr>
<td>2</td>
<td>Gondia</td>
</tr>
<tr>
<td>3</td>
<td>Bhandara</td>
</tr>
<tr>
<td>4</td>
<td>Sakoli</td>
</tr>
<tr>
<td>5</td>
<td>Bramhpuri</td>
</tr>
<tr>
<td>6</td>
<td>Wardha</td>
</tr>
<tr>
<td>7</td>
<td>Chandrapur</td>
</tr>
</tbody>
</table>

From the above cities of SGBAmravati university and from the cities of RTM Nagpur university affiliated colleges badminton players were selected the study.