

A BASKETBALL CHARTING SYSTEM

A Thesis

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Master of Arts

by

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CHAPTER I

INTRODUCTION

THE PROBLEM

The purposes of this study are: (1) to analyze the game charts in use by leading representative colleges and universities, (2) to determine common elements and trends, and (3) to recommend a simplified and efficient game chart.

DEFINITION OF TERMS

Basketball game chart. The term "game chart" as used in this study is defined as a means of keeping an accurate record of performance of individual players throughout each game.

Shots attempted, position and accuracy. This is the recording of all shots attempted, the percentage of accuracy and the exact spot from which the shots were taken on the court.

Offensive rebound. An offensive rebound is the result of a team recovering its own attempt to score a basket.

Intercepted pass. An intercepted pass occurs

when a member of the defending team gains possession of the ball as an opponent attempts a pass to a teammate.

Held ball. A situation when two players on opposing teams have one or both hands on the ball; also when a closely guarded player withholds the ball from play in his front court, and makes no apparent effort to put it in play. It is then put in play by a jump between the two players holding it -- or the one player and an opposing player in the latter instance.

Bad pass. A bad pass is an incompleated pass due to an error by the passer.

Assist. An assist is credited when a direct pass to a teammate is made which results in a goal.

Tips and possession on all jump balls. This is a recording on the game charts of who actually tips the ball during the jump and who gains possession of the ball after the jump.

Defensive rebound. A defensive rebound is the play in which a team recovers the ball following an opponents attempt to score a basket.

SCOPE AND LIMITATIONS

This thesis is concerned only with the problems involved in setting up a valid game chart for both offensive and defensive basketball. It undertakes to show the essentials of a game chart and how the material should be recorded with reference to own team and opponents.

There were two types of game charts used: The basketball charts in use at the fifty colleges and universities of the Nation that had leading basketball teams in 1949-1950 as determined by the National Collegiate Athletic Association for offensive and defensive ratings;¹ and the experimental game charts that were used at Alcoa High School, Alcoa, Tennessee during the 1950-1951 season. (See recommended charts, pages 66 and 67.)

A brief history of the development of basketball game charts, as they have been used in the United States from the beginning of interscholastic and intercollegiate basketball competition to modern time, has been included to give a general background for this thesis.

1. Appendix A, pages 40-41.

SIGNIFICANCE OF THE STUDY

The topic with which this study deals takes its significance from the fact that one of the greatest problems of basketball coaches is to be able to keep an accurate record of the performance of individual players during each game. Shooting data from which averages and percentages may be computed as well as all other objective data is valuable to the coach for instructional purposes with his own players and in planning strategy in meeting opponents. Similarly it is of value to the player so that he may improve his own game and play his opponent to better advantage. Complete game charts serve as valuable reference guides in planning throughout the season and in years to come. Finally, pertinent information can be released to sports writers and to spectators, which means a greater general interest in the game.²

A large number of game charts have been in use for more than twenty years. From information received from a majority of the leading coaches of the Nation most game charts are used, not because of their practicability but because they are charts taught the coaches when they were

2. Howard A. Hobson, Basketball Scout and Record Book (New Haven, Connecticut: Walker-Rackliff, 1948), Introduction.

athletes. The elimination of the jump ball after a goal, the introduction of the fast break offense, and more scientific methods of coaching make it essential that game charts be revised to include the recording of more specific information about the players and the plays used.

PROCEDURE

The collected data used in the brief history of basketball in the United States was taken from the writings of authorities in the field.

A questionnaire was constructed by the investigator pertaining to individual performances of players during a game. A copy of this questionnaire was mailed to the head basketball coach of each of the colleges and universities that were ranked in the first fifty teams of the Nation for the 1949-1950 basketball season. These men were asked to send a copy of the game charts used at their schools or any other material designed to provide a record of performance of individual players throughout the season. They were also asked to rate certain characteristics that were considered essential in the construction of a valid game chart.

These questionnaires were mailed June 30, 1950 and the writer began to receive replies on July 3, 1950. Sixty percent, or thirty of the fifty questionnaires released were returned. This percentage was considered to provide

adequate data from which to draw conclusions. The charts were a representative sampling since returns were from schools in all parts of the United States, giving a cross-section sample of the country.

The returned questionnaires were then studied and the data from them compiled, showing the various charts in use and their functions.

The experimenter proposed charts which cover a majority of the situations arising in a basketball game and experimented with them during the season of 1950-1951 at Alcoa High School. The charts were devised mainly from the results of the returned questionnaires. The outcome of this study is explained fully in Chapter IV.

ORGANIZATION OF THE REMAINING CHAPTERS

Chapter II contains a brief history of basketball with reference to game charts. This history describes the beginning of charts, why they were used and how they were constructed. Chapter III deals with the analysis of the data collected from the various sources. Chapter IV pertains to the charts experimented with at Alcoa High School. Chapter V contains the summary, conclusions and recommendations.

CHAPTER II

A BRIEF HISTORY OF BASKETBALL AS RELATED TO GAME CHARTS

The game of basketball was invented by Dr. James Naismith in 1892 while a student at Springfield College. At that time an interesting and beneficial indoor sport was needed to fill in a dull season between football and baseball, since most students had little interest in gymnastics and apparatus exercises. A game was sought which possessed such characteristics as competition, co-operation and nonpersonal contact; basketball met these requirements.

The first game was played in a large hall with a soccer ball. At each end of the court a peach basket was placed ten feet above and parallel to the floor; hence, the name basketball was adopted. As the game grew in popularity, from forty to fifty players frequently represented each side. The number was soon reduced by rules to nine players on each side and later to five. The rules, however, were simple from the first and the game gained national and international fame almost over night.

The rapid world-wide acceptance of basketball is easily explained. No complicated equipment was necessary and many could play. Before the game was two years old it had spread to foreign lands and today it is the most universally played game. It is estimated that 98 per cent of the

schools in America have varsity teams and approximately ten million persons play the game annually.¹

During the first thirty years of basketball no records concerning game charts could be found. It is believed that coaches have charted their teams for many years but no definite evidences of such charting were available for study. One of the first charting systems was that of J. Craig Ruby, Basketball Coach at the University of Illinois in 1926. He advised coaches to take notes during the game, especially in the early part of the season. Notes on the opposing team were of value in a later game of the following year.²

In 1930-1931 a charting system was recommended by Donald L. Trythall, Coach of Basketball at Elkhorn, Wisconsin. This chart was called a checking sheet and on it were listed some of the essential items of basketball. To keep the results as accurate as possible, each student who was acting as a statistician had but one phase to check. For example; the different kinds of passes, the number of catches, good or bad, the position from which shots were

1. Charles C. Murphy, Basketball (New York: A. S. Barnes and Company, 1939), Introduction.

2. J. Craig Ruby, How to Coach and Play Basketball (Champion, Illinois, Bailey and Himes, 1926), p. 246.

taken on the floor and by whom, the kinds of violations, such as double dribbling, traveling, ten second rule, the kinds of fouls, and a record of the opponents total field goals were all kept by separate clerks. This particular chart proved very satisfactory for coach Trythall³ and undoubtedly marked the beginning of various types of checking systems in basketball.

A year later H. D. Edgren of George Williams College, Chicago, Illinois, set up what he called a spot chart. This was a study of basketball scoring. Each shot was located on the floor by the use of a dot. If the basket was made the dot was circled. Not only did this method enable him to determine the number of shots attempted and made, but also the position on the court of each player attempting a shot. After a game was completed Coach Edgren could easily figure the percentage of accuracy of the team's shots when winning and losing.⁴

Different methods of recording shots are evident. In one instance a diagram of half of a basketball court was made for each player. Space was left at the top of the diagram for the player's name and number, shots attempted

3. Donald L. Trythall, "Diagnostic Basketball," The Athletic Journal, 5:7 January, 1931.

4. H. D. Edgren, "A Study of Basketball Scoring," The Athletic Journal, 7:22, March, 1935.

and shots made. Each time the player shot and missed the basket a dot was placed on the diagram in approximately the position on the floor from which the shot was taken. Each time a player shot and made the basket an "X" was placed on the diagram. These shots were counted and the results were placed in their respective columns as shown in Figure 1.⁵

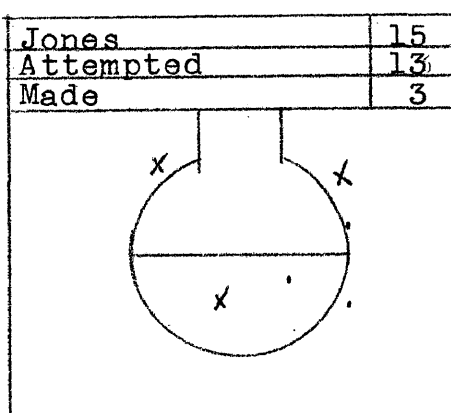


Figure 1

Another system in operation was that of using colored pencils to designate the individual player in the game. The recording of attempted shots were the same as in Figure 1 with the exception of baskets made and they were indicated by drawing a circle around a dot.⁶

The last example, and probably the most common

⁵. Trythall, loc, cit.

⁶. Lon W. Jourdet and Kenneth A. Hasbagen, Modern Basketball (Philadelphia: W. B. Saunder Company, 1940), p. 77.

one, was the recording of shots by the number system. A miniature half of a basketball court was used as shown in Figure 2. When a player attempted a basket his number was written on the chart in the approximate position from which the shot was taken. A circle was drawn around the number when a basket was made. Charts of this type were used for both the first and second half. The percentage of shots made was figured at the end of the half and at the completion of the game.⁷

The previous illustrations of recording game charts were all that could be found and are believed to be the only ones in use during the early stages of tabulating game statistics.

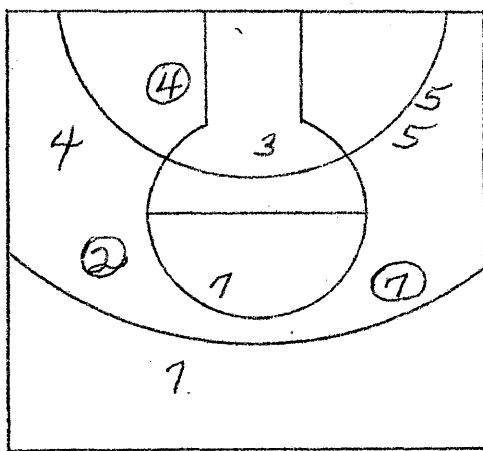


Figure 2

7. John W. Bunn, Basketball Methods (New York, New York: The Macmillan Company, 1939), 34 pp.

CHAPTER III

THE QUESTIONNAIRE RESULTS

INTRODUCTION

The chief purpose of this chapter is to present the data taken from the questionnaires¹ relative to basketball game charts currently being used. The data received includes recommendations and charts that are now being used by the outstanding coaches who returned the questionnaires.

According to Table I, page 13, the results of the returned questionnaires showed that a majority of coaches believed the ten items or types of data should be included in constructing valid game charts. However, the number of items and methods of recording vary according to individual coaches.

THE INDIVIDUAL RESULTS OF GAME CHARTS

This portion of Chapter III contains information received from individual coaches analyzing charts submitted for the purpose of this study.

1. See Appendix B, pages 42-43.

TABLE I

TOTAL RESULTS OF QUESTIONNAIRES SHOWING THE RATING OF EACH OF THE TEN CHARACTERISTICS BY THE COACHES RESPONDING

CHARACTERISTICS	RATINGS			
	Unnecessary	Desirable	Important	Essential
Shots attempted, position and accuracy	0	0	5	25
Offensive rebounds	0	5	7	18
Intercepted passes	2	9	9	10
Bad passes	0	5	6	19
Tips and possession of jump balls	2	5	15	8
Assists which result in baskets made	1	6	10	13
Held balls	5	11	10	4
Defensive rebounds	0	2	6	22
Shots attempted, position and accuracy of opponents	0	2	5	23
Simplicity of recording game statistics	0	0	9	21

Everett S. Dean,² Stanford University, uses six of these characteristics in his charts. They are as follows: Shots attempted, position and accuracy of both home team and opponent, offensive and defensive rebounds, held balls, and all recoveries made by both teams. Coach Dean used three observers to record game statistics. One observer records shots attempted, position and accuracy. Another tabulates offensive and defensive rebounds for both home team and opponent. A third records all jump balls and recoveries made by both teams.

Coach Forrest Anderson of Bradley University was very much interested in recording game statistics. Chart 1, page 44, used by him, has proven very satisfactory. His chart contains eight of the ten specific characteristics presented in the questionnaire. A separate copy of the chart was used for each half. The number of the player executing the particular phase of the game is placed under the characteristic which he performs. After the game tallies of the characteristics of the two charts were combined for analyzing the performances of individual players.

Donald W. Moore, Coach at Duquesne University, did not use a shot chart but only recorded the percentage

² E. S. Dean, Progressive Basketball (California: Stanford University Press, 1942), 30-31 pp.

of shots made. Chart 2, page 45, showed how simple and self-explanatory his chart was. The chart contained a majority of the characteristics suggested in the questionnaire.³

Two charts were used by H. D. Foster, Coach at the University of Wisconsin, in recording game statistics. Chart 3A, page 46, was used to record the shots attempted, position and accuracy of Wisconsin and their opponents. His second chart, Chart 3B, page 47, contained pertinent information in recording violations during the game. Coach Foster suggested that fumbles, double dribbles and styles of play were important in compiling game statistics.

John J. Gallagher, Coach at Niagara University, used a limited amount of material in tabulating game statistics. His suggested Chart 4, page 48, was made up of three essentials. Each player had an individual chart with space reserved for tallying shots attempted, position and accuracy, offensive and defensive rebounds. Total results for the team were computed at the bottom of the chart.

A record of the position from which shots were taken was not deemed necessary by Ed Diddle, the coach at Western Kentucky State College. He used a violation chart upon which only shots made or missed were noted. (Chart 5,

3. See Appendix B, pages 42-43.

page 49)

Coach Clair Bee, of Long Island University, used the number system in tabulating his shot chart. (Chart 6, page 50.) For example, if player number seventy-seven attempts a shot from the field his number was written on the chart, if he made a goal his number was circled. Coach Bee also recorded fouls committed and balls lost by the Long Island players.

Like many other coaches, Coach R. F. Williams of Iowa University recorded shots attempted, position and accuracy of the home team as well as the opponents. However, according to Chart 7, page 51, he differed in that he recorded shots blocked and offensive fouls.

Coach Henry Iba, of Oklahoma A. & M., required two recorders to tabulate game charts. One person kept data for the home team while the other secured information on the opponents. Coach Iba used a code system, (Charts 8A and 8B, pages 52-53) that was made up of symbols which represent different phases of the game. The recording of intercepted passes and held balls were believed to be unnecessary by Coach Iba.

Ed. Hickey, Coach at St. Louis University, used a charting system somewhat similar to that of Coach Iba of Oklahoma A. & M. Coach Hickey believed in gathering

plenty of statistical information and constructed four charts (Chart 9A, B, C, and D, pages 54-57) each requiring one recorder. The code used pertains to all four charts. He wrote a running description of all front court plays that took place during each game.

The Coach at The University of San Francisco, Phil Woolpert, said,

One of the greatest problems of recording game statistics is the lack of personnel sufficiently trained to record the desired information correctly. The maintenance of proper game records would require the services of at least three people using the game charts now available. A simplified chart, I feel certain, would enable one trained observer to compile all desired information.⁴

Coach Woolpert used two charts, (Chart 10A and B, pages 58-59) at the University of San Francisco but felt that they did not contain ample information to cover the important phases of the game. He used his charts primarily for checking shots attempted, position and accuracy.

Osborn B. Cowles, at The University of Minnesota, used two types of game charts, Charts 11A and B, pages 60-61. One was a rebound and violation chart, while the other showed the percentage of shots made or missed. He also kept tab of all field goals made from the results of rebounds.

4. Personal letter from Phil Woolpert, Coach at The University of San Francisco, July 1950.

Karl J. Lawrence, of Colgate University, was a great exponent of charts and believed any data that could be recorded during a basketball game were very important. He employed trained observers to compile all the desired information. A recorder was assigned each individual player to chart his course of action during the entire game. (Chart 12A and B, pages 62-63.) After the game the individual results were compiled and placed on the team data sheet.

According to Chart 13A, page 64, Bernard E. Wilson, Coach at The College of William and Mary, used a chart consisting of shot percentages, rebounds, and different types of violations. Another chart, Chart 13B, page 65, was devised to describe the type of play occurring each time the home team gains or loses possession of the ball. He also had a third chart, Chart 13C, page 66, which he seldom used because the information was given on Chart A. His charts contained summaries of the desired information and a description of how they were put into use.

COMMENTS FROM OTHER COACHES

The following coaches did not send samples of game charts but commented and offered suggestions as to how a valid game chart should be constructed.

Coach Hoyt Brawner, University of Denver, is a

firm believer that records are important to the team and the boy, as well as having a permanent record for the coach. He used a statistical, and offensive, and a defensive shot chart.

Adolph Rupp, Coach at University of Kentucky, used a shot chart with a standard floor diagram and recorded shots attempted, position, and accuracy. He attempted to use the more complex forms but found it was impossible for fewer than five or six individuals to record accurately.

Lester H. Sheary, of Holy Cross College, finds it impossible to cover all phases of the game accurately without the aid of a staff of trained individuals. He compiled only his offensive records, shot positions and defensive weaknesses.

C. M. Price, Coach at the University of California, believes shot charts and foul shots taken for both the home team and the opponent are all that is necessary. Sometimes he took information on rebounds and held balls, but did not like to record too many statistics because his boys looked at them and tended to get an inferiority complex.

F. C. Cappon, Coach at Princeton University, would like to keep more game statistics than he does but due to a lack of trained observers when he is away from home he does not get the desired information.

COACHES SUBMITTING QUESTIONNAIRES ONLY

The following coaches submitted only completed questionnaires, but did not indicate whether they used game charts, nor did they offer any suggestions as to how a simplified chart could be constructed. The coaches submitting only completed questionnaires were:

W. "Sparky" Stalcup, University of Missouri, Columbia, Missouri; Ray Eddy, Purdue University, La Fayette, Indiana; G. C. Wahabough, Westminster Pennsylvania College, New Wilmington, Pennsylvania; John W. Bach, Fordham University, New York, New York; Harry Combs, University of Illinois, Champaign, Illinois; Bob Polk, Vanderbilt University, Nashville, Tennessee; John A. Wiethe, University of Cincinnati, Cincinnati, Ohio; L. P. Andreas, Syracuse University, Syracuse, New York; John Jordan, Loyola University, Chicago, Illinois; J. B. Friel, Washington State College, Pullman, Washington; Harry C. Good, University of Nebraska, Lincoln, Nebraska; Bruce Drake, University of Oklahoma, Norman, Oklahoma; Everett S. Dean, Stanford University, Stanford, California; Tibby Dye, Ohio State University, Columbus, Ohio; Ed Krause, University of Notre Dame, South Bend, Indiana; Forrest C. Allen, University of Kansas, Lawrence, Kansas.

SUMMARY

From the material presented by the leading coaches in the field of basketball it seems evident that there was a variety of opinions and means of recording data regarding the games. Due to the number of charts used and to the lack of trained observers needed to record them, several coaches feel that they are failing to get the proper information from the more complex charts now in use. Possibly, the variety in the charts used by different coaches was the cause for the difference in the relative rating of the ten characteristics as shown on the individual tally of all questionnaire results, Table II, pages 22-24.

INDIVIDUAL TALLY OF QUESTIONNAIRE RESULTS

COACH AND SCHOOL	Shots attempted, position and accuracy	Offensive rebounds	Intercepted passes	Bad passes	Tips and possession on jump balls	Assists which result in baskets made	Held balls	Defensive rebounds	Shots attempted, position and accuracy of opponents	Simplicity of record- ing game statistics
Anderson, Forrest Bradley University	E	E	D	D	D	E	U	E	E	E
Andreas, L. P. Syracuse University	I	I	D	D	I	E	D	E	E	E
Bach, John Fordham University	E	E	D	I	D	I	D	E	E	E
Bee, Clair Long Island Univ.	E	E	E	E	I	I	I	E	E	E
Brawner, Hoyt Univ. of Denver	E	E	E	E	I	E	I	E	E	E
Cappon, F. C. Princeton University	E	D	U	I	I	I	D	I	E	E
Combes, Harry Univ. of Illinois	E	E	I	E	I	I	D	E	E	E
Cowles, Osborn Univ. of Minnesota	E	E	D	I	I	D	D	E	D	E
Dean, Everett Stanford University	E	E	I	E	E	I	I	E	E	I
Diddle, Ed Western Ky. State Col.	E	I	E	E	E	E	I	E	I	E

NOTE: Letters in the squares indicate how coaches checked the questionnaire with reference to the following:

E--Essential

D--Desirable

I--Important

U--Unnecessary

INDIVIDUAL TALLY OF QUESTIONNAIRE RESULTS

COACH AND SCHOOL	Shots attempted, position and accuracy	Offensive rebounds	Intercepted passes	Bad passes	Tips and possession on jump balls	Assists which result in baskets made	Held balls	Defensive rebounds	Shots attempted, position and accuracy of opponents	Simplicity of record- ing game statistics
Drake, Bruce Univ. of Oklahoma	E	E	E	E	E	U	U	E	E	E
Dye, Tibby Ohio State University	E	I	E	E	I	E	I	E	E	E
Foster, H. E. Univ. of Wisconsin	E	E	I	E	I	I	D	I	E	E
Friel, J. B. Wash. State College	E	I	I	D	I	E	I	E	E	I
Gallagher, John Niagara Univ.	E	E	E	E	E	E	E	E	I	E
Good, Harry Univ. of Nebraska	E	E	E	E	E	D	I	E	E	I
Hickey, Ed St. Louis University	E	D	D	E	D	E	D	E	E	E
Iba, Henry Oklahoma A. & M.	I	E	U	E	I	I	U	E	E	I
Jordan, John Loyola University	E	D	D	E	U	E	U	I	D	I
Lawrence, Karl Colgate University	E	E	E	E	E	E	E	E	E	E

NOTE: Letters in the squares indicate how coaches checked the questionnaire with reference to the following:

E--Essential

D--Desirable

I--Important

U--Unnecessary

INDIVIDUAL TALLY OF QUESTIONNAIRE RESULTS

COACH AND SCHOOL	Shots attempted, position and accuracy	Offensive rebounds	Intercepted passes	Bad passes	Tips and possession on jump balls	Assists which result in baskets made	Held balls	Defensive rebounds	Shots attempted, position and accuracy of opponents	Simplicity of record- ing game statistics
Moore, Donald Duquesne University	E	I	I	I	I	I	D	I	I	E
Polk, Bob Vanderbilt Univ.	E	E	E	E	E	E	E	E	E	I
Price, C.M. Univ. of California	E	E	I	E	E	E	E	E	E	I
Rupp, Adolph Univ. of Kentucky	E	E	D	D	I	D	D	I	E	E
Sheary, Lester Holy Cross College	I	D	D	D	U	I	U	D	E	E
Stalcup, Sparky Univ. of Missouri	E	E	I	E	I	D	I	E	E	E
Wieth, John Univ. of Cincinnati	I	E	E	E	D	I	D	E	E	I
Williams, R. F. Univ. of Iowa	I	I	D	I	I	D	D	I	I	I
Wilson, Bernard College of Wm. & Mary	E	I	I	E	I	E	I	E	E	E
Woolpert, Phil Univ. of San Francisco	E	D	I	I	D	D	I	D	E	E

NOTE: Letters in the squares indicate how coaches checked the questionnaire with reference to the following:

E--Essential

D--Desirable

I--Important

U--Unnecessary

CHAPTER IV

TECHNIQUE AND RESULTS OF THE INDIVIDUAL EXPERIMENT

INTRODUCTION

This chapter is concerned with the proposed game charts constructed by the investigator and tested at Alcoa High School, Alcoa, Tennessee during the 1950-1951 season. Data used in composing these experimental charts were taken from results of the questionnaires and charts used by leading coaches of the Nation.

TECHNIQUE

An experimental chart, page 26, was constructed, showing a diagram of two standard basketball courts, for recording shots attempted, position and accuracy, and other phases of the game that are considered necessary for determining the performance of players during a contest. The material used in this chart was taken from the returned questionnaires and charts submitted by leading authorities in the field. The assistant coach was assigned the job of tabulating the data called for on this experimental chart. This plan was followed during the first few games of the season. It was discovered that one recorder could not tabulate accurately all the desired information. There

was too much data to record during the allotted time of a basketball game. The experimental chart was therefore revised into two charts; a shooting chart and a statistical chart. Two charts proved adequate and also kept the recording personnel to a minimum. (See Chart A and B, pages 28-29.)

An experimental shot chart, (Chart A, page 28) was constructed and each time a player attempted a shot his number was written on the diagram in the approximate position from which the shot was taken. When the shot was made a circle was drawn around the number. The number of shots taken and the number of successful shots were recorded and a percentage of accuracy was computed for each player in each game. Each percentage was recorded as a decimal form; the result was carried out three places and was given on the basis of one thousand, as .142 or .467. The shot percentage of the home team and opponents was recorded in the same manner. These percentage tables for individual players were kept during each game and a total percentage for the teams was cumulated.

The second chart, (Chart B, page 29) contains statistics such as offensive and defensive rebounds, bad passes, interceptions, free balls recovered, fumbles, offensive and defensive held balls, tips recovered, assists that result in goals made, baskets made from out-of-bounds

plays and traveling. Two copies of this chart were used each game. Data on individual players were recorded on one copy and the results and total team record compiled on the other at the completion of the game. In recording the percentage of recovered offensive rebounds the observer checked the shooting record to find how many field goals and free throws were attempted by the home team. By subtracting the number of goals made from the number of goals attempted he determined the number of offensive rebounds possible during the game. The statistician then divided the number of rebounds recovered by the number of rebounds possible, thus determining the percentage of recoveries. To compute the percentage of recovery of defensive rebounds the process is the same as computing offensive rebounds except the opponents shots are checked and subtracted instead of those of the home team.

To find the total percentage of tips recovered the observer made note of every jump ball occurring during the game by placing a mark in the totals column of the first copy. The number of actual tips recovered was divided by the number of chances possible. The quotient showed the percentage of recoveries during the game. Free balls recovered and baskets from out-of-bounds plays are figured in the same manner. If a player makes a bad pass, interception, fumble, assist, or travels, a tally is placed opposite his name in

the proper column. Totals for the team are figured at the completion of the contest.

RESULTS

The assistant coach and manager were employed to tabulate the revised game charts. The assistant coach was responsible for the shot chart during the season while the manager recorded the statistical chart. The revision of the experimental chart into a shot chart and a statistical chart eliminated the problem of the lack of time necessary to record this information.

These game charts enabled the experimenter to show players their mistakes and how they could be corrected. The charts were studied at half-time to determine the style of play for the second half. Such questions as the following were solved: Shall it be a fast break the rest of the game? Will we continue a man-to-man defense or switch to a zone? Why is John Doe making so many bad passes? Are the out-of-bounds plays being utilized? Is the team's rebounds organization functioning? Why is our percentage so low on tips recovered? These questions and many more were answered by observing the game charts closely.

At the first practice session following a game the total results from the charts were reviewed to compare the players with each other both offensively and defensively

and to correct their mistakes. The charts were placed on the bulletin board where they could be seen by the players at their leisure. At the end of each week the charts were taken down and filed. Later they proved to be very valuable when playing the same team in the return contest. The opponent's weaknesses were studied and a plan of attack was organized. They were also helpful the following year as a review on the ability of individual players.

SUMMARY

Two recorders were sufficient for tabulating the desired statistics during a regulation game. A third recorder would not have improved the accuracy of the data since there was no complaint by the recorders for the lack of time in recording information required.

These charts proved to be an excellent coaching aid as they were very helpful at half-time and also to get the over-all picture when the game was completed.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

SUMMARY AND CONCLUSIONS

To synthesize the conclusions reached in the preceding chapters an analysis has been prepared to show the results attained by the investigator. A study was made of charts being used at thirty leading colleges and universities of the Nation. The results indicated that a majority of coaches were using some type of aid in tabulating game statistics. Some charts were complicated and contained as many as twenty-six game characteristics for one person to record. It is believed to be nearly an impossibility for one observer to record this much information with accuracy. Approximately one-third of these charts required the services of at least five trained observers. The majority of schools are not able to carry this many statisticians to games away from home.

Other charts were inefficient in that they did not contain the essentials necessary to make an effective game chart. Some coaches included on their charts data that were already being kept in the scorebook. A good example is the recording of free throws made or missed. This only takes the recorders time when it could be spent

keeping information that would prove more valuable to the coach.

All the sample charts used in this study contained a number of the essentials as suggested in the questionnaire; however, there were no two alike. A majority of coaches stated their charts were being used because they were handed down from former coaches, even though since out dated. It was interesting to notice that seventy-five per cent of the coaches returning questionnaires requested a copy of the results of this study. Many of them expressed approval of a study along this line, because they felt a definite need for research on this subject.

After examining the sample charts used by the leading coaches of the Nation and reviewing the results of the returned questionnaires, a proposed game chart consisting of the essential items was constructed. The investigator experimented with this chart during the 1950-1951 basketball season at Alcoa High School. The assistant coach tried to tally this information, but soon found that the amount of material listed was too much for one observer. This chart was revised into two charts to eliminate the inaccuracy that was being encountered. One chart was constructed to show the shots attempted by both teams, the player who attempted the shot and the player's position on the floor in relation to the basket. From this

chart the coach may compute each player's shooting percentage as well as discover the place from which the shots are taken. This chart may be used at the half-time intermission to single out the strength or weakness of the opponent and to exploit this knowledge to the utmost. At the lower part of the shot chart a place was set aside to record the cumulative totals for the entire game. The other chart was used to obtain a statistical record of each player. Such items as offensive rebounds, defensive rebounds and assists were recorded. Good rebounding is an important factor in winning a game and the rebound column will reveal the player making the most rebounds. A player who is able to set up a teammate for a good shot, and then execute that quick, accurate pass is a valuable asset to any team, and he deserves a great deal of credit. Other items recorded were ball losses and recoveries. Ball losses are broken down in three divisions: Bad passes, fumbles, and traveling. Recoveries are also broken down in three divisions: Interceptions, free balls recovered and tips recovered from jump balls. Offensive and defensive held balls were found to be very helpful as a coaching aid even though only four coaches checked this item as being essential. The experimenter found this item was a very good coaching aid because it could be pointed out to the player after the game that he was letting opponents tie

up the ball when he had possession. Also it would enable the coach to see who was more aggressive when the opponent was in possession of the ball.

Two observers compiled these data for the remainder of the season and reported no difficulty in obtaining the desired information. The charts provided the needful data and were extremely valuable to the team as well as the coach in an analysis of how each player performed individually and collectively as a team. From this analysis the players and the coach might well obtain information on the weaknesses of the players and by whom and how most mistakes were being made.

RECOMMENDATION

As coach at Alcoa High School, Alcoa, Tennessee the investigator, having experimented during the 1950-1951 season with the game charts recommended, believed them to meet all the necessary requirements of validity and effectiveness. These charts proved to be simple in that they do not contain a code to memorize or symbols to make the charts complicated. In fact, anyone having an active interest in the game of basketball and having had explained to them each item on the charts so that they will have the correct interpretation should encounter no difficulty in keeping these charts; however, the recorded

results were found to be more accurate when using the same trained observer for each game because he had learned the exact position of each characteristic on the chart and checked them more quickly and with more efficiency.

Players were conscious that charts were of the utmost importance. Their individual performances became more apparent to them by checking the charts regularly after each game. Charts reveal facts and facts were incentives to players as they could see how they were progressing during the season.

The investigator highly recommended these charts for any high school, college or university of the Nation. They appeared valid because they contain the ideas, and characteristics now in use by leading authorities in the field of basketball. In the recommended charts the defects noted in the various charts examined in this study had been corrected. The recommended charts were simplified so that only two recorders were needed. The essential characteristics were included in such a manner as to make possible an analysis of the game, so the coach may counsel each player and point out to him the departments in which he is weak, thereby encouraging him constantly to improve.

FURTHER RESEARCH PROBLEMS

The following problems arose during the writing of this thesis.

1. The study of the effectiveness of different types of shots in basketball.
2. The study of offensive and defensive rebounding and its relation to the winning and losing of games.
3. The study of scouting basketball as related to the winning and losing of games.
4. The study of visual aids and how they are helpful in coaching basketball.
5. A study of the different types of coaching techniques used in basketball.

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APPEDIX A

RANKING OF COLLEGE BASKETBALL TEAMS FOR 1949-1950

The fifty leading basketball teams of the Nation as ranked by the National Collegiate Athletic Bureau for the 1949-1950 season were:

Ohio State University
College of The Holy Cross
Bradley Polytechnic Institute
Kansas State College
Indiana University
University of Kentucky
Duquesne University
La Salle College
University of California at Los Angeles
University of Kansas
University of Cincinnati
Eastern Kentucky State College
University of Wisconsin
North Carolina State College
Villanova College
Niagara University
Western Kentucky State College
Syracuse University
University of Illinois
Long Island University
University of Wyoming
University of Nebraska
Cornell University
Loyola University
University of Iowa
Oklahoma A. & M. College
De Paul University
University of Missouri
Bowling Green State University
City College of New York
Purdue University
Vanderbilt University
Westminster College
Beloit College
Saint Louis University
University of Southern California
Saint John's University
University of California
University of Notre Dame

APPENDIX A (continued)

University of San Francisco
University of Denver
Princeton University
University of Oklahoma
Washington State College
University of Minnesota
Fordham University
College of William and Mary
University of Toledo
Colgate University

APPENIX B

QUESTIONNAIRE ON BASKETBALL GAME CHARTS

Name of Coach _____

Name of School _____

Essentials of a game chart with reference to own team.

1. Record shots attempted, positions and accuracy:
Essential _____. Important _____. Desirable _____. Unnecessary _____.
2. Record offensive rebounds: Essential _____. Important _____.
Desirable _____. Unnecessary _____.
3. Record intercepted passes: Essential _____. Important _____.
Desirable _____. Unnecessary _____.
4. Record bad passes: Essential _____. Important _____.
Desirable _____. Unnecessary _____.
5. Record tips and possession on all jump balls: Essential _____.
Important _____. Desirable _____. Unnecessary _____.
6. Record assists which result in baskets made: Essential _____.
Important _____. Desirable _____. Unnecessary _____.
7. Record held balls: Essential _____. Important _____.
Desirable _____. Unnecessary _____.
8. Record defensive rebounds: Essential _____. Important _____.
Desirable _____. Unnecessary _____.
9. Record shots attempted, position and accuracy of
opponents: Essential _____. Important _____. Desirable _____.
Unnecessary _____.
10. Simplicity of recording game statistics: Essential _____.
Important _____. Desirable _____. Unnecessary _____.

Space for additional information: _____

I am sending copies of game charts used. Yes _____. No _____.

June 30, 1950

Dear Coach:

Congratulations on the outstanding record compiled by your team during the 1949-1950 basketball season. According to the official basketball statistics released by the National Collegiate Athletic Bureau, your team ranked with the leading teams of the nation.

I am using the attached questionnaire to collect data to be used in a thesis for the partial fulfillment of the Master of Arts Degree at The College of William and Mary. My objective is to set up as simple and effective a game chart as possible by taking the best characteristics from charts used at leading colleges and combining them into one chart. These questionnaires are being sent to the leading college basketball teams of the nation for the 1949-1950 season.

You will be given full credit for any information given unless otherwise requested, in which case you can be assured your name or the name of your school will not be used in any way.

I would appreciate it very much if you will send me a copy of the game charts used at your school or any other material used to keep a record of performance of individual players throughout the season.

On the following page I have listed ten characteristics which are generally considered to be essential in setting up a valid game chart. Please rate these characteristics according to their importance. In the space below the statements, list any additional items you consider important or give any criticism or suggestions you think would help me in this study.

I shall be grateful for any assistance you will give me in this undertaking.

Sincerely yours,

Vernon Osborne

APPENDIX C

CHART I
STATISTICS CHART

DATE

BRADLEY UNIVERSITY vs

at

HALF

Bad Passes	Violation	Held Ball	Defense	Recovery	Assists

Rebounds	
Defensive	Offensive

Rebounds	
Offensive	Defensive



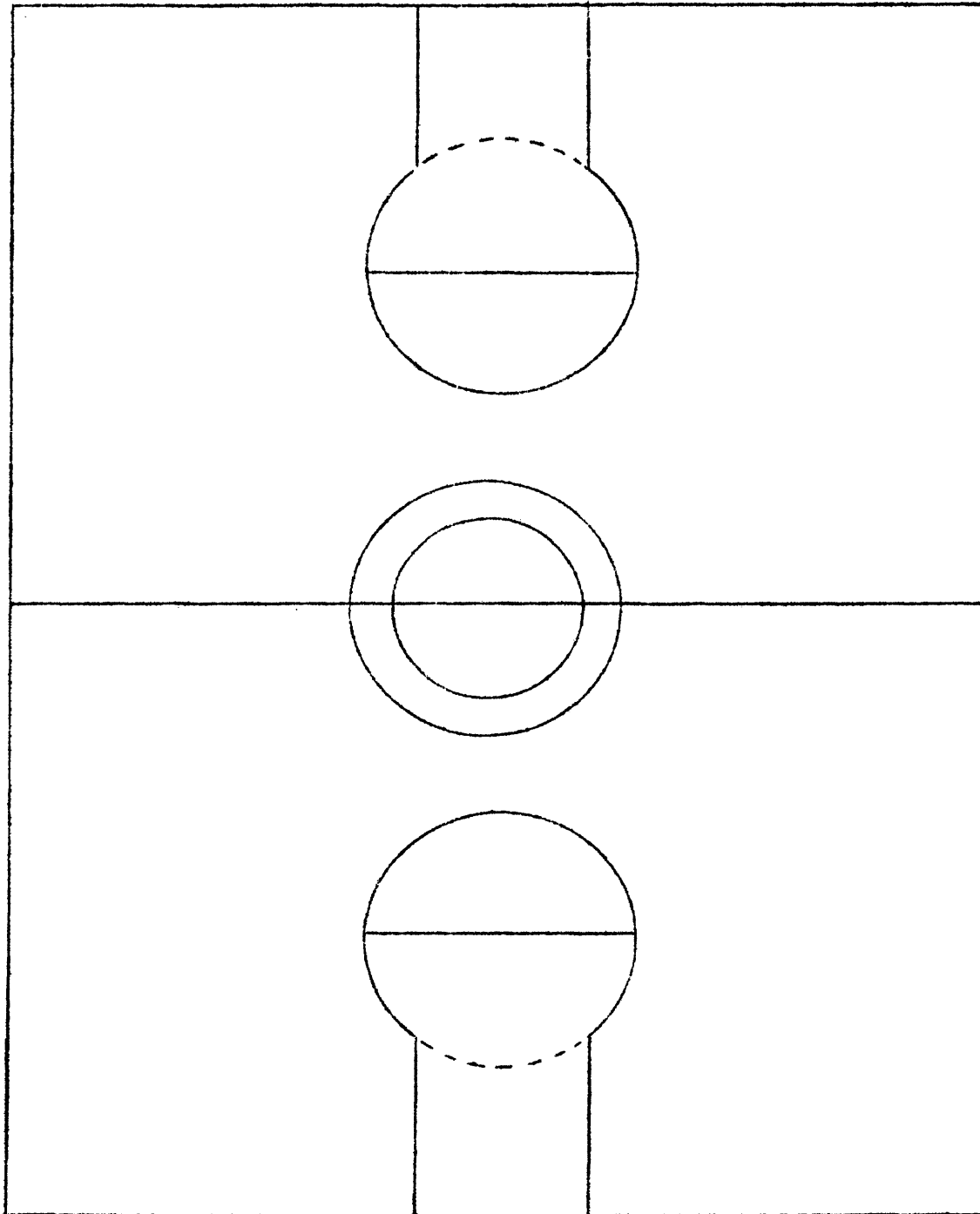
IOWA UNIVERSITY

Played at _____

Date _____

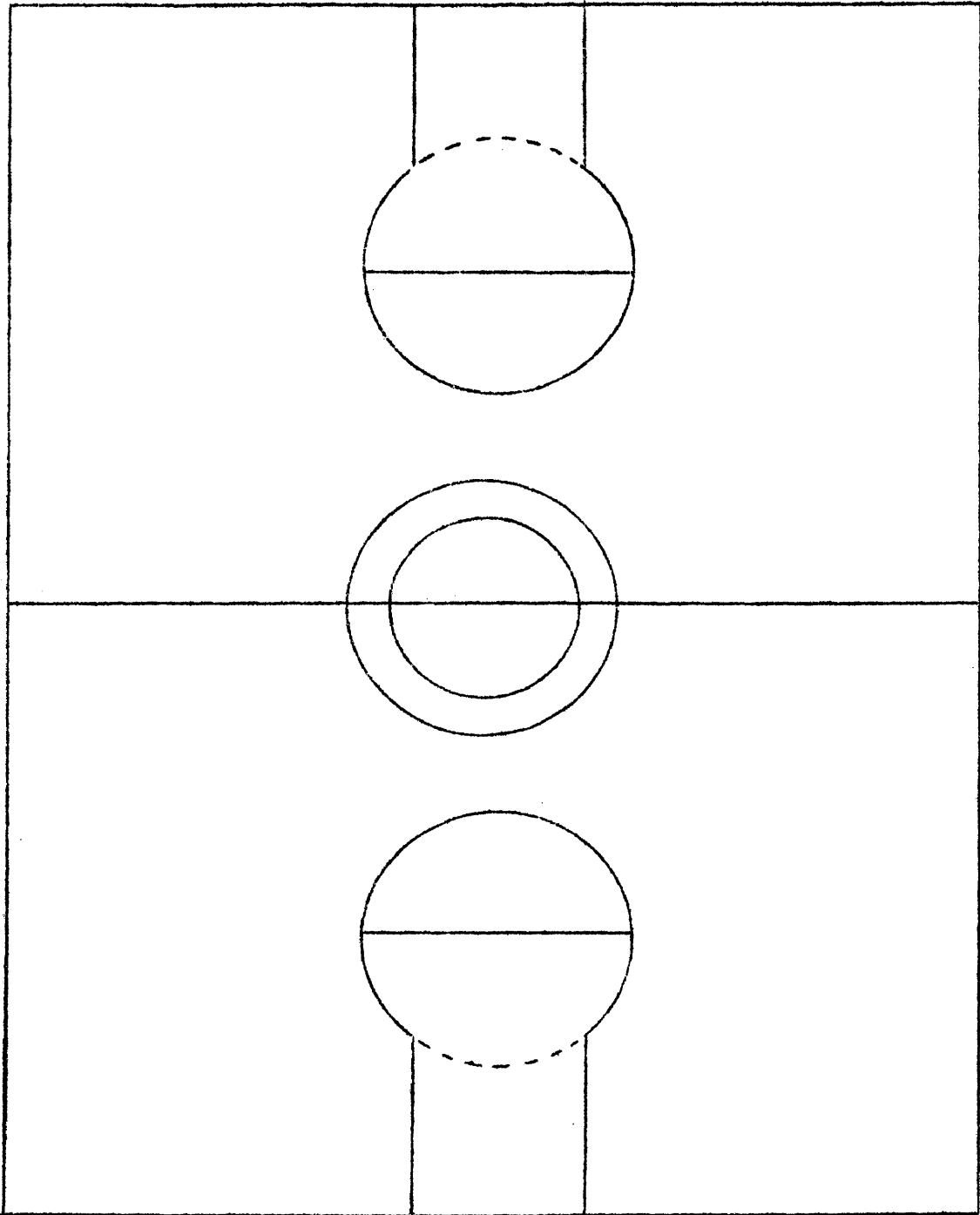
REMARKS	JUMP BALL	VIOLATIONS	SHOTS BLOCKED	OFF. FOULS	TRAVELING	DRIBBLING	PASSING		SHOTS	FREE THROWS
								1		
								2		
								3		
								4		
								5		
								6		
								7		
								8		
								9		
								10		
								11		
								12		
								13		
								14		
								15		
								16		
								17		
								18		
								19		
								20		
								21		
								22		
								23		
								24		
								25		
								26		
								27		
								28		
								29		
								30		
								31		
								32		
								33		
								34		
								35		
								36		
								37		
								38		
								39		
								40		

COLLEGE OF WILLIAM & MARY



CODE

- ∕ shots taken
 - ∕ shots hit
 - loss of ball
 - F free throws attempted
 - F free throws made
 - DR defensive rebounds
 - personal fouls
- Numbers indicate times in front court.



CODE

- + shots taken
 - + shots hit
 - loss of ball
 - F free throws attempted
 - F free throws made
 - DR defensive rebounds
 - personal fouls
- Numbers indicate times in front court.

CHART 9D
FRONT COURT PLAY

TIMES IN FRONT CT	DESCRIPTION OF PLAY (USE CODE)
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.	
19.	
20.	
21.	
22.	
23.	
24.	
25.	
26.	
27.	

CHART 11B

Name	Short		Half		Medium		Long	
	Made	Missed	Made	Missed	Made	Missed	Made	Missed
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								

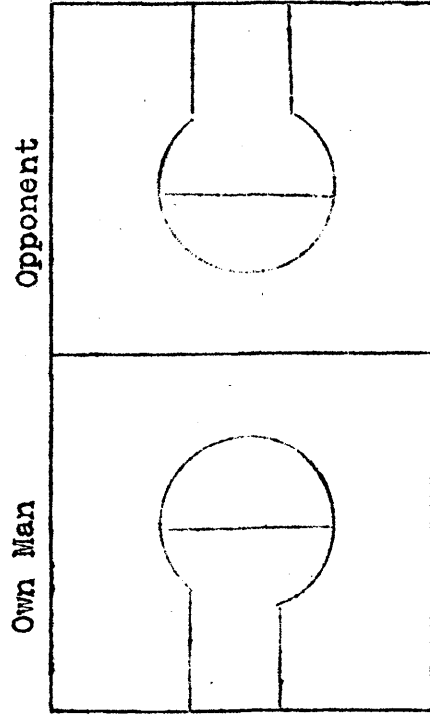
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33

Individual data sheet--Colgate University--K. J. Lawrence

Player _____ Recorder _____ vs _____

	First Half	Second Half	Totals
Good passes			
Passes Resulting in Baskets			
Poor Passes			
Poor Lead			
Intercepted			
Thrown Away			
Passes Man Intercepts			
Passes Man Intercepts for Baskets			
Fumbles			
Man getting by with Ball			
Man getting by for a Pass			
Man getting a set shot			
Rebounds Man			
Offense			
Gets on Defense			
Dribbles Resulting in Baskets			
Dribbles Tied Offensively up			
Defensively			
Dribbles Lost			
Offensively			
Defensively			
Held Balls			
Tips that Man Controls			
Tips that Man Recovers			
Baskets from Held Ball			
Baskets from Fast Break			
Baskets from Out-of-bounds Plays			

Shooting Chart



Scoring

	Own Man	Opponent	Made	Missed

Possession of Ball

Loss of Ball

<u>Play Description</u> <u>No.</u>	<u>Description</u>	<u>Player</u>
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____
6.	_____	_____
7.	_____	_____
8.	_____	_____
9.	_____	_____
10.	_____	_____
11.	_____	_____
12.	_____	_____
13.	_____	_____
14.	_____	_____
15.	_____	_____
16.	_____	_____
17.	_____	_____
18.	_____	_____
19.	_____	_____
20.	_____	_____
21.	_____	_____
22.	_____	_____
23.	_____	_____
24.	_____	_____
25.	_____	_____
26.	_____	_____
27.	_____	_____
28.	_____	_____
29.	_____	_____
30.	_____	_____

SUMMARY

<u>Description</u>	<u>Possession of ball</u>			<u>Loss of Ball</u>		
	<u>1st</u> <u>half</u>	<u>2nd</u> <u>half</u>	<u>Game</u>	<u>1st</u> <u>half</u>	<u>2nd</u> <u>half</u>	<u>Game</u>
After free throw	_____	_____	_____	_____	_____	_____
Rebound	_____	_____	_____	_____	_____	_____
Pass	_____	_____	_____	_____	_____	_____
Travel	_____	_____	_____	_____	_____	_____
Double Dribble	_____	_____	_____	_____	_____	_____
Stolen Ball	_____	_____	_____	_____	_____	_____
Foul	_____	_____	_____	_____	_____	_____
Jump Balls	_____	_____	_____	_____	_____	_____
<u>AFTER field goals</u>	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

PERCENTAGES

	<u>Possessions</u>	<u>Successes</u>	<u>Percentages</u>
W & M	_____	_____	_____
OPPONENTS	_____	_____	_____

W. & M. vs. _____ Where _____ Date _____

W. & M. COLLEGE		BASKET ATTEMPTS AND MADE																		
Name of Player	Number	Basket Attempts																		
Attempts Made	Percentage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Free Throws: 1 2 3 4 5 6	
Attempts Made	Percentage	7	8	9	10	11	12	Assists: 1 2 3 4 5 6 7 8 9												
Attempts Made	Percentage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Free Throws: 1 2 3 4 5 6	
Attempts Made	Percentage	7	8	9	10	11	12	Assists: 1 2 3 4 5 6 7 8 9												

TEAM SUMMARIES

	First Half	Second Half	Game
Basket Attempts	_____	_____	_____
Basket Made	_____	_____	_____
Percentage	_____	_____	_____
Free Throw Attempts	_____	_____	_____
Free Throw Made	_____	_____	_____
Percentage	_____	_____	_____

Type of Defense _____
 Officials _____
 Remarks: _____

APPENDIX D

