IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

DEPARTMENT OF PHYSICAL EDUCATION
FOR MEN

March 3, 1938

Dr. F. C. Allen
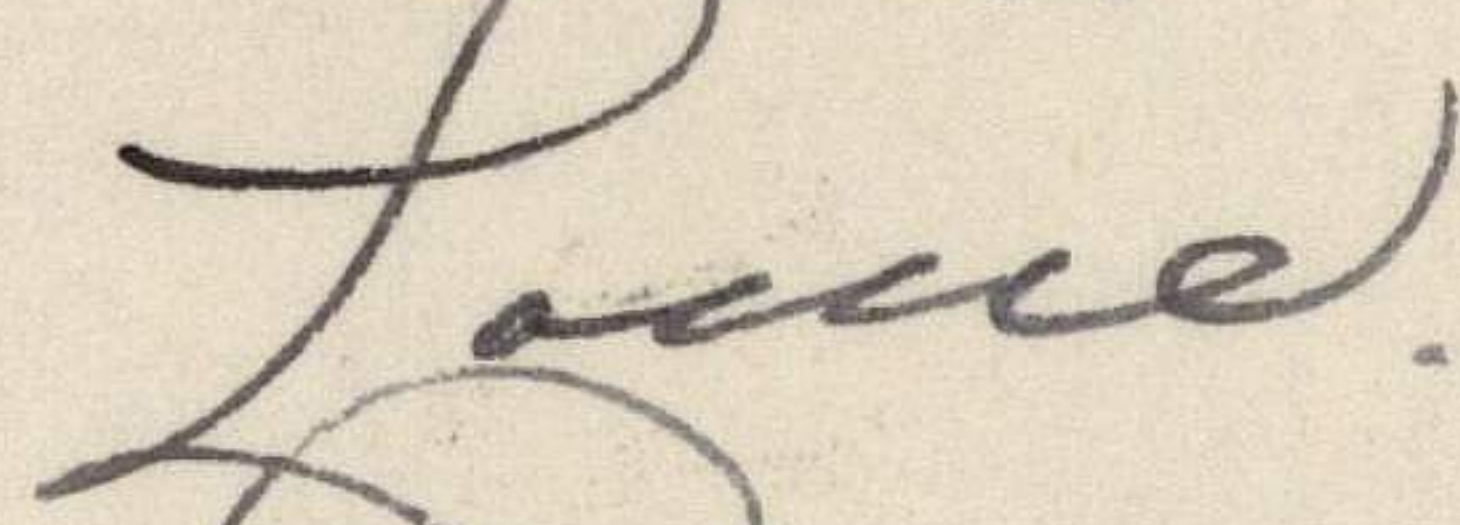Basketball Coach
University of Kansas
Lawrence, Kansas

Dear Doc:

Here are the statistics on our final home game:

1. Taking the ball across the division line after a field goal -- 21 attempts, total time 123 seconds, average 5.7 seconds, per try.

2. Number of held balls: End circle - 6, center circle - 2, end circle - 14. Total -- 22.

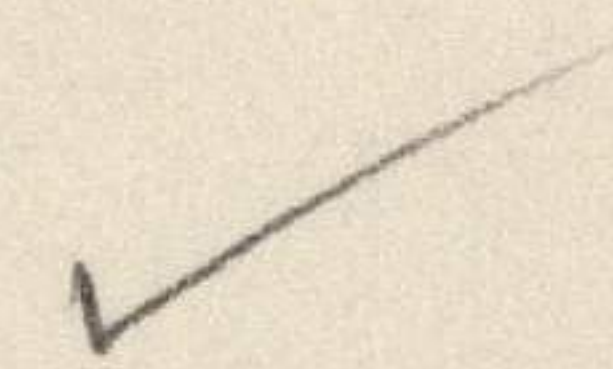3. Baskets scored from held ball -- 1.

We "fit" the Sooners right down the stretch but couldn't make it. You must have had a tough one with Nebraska. I am glad you won it.

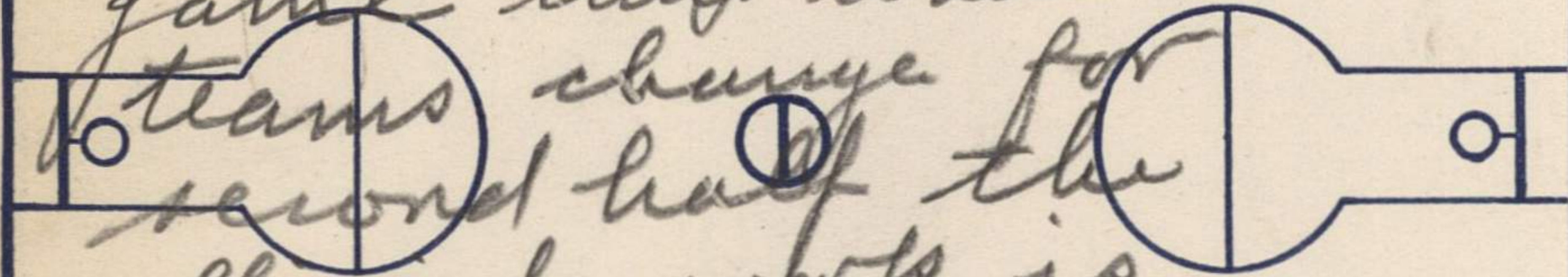Sincerely,

L. E. Menze
Basketball Coach

LEM:JH

cochrane

officials keep these
sides throughout the
game thus when
teams change for
second half the
officials work is
evenly distributed

Volz

March 2, 1938.

Dr. F. C. Allen,
Coach of Basketball,
University of Kansas,
Lawrence, Kan.

Dear Dr. Allen:

Statistics on the Oklahoma-Missouri game played in
Columbia February 28, 1938.

Passing into front court following goals and freethrows:
Number of trials ----- 53
Total time ------------ 162.80 seconds.
Average time per trial -- 3.7 seconds.

Jump balls
End circle ----- 13
Center circle - 4
End circle ----- 9
Total ----- 26

Number of jump balls moved to a circle:
End circle ---- 6
End circle ---- 3
Total ----- 9

Goals scored following jump ball situations:
Oklahoma ------- 2
Missouri ------- 2
Total ----- 4

Your special delivery letter regarding the location of
officials came this morning and was read with interest. When this
was discussed several years ago I thought that it was agreed with
officials as to how they locate themselves and the plan, as I remember
it, followed your suggestions. Early in the season I checked the
work of some of the officials in this regard and since they followed
it pretty well I dismissed it from my thoughts and have been con-
centrating on the numerous errors of our players.

Attached is a diagram of the scheme I had in mind. We
probably should check with the two men in our game and obtain an
understanding.

Yours truly,

Geo. R. Edwards.

THE KANSAS BASKETBALL OFFENSIVE EVALUATION ~~CHART~~ *Study*

This study was undertaken in ~~order to~~ *an* attempt to find a means of evaluating offensive basketball. For years the generally accepted method of evaluating a basketball team or an individual has been on the number of scores that were made by the team or by the player. The development of a list of offensive elements was the first step. With that idea in mind a list of offensive elements was made and each activity or play was weighed subjectively. The weight of the item was given due consideration concerning its importance insofar as it contributed to the execution of sound fundamentals and to winning success. Of course, the objective was the successful scoring of field goals or free throws by the player.

The items used in the evaluation chart and their weights are listed below:

A. Positive Items	Weight in Evaluation Points
1. Field goals	10
2. Free throws	5
3. Immediate assists	4
4. Secondary assists	3
5. Recovers ball off opponent's backboard	2
6. Recovers ball off own backboard	2
7. Taps and recovers own jump ball	2
8. Recovers teammate's jump ball	1
9. Makes a good pass to a teammate	1
10. Catches a teammate's pass	1

B. Negative Items	
1. Error of omission	1
2. Held ball obtained by an opponent	1
3. Fumbles ball and it goes out of bounds	2
4. Fumbles ball and it is obtained by opponent	2
5. Taps ball 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

In the use of the weighted items the algebraic sum of the positive and negative points is computed. This sum for each game represents the total effectiveness of the team or player.

For the purpose of illustration the Kansas chart of a conference game is shown in "Exhibit A" with team and individual points computed.

The data were collected by student assistants, majors in the department of Physical Education. Twelve men students were used in the collection of facts, six for each team. The men worked in pairs, one acting as a recorder and the other as an observer. One pair made a record of all the passes and catches, one pair made a spot record of all the shots taken by players' numbers, and the other pair recorded the remaining material.

Definition of Terms

The terms used in the evaluation chart study are, for the most part, in common usage in the game of basketball and need not be defined. However, some of the terms have not usually been connected with basketball and for this reason are defined.

1. <u>Immediate assist</u>, a pass made to a player who scores a field goal.

2. <u>Secondary assist</u>, the pass directly preceding an immediate assist.

3. <u>Error of omission</u>, a mistake in judgment or observation, such as a failure to pass to a teammate who is in a better position for scoring.

4. <u>Held ball obtained by an opponent</u>, a player having complete control of the ball and by poor judgment or poor technique on his part an opponent is able to "tie him up" to such an extent that an official calls a held ball.

5. Team efficiency, $\dfrac{\text{team positive evaluation points}}{\text{team positive plus negative evaluation points}}$

6. Player efficiency, $\dfrac{\text{player's positive evaluation points}}{\text{player's positive plus negative eval. points}}$

7. Scoring ability index, number of goals times percent of goals made plus one-half (free throws times per cent of free throws made).

8. Ball handling error rate, $\dfrac{\text{ball handling errors}}{\text{good catches plus goodppasses plus ball handling errors}}$

Team Analysis

By using the technique outlined, data were collected on the Kansas team during nine home games and on the opponents during the last three home games. From this material comparisons were made on the Kansas team using the averages for the four non-conference games and for the five conference games. In the last three home games, the Kansas team was compared with its opponents. Different styles of basketball would undoubtedly yield a different average for the number of shots, passes, etc. The frequency of these occurrences are listed as follows:

TABLE I.

Nine Game Averages
1. Score: 42.7 points
2. Goals: attempted 61.5; made 16.5 %26.9
3. Free throws: attempted 16; made 9.56; %59.7
4. Personal fouls: 10.2
5. Offensive personal fouls: .78
6. Violations: 3.7
7. Rebounds from own backboard: 21.3
8. Rebounds from opponent's backboard: 22.3
9. Passes and good catches: 361.3 passes; 345 catches
10. Wild passes: total 7.57; out of bounds, 2.67; to opponents, 4.9
11. Held balls: obtained by opponents, 3.1
12. Fumbles: total 6.1; out of bounds 3.1; to opponents 3
13. Tapped ball: out of bounds 1.3
14. Jump ball: tapped and recovered own jump ball .22
15. Jump ball: recovers teammate's jump ball 10.8
16. Assists: total 24; immediate 13; secondary 11
17. Evaluation points: 1103.0 - 73.2 = 1029.8 points per game
18. Evaluation points per player per minute of play: 5.14 points
19. Evaluation points per score: 24.1 points
20. Team efficiency: 93.6%

It is interesting to note that there are 16.3 more passes than catches. If one adds the fumbles (6.1) and the wild passes (7.57) the difference is almost erased.

When one considers the possibilities for offensive mistakes, it would appear that the negative evaluation points (73.2) is relatively low.

In order to compare averages of the four non-conference home games and the five conference home games, the data are presented in outline form.

TABLE II.

Four Non-Conference Games and Five Conference Games:

1. **Score:** non-conference average 42 points
   conference average, 43.2 points

2. **Goals:** non-conference average shots attempted 68.75; average made 16.75; % 24.4
   conference average shots attempted 55.8; average made 16.4; % 29.4

3. **Free throws:** non-conference average shots attempted 14.0; average made 8.5; % 60.7
   conference average shots attempted 17.6; average made 10.4; % 59.9

4. **Personal fouls:** non-conference average 10.5
   conference average 10.0

5. **Offensive personal fouls:** non-conference average .25
   conference average 1.2

6. **Violations:** non-conference average 3
   conference average 4.2

7. **Rebounds from own backboard:** non-conference average 22.0
   conference average 20.6

8. **Rebounds from opponent's backboard:** non-conference average 19.0
   conference average 25.0

9. **Passes and good catches:** non-conference passes, 374.75; catches 362
   conference passes 350.6; catches 331.4

10. <u>Wild passes</u>: non-conference, 8.5; out of bounds, 2.75; to an opponent, 5.75
    conference, 6.8; out of bounds, 2.6; to an opponent, 4.2

11. <u>Held balls obtained by opponents</u>: non-conference, 2
    conference, 4

12. <u>Fumbles</u>: non-conference, 6.25; out of bounds, 3.25; obtained by opponent, 3
    conference, 6.0; out of bounds, 3.0; obtained by opponent, 3

13. <u>Tapped ball out of bounds</u>: non-conference, 1.25
    conference, 1.4

14. <u>Tapped and recovered own jump ball</u>: non-conference, .5 times
    conference, no times

15. <u>Recovers teammate's jump ball</u>: non-conference, 13.75
    conference, 8.4

16. <u>Assists</u>: non-conference, 25.25; immediate, 13.5; secondary, 11.75
    conference, 23.0; immediate, 12.6; secondary, 10.4

17. <u>Evaluation points</u>: non-conference, 1132.75 - 69 = 1063.75
    conference, 1079.2 - 76.6 = 1002.6

18. <u>Evaluation points per minute of play</u>: non-conference, 26.59
    conference, 25.07

19. <u>Evaluation points per score</u>: non-conference, 25.36
    conference, 23.22

20. <u>Playing efficiency</u>: non-conference, 94.3%
    conference, 93.4%

21. <u>Ball handling error rate</u>: non-conference, 2.2%
    conference, 2.5%

It is interesting to note that the scores are almost identical and that the number of goals are about the same. However, in the conference games, the team took 13 less shots per game. This means that the team's shooting average was considerably better, being 29.4% for the conference games and 24.4% for the non-conference games. From the standpoint of ball handling, there were 24 more passes and 31 more catches per game in the non-conference matches than in the conference games. Both the playing efficiency and ball

handling error rate were poorer in the conference games than in the non-conference games.

It should also be noted that for each game point scored in the non-conference games, 20.36 evaluation points (25.36 - 5) were earned by some other method. An analysis of the data shows that scoring a field goal plays a relatively small part in scoring evaluation points, and that ball handling, recovery of rebounds, etc. must be considered to a larger extent.

In the last three games data were obtained on both the Kansas team and its opponents. This material is summarized in the following list.

TABLE III.

Conference Game Records made by Kansas and Opponents:

1. Scores: Opponents, 102
            Kansas, 139

2. Goals: Opponents took 184 shots, made 39 goals; average % 21.2
          Kansas took 165 shots, made 56 goals; average % 33.9

3. Free throws: Opponents took 44 shots, made 24; average % 54.5
               Kansas took 42 shots, made 27, average % 64.3

4. Personal fouls: Opponents, 36
                  Kansas, 27

5. Offensive personal fouls: Both teams made 3 personal fouls while they had the ball and called offensive fouls.

6. Violations: Opponents, 16
               Kansas, 15

7. Rebounds off own backboard: Opponents recovered 45
                               Kansas recovered 70

8. Rebounds off opponent's backboard: Opponents recovered 40
                                      Kansas recovered 78

9. Good passes and catches: Opponents, 607 good passes; 485 catches
                           Kansas, 1043 good passes; 998 catches

10. <u>Wild passes</u>: Opponents, 20; 6 out of bounds, 14 to an opponent
    Kansas, 19; 6 out of bounds, 13 to an opponent

11. <u>Fumbles</u>: Opponents, 20; 9 out of bounds, 11 to an opponent
    Kansas, 20; 10 out of bounds, 10 to an opponent

12. <u>Tapped ball out of bounds</u>: Opponents, 4 times
    Kansas, 4 times

13. <u>Held balls:</u> Opponents obtained 17
    Kansas obtained 16

14. <u>Jump ball</u>: Opponents tapped and recovered own jump ball 1 time
    Kansas tapped and recovered own jump ball no times

15. <u>Jump ball</u>: Opponents recovered teammate's jump ball 32 times
    Kansas recovered teammate's jump ball 23 times

16. <u>Assists</u>: Opponents made 54 assists; 29 immediate, 25 secondary
    Kansas made 82 assists; 46 immediate, 36 secondary

17. <u>Evaluation points</u>: Opponents, 1997 positive; 244 negative
    Kansas, 3327 positive; 237 negative

18. <u>Evaluation points per minute</u>: Opponents, 14.6
    Kansas, 25.8

19. <u>Evaluation points per score</u>: Opponents, 14.6
    Kansas, 22.2

20. <u>Playing efficiency:</u> Opponents, 89.1%
    Kansas, 93.4%

21. <u>Ball handling error rate:</u> Opponents, 4.9 %
    Kansas, 2.6 %

(Totals are shown.)

In comparing the totals one can see that the opponents made more attempts at both field goals and free throws than did the Kansas team. However, it should be noted that the home team scored more goals (56 for 33.9%) than the opponents (39 goals for 21.2%). This same thing is true of the free throws with Kansas making 27 free throws for 64.3% and the opponents making 24 free throws for 54.5%.

When one examines the personal fouls Kansas made less (27) than the opposition (36). However, the Kansas fouls yielded the greater number of free throws (44) to the visiting teams (42). It

seems that the Kansas personal fouls occurred more often when a man was in the act of shooting than did the fouls of the opponents, by the rate of 8 to 15. In this case the total is somewhat misleading, as the discrepancy occurred almost entirely in one game that Kansas won by 20 points. The most outstanding difference to be pointed out occurred in two places; in the recovery of rebounds and in ball handling.

In the recovery of rebounds, one sees that the Kansas players recovered 70 rebounds off their own backboards, while the opponents recovered 45 off their backboards. The same ratio holds when one notes the rebounds of the opponent's backboards - Kansas securing 78 while the visitors were collecting 40 rebounds. The recovery of rebounds seems to be the most outstanding difference in the teams.

The ball handling of the teams shows that Kansas caught and passed 2041 times and the opponents 1092 times. This difference could be entirely due to various styles of play. However, when one considers the errors in ball handling, such as wild passes, fumbles and held balls obtained by opponents, we see that Kansas made 55 errors and the opponents made 57 errors in ball handling. While the number of errors remained about the same, it should be pointed out that the opponent's ball handling error rate (4.9%) was almost twice that of the home team (2.6%).

In considering the total negative evaluation points, both Kansas and the opposition made about the same number of mistakes (237 for Kansas and 244 for the visitors). However, Kansas earned 3327 positive evaluation points as compared to 1997 positive evaluation points earned by the opponents. When these figures are reduced to playing efficiency, we find that the home team has a playing

efficiency of 93.4% as compared with 89.1%.

The data show that for each score point the visitors earned 17.2 evaluation points and Kansas earned 22.2 evaluation points. By deducting the 5 evaluation points for each score point one sees that 12.2 evaluation points were earned as compared with 17.2 for Kansas. While Kansas had the ball earning the extra evaluation points it is certain that the opposition was not scoring. However, as pointed out previously, the various styles of play may effect the total number of evaluation points, but the style should not have a great deal of effect on errors in ball handling.

In making direct comparisons between specific teams, a summary table made up from the evaluation summaries shows much the same facts as the totals between Kansas and the opposition.

TABLE IV.

Summary from Evaluation Chart:

Team	Score	Goals	% of goals	Free Throws	% of Free Throws	Personal Fouls	Errors in Ball Handling	Total passes and catches	% of Errors in Ball Handling	Recovery of Rebounds	Player's Efficiency
Kansas	48	17	33	14	77	13	18	623	2.8	39	91.3
School A	33	12	16	9	56	15	18	441	3.9	41	91.4
Kansas	35	16	35	3	37	5	27	738	3.5	43	91.9
School B	33	15	29	3	60	8	26	326	7.4	24	86.6
Kansas	56	23	31	10	63	9	10	680	1.4	66	96.6
School C	36	12	20	12	51	13	13	325	3.8	20	89.1

School A played the home team fairly even on most of the comparisons except that they could not hit the goal, making only 16% of their field goals while Kansas was making 33% of their attempts.

School B played the closest game from the score standpoint. Their loss can be credited to a poorer shooting percentage than Kansas

and possibly the direct cause of the loss was Kansas' ability to recover the rebounds, the control of which gave them additional chances to score and prevented Team B from scoring during the added time that the home team controlled the ball.

School C excelled only in the number of free throws while Kansas had a 63% average in free throwing as compared to a 51% average.

Like the total table, this summary table shows that the fundamentals of the game - shooting, ball handling and rebound recovery - are necessary to offensive power and for winning games.

Individual Player Rating

During the season a running tabulation was kept on each player who played in the home contests, showing the individual's performance in each game and his total endeavors for the season. (Sample record, Exhibit B.)

Since the close of the season other items have been devised, such as <u>ball handling error</u>, <u>playing efficiency</u>, and <u>scoring ability</u>. These points do not appear on the original tabulation sheets.

In rating an individual basketball player's offensive ability, many points should be taken into consideration, and the method as a whole needs some modification, depending upon the position played and the style of basketball used. Naturally, the guards will recover more rebounds from the opponents' backboard than the forwards. It also follows that the forwards should recover more rebounds off their own backboard, and certainly the center or "quarterback" man will handle the ball more often than other offensive players. These general trends are apparent as soon as one begins an intensive study

of the data gathered.

The players have been listed (see Table V, Evaluation Point Totals) by the number of minutes played during the home games. By a brief study of this table one can see that there is a high relationship between minutes played and the total number of evaluation points. The next column should have more meaning in that points are considered in relationship to the total number of minutes played. The column on playing efficiency was arrived at by the formula given in the definition of terms (No. 6). This rating is probably the most meaningful in the table, but it does not tell the complete story.

Ball handling is the basis for offensive ability, and for this reason a ball handling table has been tabulated (see Table VI).

TABLE V.

Ratings Based on Evaluation Point Totals

Player	Minutes*	Eval. Points Earned	Points per Minute	Player efficiency Percentage
A	328.5	2098	6.38	97.3
B	266	1307	4.91	92.2
C	263.5	1300	4.93	96.4
D	221.5	1256	5.67	94.9
E	141.5	560	3.96	90.5
F	117	628	5.37	94.1
G	100	460	4.60	94.2
H	74.5	344	4.62	93.0
I	70.5	310	4.39	91.7
J	70.0	395	5.64	91.6
K	59.5	297	4.99	94.3
L	34.5	120	3.48	84.5
M	22.5	117	5.22	91.5

*Time as recorded by W. A. Dill, compiled by the Dill method of playing time recording.

TABLE VI.

Ball Handling

| Player | Position* | Scoring Ability | Goal Shooting | | | | Passing and Catching | | | |
			Goals Made	% of Goals Made	Free Throws Made	% of Free Throws Made	Total Passes and Catches	Errors in Ball Handling	% of Errors in Ball Handling	Ball Handling Rank
A	g	1	47	32.6	28	59.6	1273	15	1.17	2
B	f,c	2	23	27.1	20	66.7	845	26	2.9	7
C	g	3	13	33.3	5	71.4	1004	17	1.7	3
D	c	4	14	28.0	5	62.5	961	18	1.8	4
E	f	6	10	30.3	5	71.4	372	18	4.6	12
F	f	7	12	17.9	8	57.1	341	7	2.0	5
G	f,g	9	4	20.0	2	50.0	348	4	1.13	1
H	f	5	13	30.2	4	66.7	166	11	6.2	13
I	f	8	7	21.2	2	33.3	192	8	4.0	11
J	f	10	3	16.7	2	40.0	346	11	3.1	8
K	g,c	11	2	25.0	1	50.0	244	6	2.4	6
L	g	13	0	0	0	0	116	4	3.3	9
M	f	12	1	33.3	2	66.7	85	3	3.4	10

* guard, forward, center.

In this tabulation of the percentage of goals made (see Table VI), one can see that player C and player M have both the same score, 33.3%. However, player C was the most valuable on the basis of other items. Player A with 32.6% is undoubtedly more valuable than either. This method must be tempered with judgment. In order to arrive at an index number for rating scoring ability an arbitrary formula was used (see definition of terms, No. 7). This gives a rather high index number which when reduced to a one-two-three basis rating gives a logical order.

Errors in ball handling include the total number of wild passes, fumbles, and held balls obtained by an opponent. In order to arrive at a ball handling error rate, the total number of passes and catches was assumed to be an accurate index as to the relative

number of times chances for errors were present. By using the formula given in definition of terms, No. 8, an index was established. The guards handled the ball more often than did the forwards, and the two players with the lowest ball handling error rate (players A and G) are guards. However, player G also played as a forward. The lowest error rate for a forward was 2.0 for player F.

In order to find further ratings for the purpose of analysis, the scores from the evaluation chart were computed on a point per minute basis and a rating from 1 to 13 given the various players. The material in this chart (Table VII) is of value until one reaches the players with only a few minutes of playing time. Here the chart breaks down because these players did not perform all of the items mentioned, and are rated too highly. This material is discussed somewhat in the summaries dealing with the individual players.

TABLE VII.

Rating on Activities Per Minute*

Player	Position	Time played	Eval.Points per min.	Goals per min.	Free throws per min.	Personal foul per min.	Immed.assists per min.	Ball off opp. backboard per min.	Ball off own backboard per min.	Recovers tm. jump ball per min.	Good passes per min.	Good catches per min.	Fumbles per min.	Wild passes per min.	Negative poings.
A	g	1	1	2	2	6	8	4	11	11	5	3	1	4	1
B	f	2	8	5	3	5	2	8	7	10	9	9	6	9.5	9
C	g	3	7	8	11	9	10	1	13	2	4	7	4	6	5
D	c	4	2	7	9	10	3	10	9	9	3	2	9	3	3
E	f	5	12	6	6	2	5	9	4	8	11	12	7	9.5	10
F	f	6	4	3	4	11	6	7	1	1	10	10	5	5	6
G	fg	7	10	11	10	12	7	2	12	3	7	8	2	1	2
H	f	8	9	1	5	8	4	12	10	4	13	13	12	8	7
I	f	9	11	4	8	1	9	3	2	7	12	11	3	7	8
J	f	10	3	10	7	3.5	12.5	6	3	12	1	1	13	12	12
K	gc	11	6	12	12	7	11	11	8	6	2	4.5	10	2	4
L	g	12	13	13	13	3.5	12.5	5	6	5	8	6	11	11	13
M	f	13	5	9	1	13	1	12	5	13	6	4.5	8	13	11

* A ranking of 1 is the best performance.

TABLE VIII.

Offensive Ability Rankings

Player	Position*	Varsity ranking	Freshmen's ranking	Coach's ranking	Scoring ability	Ball Handling Errors	Playing efficiency
A	g	1	1	1	1	2	1
B	f,c	3	2	2	2	7	8
C	g	2	3	3	3	3	2
D	c	4	4	4	4	4	3
E	f	6	6	7	6	12	12
F	f	5	5	5	7	5	6
G	f,g	9	9	9	9	1	5
H	f,	10	12	11	5	13	7
I	f	7	8	8	8	11	9
J	f	8	7	6	10	8	10
K	g,c	12	10	10	11	6	4
L	g	11	11	12	13	9	13
M	f	13	13	13	12	10	11

* guard, forward, center.

At the close of the season a letter was sent to the 16 letter men of the varsity and the 17 numeral men on the freshman squad. (Sample letter and rating blank, Exhibits C and D) These 33 boys were asked to rate the 13 varsity players on their offensive playing ability. The 13 players included in the study were ranked by 21 players and the coach. On the basis of offensive playing ability, these rankings plus other significant rankings from the evaluation data are shown in Table VIII.

Of particular interest is the similiarity of the rankings that were given by the varsity, the freshmen and the coach. There are only 3 players where the disagreement is more than 2 rankings apart. All are unanimous on 5 players. It should be remembered that in spite of the apparent discrepancies between the judgment ratings and the computed ratings, the latter are built up of

isolated abilities. As pointed out earlier, the guards and center have a better chance of making a higher score in ball handling due to their positions and the style of basketball used in this school.

No attempt was made in this study to give any of the players a composite ranking, but it should be noted that player A was a guard known nationally as an All-American player.

On the basis of the individual evaluation tables certain facts are brought out that can best be shown in individual analyses. For that reason, the abilities of the players are discussed as single units.

Summary of Individual Player Analysis

omit in new study.

Player A. Guard.

This player was in 9 home games for 328.5 minutes and had a player efficiency rating of 97.3%. He was the number one man in almost any way that he could be rated. He earned 2098 evaluation points and 122 score points. He made 47 goals (32.6%) and 28 free throws (59.6%) and had a ball handling error rate of 1.17%. In earning the high scorer position on the squad he made more passes than catches. This is partly due to his willingness to cooperate and to his position as a guard. There were three men on the squad that took more shots per minute of playing time. Of the men who took more shots per minute of playing time none had as good an average of made shots. During his long playing time he made only 13 personal fouls; two of his teammates with less playing time exceeded his total number of fouls and five teammates made more fouls per minute of playing time. He was an excellent ball handler, a dandy shot and a team player. The coach, his fellow players, the freshman squad, and the statistics were in complete agreement on his offensive ability,

and listed him as the number one player on the squad.

Player B. Forward and Center.

From the standpoint of time, this player played more minutes (266) than any other player except player A. He was also second high scorer, earning 66 points by making 23 goals (27.1%) and 30 free throws (66.7%). From the standpoint of evaluation points, he was also second earning 1307 points, and had a playing efficiency of 92.2%. In ball handling errors he rated 2.9%. Six of his team-mates rated poorer in this department. However, in spite of his errors in ball handling he made more passes at the opportune time to players who scored than any other individual. Even on immediate assists per minute he rated second to only one other player, and this player played only 22.5 minutes during the season. There were four men on the squad that took more shots per minute. He was the only forward on the team to make more passes than catches who played more than 22.5 minutes. He had only 8 personal fouls and was the only player with over 200 playing minutes to have so few fouls. He was rated third by his fellow players, and second by his coach and the freshmen players.

Player C. Guard.

Player C played 263.5 minutes, earning 1300 evaluation points and 31 score points, scoring 13 goals (33.3%) and 5 free throws (71.4%). He handled the ball on passes and catches 1004 times which is the second greatest number on the squad and had a ball handling error rate of 1.7% which is next to that of players A and G. However, player C played over 2½ times as many minutes as player G. This player took a total of 39 shots and this is the smallest number of shots for any of the players that had over 200 minutes of playing time. As a guard he was in position to recover rebounds from off the

opponent's backboard. He recovered 48 times, as compared to player A's 50 times, and on a basis of recoveries per minute of playing time he is the leader for the team. This player passed the ball 128 times more than he caught it. On the basis of the data gathered this player is a good ball passer and rebound recoverer, which is a great asset to the team. On ball handling he has a very low percentage of errors and has a playing efficiency of 96.4% which makes him the number two man on the squad. His teammates rated him second on offensive ability, and his coach and the freshmen rated him third.

Player D. Center.

Player D was the fourth man on the squad to play over 200 minutes with a total time of 221.5 minutes. He earned 33 score points and 1256 evaluation points, which was fourth high for the squad. While playing he scored 14 goals (28%) and made 5 free throws (62.5%). In ball handling errors he had a low score of 1.9% and was one of the four men to score less than 2% errors. His all-around playing efficiency was 94.9%, which was also fourth for the squad. As far as ball handling was concerned, he was third in the total number of passes and catches. He made 17 more passes than catches. There were only four men on the squad that took fewer shots per minute. The data show that this player handled the ball many times for a low error rate of 1.870. He was second on the squad in evaluation points per minute and that shows he did not shoot too often. On playing efficiency he was the best center on on the squad, and the players, the coach and the freshmen all rated him as the number four man.

Player E. Forward.

This player was a forward and had 141.5 minutes of playing time to his credit. He earned 560 evaluation points and 25 score points. He scored 10 goals (30.3%) and made 5 free throws (71.4%). In ball handling he had an error rate of 4.6 which was second highest on the squad. From the standpoint of player efficiency he was twelfth. There was only one other player on the squad that had a lower rate of personal fouls. Player E played 141.5 minutes or over 3½ games of 40 minutes each and made only 3 personal fouls. He is the first player in the list to catch the ball more than he passed it by 4 catches. He also is the first man on the list to be listed as a forward only. Player B played both forward and center during the season. It seems to be a characteristic of the forward position to demand more catching than passing. The data indicate a low personal foul rate, a poor efficiency rating as compared to the players who played 200 minutes and an error rate in ball handling 4 times as high as that of players A and G. He was rated as sixth by his fellow players and the freshmen, and seventh by the coach.

Player F. Forward

This player was listed as a forward and he played 117 minutes, making 12 goals (17.9%), and 8 free throws (57.1%). He earned 628 evaluation points and 32 score points. On the player efficiency chart he rated sixth with a percentage of 94.1. His rate of error in ball handling was 2.070, which placed him in fifth place. Like the preceding player, he had more catches than passes in ball handling. Only one other player (H) had more attempted shots per minute of play and only two squad members made a smaller percentage of their shots. On balls recovered off his own backboard

he rates as the No. 1 man. This is also true for the recovery of
his teammate's jump balls. On the basis of personal fouls per minute,
this player ranked eleventh for the squad only two making more than
he did. The data indicate that the player was fairly efficient,
but that his shooting average was far too low. He makes a first
class man on handling rebounds off his own backboard and getting
the ball after a teammate's jump, but he committed too many personal
fouls. His teammates, freshmen and coach rated him fifth.

Player G. Forward and Guard

This player was listed as both a forward and a guard. He
played 100 minutes, made 460 evaluation points and ten score points,
4 goals (20.0%), and shot 2 free throws for 50.0%. He earned a
rating on player efficiency of 94.2%, which places him in fifth place
for the squad. In errors for ball handling, he rated first with
a rate of 1.13%. As a guard he had an opportunity to recover re-
bounds off the opponent's backboard to such an extent that he rated
No. 2 for the squad on a basis of rebounds per minute. He passed
the ball more than he caught it, and on the basis of shots per minute
there are only 3 players who took less shots. This player is twelfth
on the basis of personal fouls committed per minute. The data
indicate that he was an excellent ball handler, and a good rebound
recoverer, but he did not shoot enough. On the basis of efficiency
his coach, teammates and freshmen rated him ninth.

Player H. Forward.

Player H was a forward with 74.5 minutes of playing time
to his credit. He earned 344 evaluation points and 30 score points,

made 13 baskets (30.2%) and 4 free throws (66.7%). This player also had the highest number of shots attempted per minute of play. On the basis of player efficiency he rated 93.0%. But on his ball handling ability he had an error rating of 6.2%, or 5 times that of players A and G. He was the eighth player on the basis of time played and he ranked eighth on the basis of personal fouls. When it came to passing and catching the ball, he made 22 more catches than passes. This player was a good scorer but he shot more than any other player per minute of play. He made too many errors in ball handling and in this department he ranked thirteenth. He ranked seventh on his playing efficiency, and the players rated him tenth, the coach eleventh, and the freshmen twelfth.

Player I. Forward.

Player I was in the games for 70.5 minutes as a forward. He earned 395 evaluation points and 16 score points, and made 7 goals for 21.2% and threw 2 fouls for 33.3%. On the basis of personal fouls per minute he was number one man with less than any other member of the squad. He had a ball handling error rating of 4.0% and a playing efficiency of 91.7%. As a forward he recovered enough balls from the opponent's backboard per minute to rank as the No. 2 man of the squad. He also was the No. 3 man in recovering the ball off his own backboard, and he ranked third on the basis of total recoveries per minute. In the amount of playing time this player ranked ninth and on the basis of playing efficiency he also ranked ninth. Like the other forwards, he also caught the ball more than he passed it and ranked third in the attempted goals per minute of playing time. This player was good at recovering rebounds, not too good a shot, and among the 3 players to have an error rating over

4%. He did not commit many personal fouls. He was rated seventh by the players, and eighth by the coach and freshmen.

Player J. Forward.

This man had a playing time of 40 minutes. During this time he made 8 score points, 3 goals (16.7%), 2 free throws (40%) and earned 395 evaluation points. His error rating in ball handling was 3.1% and his playing efficiency rated at 91.6%. He was tenth in the amount of time in home games and ranked tenth in playing efficiency. As a forward he recovered the ball off his own back- board to rank third on the per minute basis, and caught the ball more than he passed it. As a forward he was not a good shot as only one boy on the squad had a lower rank and the player who was lower did not make a basket in his five attempts. He was ranked eighth by his teammates, sixth by the coach and seventh by the freshmen.

Player K. Guard and Center.

With a playing time of 59.5 minutes this player made 297 evaluation points, 5 score points, 2 goals (25%) and 1 free throw (50.%). His error rate in ball handling was 2.4% and of the 5 players with a better rating 3 were guards, one was a forward, and one was a center. His playing efficiency was 74.3, and of the three players who ranked better than he, two were guards and one was a center. In rebounds off the opponent's backboard, he rated eleventh and in goals made per minute he ranked twelfth. This player had some excellent men to compete with and on a team without an all- American guard he might have had more opportunity to play. Like the other guards and centers, he passed more than he caught the ball. On rebounds off his own backboard per minute he ranked eighth and

he ranked sixth on the recovery per minute of a teammate's jump
ball. The data indicate that this player was a good ball handler
and an efficient player, but that he did not shoot enough in pro-
portion to his playing time. He was rated twelfth by his teammates,
and tenth by the coach and the freshmen.

Player L. Guard.

This boy had a total time of 34.5 minutes, 120 evaluation
points, and no score points. He is the only player of the 13 in the
study that did not score during the home season. He attempted 5
goals and 2 free throws. His error rate in ball handling was 3.3%
and this was better than four of his teammates, who played longer.
From the standpoint of playing efficiency he made a score of 84.5%,
the lowest on the squad. The point most in favor of this boy was
his rank in free throws attempted per minute (not making any) in
which he was tied with player J for third place. This player ranked
the lowest of the guards and was the only one to catch the ball more
than he passed it. He was rated eleventh by the varsity and fresh-
men, and twelfth by the coach.

Player M. Forward.

This player ranked thirteenth in minutes of play (22.5),
earned 117 evaluation points and 4 score points. He made one goal
(33.3%) and 2 free throws (66.7%). He ranked tenth both in player
efficiency (91.5%) and in error rate 3.4%. He had the highest rate
of personal fouls per minute of any of the 13 boys. This player
had a very definite height disadvantage as he was by far the short-
est man on the squad and can be considered small in stature even
in comparison with boys not playing college basketball. He was
ranked thirteenth by all his fellow players and thirteenth by his
coach.

The summaries have been presented and discussed in the body of the paper. In addition some general conclusions seem to be warranted;

1. The study is of value in that a record was made of the number of times various activities are performed in college basketball.

2. An accurate record of the offensive abilities of players was made available independent of the score book.

3. By examination of the material after a game a coach can see which men were performing their duties and which fundamentals need extra work.

4. The players have a definite interest in the charts and watch their improvement in deficient abilities.

5. There remains ample room for additional studies.