THE CONSTRUCTION OF SCALES FOR PREDICTING ABILITY

TO PLAY INTERSCHOLASTIC BASKETBALL

A Dissertation

Presented to

the Graduate Faculty of the

College of Education

The University of Houston

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

by

Paul Edward Pierce

June 1961

FOREWORD

The writer wishes to express his most sincere appreciation to his wife, Lunelle Mitchell Pierce, for her encouragement, assistance, and inspiration throughout this study.

Acknowledgement is made to the schools, coaches, and 506 players who participated in the accumulation of data. The coaching staff at Sam Houston State Teachers College has contributed a great deal by assisting in the testing program and by their interest shown throughout.

Special acknowledgment for valuable guidance and encouragement is given to the Advisory Committee, Dr. W. J. Rhodes, Chairman; Dr. F. L. Stovall, Dr. William Yost, Dr. J. Milton Muse, and Mr. Harry Fouke.

<div align="right">Paul E. Pierce</div>

Huntsville, Texas

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The purpose of this study was threefold: (1) to determine to what extent a high school basketball player's ability to play basketball was based on: (a) known criteria and (b) physical skills measurable by objective tests; (2) to determine the most useful known criteria and objective tests most practical and useful for measuring these physical skills, and (3) to develop a method for computing a boy's "Basketball Classification Index". The objective tests that made up the battery were selected which required a minimum of equipment.

To help in the selection of the objective physical skill tests, the personal factors, and to establish procedures and techniques a pilot study was conducted at Sam Houston State Teachers College. Twenty basketball tests were considered in this study, ten were selected and ten were discarded because they were not entirely objective or were too difficult to administer. The tests selected were; jump and reach, basketball shoot, obstacle dribble, shuffle step, dribble and shoot, wall bounce, free throws, thirty-five foot shoot, two hundred foot forward run, and one hundred foot backward run. Eight personal factors were considered and three were discarded because it was believed that they were not vital in determining a boy's basketball ability. The personal factors selected were; height, age, weight, grade level, and experience in basketball.

In the main study the coaches of all the participating schools administered the ten objective tests and obtained the personal data information on all their basketball players and

boys in physical education classes. The data on the five personal factors and the scores on the ten objective tests were tabulated for the 506 boys from the eleven participating schools. On the basis of a careful analysis of the range of raw scores made by the 506 boys on each of the fifteen factors, raw scores in each distribution were arbitrarily assigned rank values from one to ten. The sum of the ranks earned by each boy on the fifteen variables gave each boy's Basketball Classification Index (BCI). The BCI's on the 506 boys then had a possible range from fifteen to one hundred fifty.

From the BCI's the predictions were made. The boy having the lowest scores were considered first team for each of the three positions; center, guards, and forwards. The validating criteria was the coaches' selection of his first and second teams. It was found that the players selected on the first team, on the basis of the Basketball Classification Index, were the same as those selected by the coach in 85.6 per cent of the cases. The players selected on the first or second team on the basis of the Basketball Classification Index were the same as those selected by the coach in 97.1 per cent of the cases.

On the basis of this study five known or personal factors and ten objective basketball tests were found to be practical and useful for measuring the physical skills necessary to play interscholastic basketball.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

xii

CHAPTER I

THE PROBLEM

Introduction

The game of basketball was originated by Mr. James
Naismith, an instructor at Springfield College, Springfield,
Massachusetts, in 1891. The name was derived from the tall
cone-shaped peach baskets which were first used for goals.
The original ball used was a soccer football. It first appear-
ed on an Olympic program in the year 1904, at St. Louis, Miss-
ouri. Today there are millions of young men all over the
world playing the game of basketball, with at least ninety-
eight per cent of all high schools in the United States
having a varsity team. As the game increased in popularity,
more and more emphasis was placed on winning, both in high
schools and in college.[1]

For a coach to field a representative basketball team
he should be able to select the five best players early in
the season. To help the coach in this selection there exists
a definite need for a series of objective tests that will
measure certain physical skills that are essential to becoming
an outstanding basketball player. For the coach to be as

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[1]Ray Welsh, "Winning Basketball," (Minneapolis:
Burgess Publishing Company, 1947), p. 5.

objective as possible in the selection of players certain personal factors as well as physical skills should be considered. The survey of the literature in the field of basketball testing discloses that some research has been done in this area and that articles have been written that might help the coach select the five best players.

Statement of the Problem

The purpose of this study was three-fold: (1) to determine to what extent a high school basketball player's ability to play basketball was based on: (a) known criteria and (b) physical skills measurable by objective tests, (2) to determine the most useful known criteria and objective tests most practical and useful for measuring these physical skills, and (3) to develop a method for computing a boy's "Basketball Classification Index," the best predictive combination of the factors and variables listed above.

Importance of the Study

An attempt was made to develop a series of objective basketball tests to be used in conjunction with known personal criteria in determining a high school boy's Basketball Classification Index. No evidence has been found, indicating that a study of this type had been conducted previously.

The Basketball Classification Index might be of value to the basketball coach in the following ways.

1. To select boys capable of playing interscholastic basketball.

2. To determine to what degree the subjective selection of the starting team was based upon, known or measurable criteria.

'3. Encourage players to become better basketball players by working to lower their Basketball Classification Index.

4. Counsel with boys who were not physically capable of participating in an interscholastic basketball program.

Limitation of the Study

This study was limited by attempting to determine the basketball ability of high school boys only. Should it ever be used in an attempt to determine the basketball ability of junior high school or college players, certain adjustments would necessarily have to be made. No attempt was made to measure the basketball ability of girls or women.

To establish procedures and techniques for the collection of necessary data, ninety-three college students were tested. The results of the tests were not used in this study.

Summary

The introduction, statement of problem, importance of the study, and limitation of the study were presented in Chapter I.

Literature in the field of basketball testing will be presented in Chapter II.

CHAPTER II

REVIEW OF THE LITERATURE ON
BASKETBALL TESTING

C. V. Money,[1] former basketball coach and present
Director of Athletics at the University of Louisville, devel-
oped a series of basketball tests evaluating the abilities of
basketball players. This study was published in the Athletic
Journal and was discussed in the book, Tests and Measurement
in Physical Education by Bovard, Cozens, and Hagman.[2] These
tests were not presented as an end, but as a means to an end.
They have two main objectives: part one measured the abili-
ties of basketball players when performing as individuals;
part two attempted to measure the same abilities as those
dealt with in part one, while the individual performed as a
member of a group. The first battery of tests was divided
into seven parts to determine the various abilities of the
players: physical efficiency, speed and coordination, accu-
racy in passing, accuracy in shooting, dribble and shoot,
pivot and shoot, and competitive shooting.

The Foster Physical Efficiency tests were used by

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[1]C. V. Money, "Tests for Evaluating the Abilities of
Basketball Players," Athletic Journal, Volume XIV, No. 3,
(November, 1933), pp. 32-34.

[2]John F. Bovard, Frederick W. Cozens, and E. Patricia
Hagman, Tests and Measurements in Physical Education,
(Philadelphia and London: W. B. Saunders Co., 1938), p. 195.

Money in his study. The score of this test represented the physical efficiency of the individual and, when added to the scores from the individual tests, gave the final ability ranking in the first group of tests.

Speed and coordination was measured by having the subject stand near the basket with the ball in his possession. On a given signal, as many goals as possible were shot in one minute. One point was deducted each time the ball touched the floor. The number of goals made in one minute, minus the times the ball touched the floor, represented the score.

Accuracy in passing was determined by using the chest, underhand, two-handed, and hook passes. The coach indicated which of the four type passes was to be used. The one being tested dribbled to a point and he made a pass to a moving player. 'A total of thirty-six passes was made by each player but fumbles by the receiver were not charged against the passer. Passes received at a point between the belt and bottom of the shorts counted five points. Passes received between the shoulders and knees counted three points. Passes which were received above the shoulders and below the knees counted two points. Passes that could not be handled were given a minus one point. The total score for all passes made represented the score. No attempt was made to grade the form used in making designated passes.

Shooting for accuracy was measured by dividing the lines forming the free throw area into seven shooting stations, and two additional stations were located four feet apart on the free throw line. The player being tested shot from each station until the goal was made, then moved to the next station. The total number of shots needed to make a goal from each shooting station was the basis for the score. If nine to ten attempts were needed, the score was ten points. If eleven to fifteen attempts were needed, the score was eight points. If sixteen to twenty-two attempts were needed, the score was six points. If twenty-three to thirty-one attempts were needed, the score was four points. If thirty-two to forty-two attempts were needed, the score was two points and if forty-three or more attempts were needed, the score was one.

In the dribble and shoot test, a chair was placed near the middle of the court on the right side line and another chair was placed on the left side line near the center of the court. The person being tested stood out of bounds under one of the baskets and on a given command dribbled around both chairs and shot at the opposite goal until the basket was made. The length of time in seconds taken to make the round trip, divided into four hundred, was the score.

The pivot and shoot test was given on one end of the gymnasium floor with the starting point directly under the basket. The subject being tested started from a point directly

under the basket and dribbled to the free throw line, stopped,
pivoted, and shot, repeating this procedure three times. After
completing the first three shots, he dribbled from directly
under the basket to a point to his right, fifteen feet away,
and at a forty-five degree angle to the free throw line; stop-
ped, pivoted, and shot three times. The same procedure was
followed to the left. The number of goals made from the nine
shots was the score.

The competitive shooting test attempted to determine an
offensive player's ability to outmaneuver a defensive man. The
player being tested started at mid-court without the ball and
ran toward the basket attempting to outmaneuver the defensive
man who was attempting to guard him. As the offensive player
neared the free throw line, the coach passed the ball to him.
Upon receiving the ball, the offensive player attempted to free
himself from the guard and make a goal. The offensive player
was given five attempts to score. If the offensive man fouled,
one point was taken from his score and if the defensive man
fouled, one point was added to the offensive man's score. If
the score was a minus quantity at the end of the five attempts,
it was subtracted from the total of the other tests.

The second part of the tests by Money[3] included speed

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[3]C. V. Money, "Tests for Evaluating the Abilities of
Basketball Players," Athletic Journal, Volume XIV, No. 4
(December, 1933), pp. 18-19.

and coordination, passing for accuracy, shooting for accuracy, dribble shoot, pivot and shoot, and competitive shooting.

In the speed and coordination test, three men were in a group and stationed on any position on the floor. One man had the ball and on a given signal they began passing the ball to each other and continued for one minute. The men kept moving while making passes. Fumbled passes did not count. The number of passes made by the group in one minute, divided by three, represented the score for each man.

The passing for accuracy test involved a group of three men, each stationed at one end of the court on the end line, twelve feet apart. On a given signal, they started running down the court and the man with the ball passed it to one of the others then went behind him. Each time the ball was passed, the passer would go behind the receiver, forming a figure 8. The group ran and passed the length of the court returning to the starting point, and the time was recorded. No penalty in time was assessed for passes not conforming to the type designated by the coach. The total score divided into four hundred represented the score for the individual as a member of the group.

Three players form a group when the shooting for accuracy test was given. The group played a game of fifteen points. An imaginary line across the court, just touching the foul circle and parallel to the end line, was the restraining line

for the long shot. A short shot was taken from any position
on the court where the ball was first recovered after attempt-
ing a long shot, and must be taken from within bounds. The
men shot in turn, the long shot counted two points if made,
and the short shot counted one point if made. The winner's
points had to total fifteen--no more, no less. The individual
winning received five points, second received three points,
and third one point.

The dribble and shoot test was an attempt to determine
a player's ability to dribble and shoot while competing against
two other players. Three boys, five feet apart, with a ball
each, stood on the end line facing the opposite goal. On a
given signal, they dribbled to the opposite end, made a goal,
and dribbled back and made a goal. Each must shoot until the
goal was made. The winner received five points, second place
received three points, and third place received one point.

Three players work as a unit in the pivot and shoot
test. They each stood on the end line, twelve feet apart,
and on a given signal, passed the ball to each other as they
ran down the court. When the opposite end was reached they
shot until the goal was made. They ran back down the court
passing the ball to each other, and shot until the second
goal was made. The elapsed time divided into four hundred
represented the score for each player.

In the competitive shooting test a group of three offensive men and two defensive men were used as a unit. The three on offensive attempted to score under game conditions. On a given signal, the offensive men put the ball in play and made as many goals as possible in two minutes. Each goal scored by the offense counted two points. A foul by the defense added one point to the offensive score, while a foul by the offense deducted one point from the total offensive score. The total number of points scored represented the score for each individual in the offensive group.

Stroup[4] attempted to use game results as a criterion for validating basketball skill tests in a study at Southern State College. The study was published in the Research Quarterly, and was discussed in Application of Measurement to Health and Physical Education by H. Harrison Clarke.[5] In this study the scores of the competing teams, in thirty-one ten minute basketball games, were compared with the skill score averages of the teams. Two related purposes provided the problem for investigation. The first was to demonstrate the use of a validation technique for a team sport test in which

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[4]Francis Stroup, "Game Results as a Criterion for Validating Basketball Skill Tests." Research Quarterly, Volume XXVI, No. 3, (October, 1956), pp. 353-357.

[5]H. Harrison Clarke, Application of Measurement to Health and Physical Education, (New Jersey: Prentice-Hall, Inc., 1959), p. 334.

game results were used as the criterion. The second was to
establish the validity of an administratively economical test
for equating teams. No criterion for determining the validity
of a sport test seems more appropriate than the results of con-
tests in that sport.

In order to accomplish the two main purposes of this
study, men were chosen from four sections of freshmen and
sophomore physical education classes at Southern State College.
Three basketball tests were given to this group; goal shooting,
wall passing, and dribbling.

In the goal shooting test, the subject was allowed to
stand as near the goal as he wished and shoot as many goals
as possible in one minute. The number of goals made was the
score.

In the wall passing test, the subject stood behind a
line six feet from a solid wall and bounced the ball against
the wall as many times as possible in one minute. It was
considered a miss to bat the ball instead of catching it, or
to move beyond the restraining line when handling the ball.
The number of legal passes was the score.

The dribbling test required the subject to dribble
alternately to the left and to the right of bottles placed in
a line fifteen feet apart on a ninety foot court, circling the
end bottle and continuing in this manner for thirty seconds.
To knock over a bottle or not to pass a bottle on the proper

side was considered a miss and did not count. The score was
the number of bottles properly passed in one minute.

As part of the study, ten-minute basketball games were
played in four-team sport sections of physical education class-
es for men. A scorekeeper kept the lineups and scores of each
game. The three-item skill test was given to class members,
and the score for each subject was placed by his name on the
score sheet.

Forty-one ten minute games were played during the study
with one hundred and twenty-one men competing. The scores de-
rived from the three skill tests ranged from 52 to 84 with a
mean of 72.65. The average skill score difference for the
competing teams ranged from 0.4 to 10.2 with a mean of 3.45.
The game score differences ranged from 2 to 18 with a mean
difference of 7.36. Of the games in which differences both
between average skill scores and between game scores for the
competing teams were observed, 83.87 per cent of the games
were won by the team having the highest average skill score.
In no case did a team having an average skill score advantage,
or more than 6.6, lose a game.

From the results of the study, these conclusions were
drawn:

1. The procedure employed in this study demonstrated
the use of ten-minute game results, as a criterion
for validating a team sport.

2. Average skill scores derived from scores on the three-item test were a valid measure of team strength in basketball because relative skill scores of competing teams were related to the ability to win ten-minute games.

3. The test appeared to be a practical instrument for equating teams.

Knox[6] in an article written for the Scholastic Coach and discussed in the text, Application of Measurement to Health and Physical Education by H. Harrison Clarke,[7] developed a battery of basketball ability tests. The four tests used in the battery: speed-dribble, wall bounce, dribble-shoot, and the penny cup.

In the speed-dribble test, four chairs were placed in a straight line so that the first one was 20 feet from the starting line and the others were 15 feet apart. The dribbler followed a zig-zag path around the chairs for thirty seconds. The score was the number of chairs passed.

When the wall-bounce test was given, the subject stood behind a line five feet from a wall and chest passed the ball against the wall. The length of time it took to pass the ball

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[6]Robert D. Knox, "Basketball Ability Tests." Scholastic Coach, Volume XVIII, No. 3, (March, 1957), p. 45.

[7]Clarke, op. cit., pp. 332-333.

against the wall 15 times was the score.

In the dribble and shoot test, the starting point was on the right side line of the court, 65 feet from the basket. Three chairs were placed in line with the basket, so spaced as to divide the distance into four equal segments. The subject dribbled around the chairs and shot until the goal was made, then dribbled around the chairs back to the starting point. The length of time to make the round trip was the score.

Three tin cups were used in the penny cup test. One was painted blue, one white, and one red. They were placed five feet apart on the finish line. The starting line was 20 feet from the cups and the signal line was 12 feet from the cups. The player being tested, with a penny in his hand, stood behind the starting line with his back to the cups and on a given signal turned and sprinted toward the cups. When the signal line was reached, the tester called out one of the cup colors. The player dropped the penny into the designated cup and elapsed time was recorded. The test was repeated four times, the total elapsed time represented the score.

The score made in each test was added together to get the Knox Rating.

The reliability coefficient for various test items ranged from .58 to .90; for the total battery the coefficient was .88. The criterion for validating the test was success

in making a ten-man high school varsity basketball squad competing in an Oregon district tournament.

Boyd, McCachren, and Waglow[8] attempted to determine the predictable ability of a test battery in selecting members of a basketball team. This article was written for the Research Quarterly and was referred to in, Application of Measurement to Health and Physical Education, by H. Harrison Clarke.[9] The Knox Basketball Test was used as a basis for the study because a reliability coefficient had been reported. The test was administered to 42 candidates for the University of Florida junior varsity basketball squad. At the end of three weeks of practice, the coach was asked to rank the players according to playing ability. The coach retained the top 18 of his squad; and the remaining 24 players were dropped. The coach's ranking was placed in a sealed envelope to be opened at the end of the season. The coach also ranked the 18 squad members as to ability without consulting any of the written records, at the conclusion of the season.

In order to arrive at an equitable system of ranking players regarding playing time, the total number of minutes played was divided by the number of games played.

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[8]Clifford A. Boyd, James R. McCachren, and I. F. Waglow, "Predictive Ability of a Selected Basketball Test," Research Quarterly, Volume XXVI, No. 3, (October, 1955), p. 364.

[9]Clarke, op. cit., pp. 333-334.

The players were also ranked by comparing total points scored with average minutes played per game. A bi-serial correlation of .96 was revealed when the test results were correlated with the category of team membership and non-team membership.

It was concluded by the authors that the Knox Basketball Test appeared to have merit as a predicator of squad membership in basketball; that is, it could readily distinguish between varsity and non-varsity caliber players. On the other hand, the value of the Knox Test in distinguishing between levels of ability among squad members did not have statistical significance.

Voltmer and Watts[10] in a study, in 1940, set up a scale for the rating of basketball players during actual scrimmages and games. The study was presented for the Journal of Health and Physical Education and was referred to in, Measurement and Evaluation in Physical, Health, and Recreation Education by Larson and Yocom.[11] In the development of the method of rating, an effort was made to introduce one that: requires comparatively few scorers, relies relatively little on the opinions of the scorers, and presents adequate evidence on performance of skills under game conditions.

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[10]E. F. Voltmer and Ted Watts, "A Rating Scale for Players Performance in Basketball," Journal of Health and Physical Education, Volume XI, No. 2, (February, 1940), pp. 94-95, 123-125.

[11]Leonard A. Larson and Rachael D. Yocom, Measurement and Evaluation in Physical, Health, and Recreation Education, (St. Louis, The C. V. Mosby Co., 1951), p. 213.

Players were scored on performance.

Each man gained points when:

                                                                       <u>Points</u>

1. He made a basket.   3
2. He made a free throw.   1
3. He gained possession of the ball. . . .   1
4. He tied up a ball 5
5. He gained possession after jump ball. .   .5

Each man lost points when:

1. He missed a shot at the basket, from the
    field or free throw line.   1
2. He lost possession of the ball.   1
3. He committed a personal foul.   1
4. His man scored a basket   1
5. He got tied up with the ball. 5

The total points gained by a player during scrimmage or a game were compiled; from this total was taken the sum of the points he lost in the same competition. The result was his score, which may have been positive or negative. A chart was prepared after competition showing each player his weaknesses, which he should practice to correct.

When a scrimmage or game was to take place, a manager or assistant was given a card with a place for the players' names and the several items on which they could gain points. A manager and a card were also needed for checking the points "against" the players during a game or scrimmage.

For the benefit of the players and coaches, a summary chart was made for each individual, and for the team at the end of the game or scrimmage.

From the study the authors concluded:

1. The chart did not present all the evidence of basketball ability exhibited by those players scored; but it did present a large share of it, as far as the execution of physical skills under game conditions was concerned.

2. No effort was made to measure those characteristics that were essential in the "spark plug" of the team.

3. The chart provided a very convenient summary of facts that would stimulate players to improve and enable coaches to select their players on a more factual basis.

4. If the coach studied the chart, a large amount of prejudices in player evaluation could be ruled out.

Friermood,[12] in 1941, wrote an article for the Journal of Health and Physical Education entitled "Basketball Progress Tests Adaptable to Class Use". The article was referred to in Tests and Measurement in Physical Education by Bovard, Cozens, and Hagman.[13] In order to give boys and young men, ranging in age from twelve to thirty years, a simple check-up on some of the game fundamentals, a series of tests were devised that proved interesting and helpful to each of the participants. The tests were so designed as to make

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[12]H. T. Friermood, "Basketball Progress Tests Adaptable to Class Use," Journal of Health and Physical Education, Volume V, No. 1, (January, 1934), pp. 45-47.

[13]Bovard, op. cit., p. 196.

it possible for each participant to determine his score, and with the exception of one "judgment" grade, were sufficiently objective to use in noting progress and changing skill from time to time during the season. Four tests were used in the battery: passing accuracy, pivot for efficiency and form, dribble with speed and control, and shoot accurately.

The passing accuracy test determined passing ability using either hand. A target three feet high and four feet wide was set up twenty feet from a restraining line. The lower edge of the target was three feet above the floor and the top edge was six feet above the floor. Each competitor was given three throws with his right hand and three with his left hand, from behind the restraining line. Each thrown ball that passed through the target and did not touch the sides of the target counted one point; if it touched the sides of the target, it did not count.

During the pivot for efficiency and form test, the coach acted as judge and determined the score subjectively. The top edge was six feet above the floor. Each competitor was given three throws with his right hand and three with his left hand from behind the restraining line. Each thrown ball that passed through the target and did not touch the sides of the target counted one point; if it touched the sides, it did not count.

During the pivot for efficiency and form test, the
coach acted as judge and determined the score subjectively.
The competitor received a pass from another person who was
stationed ten feet away. As the ball was received, he dribbled
toward the passer, who could advance toward the dribbler or
remain stationary. The competitor demonstrated four types of
pivots. These types of pivots were:

1. Pivot on right foot, stepping back one-quarter turn
on the left foot.

2. Pivot on the left foot, stepping back one-quarter
turn on the right foot.

3. Pivot on left foot, stepping across with right foot.

4. Pivot on right foot, stepping across with left foot.

The score was based on smoothness of action and position
of the ball, with three points being given for a good pivot
and proper ball position, two points for a fair pivot and fair
ball position, one point for a poor pivot and poor ball position,
and no points for an incorrect pivot and incorrect ball position.

When the test to determine speed and control was given,
the player stood inside the circle in the center of the court.
Fifteen and thirty feet from the center of the starting circle
and on a line with a radius of the circle, chairs were placed.
On a given signal, the player dribbled around each chair in a
figure eight, dribbled back to the starting point, and came to
a complete stop in the circle with the ball in both hands.

Each player tested was given two trials with the final score being the total time of the two trials.

The shooting for accuracy test was an attempt to determine a player's ability to make goals unguarded. Each player was allowed to shoot free shots until he missed. One point was given for each free shot made, up to five. The second phase of the shooting for accuracy test, the player was allowed to dribble in and shoot three lay-up shots with his right hand and three with his left hand. Each shot made counted one point. The total score for the test was a combination of the free-throw test and the lay-up test.

A master score sheet was made up and placed on the bulletin board so that each player tested could determine his own score. Six points made on the passing test was 100%. Twelve points made on the pivot test was 100%. Ten seconds made on the dribble test was 100%. Eleven points made on the shooting test was 100%.

Johnson,[14] in a study conducted at State University of Iowa, developed a battery of objective basketball tests for high school boys. As a criterion, he used the bi-serial correlation, dividing all of the boys into two groups, the "good group" and the "poor group". There were fifty boys in

[14]L. William Johnson, "Objective Basketball Tests for High School Boys," Unpublished Master's Thesis, State University of Iowa, 1934.

the good group and one hundred thirty in the poor group. A total of nineteen tests were experimented with while the final battery was made up of three basketball ability tests and four "potential basketball ability" tests.

The basketball ability tests were as follows:

1. The player stood in any position under the basket and shot goals for thirty seconds. One point was given for each goal made. Reliability, .731. Validity .713.

2. For the passing for accuracy test, a large rectangle 60 by 40 inches was painted on a canvas. In the center of this rectangle was another rectangle, 40 by 25 inches; and inside of this rectangle was one, 20 by 10 inches. This target was hung on the wall with the length of the rectangle horizontal and the bottom of the large rectangle 14 inches from the floor. The player was allowed ten passes at this chart from a distance of forty feet, using either the baseball pass or hook pass. The score was the total points made in ten throws, computed by giving three points for hitting the inner rectangle or line, two points for hitting the middle rectangle or line, and one point for hitting the outer rectangle or line. Reliability, .796. Validity, .785.

3. In the obstacle dribble test, the starting line was six feet long, and a hurdle was placed parallel to this line and twelve feet in front of it. Three more hurdles, six feet apart were placed in line with the starting line and first

hurdle. The player started at one end of the starting line and dribbled around through the hurdles and back to the other end of the starting line. The player's score was the number of zones passed in thirty seconds. Reliability, .790. Validity, .651.

The three tests were scored as a battery by adding the three obtained scores. The battery reliability was .890 and the validity was .880. The total score range was from 16 to 68.

The tests for potential basketball ability which did not involve ball handling were as follows:

1. Two parallel lines were drawn on the floor six feet apart. The player stood with one foot on one line; and when the signal was given he shifted sideward with the boxer's sidestep until his foot touched the other line, then he returned the same way. One point was scored for each time the player touched one of the lines in twenty seconds. Reliability, .870. Validity, .561.

2. The player stood with his side toward the wall and jumped and reached as high as possible with the hand next to the wall. As he reached the highest point of his jump, he pushed his fingers, which had been previously moistened, against the wall leaving finger marks. Either before or after the jump, his standing reach was measured by moistening his fingers and reaching as high as possible from a standing

position facing the wall. The score was the distance between the mark made in standing position and the mark made in jumping. Each boy was given three trials and his best effort was recorded in inches. Reliability, .916. Validity, .537.

3. On the zig-zag run test, the boy ran around five obstacles, six feet apart, with each one off-set to the right six feet. On a given signal, the boy circled the hurdles for thirty seconds. The score was the number of zones passed in thirty seconds.

4. The Iowa revision of the Brace test was used to determine motor educability. The reliability of the battery was .927. Validity, .842.

Elbel and Allen[15] conducted a study at the University of Kansas, during the seasons of 1938-39-40, in regard to a procedure of evaluating team and individual performance during a basketball game. The study was referred to in Measurement and Evaluation in Physical, Health, and Recreation Education by Larson and Yocom.[16] Much takes place during the course of a basketball game which, in the final analysis, contributes materially to the success or failure of a team. Many of these

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[15]E. R. Elbel and Forest C. Allen, "Evaluating Team and Individual Performance in Basketball," Research Quarterly, American Association for Health and Physical Education and Recreation. Volume 12, No. 3, (October, 1941), pp. 538-555.

[16]Larson, loc. cit.

factors are not apparent to the average observer nor are they evidenced in the generally accepted summary of the game.

The first step was the development of a list of offensive basketball items. These game elements were divided into two groups. The first of these groups was composed of those factors which were considered contributory to winning, or positive items. The second group was made up of elements which were considered detrimental to winning success, or negative items. Twelve men, physical education students, were used during each game to secure the desired information. The men worked in pairs; one as an observer, the other as a recorder. Goals and attempts were secured from spot-shot charts. Free throws and attempts and personal fouls were secured from the official score book.

Positive Items	Weight in Evaluation Points
1. Field goals.	10
2. Free throws.	5
3. Immediate assists.	4
4. Secondary assists.	3
5. Ball off opponents backboard . . .	2
6. Ball off own backboard	2
7. Taps and recovers own jump ball. .	2
8. Recovery of team mate's jump ball.	1
9. Reception of a good pass to team mate	1
10. Reception of a team mate's pass. .	1

Negative Items	Weight in Evaluation Points
1. Error of omission.	1
2. Held ball by an opponent	1
3. Fumbles out of bounds.	2
4. Fumbles ball and obtained by opponent	2
5. Ball tapped out of bounds.	2
6. Wild pass out of bounds.	3
7. Wild pass to an opponent	4
8. Violation of rules	5
9. Personal offensive foul.	8

The desired data having been secured, they were tabulated upon mineographed work-sheets containing adequate spaces for earned evaluation points for each item. Game summaries, including a gross computation of evaluation points, were prepared immediately following each game. It was clearly indicated that much information which could be helpful, and was readily available in basketball games, was not used.

Tibbett[17] in an unpublished thesis written at Springfield College, Springfield, Massachusetts, in 1940, reported on a study of the development and evaluation of potential basketball ability tests. An attempt was made to build a battery of

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[17]H. N. Tibbett, "The Development and Evaluation of Potential Basketball Ability Variables and Tests." Unpublished Master's Thesis, Spring College, 1940.

potential basketball tests that would be validated statistically and would be of practical use to basketball coaches in the selection of squad members.

Modern coaching is a race against time. Schedules require the development of a team in the least time possible, and the personnel of the squad must be decided upon very quickly. Moreover, many coaches agree that the selection and placement of the players is one of the most important factors in the success of any athletic team and would welcome any method which would better enable a selection of the most promising members.

The objectives of this study were divided into six basic elements and a test or series of tests were given to measure speed, body coordination, explosiveness, hand-eye coordination, arm and shoulder girdle strength, and body control and balance.

The test to determine speed was divided into two parts. One part of the speed test measured the boy's ability to shuffle step or slide step from one line to another, twenty-four feet apart. The score indicated the number of times that the subject was able to touch the lines in thirty seconds. The other speed test measured a boy's running speed for forty feet and his ability to stop and start. Two parallel lines, forty feet apart, were drawn on the gymnasium floor, and the boy being tested stood behind one of the lines. On a given signal, he ran to the opposite line and returned to the starting point.

The score was the length of time it took him to make five round trips.

Body coordination was measured by three separate tests, with each test measuring a different phase of body coordination. In one test, the boy grapsed the horizontal bar that was four feet and six inches high, swings underneath with his feet close to the bar, shooting the feet upward and arching the back, and letting go at the right moment to obtain maximum distance. The score was the distance between the bar and the point that the heels first touched the floor. In the second test, the boy's right foot was touching a line, six feet away from and parallel to another line. The number of times that one line was touched with the left foot and the other line with the right foot in twenty seconds was the score. The score, for the third test to measure body coordination, was the number of burpee exercises that were done in ten seconds.

Explosiveness was measured by using two separate tests. One test measured ability to jump straight up from a standing position. The boy faced the wall, moistened his fingertips, reached as high as possible and made a mark. He then jumped as high as possible, at the same time marked with moistened fingertips the highest point of the jump reached. The score was the distance between the two marks. When taking the second test, the boy stood in a twenty-four inch square. The tester

pointed to any direction; front, back, or to either side.
The subject stepped with the foot nearest to the direction
indicated, placing it outside the square. Without waiting,
he immediately stepped with the other foot, placing it beside
the first and also outside the square. Again, without wait-
ing, he returned to the starting position, stepping first
with the foot nearest the square. The tester indicated the
direction to step just before the placing of the second foot
in the starting position. The score was the number of steps
made in twenty seconds.

The hand-eye coordination test was divided into three
parts with each part testing a separate area. One test measur-
ed accuracy of throwing a soft ball at a target. The target
was made up of five concentric circles drawn on the wall with
the inner circle having a one foot diameter, the second having
a two foot diameter, the third having a three foot diameter,
the fourth having a four foot diameter, and the fifth having
a five foot diameter. The largest circle was one foot from
the floor. A throwing line three feet long and thirty-five
feet in front of the target was established. The subject
stood with one foot in contact with the throwing line and
threw the ball at the target with an overhand throw as used
in baseball. Two trials of fifteen throws each were allowed
and the total of the two trials was the score. Counting from
the center outward, the circles scored 10, 8, 6, 4, 2. Throws

going outside the largest circle scored nothing. Throws hit-
ting the line between two zones scored for the inside zone.
The subject's score was recorded as the number of target
points made in thirty throws. The second test determined
ability to hit a moving target with a chest pass. A target
eighteen inches square was hung from the backboard to within
three feet and nine inches of the floor. The target was
raised to a height of six feet and released, the subject be-
ing tested, from fifteen feet away, attempted to hit the tar-
get with the ball, using a chest pass. The score was the
number of times the target was hit in thirty attempts. The
peripheral vision was tested by use of an arch-perimeter
testing device. The subject was seated with chin on the rest
looking straight ahead with the eye to be tested at the button
target. The opposite eye was covered. The subject was told
to respond when the moving target was sighted. This procedure
was carried out in testing three fields; superior, inferior,
and lateral temporal. The score was recorded in degrees where
the moving target was first sighted.

The arm and shoulder strength was measured by using the
parallel bars and the horizontal bars. The score was the num-
ber of dips and the number of pull-ups that the boy was able
to do.

Body control and balance were measured by having the
individual walk on different width beams. Five beams were

made of red oak with cross bases of soft wood. The beams were ten feet long and three inches high. The walking surfaces were of one and one-half inch, one inch, one-half inch, one-fourth inch, and one-eighth inch widths. The subject placed his hands on his hips and started walking the beams in toe-to-heel manner, beginning with the one and one-half inch beam, followed by the one inch beam, the one-half inch beam, the one-fourth inch beam, and the one-eighth inch beam. The toe had to touch the heel of the opposite foot. The boy continued toward the end of the beam until ten steps had been taken. He then returned to the starting position, continuing his walking on the remaining beams. This continued until each beam had been walked twice. The test was scored on the basis of the number of errors made in two tries. Taking the hands from the hips or losing balance and stepping off the beam was counted as an error.

Lehsten,[18] in 1948, while at Indiana University, attempted to develop a series of basketball tests that would be of value to high school coaches in the selection of basketball teams, and of value to the physical education instructor as a grading item, a motivator, or as a measure of pupil achievement. The study was reported in The Physical Educator and was referred to in Application of Measurement to Health and Physical

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[18]Nelson Lehsten, "A Measure of Basketball Skills in High School Boys," The Physical Educator, Volume V, No. 5, (December, 1948), pp. 103-109.

Education by H. Harrison Clarke.[19] In the original selection
of the test items which involved various motor skills it seem-
ed desirable to include activities which were fundamental to
the game of basketball. Speed, shooting, passing, reaction
time, sensory-motor coordination, footwork, motor ability,
motor agility, and ball handling were among the fundamental
factors considered.

The eight tests selected and the factors to which they
are known or assumed to be related are: Height--shooting, ball
control and recovery; Baskets per minute--ball handling, speed,
sensory-motor coordination; Forty-foot Dash--Velocity, reaction
time, motor agility; Vertical Jump--velocity, agility, power;
Burpee Motor Ability Test (10 seconds)--motor ability; Dodging
Run--speed, motor agility, velocity; Free Throws (out of ten)--
shooting, sensory-motor coordination, motor ability; Wall
Bounce (10 seconds)--motor agility, sensory-motor coordination,
velocity.

Height: To be measured to the nearest inch with the
subject wearing regular basketball shoes.

Baskets Per Minute: The subject stands behind the foul
line facing the basket and on a given signal dribbles to the
basket and proceeds to shoot as many baskets as possible in

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[19]H. Harrison Clarke, Application of Measurement to
Health and Physical Education, (New Jersey: Prentice-Hall,
Inc., 1959), p. 330.

one minute. The score is the number of baskets made in one minute.

Forty-Foot Dash: The player to be tested takes a position behind the out of bounds line at the end of the court. The player starts from an upright position and runs at top speed for forty feet. The score is the time elapsed to the nearest tenth of a second.

Vertical Jump: The subject stands facing the jump and reach board which has been attached to the basketball back-board. With a short piece of chalk in his hand he reaches up and makes a mark as high as he can on the board while still keeping both feet on the floor. He may then turn 90° to the left or right so that the reaching hand is closest to the board; he jumps as high as possible and makes a second mark on the board. The distance to the nearest half inch between the two chalk marks is the score.

Burpee Motor Ability Test: Starting in the erect position, the subject comes to a full squat, from there the feet are extended backward coming to a front support, then back to a full squat and finally to the erect standing position. The score is the total number of complete movements, and the fractional part, if any, which is done in ten seconds.

Dodging Run: A chair is placed at the starting point of the dodging run test. Nine feet from the first chair and offset four feet to the right a second chair is placed. Six

feet from the second chair and offset eight feet to the right
a third chair is placed. Six feet from the third chair and
offset four feet to the left a fourth chair is placed. Six
feet from the fourth chair and offset eight feet to the right
a fifth chair is placed. The boy being tested starts at the
starting point and zig-zags around the fifth chair, the sub-
ject returns to the starting point without zig-zagging around
the chairs. He must go through the course twice, with the
score being the time elapsed to the nearest tenth of a second.

Free Throws: The subject shoots ten free shots. The
score is the number of baskets made out of ten free throws.

Wall Bounce: A target is painted on a smooth surfaced
wall. The dimensions are two feet wide by four feet high with
the lower limit of the rectangle three feet above the floor.
From a point six feet from the target the subject bounces
the basketball against the wall target and catches the rebound.
The ball must hit the wall inside the borders of the rectan-
gular target. The score is the number of times the ball is
bounced against the wall in ten seconds.

The battery of eight tests were given in regularly
scheduled physical education classes. The squad leaders
were given special instructions in the manner of giving and
scoring the test items. At the next meeting of the class
after the testing had been completed, the members of the
class were scheduled in inter-squad basketball games for the

purpose of observation and rating by the jury. The subjects were also observed by this jury during two successive class periods in similar game conditions. After a first, second and third observation each member of the jury turned in a check list rating sheet which had been prepared to standardize the procedure involved in rating. The player was rated on a scale from one to five points with five as very good, three as average, and one as very poor. The total ratings for all items were obtained and divided by the number of items for an average. Since each boy was rated three times by each of the five member jury his average was obtained and entered on the master record sheet. Thus, each case had five average ratings submitted by the jury; these were totaled under the heading of Total Point Rating. Upon the completion of gathering data and testing there were eighty-six cases.

The next step was the conversion of the raw scores to scale scores in each event for every case and then add them for an Eight Item Battery Total Score. The subjective Total Point Rating were correlated with the Eight Item Battery Scores and resulted in a .80 correlation. Intercorrelations were done between the eight items comprising the battery.

The mean and standard deviation were computed for each of the eight items.

TEST ITEM	RANGE	ARITH. MEAN	SCALE SCORE POINT VALUE	STANDARD DEVIATION
Height	60 to 73	66.8	.169	2.81
Baskets Per Minute	11 to 37	15.9	.508	8.48
Forty Foot Dash	2.1 - 3.0	2.40	.010	.172
Dodging Run	17 - 26	21.0	.102	1.705
Vertical Jump	10 - 23	18.17	.173	2.88
Wall Bounce	6 - 16	11.46	.115	1.92
Free Throws	0 - 8	4.303	.102	1.70
Burpee Motor Ability	2 - 9	5.75	.214	.667

A substantial relationship existed between the following items: Vertical Jump and Forty Foot Dash (.579), Baskets Per Minute and Wall Bounce (.543), Forty Foot Dash and Dodging Run (.538), Dodging Run and Wall Bounce (.464), Vertical Jump and Wall Bounce (.423), and Dodging Run and Baskets Per Minute (.402).

A definite but small relationship existed between the following: Baskets Per Minute and Vertical Jump (.349), Vertical Jump and Dodging Run (.353), Height and Baskets Per Minute (.319), Burpee and Dodging Run (.314), Wall Bounce and Forty Foot Dash (.303), Baskets Per Minute and Burpee (.294), Wall Bounce and Height (.267), Baskets Per Minute and Forty

Foot Dash (.254), Vertical Jump and Burpee (.250), Burpee and Forty Foot Dash (.239), Height and Burpee (.227), Dodging Run and Height (.200).

There is a slight relationship between Wall Bounce and Burpee (.197), Baskets Per Minute and Free Throws (.170), Forty Foot Dash and Height (.157), Free Throws and Vertical Jump (.148), Dodging Run and Free Throws (.107), Free Throws and Wall Bounce (.090), and Height and Free Throws (.001).

Negative correlations were found between Free Throws and Forty Foot Dash (-.257), Height and Vertical Jump (-.232), and Burpee and Free Throws (-.011).

Each of the eight items were then correlated with the Total Battery Scores and the figures obtained were : Dodging Run .80; Baskets Per Minute .773; Forty Foot Dash .769; Wall Bounce .735; Vertical Jump .698; Height .570; Burpee .516; and Free Throws .402.

It was then decided to take the five events which had the highest correlations, and, as they all had a validity of .70 or better, set up a five item battery test made up of Dodging Run, Baskets Per Minute, Forty Foot Dash, Wall Bounce, and Vertical Jump.

Either of the two batteries or any of the events individually can be readily adapted to numberous used in the physical education program as a motivator, as a basis for

achievement, as a skills diagnosis, as a means of classification for intramurals, and as a marking device on basketball skills.

Edgren,[20] in 1935 wrote an article for the Research Quarterly entitled, "An Experiment in the Testing of Ability and Progress in Basketball." The article was referred to in Tests and Measurements in Physical Education by Bovard, Cozens, and Hagman.[21] This article is an attempt to list the results of studies in the field of basketball and to indicate the method used in recent studies by the author.

In 1914, Cummins[22] made a study of the effect of basketball practice on motor reaction, attention and suggestibility. Motor reaction was judged by tapping and steadiness test; attention, by the cancellation of various letters, misspelled words and a simultaneous adding test; and suggestibility, by the progressive lines illusion and the progressive weight illusion. The following conclusions are based on his study.

Persistent practice of basketball breaks up motor reaction by reducing the rate of voluntary movements and rendering

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[20]H. D. Edgren, "An Experiment in the Testing of Ability and Progress in Basketball," Research Quarterly, Volume III, No. 1, (March, 1932), pp. 159-171.

[21]John F. Bovard, Frederick W. Cozens and E. Patricia Hagman, Tests and Measurement in Physical Education, (Philadelphia and London: W. B. Saunders Co., 1949), p. 195.

[22]R. A. Cummins, Psychological Review, (1914), pp. 556-569.

the subject less steady in point of involuntary movements.
This same exercise increases the subject's power of attention.
It also renders the subject more susceptible to suggestion.

In 1922, Noble[23] conducted an experiment to study the
acquisition of skill in throwing basketball goals. When the
men who had taken the drills were tested against the game
situation these men showed a positive increase compared with
their rating before the practice drill.

In 1929, Coleman Griffith[24] of the University of Illi-
nois, carried out some experiments in basketball testing and
arrived at some definite conclusions. To be both efficient
and deceptive a good basketball player must develop his in-
direct or peripheral vision. Mastery in this department of
the game depends not only on indirect, vision, but also on a
delicate sense of touch, for the ideal player is master of
the ball without paying any attention to is.

The short, fast passing type of game demands the
ability to keep the head still, see the entire floor and
still catch the ball. The failure to stress this psycholog-
ical fundamental has undoubtedly been the cause of much fumb-
ling of the ball in this game of basketball.

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[23]A. Noble, School and Society, (1922), pp. 342-344.

[24]Coleman Griffith, Athletic Journal, "Experiments in
Basketball," (June, 1929).

The frame of mind or 'mental stance' of an individual plays an important part in the development of bodily skills. The dependable man or consistent player is one who backs up bodily skills with an undisturbed mind. If individuals are to have a proper frame of mind in the game, the same mood and temperament must be practiced during training periods.

Edgren[25] while at the University of Illinois attempted to develop a series of tests to determine ability and progress in basketball. A group of sixty men were used. The experimental group was made up of thirty members of a beginner's class in basketball, while the control group was made up of thirty men of varied basketball ability.

Eight tests of specific ability in basketball skills were used, four tests of general athletic ability were used, and the Brace Motor Ability Tests of Neuro-Muscular Coordination were used.

The basketball, general ability, and Brace tests were given to the experimental group at the beginning of the quarter, and the basketball tests were given to the control group at the same time. After two months of instruction, of forty minutes per day, in basketball fundamentals, and two weeks of actual play, the experimental group was again tested, to determine whether or not any progress had been made in motor

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[25]Edgren, loc. cit.

skill. At this same time the control group was again tested to see whether or not any progress had been made in this group which had not been instructed. This group was used primarily in the basketball test to determine the validity of this particular test.

The raw scores of each test have been reduced to T-scale scores, to make all scores comparable and to place each student properly in relation to other students.

At the conclusion of the period of instruction, the experimental group was scored and rated on their actual playing ability as indicated by their performance in organized teams. These data were recorded by student coaches and scorers who watched particular men at play.

The Brace Motor Ability Tests were also given to the experimental group to allow a comparison of three types of tests and to determine whether or not one test had a greater degree of predictability than either of the other tests.

The results of the experiment are as follows:

1. The mean T-score of the basketball tests of the experimental group is: pre-test, 45.5; and final test, 54.1; while in the control group the pre-test is 50.1 and final test, 50.5. The average per cent of increase is 20.1% in the experimental group, with only 4.2% in the control group.

2. The final test average T-score of the general ability tests gave an increase of 17.3% over the pre-test of

the same series of tests.

3. The correlations of each of the eight basketball tests with actual ability separated these tests into two groups. Five of the tests had correlations ranging from .42 to .64, and three of them had correlations from minus .13 to .33. The total basketball test correlations with actual play is .73 on the pre-test and .77 on the final test.

4. The individual general athletic ability tests correlations with actual play ranged from .50 to .72 and the total general athletic test was .73 for the pre-test and .77 in the final.

5. The correlation between total basketball test and general athletic tests was .76 for the pre-test and .77 in the final.

6. The correlation between the Brace test and general ability is .14, the Brace test with basketball tests is .59 and with actual playing ability is .16.

The results of this experiment seem to indicate that progress in the fundamentals of basketball can be measured.

The similar percentage of increase and the high correlation between basketball and general athletic ability proves the close relationship of these two groups of skills even though the correlation of improvement was very low.

The lack of correlation in improvement indicates that learned skill in one activity does not carry over in the same

amount to another skill.

To test an individual objectively for potential basket ball ability the test must of necessity measure untaught skills. If this were not so the individual could not be tested on his first appearance and the individual who had never played basketball would automatically be ruled out. The high correlation between general ability test scores and specific basketball test scores on the one hand, and general ability test scores and actual playing ability scores on the other hand, which are brought out in this study, seem to warrant the use of this general ability test as a predictive test for potential playing ability.

The advisability of using this series of tests in contrast with the standard Brace Motor Ability test was clearly shown in the poor correlation between the Brace test and General Ability and Actual Ability score, but it must be remembered that the Brace test was designed to test native neuro-muscular ability.

The results of a study of this type might be used by coaches and physical educators in the following ways.

1. Individual instruction is enhanced when the instructor knows the skills of each pupil. This is only possible when each student has been tested in the particular activity in which he is engaged.

2. Pupil interest is developed when the pupil can see

the progress he is making as shown by periodic testing.

3. Final grades can be given more accurately when actual scores are present.

4. The coaches of basketball teams will make wiser choices and better elimination of men from their squads when men remain on the squad on the basis of actual performance in tests rather than mere opinion of one man.

Following is a description of the various basketball tests that were used.

1. Speed Pass.

The subject stands behind a line eight feet from a wall and parallel to it. He passes the ball as rapidly as possible ten times against the wall. Time is started when the ball leaves his hand on the first pass and stopped when the tenth pass returns to his hands.

2. Accuracy Pass.

This test is designed to measure the accuracy of the subject in using four different passes. The four differend passes are; chest pass, underhand pass, two-hand shoulder pass, and one-hand overhead hook pass. The target is painted on the wall. The outside target is sixty inches wide and forty-eight inches high. The middle target is forty inches long and twenty-four inches high. The center target is twelve inches wide and ten inches high. The subject stands back of a target. This line is fifteen feet from the target in the case

of the chest and underhand passes, and thirty feet from it in the case of the shoulder and hook passes. Five throws are made with each kind of pass. The ball maybe passed at any speed, for accuracy alone is being tested. Passes are scored on the following basis:

Inner square or line marking it. . . . . . . 3 points
Middle square or line marking it . . . . . . 2 points
Outer square or line marking it. . . . . . . 1 point

3. Pivot and Shoot.

This test is constructed as a measure of shooting accuracy when the shot is attempted immediately following a pivot. The subject stands anywhere behind a line drawn through the far end of the free throw circle and parallel to the backboard.

He turns and shoots immediately at the basket without advancing toward it. He takes five such shots and is given one point for every basket made. There is no attempt at speed between throws. The turn is made similar to a backward pivot and the shot follows without any pause.

4. Speed Dribble.

This test is developed to test the subject's ability to manipulate the ball around objects. The subject is urged to go as fast as possible but to keep the ball under control. Three chairs are placed side by side as a starting point, fifteen feet away one chair is placed and six feet away one chair is placed, six feet from the last chair another chair

is placed and six feet away another chair is placed. The subject starts by the side of the three chairs and dribbles the ball between the chairs in a zig-zag fashion returning to the starting point. The time that it takes the subject to get back to the starting point is his score.

5. Dribble and Shoot.

The object of this test is to measure the ability of the subject to handle the ball when he is forced to combine a dribble, a short shot, retrieving the ball on the rebound, and repeating the procedure. The subject starts from the spot where the free throw line intersects the end line and stops where the opposite free throw line intersects the end line. The subject dribbles around the free throw line, and takes a short shot as he approaches the basket. He then retrieves the ball and repeats the process a total of five times. The time is taken from the second that he leaves the starting point until he recovers the fifth shot. His score is determined by dividing the number of baskets made out of the five attempts into his total time in seconds.

6. Accuracy Shooting.

This is a test to measure the distance and direction of an individual when making free throws. One point is scored for each free throw made out of ten attempts.

7. Opposition Shooting.

The subjects are paired with men of approximately

equal ability working against each other. Two men stand with their backs to the backboard, one on each of the free throw lanes where the free throw circle begins. The subject on the right side has the ball and on a signal turns and dribbles in for a lay-up shot. The other subject on the same signal attempts to block the shot without making a foul. Each subject is given five attempts and scores one point for each basket made.

8. Ball Handling.

This test is constructed to measure the subject's ability in ball handling and body coordination. He must pass the ball, follow the ball with the body, receive the ball, stop forward progress, and start back in the opposite direction.

A three foot wide mat about two inches thick is hung on the wall in the center of a six foot lane. Another line is drawn on the floor eight feet from the wall and at right angles to the six foot lane. The ball must always be thrown from behind the eight foot line and outside the six foot lane. The subject stands at the point where the two lines intersect and passes the ball against the wall on the opposite side of the mat. He must run across the six foot land and catch the ball, then pass the ball against the wall on the opposite side of the mat. He makes ten passes and the time is started when the ball leaves his hands on the first pass and is stopped when he recovers the tenth pass.

Four general athletic ability tests were used in this study.

1. Speed Test.

A starting line six feet long is drawn on the floor. Nine feet from the center of the starting line a chair is placed. Six feet from the first chair and offset four feet to the right a second chair is placed. Six feet from the second chair and offset eight feet to the right a third chair is placed. Six feet from the third chair and offset four feet to the left a fourth chair is placed. Six feet from the fourth chair and offset four feet to the right the last chair is placed. The subject stands at one end of the starting line and on a given signal runs as fast as possible between the chairs following a zig-zag course and returns to the opposite end of the starting line. His score is the time that it took him to make the round trip.

2. Agility Test.

This test was designed to measure the ability of the individual to lift his body directly upward with a jump and reach. The distance of the jump was recorded by measuring the difference between the highest point of a standing reach and the highest point of a jump and reach.

3. Coordination Test.

This test was devised as a means of judging the ability of an individual to shift his body from left to right

similarly to the way a basketball player is forced to do when guarding an opponent. Two parallel lines are drawn on the floor eight feet apart. The subject stands between the two lines with one foot touching one of the lines, and on a signal shifts across the lane and touches the opposite line with his other foot. He is scored on the length of time it took to make ten shifts across the lane.

4. Endurance Test.

The subject was required to run up and down a flight of stairs ten times taking as many or as few steps as he needed. The time was recorded at the conclusion of the tenth trip.

Summary

A review of selected literature in the field of basket ball testing was presented in the preceding chapter.

In the next chapter letters from basketball coaches, the pilot study, tests selected, a discussion of each test and procedures used will be dealt with.

CHAPTER III

MATERIALS AND PROCEDURES

Preliminary Procedures

Ideas were obtained from the survey of the literature concerning the known criteria or personal factors apt to be most related to basketball game performance, and, as to the objective tests most useful for measuring physical skills necessary to play basketball competitively. It was thought, however, that these ideas should be supplemented by opinions of basketball coaches at both the college and high school level. Accordingly, letters were sent to thirty college basketball coaches in the United States and to ten high school basketball coaches in Texas. Among other things, these coaches were given an opportunity to express their feelings in regard to objective basketball testing, as a means of strengthing the intercollegiate and interscholastic program. Each coach was asked to recommend a test or a battery of tests which might be of value in determining a player's basketball ability. Several of the tests considered in this study were recommended by these coaches. An analysis of these responses follows.

Of the eighteen college coaches responding to the letter, thirteen definitely thought a basketball testing program would be of value. Three of the college coaches were of the opinion the testing program would not benefit the

basketball program. Two of the college coaches had given no thought to a testing program, therefore, they were not for or against using objective tests as a means of improving the caliber of basketball players in this country.

Of the eight high school basketball coaches responding to the letter, all definitely thought a basketball testing program would benefit the interscholastic program.

Coach Johnnie Frankie, Rice University, does not use a complete testing program, however, he does use a basketball shooting test and keeps game charts. A description of his test follows:

> At the beginning of the practice year I give them a 100 shot test from five positions on the floor. I start every shooter from the same spot, twenty feet from the basket. He shoots 15 from the five positions plus 25 free tosses, total 100 shots. I work out a percentage chart from shots made and missed, date these tests, and try to make them improve their record each test. Some schools have been as high as 80 per cent and some as low as 45 per cent.[1]

Coach Bill Henderson, Baylor University, does not use an objective testing program. He keeps records of scrimmages and games in regard to defensive and offensive errors, as well as, rebounding and shooting, in order to give the players a grade. He said, "We do not give any kind of tests, though.

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[1]Johnnie Frankie, Personal letter, October 13, 1959.

If you come up with something sure, I would like to see it."[2]

Coach Al Garten, Eastern New Mexico University, uses five tests as a guide in the selection of his basketball squad.

> With these five things in mind I can eliminate a lot of boys who show up for our practice reasonably soon:
>
> 1. Speed is a factor, quickness is more important.
>
> 2. Ability to hit both set-shots and jump shots.
>
> 3. Aggressiveness is very important.
>
> 4. Coordination, his ability to move is also a factor.
>
> 5. Ball handling is taken into consideration, how he catches a ball, passes, pivots, etc.
>
> I try to grade a boy on each of the above, according to my judgment from 1 to 10. During the early season practices the score cards are kept each night.[3]

Coach Peter Newell, University of California, Berkeley, California does not use a testing program to determine a boy's basketball ability. He does keep actual statistics of shooting, ball handling, and grades or ranks his players.

> Frankly we do not determine improvement or potential through any specific tests so I can't give you any guides in this direction. I can see the possibilities; especially at the junior high school level.[4]

Coach Charles Orsborn, Bradley University, uses subjective evaluation in his selection of players.

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[2]Bill Henderson, Personal letter, October 13, 1959.

[3]Al Garten, Personal letter, October 19, 1959.

[4]Peter Newell, Personal letter, October 19, 1959.

Our procedure at Bradley University is to follow certain high school players very closely, and then make a subjective evaluation as to their college potential.[5]

Coach Bill Scott, Hardin-Simmons University, does not use a series of tests to determine a player's basketball ability. He says, "I think that you have undertaken a very fine study. A study that should be of interest to all Physical Education majors, as well as, basketball coaches."[6]

Coach Russell Walseth, University of Colorado, is interested in having a series of objective basketball tests.

We have never actually tested our kids in any way other than the jump and reach test and really have no correlation between any sort of test and basketball ability.

I think it is a very good field to survey and study closely because so little has been done and if you mimeograph or ditto your findings, I would certainly like to have a copy and perhaps we could start testing our kids.[7]

Coach Guy Lewis, University of Houston, is of the opinion that there is a need for a testing program.

I, too, feel there is a definite need for tests to measure potential basketball ability. I have discussed this with Dr. Rhodes, of our Physical Education Department, but so far we have not done anything about it.[8]

Coach Orvis Sigler, Centenary College, thinks there is

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[5]Charles K. Orsborn, Personal letter, October 15, 1959.

[6]Bill Scott, Personal letter, October 22, 1959.

[7]Russell Walseth, Personal letter, October 23, 1959.

[8]Guy Lewis, Personal letter, October 15, 1959.

a definite need for a testing program.

What you are doing I feel has a very definite place in basketball. I will mail you in the near future some of the tests that I use. All that I ask is that you send me a copy of your survey when completed.[9]

Coach Alvin Julian, Dartmouth College, uses a limited

testing program which includes shooting, rebounding and jumping.

We do use a statistical chart on shooting, rebounding and errors made. We also determine whether he is jumping higher. In this way we let him set his own norms and let him try to beat it each day.[10]

Coach Joel Eaves, Auburn, keeps charts on all games and

scrimmages but does not have or use an objective testing pro-

gram. He says, "Complete charts are kept on scrimmages and

games and we also use weights to improve jumping ability."[11]

Coach Stan Watts, Brigham Young University, uses a

series of basketball tests and is convinced they are of some

value.

I have felt as you have that we need such a test, it would certainly be a great contribution to the game of basketball.

I have given ability test, which I am enclosing, to several of my teams. It measures good ball handling, reaction, dribbling and set-up shooting.

I would appreciate hearing from you concerning the results of your study.[12]

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[9]Orvis Sigler, Personal letter, October 26, 1959.

[10]Alvin Julian, Personal letter, October 28, 1959.

[11]Joel Eaves, Personal letter, November 5, 1959.

[12]Stan Watts, Personal letter, October 16, 1959.

Coach George Smith, University of Cincinnati, does very

little actual testing.

> Most of my checking on members of the team is done by
> records kept on each participant. Through these records
> I am able to determine whether a boy is improving or di-
> gressing in ability.[13]

Coach Fred Enke, University of Arizona, does not use a

formal testing program.

> Enclosed is a copy of Knox Basketball Tests used in
> some area for boys of various ages. It could be used for
> boys coming into high school and even testing later as
> they are playing basketball. I have never used this test
> personally but have found that some people that have used
> it claim that tests have proven to be very successful. I
> would appreciate the results of your study.[14]

Coach Glen Rose, University of Arkansas, is of the

opinion objective basketball tests are not conclusive in deter-

mining a boy's ability.

> All such tests that I have seen, including some given
> while I was in school, proved worthless because ambition
> and courage could not be measured. Physical assets alone
> are not conclusive.[15]

Coach Harold Bradley, University of Texas, does not use

a testing program nor does he think such a program has merit.

> I may be of the old school, but I believe, the best
> appraisal of a boy's ability is entirely the judgment of
> the coach. I know many people go by standardized tests

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[13]George Smith, Personal letter, October 19, 1959.

[14]Fred Enke, Personal letter, October 19, 1959.

[15]Glen Rose, Personal letter, October 16, 1959.

but I as yet, am not a believer of such procedure.[16]

Coach Archie Oldham, Columbis University, questions the value of a testing program in high schools and colleges.

I think that standardized tests in basketball might have purpose on the elementary level, but on the senior high and especially the college level, I question the worth of the time expenditure for such tests.[17]

Coach Paul Stueckler, El Paso High School, El Paso, Texas, uses an objective testing program and believes it is of great value. He says, "We do have and use a testing program, however, we realize that it is not adequate and would like to hear of new techniques in basketball testing procedures."[18]

Coach Lee Burnett, Iraan High School, Iraan, Texas, thinks a testing program in a large high school would be very good. He questions its value in a small school.

If we have 15 to 20 boys report for and are interested in basketball, we can tell in our workouts pretty well what they can do. I know, that where there are a great number of boys interested in basketball, tests would be very good.[19]

Coach C. P. Vass, Bryan High School, Bryan, Texas, does not use basketball tests in his coaching. He says, "I do not have any kind of tests or skills required of my players.

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[16]Harold Bradley, Personal letter, October 19, 1959.

[17]Archie Oldham, Personal letter, December 8, 1959.

[18]Paul Stueckler, Personal letter, October 20, 1959.

[19]Lee Burnett, Personal letter, October 20, 1959.

I do think this might be a good idea."[20]

Coach Roland Warren, Brownwood High School, Brownwood, Texas, is interested in a testing program but does not use or have one at this time. He says, "I am afraid I can't help you on this study. If you develop some tests I would be interested in seeing them."[21]

Coach George Carlisle, Clear Creek High School, Webster, Texas has a testing program for the junior high school boys but does not have one for the high school.

> Since we are a fairly small school we do not feel that we miss many boys. In a large school tests would be invaluable. We use in junior high a general athletic ability test.[22]

Coach D. H. Watkins, Deer Park High School, Deer Park, Texas, is of the opinion there is a definite need for a testing program in our schools.

> We would certainly like to have a battery of basketball tests that we thought would help us do a better job of coaching. If you work out a battery of valid and reliable tests I would certainly appreciate a copy of them.[23]

Coach Bill Batey, Martin High School, Laredo, Texas, favors a testing program in the high schools and uses the Knox

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[20]C. P. Vass, Personal letter, October 13, 1959.

[21]Roland Warren, Personal letter, October 19, 1959.

[22]George Carlisle, Personal letter, October 28, 1959.

[23]D. H. Watkins, Personal letter, November 2, 1959.

Basketball Tests. He says, "I must confess that we have not done much in this area, but I do think that it would certainly help our program if we instituted such a program."[24]

Coach T. G. Hull, Amarillo High School, Amarillo, Texas, does not use a testing program in his school but is interested in knowing more about one. He says, "This is a very interesting problem. I have no answers as yet. Wish I could be of assistance."[25]

Coach C. Robinson of Buna High School, Buna, Texas, indicated he did not think a testing program in a small school is needed to determine a boy's basketball ability. He keeps an elaborate set of charts for each boy during all games and scrimmages and grades a boy on the basis of these charts.

> We do use several type charts to determine who makes the team and the progress he makes thereafter. We also use some charts to encourage physical fitness and to determine physical ability.[26]

The Pilot Study

From the survey of the literature and responses of the college and high school coaches to the letter a pilot study was made.

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[24]Bill Batey, Personal letter, October 26, 1959.

[25]T. G. Hull, Personal letter, October 28, 1959.

[26]C. Robinson, Personal letter, October 21, 1959.

This pilot study was conducted at Sam Houston State Teachers College, Huntsville, Texas. Ninety-three college students comprised the sample for the study. The results had no bearing on the establishment of the ranks used to determine a high school boy's Basketball Classification Index.

Eight personal factors were considered in this study and three were discarded. The three that were discarded were; whether a boy was left handed, or whether he was right handed, and if he wore eye-glasses. It was believed that the discarded personal factors were not vital in the determination of a boy's Basketball Classification Index.

Twenty basketball tests were considered in the pilot study. Six tests that were not completely objective were eliminated before the study was completed. The ones eliminated were; the figure eight passing, peripheral vision, moving target, penny cup, opposition shooting, and pivot test. Four other tests eliminated because they were very difficult to administer were; the motor educability, target passing, 40 foot run, and center court shoot.

The Personal Factors Selected

In attempting to develop a procedure that would be of value to a basketball coach in the selection of the best players on a squad, certain personal factors should be considered. The personal factors considered in this study were as follows:

height, age, weight, grade level, and basketball experience.
In the selection of the personal factors height was considered
important for rebounding and reach. Age should be a vital
factor. The more mature player will probably react more favor-
ably under stress. Weight might be a factor in ball control
and rebounding. A player's grade in school might be an indica-
tion of age and maturity. A boy's basketball experience should
be a factor in attempting to determine his basketball ability.
These personal factors are easily obtained without actual
testing.

The Ten Objective Tests Selected

In the selection of the ten objective tests an attempt
was made to select those tests that measured the following
components of motor ability; dynamic leg strength, neuro-
muscular coordination, shooting ability, eye-hand coordina-
tion, speed, ability to change direction, agility, balance,
stopping and starting, quickness of movement, strength, body
control and side vision. It is recognized that the results
of the five personal factors and ten physical tests did not
measure nor did they indicate a boy's desire, determination,
and team value.

The basketball tests selected were:

1. Jump and reach.

2. Basketball shoot, thirty seconds.

3. Obstacle dribble, thirty seconds.

4. Shuffle step, twenty seconds.

5. Dribble and shoot, thirty seconds.

6. Wall bounce, thirty seconds.

7. Free throws, ten.

8. Thirty-five foot passing and shooting, five.

9. Two hundred foot forward run.

10. One hundred foot backward run.

Four of the tests selected had been correlated with basketball playing ability by Johnson,[27] in a study conducted at the University of Iowa, while one test used was a modification of a test that was correlated in the same study. Two tests selected had been correlated with basketball playing ability, by Knox,[28] as a part of a battery of four tests. This study was reported in the Scholastic Coach and referred to in Chapter II. One test selected had been correlated by Friermood[29] as part of a battery of four tests used to determine basketball ability. This study appeared in the Journal

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[27]L. William Johnson, "Objective Basketball Tests for High School Boys," Unpublished Master's Thesis, State University of Iowa, 1934.

[28]Robert D. Knox, "Basketball Ability Tests." Scholastic Coach, Volume XVIII, No. 3, (March, 1959), p. 45.

[29]H. T. Friermood, "Basketball Progress Tests Adaptable to Class Use," Journal of Health and Physical Education, Volume V, No. 1, (January, 1934), pp. 45-47.

of <u>Health</u> <u>and</u> <u>Physical</u> <u>Education</u>. Two tests selected attempt-
ed to determine unobstructed forward and backward speed, which
are two of the basic skills.

No particular order or sequence of giving the tests was
required.

<u>Jump</u> <u>and</u> <u>reach</u> <u>test</u>. It was believed this test deter-
mined dynamic leg strength and coordination. The boy to be
tested was given a piece of chalk one-fourth inch long. He
faced the wall, with both feet flat on the floor, his toes
against the wall, reached as high as possible on the wall
with both hands above his head and with the chalk made a mark
on the wall at the highest point he reached. Next, he stood
with his side next to the wall, swung his arms and jumped as
high as possible, made a mark on the wall at the highest point
reached. The distance between the chalk marks was measured
in inches and fractions of inches. Each boy was given three
jumps with the best jump being recorded on his card.

<u>Basketball</u> <u>shoot</u> <u>test</u>. This test should determine
shooting ability and neuro-muscular coordination. The sub-
ject being tested stood as near the goal as he chose and in
any position, on either side of the goal or in front. He was
given a basketball to make as many goals as possible in thirty
seconds. He must receive no help in retrieving the ball. The
number of goals made in thirty seconds were counted and this
number was placed on his score card.

Obstacle dribble test. It was believed this test would determine eye-hand coordination, neuro-muscular coordination, changing direction ability, and speed. Using eleven chairs, an obstacle course thirty feet in length was arranged. Three chairs were placed side by side, twelve feet away two more chairs were placed side by side, six feet away two additional chairs were placed side by side, six feet away two more chairs were placed side by side and six feet away from the last two chairs, two more chairs were placed side by side. The subject was given a basketball and instructed to stand on either side of the first three chairs. On the signal "go", the player dribbled a zig-zag path through the obstacle course for a period of thirty seconds. The number of chairs that he dribbled passed, during this thirty second period, was counted and the number recorded on the score card. When the dribbler got back to the starting point, he should have passed ten chairs.

Shuffle step test. This test attempted to determine coordination, agility, balance, stopping and starting ability. The subject placed his left foot on one of the lines forming the free throw lane. On the signal "go", he shuffled or ran across the free throw lane and placed his right foot on the opposite line. He should go back and forth across the free throw lane for thirty seconds touching one line with his left foot, and the other line with his right foot. The number of times he touched either line was recorded on the card.

Dribble and shoot test. The purpose of this test was to determine eye-hand coordination, dribbling ability, speed in dribbling, and shooting ability under stress. In giving this test, a chair was placed on each end of the free throw line, inside the lines forming the free throw lane. The subject was given a basketball and stationed directly under the basket. On the signal "go", the boy dribbled around both chairs and drove in for a lay-up shot. He retrieved the ball after the goal was made and dribbled around the chairs again and made another goal. This continued for thirty seconds. The goal had to be made before the boy could continue his dribble around the chairs. For each chair dribbled around he received one point, and for each goal made he received three points. For each circle around both chairs plus a goal made five points were scored. This score was then recorded on the card by the coach.

Wall bounce test. By the use of the wall bounce test an attempt was made to determine speed and accuracy of passing, eye-hand coordination, and quickness of movement. A chalk line several feet in length and eight feet from a solid wall was drawn on the floor. The player stood behind the chalk line with a basketball in his hands. On the word "go", he bounced the ball against the wall caught it and bounced it against the wall again, continuing this procedure for thirty seconds. The number of times the ball hits the wall in this

thirty second period was counted. Each time the player moved
his feet to catch or pass, he was penalized one point. If
the ball got away from him, he had to retrieve it and return
to his original position before he could start scoring points
again. To determine the score, the number of times he moved
his feet was subtracted from the number of times the ball
bounced against the wall.

Free throw test. Basketball shooting ability was be-
lieved to be determined by this test. The player was given
ten free throws. The number made was recorded on the score
card.

Thirty-five foot passing and shooting test. The pur-
pose of this test was to determine long range passing accuracy,
passing strength and muscular coordination. A chalk line was
drawn on the floor thirty-five feet from the basket. The boy
being tested was given a ball, and while he stood behind this
thirty-five foot line, he shot at the goal, by using both
hands, one hand, or throwing the ball at the basket in any
manner he chose. If the ball hit the rim of the basket, it
counted five points; if the ball hit the backboard then hit
the basket, on the rebound, it counted three points; if the
ball hit the backboard only, it counted one point. If the
ball did not hit the backboard, it counted zero. The points
made from the five shots were added and this number was placed
on the score card.

Two hundred foot forward run test. The two hundred
foot forward run was an attempt to determine speed and body
control. The length of the playing court was measured. The
player stood at one end of the playing court. On the signal
"go", he ran the length of the court full speed, around a
chair, back to his starting point, around a chair, then to
the timer, who was near the center of the court. He must
run exactly two hundred feet full speed. His time, in seconds
and tenths of seconds, was recorded.

One hundred foot backward run test. A possible way to
determine a boy's ability to run backward, body control and
side vision was to have him take the one hundred foot backward
run test. Exactly fifty feet was measured from one end of
the playing court toward the center of the court and a chalk
mark made on the floor. The subject being tested stood at
this fifty foot mark with the timer. On the signal "go", he
ran backward to the end of the court fifty feet away, around
a person standing on the end line, and back to the starting
point. The player must run backwards all the way. His time,
in seconds and tenths of seconds, was recorded.

Schools Participating in the Basic Study

Twenty schools were asked to participate in the main
study with instructions and materials being provided. Results
were received from twelve schools, eleven of which were used

in the study, with a total of five hundred and six boys tested.

The high schools participating were: Huntsville High School, Huntsville, Texas; Madisonville High School, Madisonville, Texas; Centerville High School, Centerville, Texas; Bellville High School, Bellville, Texas; Goliad High School, Goliad, Texas; Kenedy High School, Kenedy, Texas; Groveton High School, Groveton, Texas; Livingston High School, Livingston, Texas; Cleveland High School, Cleveland, Texas; Mount Carmel High School, Houston, Texas; and Santa Fe High School, Alta Loma, Texas.

Procedures Used

The tests were given to the high school students by coaches, graduate students or persons who were familiar with testing and had actual experience in testing. The tests with the method of administration were described, demonstrated, and written directions were given to each of the twelve coaches who helped in the study. Each boy tested was given a data card that he carried with him throughout the testing period. Appropriate blanks were found on the data card to accommodate the personal information, as well as, the test results. The tests were given to a cross section of physical education classes in the twelve high schools including the boys on the basketball squads. The tests could be given by one or more persons provided one individual administered one test to all the squad.

The scores were compared within each squad and variations between testers, if there were any, had no bearing on the validity or reliability of the test.

Summary

In Chapter III the materials and procedures used in this study were discussed.

The graphical presentation of data, tabular presentation of data by schools, ranks, predictive scales, inter-correlation of the physical tests, and the results of the predictions will be presented in Chapter IV.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

Graphical Presentation of Data

The coaches of all the participating schools adminis-
tered the ten objective tests and obtained the personal data
on their basketball players. All the data for each player
was recorded on each boy's data card.

The coaches then sent to the investigator the data
cards on all his players along with a listing by name of the
players comprising his first team and a list of the names of
his second team.

The data on the five personal factors and the scores
on the ten objective tests were then tabulated for the 506
boys from the eleven participating schools. These data for
the group as a whole are shown graphically in Figures 1
through 15.

Figures 1 through 5 show the results of the personal
data collected from the 506 high school boys that participat-
ed in this study.

Figures 6 through 15 represents the results of the ten
objective basketball tests that were given to the 506 high
school boys from the eleven high schools that participated
in this study.
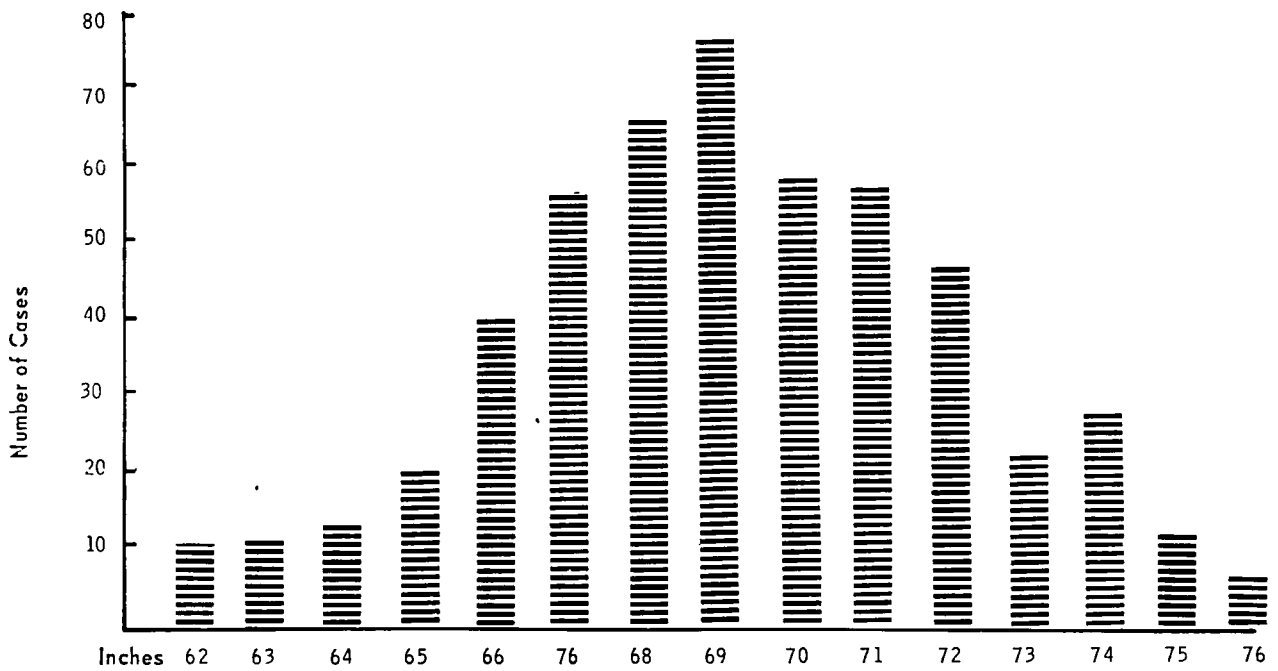
Figure 1

Distribution of Height by Inches of 506 High School Boys
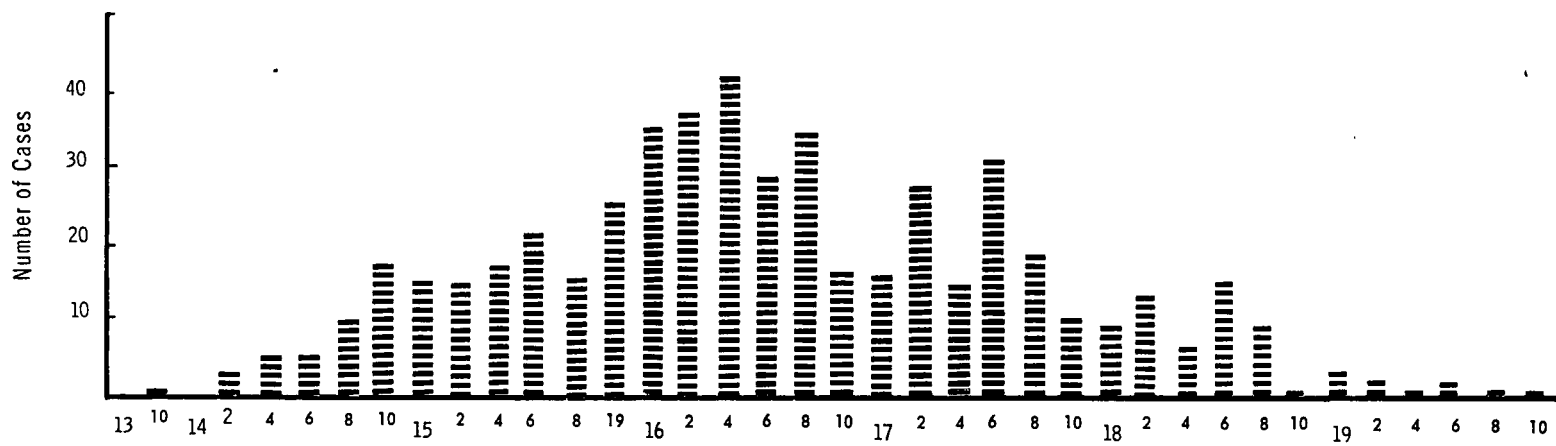
FIGURE 2

DISTRIBUTION OF AGE BY YEAR AND MONTH OF 506 HIGH SCHOOL BOYS

Number of Cases

80

70

60

50

40

30

20

10

90 to 94
95 to 99
100 to 104
105 to 109
110 to 114
115 to 119
120 to 124
125 to 129
130 to 134
135 to 139
140 to 144
145 to 149
150 to 154
155 to 159
160 to 164
165 to 169
170 to 174
175 to 179
180 to 184
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190 to 194
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215 to 219
220 to 224
225 to 229
230 to 234
235 to 239
240 to 244
245 to 249
250 to 254
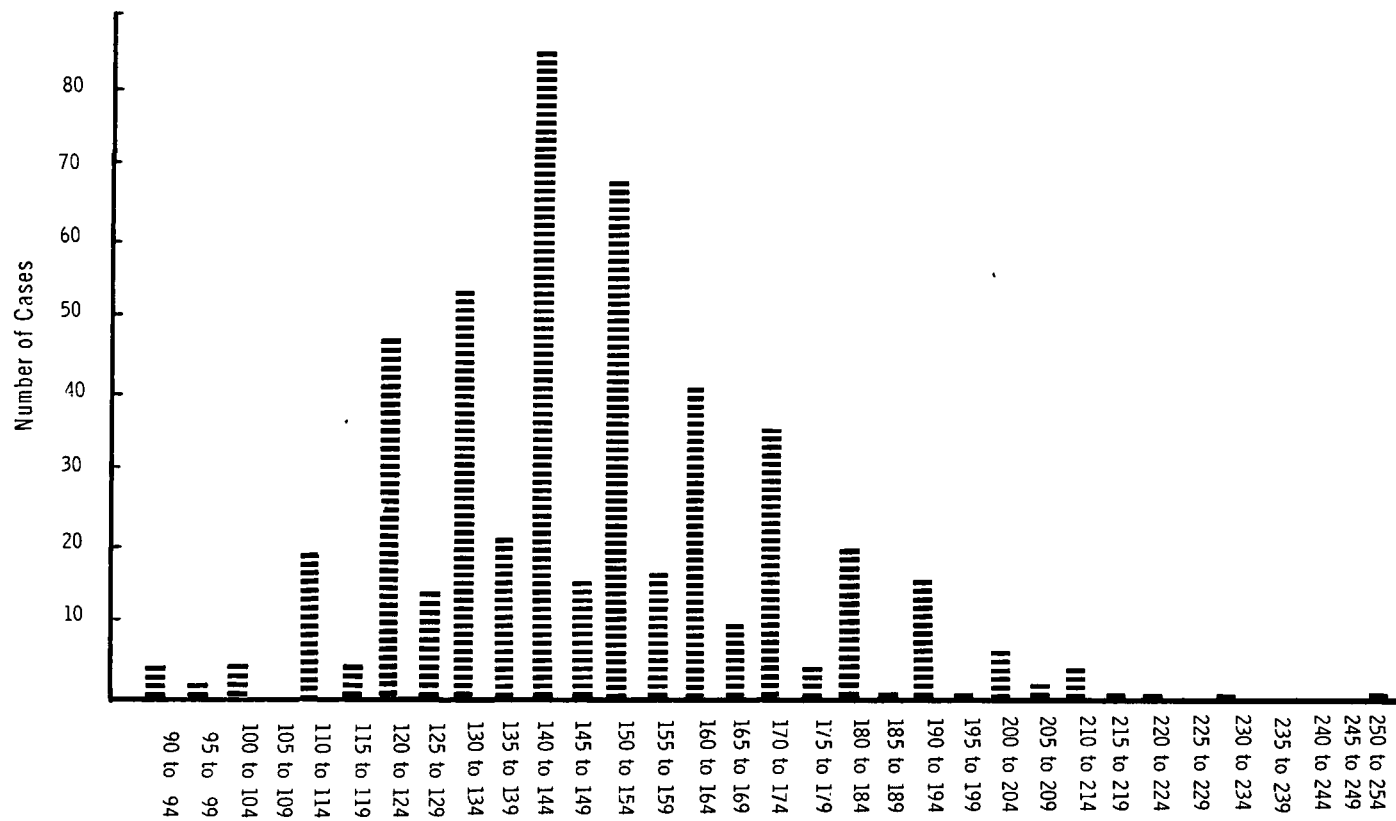
FIGURE 3

DISTRIBUTION OF WEIGHT BY POUNDS OF 506 HIGH SCHOOL BOYS
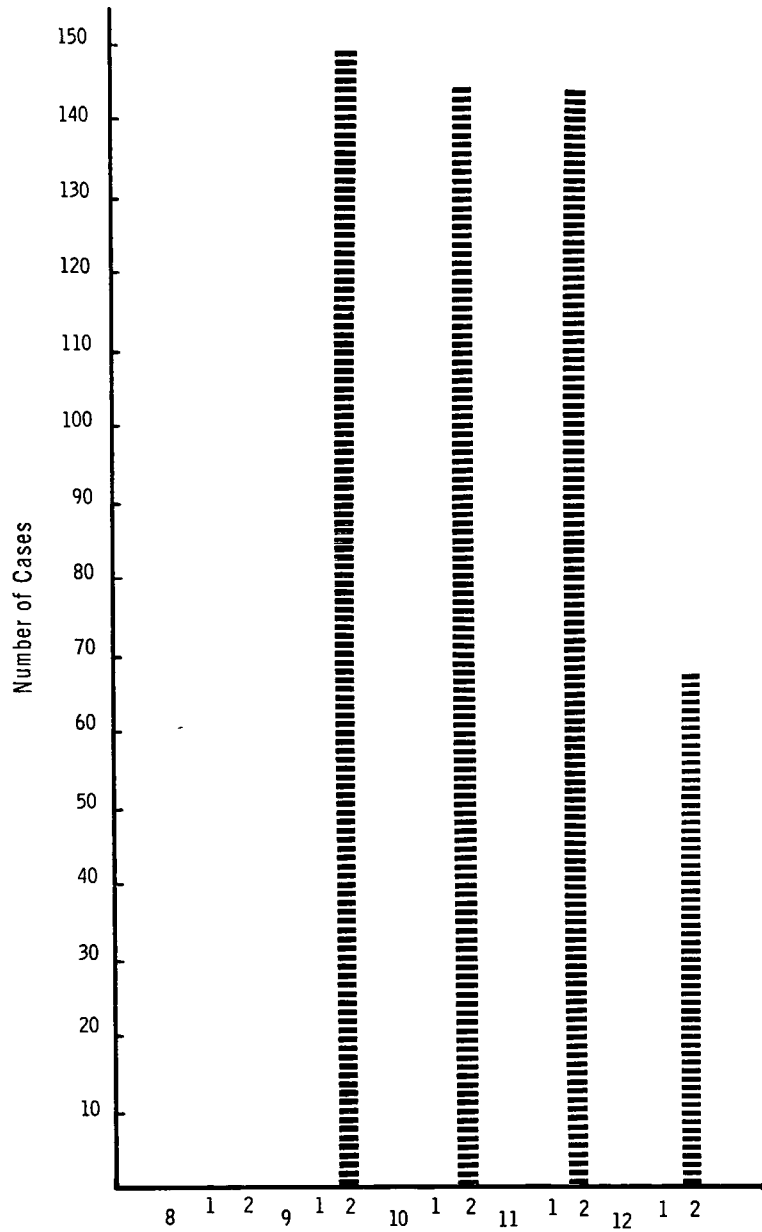
FIGURE 4

DISTRIBUTION OF GRADE BY YEAR AND SEMESTER OF
506 HIGH SCHOOL BOYS
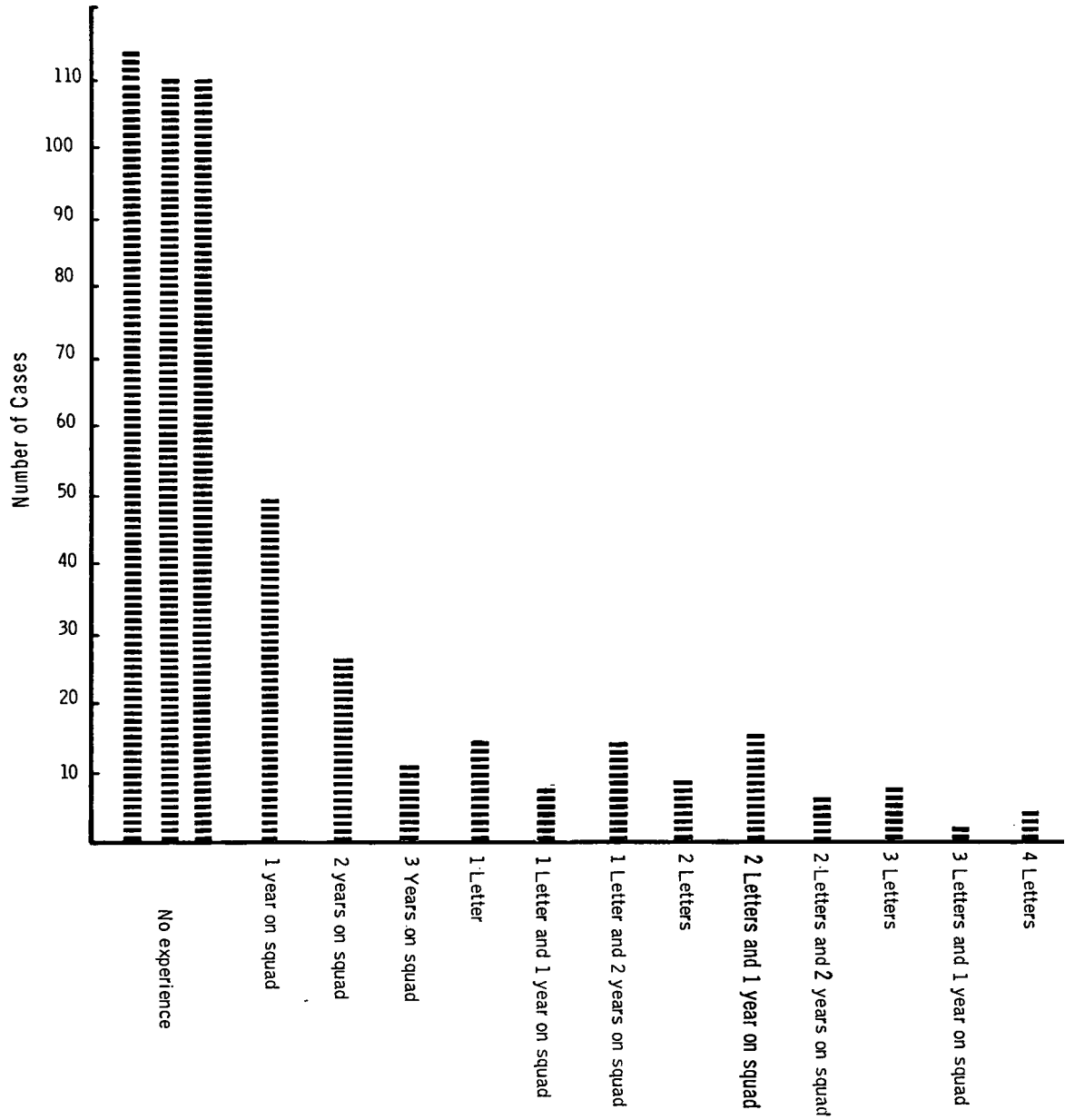
FIGURE 5

DISTRIBUTION OF BASKETBALL EXPERIENCE OF 506 HIGH SCHOOL BOYS
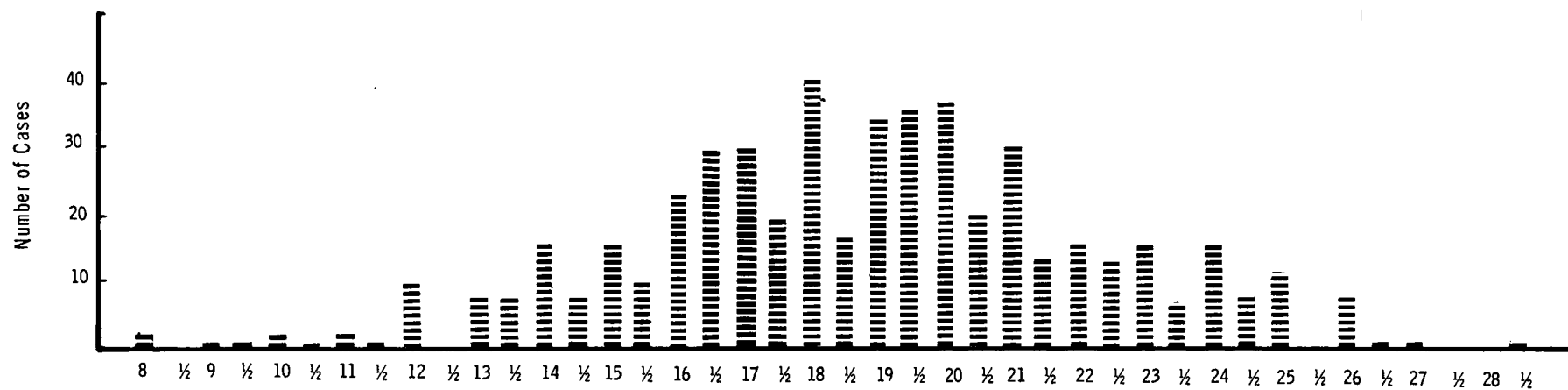
FIGURE 6

DISTRIBUTION OF THE JUMP AND REACH TEST OF 506 HIGH SCHOOL BOYS
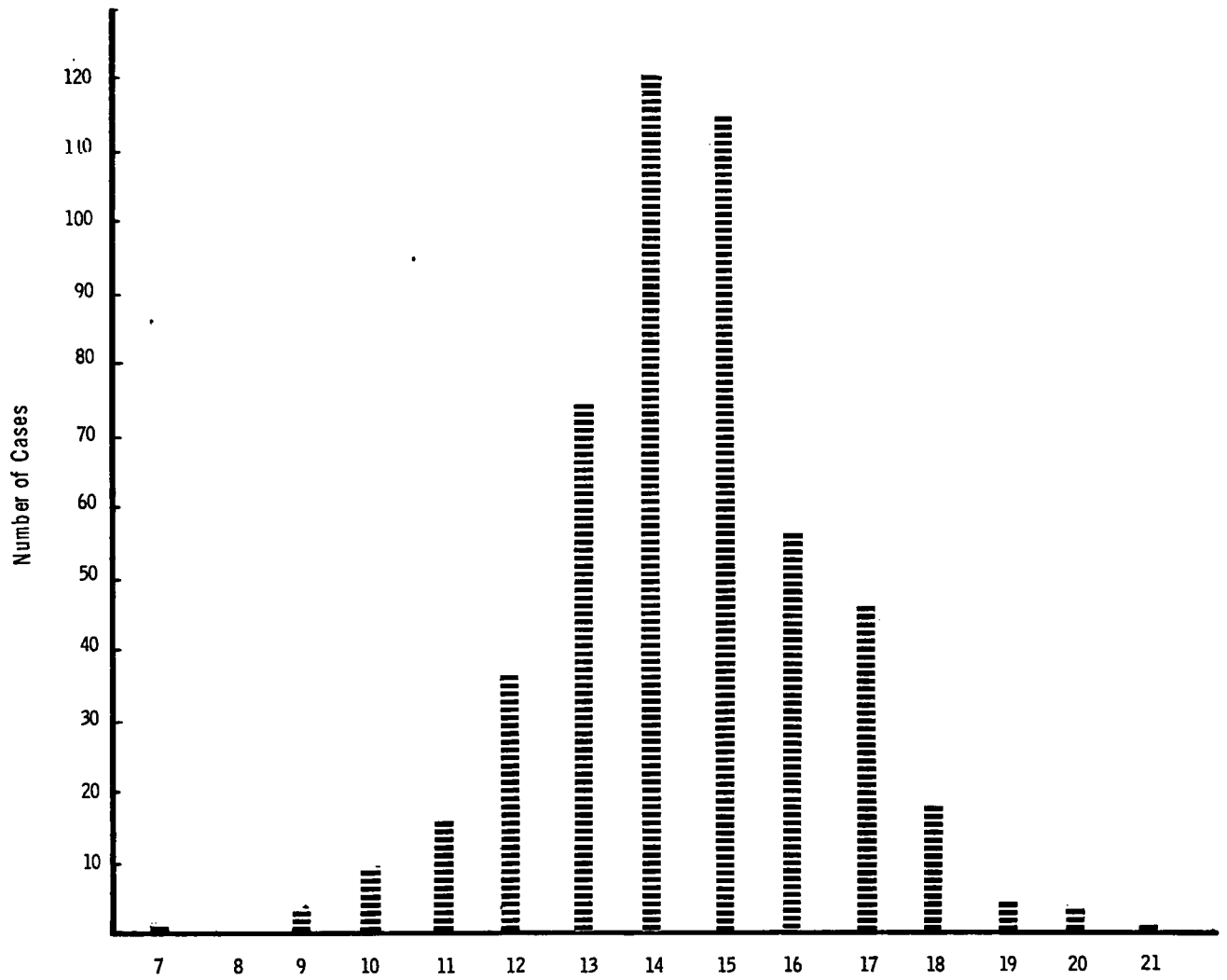
FIGURE 9

DISTRIBUTION OF THE SHUFFLE STEP TEST OF 506 HIGH SCHOOL BOYS
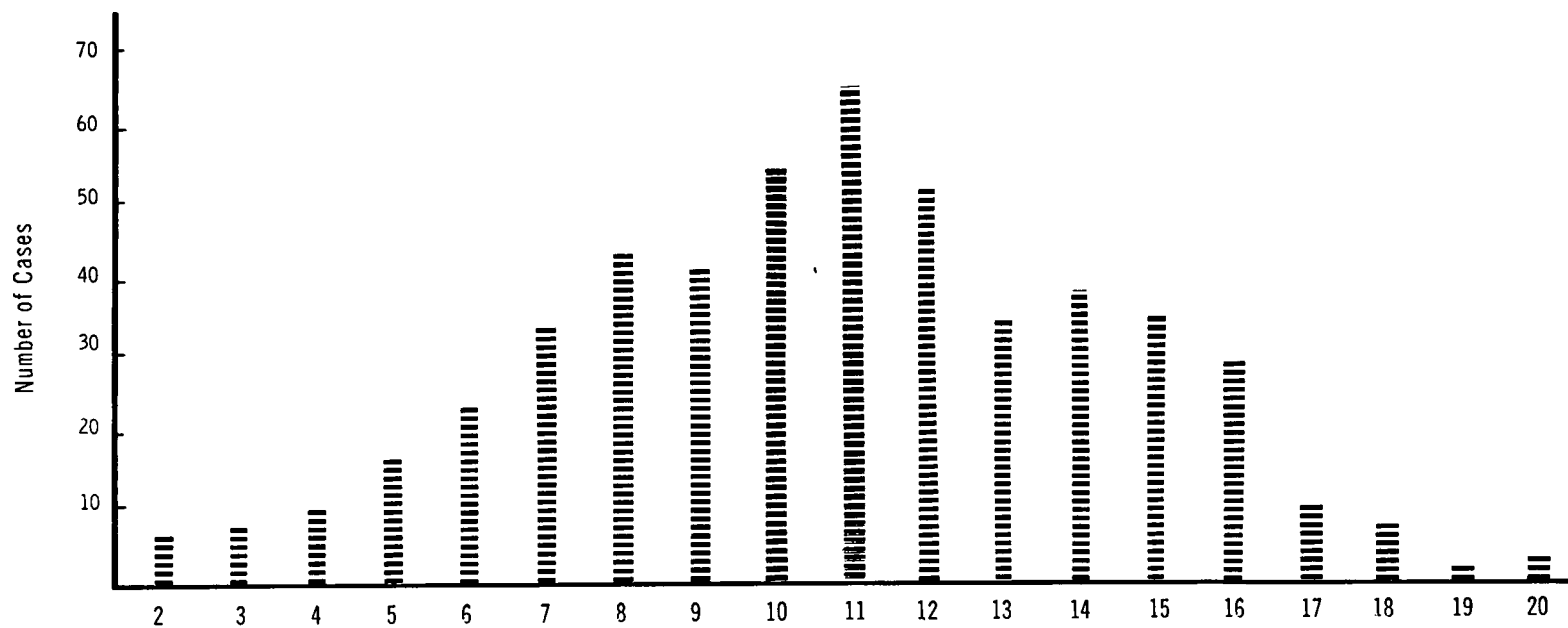
FIGURE 7

DISTRIBUTION OF THE BASKETBALL SHOOT TEST OF 506 HIGH SCHOOL BOYS
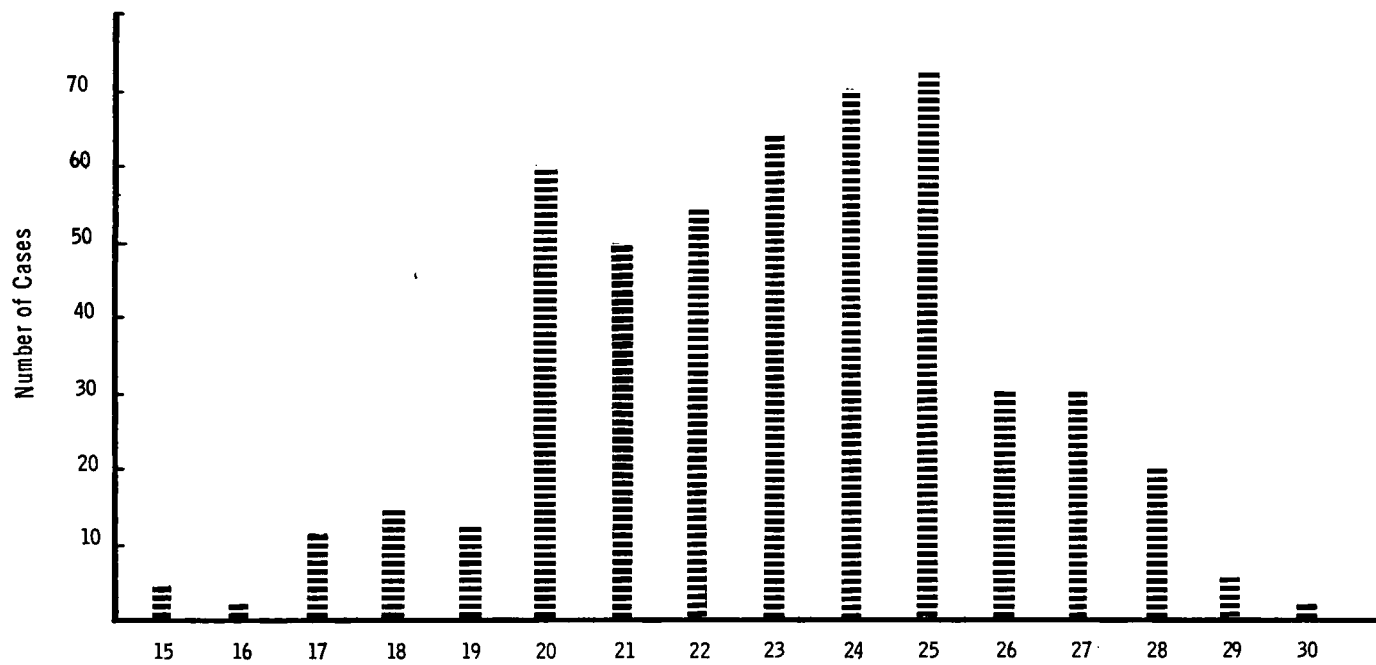
FIGURE 8

DISTRIBUTION OF THE OBSTACLE DRIBBLE TEST OF 506 HIGH SCHOOL BOYS
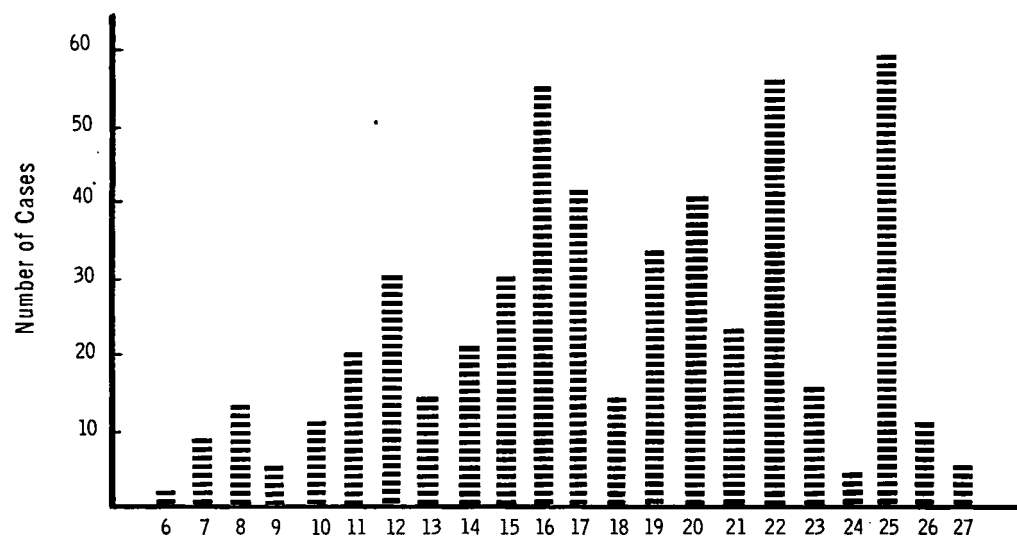
FIGURE 10

DISTRIBUTION OF THE DRIBBLE AND SHOOT TEST OF 506 HIGH SCHOOL BOYS
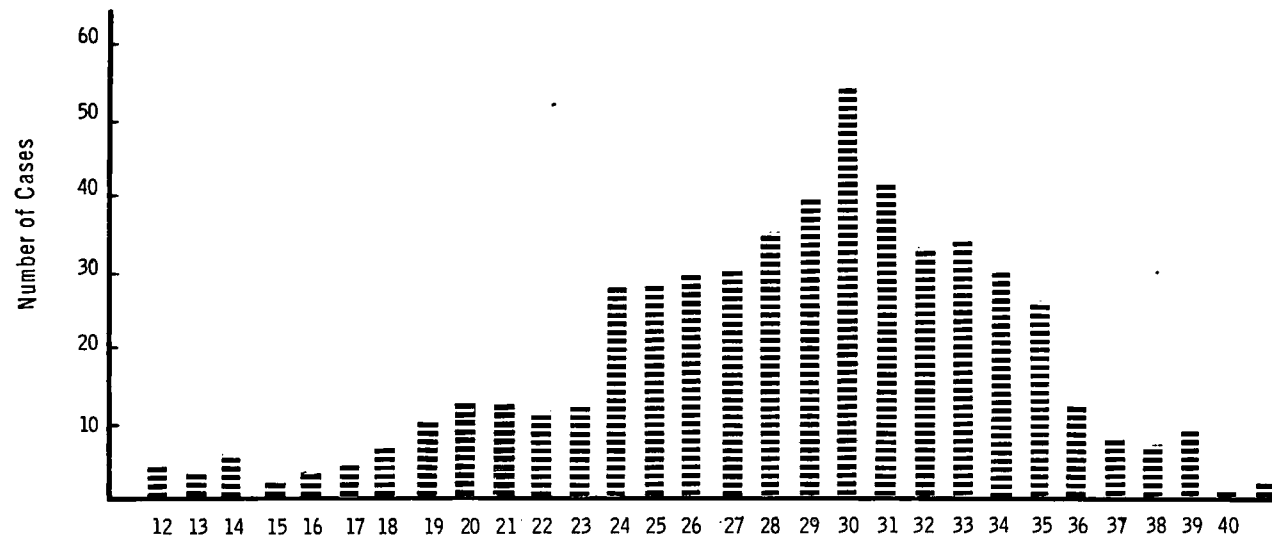
FIGURE 11

DISTRIBUTION OF THE WALL BOUNCE TEST OF 506 HIGH SCHOOL BOYS
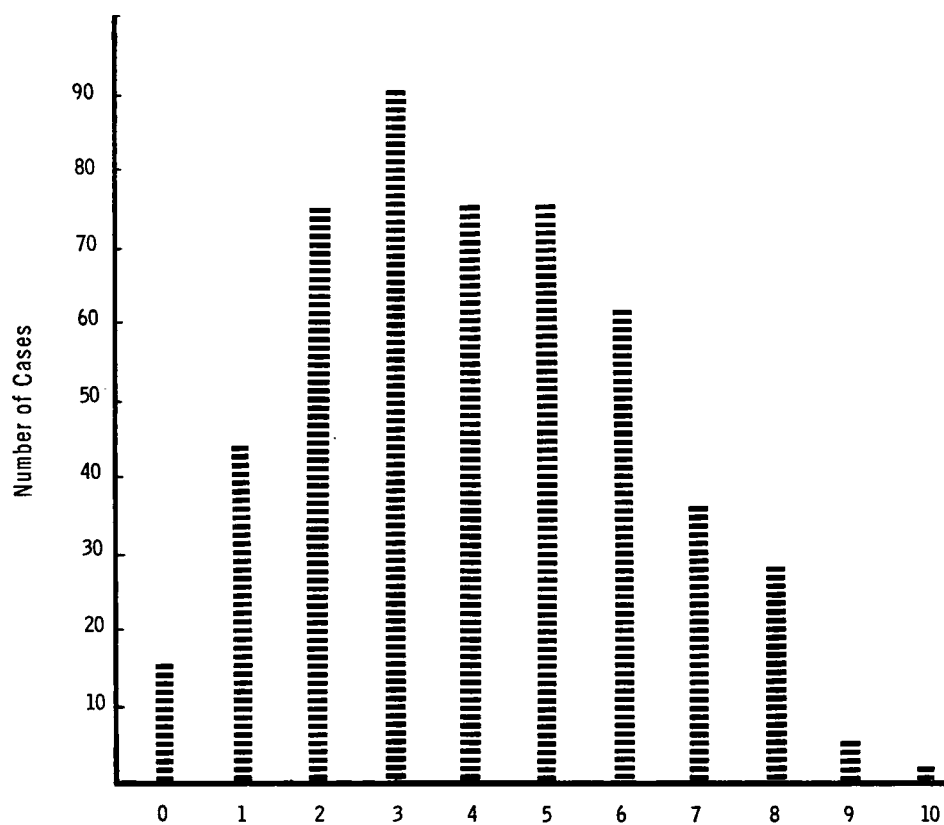
FIGURE 12

DISTRIBUTION OF THE FREE THROW TEST OF 506 HIGH SCHOOL BOYS
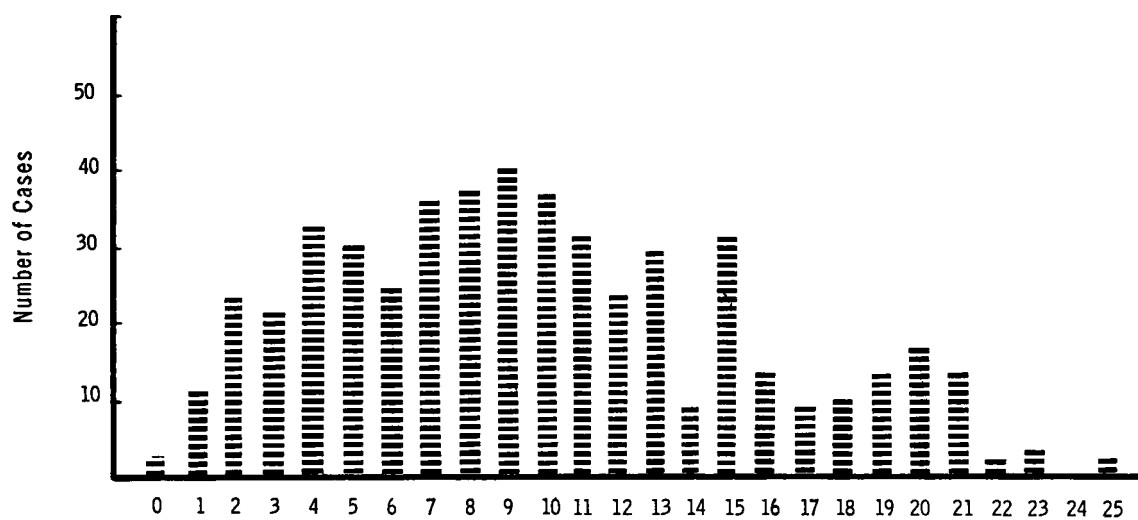
FIGURE 13

DISTRIBUTION OF THE 35 FOOT SHOOTING TEST OF 506 HIGH SCHOOL BOYS
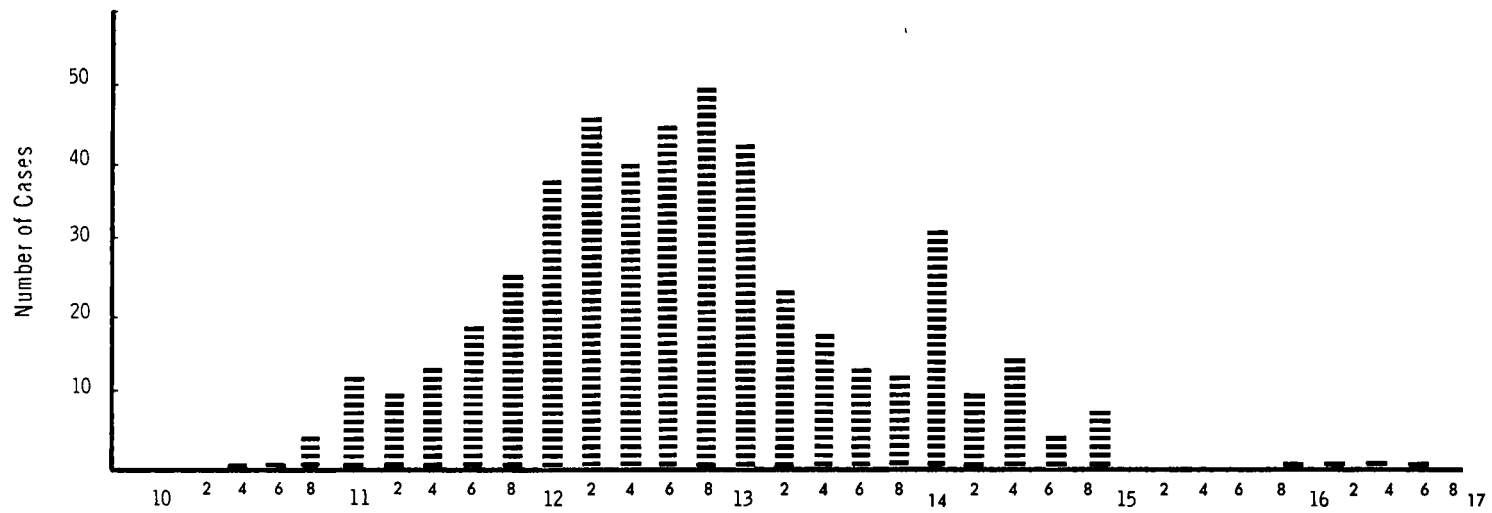
FIGURE 14

DISTRIBUTION OF THE 200 FOOT FORWARD RUN TEST OF 506 HIGH SCHOOL BOYS
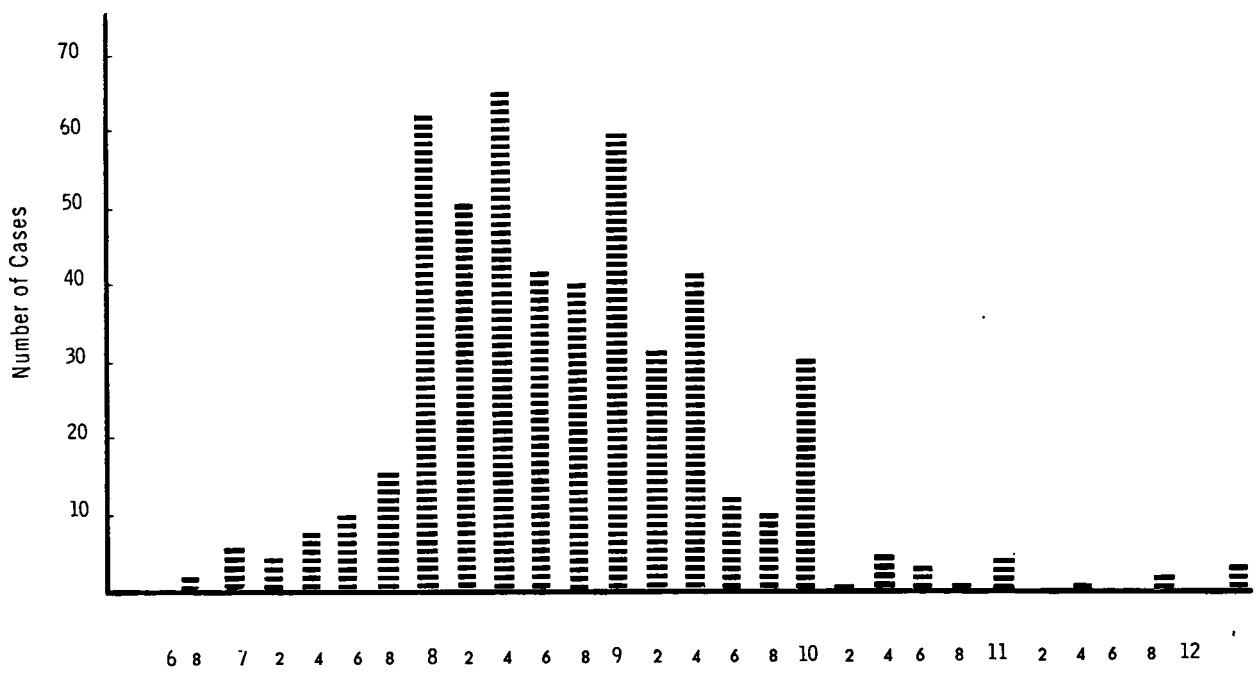
FIGURE 15

DISTRIBUTION OF THE 100 FOOT BACKWARD RUN TEST OF 500
HIGH SCHOOL BOYS

Tabular Presentation of Data by Schools

The data on the players were then tabulated by schools on all fifteen factors. The means for center, forwards, and guards for all fifteen factors were computed separately for squadmen and first team personnel. The basic data for the eleven participating high schools are presented as indicated above in Tables I through XI.

As indicated in Tables I through XI, means were established for each school separately in each of the five personal factors considered and for each of the ten objective tests given. The means were established separately for the boys that played center, forward, and guard. The scores that the starting center, forwards, and guards made were then compared with the mean or average score made by the boys that played each position.

Tables I through XI are similar in content, therefore, only Table I will be discussed.

Table I shows the norms for Santa Fe High School. Seven boys played center, the starting center was above average in all factors except weight, obstacle dribble, and 35 foot shoot. Twenty-one boys played guard with the starting guards being above average in all factors except weight and free throws. Twenty-two boys played forward and the starting forwards were above average in all factors with the exception of the 35 foot shoot.

TABLE I

NORMS FOR SANTA FE HIGH SCHOOL
BY POSITIONS

FACTORS	CENTERS		FORWARDS		GUARDS	
	SQUAD	FT*	SQUAD	FT	SQUAD	FT
Height	72.4	74	70.1	71.5	67.8	69.12
Age	15.6	17	16.7	17.5	15.9	16.9
Weight	159.4	157	154.4	157	139.8	137
Grade	9	10	10	11	10	11
Experience	Squad	Letter	Squad	Letter	Squad	Letter
Jump and Reach	20	21.5	20.2	23.6	19.8	20.37
Basketball Shoot	9.9	14	11.6	14	9.6	13.5
Obstacle Dribble	25.3	25	24.1	27.5	24.5	27.5
Shuffle Step	13.4	14	14.8	17	14.3	14.5
Dribble & Shoot	15.4	16	15.4	21	14.9	18
Wall Bounce	26.7	29	27	35	27.4	33
Free Throws	3.9	6	4.6	5.5	3.8	3.5
35 Foot Shoot	4.1	0	5.9	4.5	6.6	12
200 Ft. Forward Run	12.5	12.1	12.2	11.1	12.0	11.05
100 Ft. Backward Run	9.2	9.0	8.8	8.4	9.0	8.05
Number	7		22		21	

*FT Indicates First Team

TABLE II

NORMS FOR CENTERVILLE HIGH SCHOOL
BY POSITIONS

FACTORS	CENTERS		FORWARDS		GUARDS	
	SQUAD	FT*	SQUAD	FT	SQUAD	FT
Height	73.1	72.5	69.8	71	66.5	66
Age	16.5	18.5	16.6	17.2	16.1	16.9
Weight	164.6	205	149.5	155	130.5	132.5
Grade	10.5	12.2	10.4	11.7	10.2	11
Experience	None	Letter	None	Letter	None	Letter
Jump & Reach	18.3	19	19.6	23.2	18.4	23.5
Basketball Shoot	14.8	15	8.2	13	9.2	11.5
Obstacle Dribble	24.3	25	24.4	25.5	25.8	27
Shuffle Step	15.8	23	14.2	18.5	14.4	15.5
Dribble & Shoot	18.5	19	17.4	20	18.6	23
Wall Bounce	24.3	27	21.8	25.5	23	27
Free Throws	6.5	6	4	7	4.2	4.5
35 Foot Shoot	9.3	11	9.7	16.5	12	16
200 Ft. Forward Run	13.3	12.5	13.6	13	13.5	13.5
100 Ft. Backward Run	9.4	8.5	9.5	8.8	9.3	8.8
Number	6		18		18	

*FT Indicates First Team

TABLE III

NORMS FOR GOLIAD HIGH SCHOOL
BY POSITIONS

FACTORS	CENTERS		FORWARDS		GUARDS	
	SQUAD	FT*	SQUAD	FT	SQUAD	FT
Height	71.6	73	70	70.1	68.8	70
Age	17	17.8	16.7	17.1	16.9	17.3
Weight	166.9	145	155.6	160	140.5	155
Grade	10.2	11.2	10.5	11.2	10.5	11.2
Experience	None	Letter	None	Letter	None	Letter
Jump & Reach	18	26	19.5	25.8	19.3	22.5
Basketball Shoot	9.8	13	11.4	14.5	12.4	14
Obstacle Dribble	21.3	25	21.6	25.5	21.5	24
Shuffle Step	13.6	14	15.1	16.5	15	17
Dribble & Shoot	17	19	18.4	23.5	19.5	25
Wall Bounce	29.1	33	30.8	35.5	28.4	35
Free Throws	3.9	6	3.5	7	3.9	7.5
35 Foot Shoot	5.7	20	8.3	18.5	7.3	11.5
200 Ft. Forward Run	13.2	12.0	12.7	11.4	12.7	12.0
100 Ft. Backward Run	9.5	9.0	9.1	8.4	9.1	8.5
Number	10		15		16	

*FT Indicates First Team

TABLE IV

NORMS FOR MOUNT CARMEL HIGH SCHOOL
BY POSITIONS

	CENTERS		FORWARDS		GUARDS	
FACTORS	SQUAD	FT*	SQUAD	FT	SQUAD	FT
Height	74.4	76	69.2	70.7	67.8	69
Age	15.7	16.5	16.2	17.2	16.3	17.1
Weight	171.5	182	154.8	164	144.5	149
Grade	9.9	11.2	9.7	10.7	9.6	11.2
Experience	None	Letter	None	Letter	None	Letter
Jump & Reach	17.5	23	18.3	19.8	19	20.1
Basketball Shoot	10.3	15	9	9.5	10	10
Obstacle Dribble	23	29	21.7	27	24.3	26
Shuffle Step	15.5	16	15.1	17	16.1	16
Dribble & Shoot	19.8	24	18.1	23	18.2	22.5
Wall Bounce	30.5	38	30.3	32	31.6	32.5
Free Throws	2.7	3	3.3	5.5	4.4	3.5
35 Foot Shoot	9.2	16	9.1	9.5	7.9	11
200 Ft. Forward Run	12.0	11.3	12.2	12.2	11.8	11.6
100 Ft. Backward Run	8.4	7.5	8.9	8.0	8.6	8.5
Number	6		19		16	

*FT Indicates First Team

TABLE V

NORMS FOR BELLVILLE HIGH SCHOOL
BY POSITIONS

| | CENTERS | | FORWARDS | | GUARDS | |
FACTORS	SQUAD	FT*	SQUAD	FT	SQUAD	FT
Height	66.8	77	70.7	70.5	67.9	67
Age	16.1	17.3	16.8	17.8	16	16.5
Weight	167.5	183	155	163	141	145
Grade	10.9	11.2	10.3	12	10	10.2
Experience	None	Letter	None	Letter	None	Letter
Jump & Reach	20.4	20.5	17.3	19.1	17.5	18.8
Basketball Shoot	11.8	13	10.7	13.5	10.7	14.5
Obstacle Dribble	23.2	24	22.2	22.5	21.3	24
Shuffle Step	14.7	15	14	15	14	14
Dribble & Shoot	20.4	25	17.2	17.5	16.8	20.5
Wall Bounce	29	31	26.6	31	28	29.5
Free Throws	3.8	2	3.4	4	4.3	8
35 Foot Shoot	9	7	10.3	10	9.1	11.5
200 Ft. Forward Run	13.4	12.5	13.1	12.4	12.9	12.4
100 Ft. Backward Run	8.2	7.7	9.1	8.5	8.8	8.4
Number	12		26		27	

*FT Indicates First Team

TABLE VI

NORMS FOR HUNTSVILLE HIGH SCHOOL
BY POSITIONS

FACTORS	CENTERS		FORWARDS		GUARDS	
	SQUAD	FT*	SQUAD	FT	SQUAD	FT
Height	72.1	76	69.4	71.5	67.2	68
Age	16.9	16.9	16.6	17.3	16.6	17
Weight	148.3	155	142.6	164.5	137.7	147
Grade	10.5	11.2	10.4	11.2	10.3	11.2
Experience	None	Letter	None	Letter	None	Letter
Jump & Reach	18.1	20	17.2	22.5	17.7	22.2
Basketball Shoot	11.1	17	8.7	14	8.7	13.5
Obstacle Dribble	23.2	25	22	27	22.5	28.5
Shuffle Step	15.7	17	14.3	17	15.4	18.5
Dribble & Shoot	20.8	25	18.3	22	17.9	24.5
Wall Bounce	29.1	34	27.2	32.5	28.7	36
Free Throws	3.8	1	3.4	7.5	3.3	4.5
35 Foot Shoot	9	9	9.1	14	11.7	12
200 Ft. Forward Run	12.8	12.7	12.9	11.1	12.6	10.9
100 Ft. Backward Run	8.4	7.8	8.4	7	8.5	6.9
Number	10		22		23	

*FT Indicates First Team

TABLE VII

NORMS FOR LIVINGSTON HIGH SCHOOL
BY POSITIONS

FACTORS	CENTERS		FORWARDS		GUARDS	
	SQUAD	FT*	SQUAD	FT	SQUAD	FT
Height	72.4	75	69.1	74	67.5	69
Age	16.7	17.6	16.1	16.6	16	16.1
Weight	159.8	170	141.8	146	137	152
Grade	10.6	11.2	10.6	11	10.2	10
Experience	None	Letter	None	Letter	None	Letter
Jump & Reach	18.9	25	18.4	22.3	19.5	23.5
Basketball Shoot	12.4	20	10.6	16.5	13	16
Obstacle Dribble	22.8	28	22.8	27.5	23	28
Shuffle Step	14.4	15	13.5	14	14	16
Dribble & Shoot	18.4	22	16.1	16.5	17	17.5
Wall Bounce	29.5	33	28.7	30.5	29.1	31.5
Free Throws	3.5	5	3.1	7.5	3.6	2.5
35 Foot Shoot	11.3	2	12.2	14.5	11	14
200 Ft. Forward Run	13.2	12.7	13	13	13	12.4
100 Ft. Backward Run	8.5	8.3	8.7	8.7	8.7	7.7
Number	8		16		16	

*FT Indicates First Team

TABLE VIII

NORMS FOR CLEVELAND HIGH SCHOOL
BY POSITIONS

FACTORS	CENTERS		FORWARDS		GUARDS	
	SQUAD	FT*	SQUAD	FT	SQUAD	FT
Height	72.3	80	69.4	74.5	66.1	71.3
Age	17.8	18	16.5	19	15.9	17.9
Weight	164.5	180	142	198	129.2	147
Grade	11.2	12.2	9.5	12.2	10.4	11
Experience	None	Letter	None	Letter	None	Letter
Jump & Reach	19.2	23	20	23.5	18.2	23.5
Basketball Shoot	11	12	10.5	13	9.2	13
Obstacle Dribble	21.1	23	22.4	23.5	22	28
Shuffle Step	15.9	16	15	18	14.6	16.5
Dribble & Shoot	10.9	23	18	27	16.7	32.5
Wall Bounce	29	35	27.7	37.5	26	32.5
Free Throws	3.7	5	4	7.5	3.6	6
35 Foot Shoot	7.7	15	9.6	11	11.3	12.5
200 Ft. Forward Run	13.3	12.2	12.7	11.6	13.1	12.2
100 Ft. Backward Run	9.04	8.7	8.6	8.2	8.7	8.5
Number	8		17		15	

*FT Indicates First Team

TABLE IX

NORMS FOR GROVETON HIGH SCHOOL
BY POSITIONS

FACTORS	CENTERS		FORWARDS		GUARDS	
	SQUAD	FT*	SQUAD	FT	SQUAD	FT
Height	73.2	77.5	68.8	72	67	69.5
Age	17.5	18.2	17.1	17.9	16.5	17.5
Weight	177.6	204	150.4	159	137.4	164
Grade	11.2	12.2	10.4	11.2	10.4	12
Experience	None	Letter	None	Letter	None	Letter
Jump & Reach	18.6	20	17.2	22.8	19.5	21.4
Basketball Shoot	11.1	13	11.2	11	11.1	16.5
Obstacle Dribble	22.8	24	23.8	28	24.7	28.5
Shuffle Step	13.7	15	13	17	14	17
Dribble & Shoot	16.1	22	17 -	21.5	19.6	26
Wall Bounce	20.4	32	18.8	34	18.4	22.5
Free Throws	3.5	3	3.6	4	3.9	7
35 Foot Shoot	9.5	21	9.7	16	9.7	13
200 Ft. Forward Run	13.6	15.5	15.2	14.9	14.6	14
100 Ft. Backward Run	8	8	8.7	8	8.5	7.9
Number	10		15		22	

*FT Indicates First Team

TABLE X

NORMS FOR MADISONVILLE HIGH SCHOOL
BY POSITIONS

FACTORS	CENTERS		FORWARDS		GUARDS	
	SQUAD	FT*	SQUAD	FT	SQUAD	FT
Height	68.1	74	69.5	72	67.3	71
Age	16.6	17.2	16.2	18.2	16.3	17
Weight	150	150	150	166	139	152.5
Grade	9.8	11.2	9.8	12	9.3	11.2
Experience	Squad	Letter	None	Letter	None	Letter
Jump & Reach	18.5	25	18	26	18	25
Basketball Shoot	12.8	18	12.2	23	12	17.5
Obstacle Dribble	20	24	20.9	27.5	22	27.5
Shuffle Step	13.8	14	13.3	15	13.6	15
Dribble & Shoot	15	21	15.7	25.5	16.2	26
Wall Bounce	32	32	29	30	28.8	43.5
Free Throws	5.3	6	4.2	8.5	5	7.5
35 Foot Shoot	12.5	14	10.4	21.5	11.2	21.5
200 Ft. Forward Run	11.3	10.5	10.5	9	10.1	8.8
100 Ft. Backward Run	8.9	8.6	8.8	7.7	8.6	8.5
Number	4		22		19	

*FT Indicates First Team

TABLE XI

NORMS FOR KENEDY HIGH SCHOOL
BY POSITIONS

FACTORS	CENTERS		FORWARDS		GUARDS	
	SQUAD	FT*	SQUAD	FT	SQUAD	FT
Height	74	76	71.2	75	68	71
Age	16.4	18.6	16.7	19.1	16.7	16.9
Weight	183.8	230	160.3	190	158.4	174
Grade	10.3	12.2	10.4	12.2	10	11
Experience	None	Letter	None	Letter	None	Letter
Jump & Reach	20.8	22.5	19.2	24	19.4	21.7
Basketball Shoot	14	16	12	15	11	16
Obstacle Dribble	24.8	26	22.9	25.5	23	26.5
Shuffle Step	15	15	14.8	17	14.7	15
Dribble & Shoot	16	22.9	20.5	21.6	20	21
Wall Bounce	32.8	38	28.7	37.5	29.8	36.5
Free Throws	5.9	8	5.7	8	4.5	7.5
35 Foot Shoot	13.4	19	12.6	21	9.4	16
200 Ft. Forward Run	12.3	11.9	12.6	11.8	12.4	11.9
100 Ft. Backward Run	8.9	8.3	8.9	8.2	8.7	8.4
Number	8		10		22	

*FT Indicates First Team

Basketball Classification Index

To arrive at some meaningful composite numerical score for each player on all fifteen factors measured, the Basketball Classification Index (BCI) was formulated. To establish such an index or composite score, the raw scores on all fifteen factors were converted into an arbitrary ranking scale ranging from one to ten inclusive. The sum of a boy's rank value on each of the fifteen factors yielded the boy's BCI, or Basketball Classification Index.

On the basis of a careful analysis of the range of raw scores made by the 506 boys on each of the fifteen factors (see Table XII), raw scores in each distribution were arbitrarily assigned rank values from one to ten. Though the ranks thus assigned do not on any of the fifteen factors constitute a standard score scale, equal step intervals were maintained throughout. The raw scores and the equivalent rank values assigned for each of the five personal history factors are presented in Table XIII and for the ten physical tests in Table XIV.

As soon as Tables XIII and XIV were set up, they were used for converting all raw scores for each player on all fifteen factors into the appropriate equivalent rank value. The sum of the fifteen rank values for each player constitutes his BCI, or Basketball Classification Index.

TABLE XII

HIGH, LOW AND RANGE OF FIFTEEN
FACTORS CONSIDERED

FACTORS	HIGH	LOW	RANGE
Height	$76\frac{1}{2}''$	$62''$	$14\frac{1}{2}''$
Age	19 yrs. 10 mos.	13-10	6 yrs.
Weight	206 lbs.	92 lbs.	114 lbs.
Grade	12	9	4 yrs.
Experience	4 letters	0	4
Jump and Reach	$28\frac{1}{2}''$	$8''$	$20''$
Basketball Shoot	20	2	18
Obstacle Dribble	34	15	18
Shuffle Step	21	7	14
Dribble & Shoot	27	6	21
Wall Bounce	40	12	28
Free Throws	10	0	10
35 Foot Shoot	25	0	25
200 Foot Forward Run	10.4 sec.	17 sec.	6.6 sec.
100 Foot Backward Run	6.8 sec.	13.4 sec.	6.6 sec.

TABLE XIII

RAW SCORES AND EQUIVALENT RANKS ASSIGNED
FOR THE FIVE PERSONAL DATA FACTORS

PART A

RANK	HEIGHT	WEIGHT	AGE	GRADE
1	74 and above	180 and above	18 and above	High 12
2	73	173-179	17-8 to 17-11	Low 12
3	72	166-172	17-4 to 17-7	High 11
4	71	159-165	17-0 to 17-3	Low 11
5	70	152-158	16-8 to 16-11	High 10
6	69	145-151	16-4 to 16-7	Low 10
7	68	138-144	16-0 to 16-3	High 9
8	67	131-137	15-8 to 15-11	Low 9
9	66	124-130	15-4 to 15-7	High 8
10	65 and below	123 and below	15-3 and below	Low 8

PART B

RANK	EXPERIENCE IN BASKETBALL
1	2 Letters and 2 years on squad and more
2	2 Letters and 1 year on squad
3	2 Letters
4	1 Letter and 2 years on squad
5	1 Letter and 1 year on squad
6	1 Letter
7	3 Years on squad
8	2 Years on squad
9	1 Year on squad
10	No experience

TABLE XIV

RAW SCORES AND EQUIVALENT RANKS ASSIGNED
FOR THE TEN PHYSICAL TESTS

PART A

RANK	JUMP & REACH	BASKETBALL SHOOT	OBSTACLE DRIBBLE	SHUFFLE STEP	DRIBBLE & SHOOT
1	24 and above	16 and above	27 and above	19 and above	25 and above
2	23	15	26	18	23 - 24
3	22	14	25	17	21 - 22
4	21	13	24	16	19 - 20
5	20	12	23	15	17 - 18
6	19	11	22	14	15 - 16
7	18	10	21	13	13 - 14
8	17	9	20	12	11 - 12
9	16	8	19	11	9 - 10
10	15 and below	7 and below	18 and below	10 and below	8 and below

PART B

RANK	WALL BOUNCE	FREE THROWS	35 FOOT SHOOT	FORWARD RUN	BACKWARD RUN
1	35 and above	10	20 and above	11.4 and above	7.8 and above
2	33 - 34	9	18 - 19	11.8-11.5	8.0-7.9
3	31 - 32	8	16 - 17	12.2-11.9	8.2-8.1
4	29 - 30	7	14 - 15	12.6-12.3	8.4-8.3
5	27 - 28	6	12 - 13	13.0-12.7	8.6-8.5
6	25 - 26	5	10 - 11	13.4-13.1	8.8-8.7
7	23 - 24	4	8 - 9	13.8-13.5	9.0-8.9
8	21 - 22	3	6 - 7	14.2-13.9	9.2-9.1
9	19 - 20	2	4 - 5	14.6-14.3	9.4-9.3
10	18 and below	1 and below	3 and below	14.7 and below	9.5 and below

Predictions on Basis of Basketball
Classification Indexes

After the BCI's were computed for the 506 players it was possible to predict the five players (one center, two forwards, and two guards), comprising the first team for each of the schools represented. The center with the lowest BCI for each school was placed on the first team for his particular school. The two forwards with the lowest BCI's from among the forwards, and the two guards with the lowest BCI's from the players listed as guards for that school were also listed as first team. In like manner a prediction was made in regard to the players comprising the second team from among the players remaining after the first team players were removed.

The accuracy of the predictions for the personnel of the first and second team for each school on the basis of the BCI's was then checked by comparing each coach's listing of the personnel of his first and second teams by positions and included in the original data from each school. The comparisons and validation data by schools for the BCI technique are presented in Tables XV through Table XXVI.

Santa Fe High School

Fifty boys were tested at Santa Fe High School, Alta Loma, Texas, during the Spring of 1960. The test results were tabulated and a Basketball Classification Index for each boy tested was determined.

Table I on page 86 shows, the starting center to be above average in all of the items considered with the exception of weight, obstacle dribble and thirty-five foot shoot. The first team forwards were above average in all items except the thirty-five foot shoot test. The starting guards were above average in all items considered with the exception of weight and free throws. Using the Basketball Classification Index as a guide, the top two centers, four top forwards, and four top guards were selected.

Table XV shows, a comparison of the top ten boys selected by using the Basketball Classification Index and the top ten boys as selected by the coach. The top ten boys selected by the coach were the same boys selected when the results of the Basketball Classification Index was used. The starting team or top five boys selected by the coach were the same boys as selected when the results of the Basketball Classification Index was used with the exception of one forward.

TABLE XV

PREDICTIVE SCALE FOR SANTA FE HIGH SCHOOL

PLAYER AND BCI* RANKING	COACH'S RANKING	OUTSTANDING RECOGNITION
Centers - 7 Tested		
A - 71	A - First Team	All District
B - 78	B - Second Team	
C - 79		
D - 81		
Forwards - 22 Tested		
A - 46	A - First Team	All Tournament
B - 50	B - First Team	
C - 63	C - Second Team	
D - 68	D - Second Team	
E - 70		
F - 71		
Guards - 21 Tested		
A - 49	A - First Team	All Tournament
B - 62	D - First Team	
C - 65	B - Second Team	
D - 76	C - Second Team	
E - 79		
F - 81		

*BCI Indicates Basketball Classification Index

Centerville High School

During the Spring of 1960 forty-two boys were tested
at Centerville High School. As shown in Table II on page 87,
the starting center had better scores than the average center,
in thirteen out of the fifteen items. He was below average in
height and free throws. The starting forwards were above aver-
age in each of the fifteen items and the starting guards were
above average in all of the items except height. The Basket-
ball Classification Index was determined for each boy tested
and the top ten boys were selected on this basis.

As illustrated in Table XVI the ten boys selected by
the use of the Basketball Classification Index were compared
with the top ten selected by the coach. The ten boys selected
by the coach included eight boys that were selected on the
basis of the Basketball Classification Index results. The
coach selected one forward on the second team that was not
ranked as one of the top four forwards or one of the top ten
boys on the squad. The coach selected one guard with the high-
est Basketball Classification Index as a second team guard.
One second team guard, as selected by the coach, was not ranked
as one of the four best guards or as one of the ten top boys,
according to the Basketball Classification Index results.

TABLE XVI

PREDICTIVE SCALE FOR CENTERVILLE HIGH SCHOOL

PLAYER AND BCI* RANKING	COACH'S RANKING	OUTSTANDING RECOGNITION
Centers - 6 Tested		
A - 55	A - First Team	All District
B - 55	B - Second Team	
C - 64		
D - 83		
Forwards - 18 Tested		
A - 45	A - First Team	
B - 71	B - First Team	
C - 71	C - Second Team	
D - 72	E - Second Team	
E - 79		
F - 80		
Guards - 18 Tested		
A - 63	B - First Team	
B - 71	C - First Team	
C - 72	A - Second Team	
D - 86	E - Second Team	
E - 89		
F - 92		

*BCI Indicates Basketball Classification Index

Goliad High School

The battery of tests were given to forty-one boys in Goliad High School, during the Spring of 1960. Table III on page 88 shows, the starting center was above average in all of the items considered with exception of weight. The starting forwards were average or above average in all the items considered. The starting guards were above average in all the physical factors and physical tests considered. The basketball Classification Index was determined for each boy tested using the results of the personal factors and physical tests. From the ten boys tested as centers, the top two were selected; and from the fifteen boys tested as forwards, the top four were selected; and from the sixteen boys tested as guards, the top four were selected on the basis of the Basketball Classification Index results.

As shown in Table XVII, the top ten boys selected using the results of the Basketball Classification Index were compared with the top ten boys that were selected by the coach and they were identical. The center, two forwards, and two guards that had the lowest Basketball Classification Index were selected as the starting team and this compared one hundred per cent with the coach's selection.

TABLE XVII

PREDICTIVE SCALE FOR GOLIAD HIGH SCHOOL

PLAYER AND BCI* RANKING	COACH'S RANKING	OUTSTANDING RECOGNITION
Centers - 10 Tested		
A - 55	A - First Team	
B - 75	B - Second Team	
C - 82		
D - 91		
Forwards - 15 Tested		
A - 44	A - First Team	
B - 54	B - First Team	
C - 63	C - Second Team	
D - 69	D - Second Team	
E - 82		
F - 87		
Guards - 16 Tested		
A - 49	A - First Team	
B - 56	B - First Team	
C - 67	C - Second Team	
D - 73	D - Second Team	
E - 78		
F - 80		

*BCI Indicates Basketball Classification Index

Mount Carmel High School

The Mount Carmel basketball squad and physical education classes were tested during the Spring of 1960, with forty-one boys participating. Due to injuries, illness and absences it was impossible to test all of the boys that played on the "A" team. As shown in Table IV on page 89, the starting center was above average in all of the physical factors and physical tests considered. The starting forwards were average or above average in all of the items considered. The starting guards were below average in the shuffle step test and the free throw test but were above average in all other physical factors and tests.

Each boy tested was given a Basketball Classification Index rank and the top ten boys tested were selected and compared with the top boys tested by the coach. In that it was impossible to test all of the basketball players at Mount Carmel High School, only six of the top boys as selected by the coach were compared with the top ten boys as selected by the use of the Basketball Classification Index results. Table XVIII shows, there was complete agreement between the coach and the results of the Basketball Classification Index as to the top six boys on the squad.

TABLE XVIII

PREDICTIVE SCALE FOR MOUNT CARMEL HIGH SCHOOL

PLAYER AND BCI* RANKING	COACH'S RANKING	OUTSTANDING RECOGNITION
Centers - 6 Tested		
A - 39	A - First Team	All District
B - 81		
C - 85		
D - 91		
Forwards - 19 Tested		
A - 61	A - First Team	
B - 68	B - First Team	
C - 70		
D - 71		
E - 77.		
F - 82		
Guards - 16 Tested		
A - 52	A - First Team	
B - 69	B - First Team	
C - 71	C - Alternate First Team	
D - 72		
E - 78		
F - 82		

*BCI Indicates Basketball Classification Index

<u>Bellville</u> <u>High</u> <u>School</u>

During the Spring of 1960, sixty-five boys from Bellville High School were given the Basketball Classification tests. As shown in Table V on page 90, the starting center was below average in the free throw test and the thirty-five foot passing and shooting test but was above average in the thirteen other items considered. The starting forwards were above average in everything except height and the thirty-five foot passing and shooting test. The starting guards were below average in height and above average in all other factors considered. From the results of the physical tests and personal factors each boy was given a Basketball Classification Index.

As shown in Table XIX, the center and forwards with the lowest Basketball Classification Index were not out for the team. This was also the case of the fourth lowest center, the fourth lowest forward, and the second and third lowest guards. The ten boys with the lowest Basketball Classification Index were chosen as the top ten boys tested. Four of these top ten boys were not out for the team. The top five boys were chosen by using the tests results and compared with the top five chosen by the coach. Four of the same boys being chosen in both cases. The coach chose for a first team forward, a boy that had been chosen on the second team when the tests results were used.

TABLE XIX

PREDICTIVE SCALE FOR BELLVILLE HIGH SCHOOL

PLAYER AND BCI* RANKING	COACH'S RANKING	OUTSTANDING RECOGNITION
Centers - 12 Tested		
A - 57 Not out for team		
B - 64	B - First Team	
C - 68	C - Second Team	
D - 68 Not out for team		
Forwards - 26 Tested		
A - 52 Not out for team		
B - 58	B - First Team	
C - 71	E - First Team	
D - 72 Not out for team		
E - 77	C - Second Team	
F - 88	F - Second Team	
Guards - 27 Tested		
A - 67	A - First Team	All District
B - 69 Not out for team		
C - 70 Not out for team		
D - 81	D - First Team	
E - 85	E - Second Team	
F - 93	F - Second Team	

*BCI   Indicates Basketball Classification Index

Huntsville High School

The battery of tests were given to fifty-five boys at Huntsville High School, during the Spring of 1960. As shown in Table VI on page 91, the starting center was below average in the number of free throws made but was average or above average in all the other items checked or tested. The starting forwards were well above average in all of the personal factors and tests. The starting guards were also well above average. On the basis of the personal factors and physical tests each boy tested was given a Basketball Classification Index indicating his basketball ability.

By using the Basketball Classification Index, the top ten boys were selected and compared with the top ten boys selected by the coach. The top ten boys selected were the same in both cases. The top five boys were selected by the use of the Basketball Classification Index and compared with the top five boys as selected by the coach. Table XX shows, the coach's selection of the top five boys included three of the five selected by using the results of the Basketball Classification Index. The coach's selection for his first team center and a forward were selected on the second team when the Basketball Classification Index results were used.

TABLE XX

PREDICTIVE SCALE FOR HUNTSVILLE HIGH SCHOOL

PLAYER AND BCI* RANKING	COACH'S RANKING	OUTSTANDING RECOGNITION
Centers - 10 Tested		
A - 42	B - First Team	
B - 58	A - Second Team	
C - 61		
D - 69		
Forwards - 22 Tested		
A - 39	A - First Team	
B - 39	D - First Team	
C - 45	B - Second Team	
D - 52	C - Second Team	
E - 78		
F - 80		
Guards - 23 Tested		
A - 48	A - First Team	
B - 55	B - First Team	All Tournament
C - 62	C - Second Team	
D - 64	D - Second Team	
E - 64		
F - 65		

*BCI Indicates Basketball Classification Index

Livingston High School

Forty of the Livingston High School boys, from the ninth grade through the twelfth grade, were tested during the Spring of 1960. Table VII on page 92 shows, the squad averages by positions, of the personal factors and physical tests and compares it with the first team averages. The starting center was above average in all of the items considered with the exception of the thirty-five foot pass and shoot test. The starting forwards were well above average in all items except the two hundred foot and one hundred foot runs and they were average in them. The starting guards were below average in the grade and free shots but were well above average in all other items.

The Basketball Classification Index was determined for each boy tested and the top ten boys tested were selected and compared with the top ten boys selected by the coach. As illustrated in Table XXI, the same ten boys were selected by the coach that were selected when the results of the Basketball Classification Index were used. The coach selected a forward and a guard on his first team that had been selected on the second team on the basis of the Basketball Classification Index results.

TABLE XXI

PREDICTIVE SCALE FOR LIVINGSTON HIGH SCHOOL

PLAYER AND BCI* RANKING	COACH'S RANKING	OUTSTANDING RECOGNITION
Centers - 8 Tested		
A - 54	A - First Team	All District
B - 60	B - Second Team	
C - 77		
D - 78		
Forwards - 16 Tested		
A - 56	A - First Team	
B - 68	D - First Team	
C - 70	B - Second Team	
D - 76	C - Second Team	
E - 77		
F - 81		
Guards - 16 Tested		
A - 61	A - First Team	
B - 65	C - First Team	
C - 71	B - Second Team	
D - 76	D - Second Team	
E - 78		
F - 79		

*BCI Indicates Basketball Classification Index

Cleveland High School

Forty boys in Cleveland High School were given the battery of basketball tests, during the Spring of 1960. Of the forty boys tested, fifteen were on the basketball squad and the remaining twenty-five were chosen at random from physical education classes. As shown in Table VIII on page 93, the starting center, forwards, and guards were well above average in all personal factors and physical tests considered.

On the basis of the personal factors and the results of the physical tests a Basketball Classification Index was determined for each boy. Table XXII shows, the top ten boys were chosen by using the results of the Basketball Classification Index and compared to the top ten boys that were selected by the coach. The coach's selections were based on personal contact with each boy during the past basketball season. The same ten boys were chosen in both cases. The top five boys were chosen on the basis of the objective information gained from the personal factors and the physical tests and compared to the top five boys that were selected by the coach. The same five boys were selected in both cases.

TABLE XXII

PREDICTIVE SCALE FOR CLEVELAND HIGH SCHOOL

PLAYER AND BCI* RANKING	COACH'S RANKING	OUTSTANDING RECOGNITION
	Centers - 8 Tested	
A - 48	A - First Team	
B - 73	B - Second Team	
C - 76		
D - 91		
	Forwards - 17 Tested	
A - 25	A - First Team	All District
B - 33	B - First Team	
C - 41	C - Second Team	
D - 57	D - Second Team	
E - 75		
F - 98		
	Guards - 15 Tested	
A - 45	A - First Team	All Tournament
B - 55	B - First Team	
C - 57	C - Second Team	
D - 71	D - Second Team	
E - 86		
F - 103		

*BCI Indicates Basketball Classification Index

Groveton High School

Forty-seven boys at Groveton High School were given the Basketball Classification test, during the Spring of 1960. As shown in Table IX on page 94, the starting center was well above average in all of the factors checked, with the exception of free throws and the two hundred foot forward run. The starting forwards were below average in the basketball shoot test but well above average in all other tests and personal factors considered. The starting guards were well above average in all items given.

A Basketball Classification Index was determined for each boy tested and this information was used to select the top ten boys that were tested on the Groveton High School squad. Table XXIII shows, these top ten boys were compared with the top ten boys that were selected by the coach. It was found that the same ten boys were selected in both cases. The top five boys were selected, using the results of the Basketball Classification Index, and they were compared with the top five boys as selected by the coach. Four of the same boys were picked in both cases. The coach selected a forward on the first team that had been selected on the second team when the results of the Basketball Classification had been used.

TABLE XXIII

PREDICTIVE SCALE FOR GROVETON HIGH SCHOOL

PLAYER AND BCI* RANKING	COACH'S RANKING	OUTSTANDING RECOGNITION
Centers - 10 Tested		
A - 53	A - First Team	All State
B - 67	B - Second Team	
C - 74		
D - 80		
Forwards - 15 Tested		
A - 54	A - First Team	
B - 54	C - First Team	
C - 57	B - Second Team	All District
D - 77	D - Second Team	
E - 80		
F - 86		
Guards - 22 Tested		
A - 51	A - First Team	
B - 53	B - First Team	All Tournament
C - 61 Injured		
D - 67	D - Second Team	
E - 72	E - Second Team	
F - 83		

*BCI Indicates Basketball Classification Index

Madisonville High School

The battery of tests were given to forty-five boys at
Madisonville High School, during the Spring of 1960. Of the
forty-five boys tested, twenty were on the basketball squad
and twenty-five were chosen at random from physical education
classes. As shown in Table X on page 95, the starting center
was average or well above average in all items considered.
The forwards and guards were well above average in all per-
sonal factors and physical tests given.

Each boy that was tested was given a Basketball Classi-
fication Index on the basis of his personal factors and how
well he did on the physical tests. On the basis of the Bas-
ketball Classification Index the top ten boys were chosen.
The coach selected the top ten boys on the basis of his per-
sonal experience with them. Table XXIV shows, a comparison
of the top ten boys that were selected using both methods
and it indicated that there was complete agreement. On the
basis of the results of the Basketball Classification Index,
the top five boys were selected and compared with the top
five boys that were selected by the coach. The same five
boys were selected in both cases.

TABLE XXIV

PREDICTIVE SCALE FOR MADISONVILLE HIGH SCHOOL

PLAYER AND BCI* RANKING	COACH'S RANKING	OUTSTANDING RECOGNITION
	Centers - 4 Tested	
A - 55	A - First Team	
B - 78	B - Second Team	
C - 97		
D - 98		
	Forwards - 22 Tested	
A - 30	A - First Team	All State
B - 37	B - First Team	All District
C - 42	C - Second Team	
D - 56	D - Second Team	
E - 63		
F - 71		
	Guards - 19 Tested	
A - 33	A - First Team	
B - 48	B - First Team	All State
C - 55	C - Second Team	
D - 57	D - Second Team	
E - 58		
F - 60		

*BCI Indicates Basketball Classification Index

Kenedy High School

Forty boys were tested, during the Spring of 1960, at Kenedy High School. As illustrated in Table XI on page 96, the starting center was above average in each item considered. The forwards and guards were also above average in all personal factors as well as all physical tests. Using the results of the basketball tests and personal history, each boy was given a Basketball Classification Index. This was an indicator of the basketball ability of the boy tested. The boy with the lowest Basketball Classification Index, in each position, was considered to be the best basketball player in that particular position.

The top ten boys selected using the results of the Basketball Classification Index were compared with the top ten boys selected by the coach. As shown in Table XXV, it was found that the same two forwards and the same two guards were selected by the coach as were selected when the results of the Basketball Classification Index were used. The same starting center was chosen by the coach as when the results of the tests were considered. The coach selected a boy as second team center that was not selected as one of the top ten boys when the Basketball Classification Index was used.

TABLE XXV

PREDICTIVE SCALE FOR KENEDY HIGH SCHOOL

PLAYER AND BCI* RANKING	COACH'S RANKING	OUTSTANDING RECOGNITION
Centers - 8 Tested		
A - 37	A - First Team	All District
B - 49	C - Second Team	
C - 59		
D - 59		
Forwards - 10 Tested		
A - 28	A - First Team	All District
B - 42	B - First Team	
C - 62	C - Second Team	
D - 66	D - Second Team	
E - 77		
F - 88		
Guards - 22 Tested		
A - 49	A - First Team	All Tournament
B - 51	B - First Team	
C - 52	C - Second Team	
D - 54	D - Second Team	
E - 60		
F - 60		

*BCI Indicates Basketball Classification Index

Inter-Correlation of the Physical Tests

In an attempt to determine whether or not any two of the tests measure the same skills, an inter-correlation between the ten physical tests was run. As shown in Table XXVI, the correlation between the obstacle dribble and the wall bounce was .894. The correlation between the jump and reach and the thirty-five foot shooting and passing was .835. All other correlations were below .508 with the lowest being .102.

TABLE XXVI

INTER-CORRELATION OF PHYSICAL TESTS

	Jump and Reach	Basketball Shoot	Obstacle Dribble	Shuffle Step	Dribble and Shoot	Wall Bounce	Free Throws	35 Ft. Shoot and Passing	200 Ft. Forward Run	100 Ft. Backward Run
Jump and Reach		.431	.481	.126	.442	.384	.233	.835	.324	.453
Basketball Shoot			.308	.259	.104	.445	.418	.403	.258	.321
Obstacle Dribble				.176	.309	.894	.365	.199	.147	.305
Shuffle Step					.304	.416	.240	.250	.141	.283
Dribble and Shoot						.324	.322	.114	.109	.102
Wall Bounce							.292	.211	.508	.399
Free Throws								.252	.201	.178
35 Ft. Shoot and Passing									.165	.282
200 Ft. Forward Run										.333

Results of Predictions on Basis of Basketball Classification Index

Of the five hundred and six boys tested, eighty-nine were centers, two hundred and two were forwards, and two hundred and fifteen were guards. By using the results of the Basketball Classification Index as a guide it was found that the players selected on the first team were the same as those selected by the coach in 85.6 per cent of the cases. The players selected on the first or second team on the basis of the Basketball Classification Index were the same as those selected by the coach in 97.1 per cent of the time.

Summary

In Chapter IV the data used in this study was discussed and an analysis of this data was given.

The conclusions and recommendations are presented in Chapter V.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

As a result of this study based upon five hundred and six cases from eleven different schools the following conclusions have been reached.

1. In many cases a high school player's ability to play basketball can be predicted by the use of known criteria and certain objective basketball tests.

2. Five known criteria or personal factors and ten objective basketball tests were found to be practical and useful for measuring the physical skills necessary to play basketball.

3. A procedure for the establishment of a Basketball Classification Index has been established.

4. The basketball tests used in the establishment of the Basketball Classification Index are easily administered and scored.

5. The personal factors included in the establishment of the Basketball Classification Index are easily obtained.

6. There are certain factors that the Basketball Classification Index does not measure.

7. By using the results of the Basketball Classification Index as a guide the coach can discover good basketball players early in the season.

8. There is need for a study to measure an athlete's desire, determination, and team value.

Recommendations

A high school basketball coach may use the Basketball Classification Index as a guide in the selection of a high school basketball squad.

The Basketball Classification Index may be used by junior high school coaches with certain minor adjustments.

The Basketball Classification Index for each player should be determined during the second week of practice and twice during the season.

Through the use of the Basketball Classification Index those players not capable of playing varsity high school basketball may be advised to drop participation in this caliber basketball.

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APPENDIXES

APPENDIX A

April 11, 1960

Coach Billy Nelson
Kenedy High School
Kenedy, Texas

Dear Billy:

I am working on my Doctor's degree at the University of Houston
and I need your help before I can write my dissertation. The
dissertation will be based on a series of basketball tests that
are to be given to boys in grades 9-10-11-12.

I would be deeply grateful to you if you would give the enclosed
tests to some boys in your physical education classes as well
as the boys that made up your high school basketball team.

If there are any questions about the tests please call me
collect at GA5-2836, Huntsville, Texas.

Sincerely,

Paul E. Pierce
Athletic Director

Encl.
PEP/p

APPENDIX B

PIERCE BASKETBALL CLASSIFICATION TESTS

School _____   Coach _____

Personal History Index	Physical Test Index

Name _____   1. Jump and Reach _____

Position _____   2. Basketball Shoot 30 sec. _____

Height _____   3. Obstacle Dribble 30 sec. _____

Age: Years _____ Months _____   4. Shuffle Step 20 sec. _____

Weight _____   5. Dribble and Shoot 30 sec. _____

Grade _____ Semester _____   6. Wall Bounce 30 sec. _____

Years Experience: Squad___ Letter___   7. Free Throws 10 _____

School Classification: B, A, AA, AAA,   8. Center Court Shots 5 _____
AAAA

9. 200 ft. Forward Run _____

10. 100 ft. Backward Run _____

APPENDIX C

INSTRUCTIONS FOR GIVING THE PIERCE
BASKETBALL CLASSIFICATION TESTS

By means of a battery of tests and from a personal history record the writer is attempting to work out an objective procedure that will be of value to a high school coach in finding and selecting the best basketball players for each position on his school team. In addition, the results of the tests might be used by the coach in his counseling program. If the boy being tested has a high score or rank there is a good possibility that he will do well in basketball. If his score or rank is low the boy might use his time to a better advantage in some area other than basketball. The tests and personal history record results will not be an indicator of desire, determination and team value.

In order for the writer to work out this procedure a series of basketball tests must be given to several hundred high school boys and the personal history of each boy tested must be recorded.

When this work is completed the coaches that have given the tests to boys in their school will receive a copy of the results and how it might be used to improve their school's basketball program.

When giving the tests in any one school, please do not give it to less than forty or more than one hundred and fifty

boys, and please include in the group being tested the boys
that were on the basketball squad this past season. Of the
boys being tested that were on the high school basketball team
please indicate under-separate cover, the five boys that were
starters and the five boys that made up the second unit. List
them by positions such as; center, guard, and forward.

In that the personal history, of each boy being tested,
is a vital part of his basketball classification index please
have the boy list carefully his height in inches and fractions
of inches, his age in years and months, his weight in pounds
and fractions of pounds, his grade by grade and first or
second semester, and his experience.

The materials needed to administer the basketball tests
are; stop watches, chairs, chalk, yard-stick, and basketballs.

Jump and Reach Test. This test will determine explosive
power of the large muscles and coordination.

Give the boy being tested a piece of chalk about one-
fourth inch long. Have him face the wall standing flat-footed
with his toes against the wall, reach as high as possible on
the wall with both hands above his head and make a mark on the
wall with the chalk at the highest point that he can reach.
Next, have the boy stand with his side next to the wall, swing
his arms and jump as high as possible and make a mark on the
wall with the chalk at the highest point reached. Measure the
distance between the two chalk marks in inches and parts of

inches. Give each boy three jumps and record the best jump on
the card.

Basketball Shoot. This test will determine basketball
shooting ability and coordination.

Have the boy being tested stand as near the goal as he
chooses and in any position, that is, on either side or in
front of the goal. Give the boy a basketball and let him make
as many baskets as possible in 30 seconds. He must retrieve his
own ball. Count the number of baskets that he makes in 30 sec-
onds and record this number on the card.

Dribble and Shoot. This test will determine eye-hand
coordination, dribbling ability, speed in dribbling, shooting
ability under stress.

Place a chair on each end of the free throw line touch-
ing the outside edge. Give the boy being tested a basketball
and have him stand directly under the basket. Have him dribble
around the chairs and shoot a lay-up shot. He must retrieve
his own ball and dribble around the chairs and shoot as many
times as possible in 30 seconds. For each chair that he
dribbles around give him one point and for each shot made give
him three points. Record his score on the card. Once around
both chairs and a goal made is worth five points.

Wall Bounce. This test will determine speed and accuracy
of passing, eye-hand coordination and quickness of movement.

Draw a line several feet long on the floor eight feet

from the wall and parallel to the wall. Have the boy being
tested stand behind this line in a comfortable position with
a ball in his hand. At the word, "go" have him bounce the
ball against the wall, catch it and bounce it against the wall
again, etc., for thirty seconds. Count the number of times
that the ball hits the wall in this thirty second period.
Each time that the boy moves his feet to catch or pass the
ball he is penalized one point. If he loses the ball he must
retrieve it and come back to his original position to start
making points again. To determine the number to place on the
card subtract the number of times he moved his feet from the
number of times that the ball bounced against the wall.

Obstacle Dribble. This test will determine eye-hand
coordination, neuro-muscular coordination, changing direction
ability and speed.

Using chairs make an obstacle course. Place three
chairs side by side, twelve feet away place two chairs side
by side, six feet from the last two chairs place two chairs
side by side, six feet away from the last chair place two more
chairs side by side and six feet from the last two chairs
place two more chairs side by side, 12', 6', 6', 6'. Give
the boy a basketball, have him stand on either side of the
three chairs. On the signal, "go," the boy will dribble
between the chairs following a zig-zag path. Let the boy
dribble for thirty seconds and count the number of chairs

passed and record this number on the card. When the dribbler
gets back to his starting point he will have passed ten chairs.
The boy may dribble with either hand.

Shuffle Steps. This test will determine coordination,
agility, balance, stopping and starting ability.

Have the boy being tested stand with his left foot on
one of the lines forming the free throw lane. At the signal,
"go," have him shuffle or run across the free throw lane and
place his right foot on the opposite line. Have him go back
and forth across the free throw lane touching the lines with
his left then right foot for twenty seconds. Count the number
of times that he touched either line and record it on the card.

Free Throws. This test will determine basketball shoot-
ing ability.

Have the boy being tested shoot ten free throws. Count
the number made and record the number on the card.

Center Court Shoot. This test will determine passing
accuracy at long range, passing strength, muscular coordination.

Make a chalk line on the floor thirty-five feet from the
goal. Have the boy being tested stand behind this line and let
the boy shoot at the basket or throw the ball at the basket any
way that he chooses. Give the boy five shots or throws. If
the ball hits the rim of the goal give him five points; if the
ball hits the backboard then hits the basket rim, on the re-
bound, give him three points; if the ball hits the backboard

only, give him one point. Add the points made from the five
shots and put that number on the card.

. Two Hundred Foot Forward Run. This test is to determine
speed and body control during fast running.

Measure the length of the playing floor. Start the boy
being tested at one end of the court and have him run around a
chair at the other end then back to his starting point, around
a chair then to the timer who will be near the center of the
court. Have the boy run exactly two hundred feet full speed.
Time him with a stop watch and record the time on the card.

One Hundred Foot Backward Run. This test is to deter-
mine a boy's speed in the backward run, his body control and
side vision.

Measure exactly fifty feet from one end of the court
toward the center and make a chalk mark. Have the boy being
tested stand with the timer at the fifty foot mark. At the
word, "go," have the boy being tested run backward to the
end of the court, fifty feet away, around a boy standing on
the line and back to the starting point, running backward all
the way. Time him with a stop watch and record the time on
the card. As a safety precaution do not use a chair for the
boy to run around.