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I had an idea for research that I wanted to throw out here to start things off. Did you ever think of trying to calculate to what extent each area of run production was "Hitter controlled" or "Pitcher controlled"? What I am thinking of is that in order to create a baseball simulation, you ordinarily allow a certain of "range of control" for the hitter and pitcher, the extent of which will be determined by the spread of occurrence of the event among hitters and pitchers. For example, in the American League in 1986 there were 26.4 home runs hit per 1000 plate appearances. There were hitters, however, who hit no home runs, (0 per 1000 plate appearances), while league home run leader Jesse Barfield hit 40 in 671 plate appearance, or 59.6 per 1000 plate appearances. The spread of home runs per hitter, then, was from 0 to 59.6/1000, or possibly higher. The spread among pitchers was somewhat less, the toughest pitcher to homer off of being (I think) Mark Gubicza, allowing 8 homers to 765 hitters, while the record-setting Bert (Bombsie) Blyleven allowed 50 to 1,126 hitters. The range of home runs allowed/1000 plate appearances, then, was from 10.5 to 44.4, a substantially tighter shot pattern than for hitters.

Calculating this for each pitcher and each hitter, you would find that the standard deviation of home runs/1000 plate appearances was something for hitters and something less for pitchers--let's say, at a guess, 6.0 for hitters and 4.0 for pitchers. If the shot pattern (or the standard deviation) was exactly the same for both pitchers and hitters, then one would have to say that the occurrence was 50% controlled by the hitter, and 50% controlled by the pitcher. In this situation, we might say that the home run was 60% controlled by the hitter, and 40% controlled by the pitcher.

I have thought of doing this for years, but one problem was always getting stable data. Consider:

1) The data samples of a season for pitcher and hitter are of very different sizes. A starting pitcher may face well over a thousand hitters in a season.

2) It is a convenient fiction of most sabermetric study, and particularly modeling, that seasonal statistics represent true levels of ability. Unfortunately, for this particular study that could be a very damaging fiction, since in reality a great percentage of the spread of occurrence over the course of a season is actually random variance.

3) If you study spreads of occurrence over the course of a single season, then, you're going to be comparing a pitcher with 1100 BFP against a hitter with 600 PA, and you're going to get very different variance in the two samples simply because one of them is much larger than the other.

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The publication of The Great American Baseball Statbook a year ago makes this study much more possible than it was before. The GABS listed statistics over 3-year periods. That makes it possible to define a range of plate appearances (let's say, 1400-2000) which is a) large enough to be truly reliable, and b) available for a goodly number of both hitters and pitchers within the same defined limits. The Statbook also does something else ideal for this study: it lists the number of doubles, triples and home runs allowed by each pitcher.

Do you understand what I'm saying, in plain English? The average baseball fan, the casual fan, tends to think of the "walk" as being something that the pitcher does, and of which the hitter is the mere recipient, like a telephone call. Those of you who play table games know that the hitter is probably the largest key to when a walk occurs. What I'd love to see is a listing which might, at a guess, look something like this:

CATEGORY	% Determined by Hitter	% Determined by Pitcher
Hit Batsman	84%	16%
Triples	73%	27%
Home Runs	60%	40%
Walks	59%	41%
Doubles	55%	45%
Singles	51%	49%

I'm sure you'd find that most events were more hitter-determined than pitcher-determined, but you might find an exception. By using the front of the book you could supplement the categories to include sacrifice flies and sacrifice bunts and intentional walks.

The statbook also lists stolen bases allowed by pitchers, which you can't find anywhere else. Stolen bases, of course, have three obvious elements: hitter (as baserunner) identity, pitcher identity and catcher identity. Which brings up a general point, for in reality EVERYTHING has those three elements--the single, the double, the triple, even to a tiny degree the home run. Not only do they have the third determining element, but there's a fourth (the ballpark) and a fifth (the weather) and a sixth (the home plate umpire) and God knows what else. A 50/50 split between hitter and pitcher might, in fact, only indicate that the true determinant was something else entirely. But we have to start somewhere.

Well, enough of that. The first article up this time, and one which as an editor I am exceptionally proud, is a study by Bruce Garland of outside influences on Richie Ashburn's defensive statistics. I just re-edited the Historical Abstract, which will be out in soft cover next spring, and in that I quoted Garland's research as part of the new Richie Ashburn comment. Following that is a fun article by Russ Eagle--not to imply that the research is anything less than original or the point any less than serious--on the success of the 1987 Cardinals, and then an article by Neil Munro on Pitchers' Defensive Wins and Losses. The Munro article is slightly dated, inasmuch as it set around in somebody's drawer for a couple of years before coming to light, but I think interesting enough that you will make the mental adjustment forward to 1987. The final article, by Thomas Hanrahan, is timely in a different sense, having to do with who wins awards and why, coming as it does in the heat of the award season. My thanks to all for your research, and please note the quality of the type. Lookin' good, guys, lookin' good.

A PRELIMINARY REVIEW OF OUTSIDE INFLUENCES ON RICH ASHBURN'S FIELDING STATISTICS

By: Bruce H. Garland

When friends would ask how I could seriously envision Richie Ashburn as a member of the Hall of Fame, I would cite the usual statistics[1] and conclude by asserting that Richie (now Rich) Ashburn was one of the greatest defensive outfielders of all time. My arguments have never been persuasive on the Hall of Fame issue, but I was pleased to find that Bill James, is an ally on the defense question. In fact, James has written that Ashburn "has by far the greatest defensive statistics of any outfielder ever."[2] While James limits his statement to "statistics," he does suggest that there be some research on the possibility of outside influences as Ashburn's statistics, and I have decided to begin researching that issue. The source for my statistics is the MacMillan Baseball Encyclopedia, with the exception of the field dimensions which are from Turkin's Baseball Encyclopedia (1951 ed.) and the National League Guides and Lowry's "Green Cathedrals." I have limited my research and analysis to the time period 1948 to 1957 (ten years), with but a few noted exceptions.

How abnormal are Ashburn's fielding statistics? From 1948 to 1958, Ashburn led all National League centerfielders in total chances with the exception of 1955, when he was second. In 1951, Ashburn's total chances/game was an astounding 3.6 (James' range factor of 3.59) with 538 put outs, 15 assists, and 7 errors. From 1948 to 1957, all other National League centerfielders had TC/G of 3.0 or above only 8 times. Ashburn had a 3.0 average or above 8 times himself, doing it again in 1958 for good measure. (Ashburn had over 500 put outs in 8 different seasons.)

[1] See e.g., Carroll, Bob, "For the Hall of Fame: Twelve Good Men," The National Pastime, Winter 1985; and Clayton, Skip, "Should Rich Ashburn be in the Hall of Fame," Phillies Report, March 14, 1985, p. 6.

[2] James, Bill, Historical Baseball Abstract, Willard Books, N.Y., 1985, p. 385.

Ashburn had more than just fly ball putouts. I'm sure many will be surprised to learn that his assist totals are outstanding. From 1948 to 1957, Ashburn averaged 14.2 assists per year, with a lifetime average of 13.0. Ashburn led the league in assists 3 times. Even granting that more players tried to run on Ashburn based upon a real or perceived notion that Ashburn had a weak arm, these numbers are very good and I find it difficult to believe that this is statistical fluke, since it covers so many seasons.

I have researched and analyzed the following outside influences:

1. Home field dimensions.
2. Strikeouts per season.
3. Team Double Plays
4. Team Errors
5. Statistics of the left and right fielders both individually and collectively.

I have not considered the effect of left handed and right handed pitchers (although as a centerfielder, I suspect that there would be no noticeable effect), nor have I examined the question of whether Robin Roberts had an effect by getting an unusual number of "MF8" outs as mentioned by James. Quite frankly, I don't know how to test for this. I have also not tried to find out whether or not Ashburn participated in an unusual number of extra inning games during his career which would have given him more opportunities. I think that this is unlikely over a career, although I do not doubt that Ashburn played nearly every inning of every game. Finally, I compared Ashburn's statistics to other centerfielders who played at Connie Mack Stadium to see whether or not any other centerfielders compiled similar statistics.

PARK ILLUSION

In analyzing park illusion, I first compared Ashburn's home stadium (Connie Mack) to the other National League fields. Clearly, a much larger centerfield area would be a factor even though only half of the games would be played there.

With the exception of Polo Grounds (475' Turkins 1951, 480 National League Guide 1954 and 1955 but with a unique and limited area), Connie Mack Stadium had more room in centerfield (460') than any National League ballpark (the distances in the National League Guide for 1954 and 1955 was 468 while Lowry's "Green Cathedrals" lists the distances as 468 in 1948-49; 448 in 1950; 440 in 1951-52; 460 in 1953; 468 in 1954-55; and 447 from 1956 on), with above average distance in right field (331') and average distance to left field (334'). The Polo Grounds, Forbes Field, and Sportsman's Park, were the next largest (all over 400') and I would expect centerfielders in those parks to consistently have more chances than centerfielders who played home games in ballparks with smaller dimensions, like Milwaukee, Cincinnati, and Brooklyn. The expectation holds true for the Polo Grounds where 4 of the 8, 3.0 or above averages were recorded (Forbes Field had 1). (I suspect the presence of Willie Mays was a major factor in the Polo Grounds statistics, in fact, in Ashburn's great year of 1951 (3.6), Mays was tied for second with 3.1).) However, the other 3.0's were achieved by centerfielders in Milwaukee (1) and Cincinnati (2) which had much smaller dimensions.

Park illusion can also be studied by reference to other centerfielders' records in the same ballpark at the same time, and just before and after Ashburn. Analysis of other Phillie centerfielders during Ashburn's great years is impossible since Ashburn was almost never out of the line up. However, we can look at what other Phillie centerfielders accomplished just before and after Ashburn. In addition, we can also see how Philadelphia Athletic centerfielders fared during the same time period as Ashburn since they played in the same ballpark. From 1943 to 1947, Phillie centerfielders led the league in TC/G twice and averaged 2.96 TC/G with two, 3.0 or above seasons. This is a very good average although Ashburn's ten year

average from 1948 to 1957 is 3.23. Immediately after Ashburn[3], 1960 to 1964, no Phillie centerfielder led the league and the average dropped to 2.3 TC/G, including one horrible 1.8 TC/G season.

From 1943 to 1947, Philadelphia Athletics centerfielders averaged a respectable 2.7 TC's/G, but there were no league leaders. However, from 1948 to 1954 (Ashburn years), the Athletics centerfielders had some outstanding years and Sam Chapman led the league with a 3.2 average in 1950. In 6 of those 7 seasons, the average was 3.0 or above and 3 times the Athletics centerfielders had a higher TC/G average than Ashburn.

I suggest that this analysis reveals a park illusion for Connie Mack Stadium due to the dimensions in centerfield. However, I believe that the statistics also show that the increased area could be used to the advantage of an above average or good centerfield while the dimensions did not significantly aid an average centerfielder.

TEAM IMPACT

To the extent that Phillie pitchers struck out fewer hitters than other team's pitchers, Ashburn may have had more opportunities. From 1948 to 1957, Phillie pitching ranked third in the league in strikeouts three times, fifth twice, sixth four times and last once. In 7 out of 10 years they were in the bottom half of the league which means that Ashburn probably got more chances than most other centerfielders. Similarly, from 1948 to 1957, Phillie infielders were turning fewer double plays than most other National League teams. They were last four times, seventh three times, sixth two times and third once. Again, this probably led to Ashburn having more chances than other centerfielders since fewer outs were recorded in this manner. Finally, from 1948 to 1957, the Phillies finished in the top half of the league for most errors in all but three years, leaving the possibility that Ashburn may have had more chances, since outs were not being recorded by other fielders (or even Ashburn).

[3] To fill in this gap, Ashburn's 1958 average was 3.4 while his 1959 average was his lowest at 2.5. I attribute this drop to Ashburn's understandable decline in speed, which was also reflected in his batting statistics.

These numbers would, of course, vary from year to year and team to team. However, I have chosen to examine Ashburn's outstanding 1951 season to see what the combined effect of these three outside influences might be. In 1951, Phillie pitchers had 123 fewer strikeouts than the league leader Brooklyn (570 to 693), turned 46 fewer double plays than league leader Brooklyn (146 to 192) and committed 13 more errors than the league leading Cardinals (fewest errors). In 1951, Phillie fielders had 182 more opportunities than the league leaders.[4] This equals 6.74 games. Assuming Ashburn received the same number of total chances per game (3.6), he had about 24 (24.264) more chances in 1951 as a result of the Phillies team total of double plays, strikeouts and errors (when compared to league leaders in those categories). This amounts to .1575 TC/G over a 154 game season but it is an outside figure since it is a comparison with league leaders.[5] I would say that the team performance in the area of strikeouts, double plays, and errors helped Ashburn but not enough to bring him back to the rest of the centerfielders. The following chart compares Ashburn's TC/G with the second place centerfielder and the league average for centerfielders.

	Ashburn	Second Place	Difference	League Average*	Difference
1948	3.1	2.8	.3	2.5	.6
1949	3.5	3.3	.2	2.8	.7
1950	2.8	2.8	--	2.2	.6
1951	3.6	3.1	.5	2.9	.7
1952	3.0	2.9	.1	2.6	.4
1953	3.3	3.1	.2	2.7	.6
1954	3.3	3.1	.2	2.8	.5
1955	2.9	3.0	(.1)	2.7	.2
1956	3.4	2.9	.5	2.7	.7
1957	3.4	3.0	.4	2.7	.7

*Rounded to tenths.

[4] This number counts double plays as only one more opportunity, which may be questionable. For comparison, in 1955, the only year Ashburn did not lead the league in TC/G, the difference between the Phillies and other league leaders in these categories was 174.

[5] Since Brooklyn led the league in strikeouts and doubleplays, I compared Ashburn to Snider for 1951. Ashburn had 161 more TC than Snider in

THE ENNIS FACTOR (LEFT FIELD AND RIGHT FIELD STATISTICS)

In his historical abstract, James suggests that Del Ennis' defensive abilities be scrutinized to see if Ennis could be responsible for a statistical illusion. James then goes on to say that he doubts whether or not this had an effect and my research confirms James' doubt. For the time period 1948 to 1957, the Phillie outfielders led the league in TC/G 8 years and were second twice. During that time period, the Phillie left and right fielders averaged 4.25 TC/G (fourth) while the league average for the same time period was 4.16375. Analysis of each individual year from 1948 to 1957 reveals that the combined TC/G of the Phillies left and right fielders exceeded the league average 7 out of 10 years. In 1951 (the 3.6 year), the combined average was 4.2, while the league average was 4.2625, not a significant difference.

Individual Phillie left and right fielders TC/G figures did not vary significantly from those of other right and left fielders between 1948 and 1957. No Phillie outfielders were ever last in the league in TC/G between 1948 and 1957 confirming James' suspicion that other teams had outfielders as slow as Del Ennis and leading one to conclude that Ashburn did not receive any significant advantage over other center fielders based upon the ability or inability of the left and/or right fielder to cover ground.

CONCLUSION

While I admit that I have not exhausted all possible factors which may have had an influence on Ashburn's fielding statistics, I have found that the "Ennis Theory" did not cause a statisitcal illusion, since the Phillie left and right fielders were average or above over the entire study period and for each individual season. There was an impact from Phillies team statistics in double plays, strikeouts, and errors when compared to the most extreme teams, i.e., the league leader. When compared to each individual team, I suspect the effect would be lower. In Ashburn's greatest season (1951), this amounted to .1575 TC/G at the extreme. This would be enough to have the second place centerfielder pass Ashburn in only 2 of the 9 years Ashburn was in first place. The area of Connie Mack Stadium's centerfield was greater than most other National League parks

(Garland article completed at the bottom of page 11.)

1987: HOW THE EAST WAS WON

by Russ Eagle

While Cardinal fans may still be smarting from the World Series loss to the Twins, it is interesting to look back at the 1987 season and the amazing way in which they got there. I'm not talking about the NLCS with the Giants, which is still fresh in the minds of most people, but the Eastern Division race with the Mets and Montreal, won by a margin of three games by St. Louis. Look at the following offensive totals and percentages, given for the Cardinals, their opponents, and the average National League team in 1987.

1987	AB	RUN	HITS	TB	2B	3B	HR	BB	SO	SB	CS	ROB	%S	RC	AVG	SLG	OBP
CARDS	5500	798	1449	2081	252	49	94	644	933	248	72	2111	37.8	729	263	378	340
OPP	5589	693	1484	2256	295	45	129	533	873	99		2044	33.9	737	266	404	331
N.L.	5523	731	1440	2229	261	36	152	548	971	154	63	2017	36.2	734	261	404	329

The categories that you may not recognize are ROB, which is 'runners on base,' and '%S,' which is 'percentage of runners scored.' RC is for 'runs created,' using the stolen base version. You'll notice that I don't have the number of caught stealing for Cardinal opponents for the season, so in figuring runs created I substituted the league average. Cardinal catchers actually threw out less than 63 runners this past season, so the opponents runs created should actually be a little higher.

If you look at the chart above for a minute you'll notice some startling figures. In 1987 the Cardinals were outhit by their opponents by a margin of 35. They were outhomered by 35 also, which is not surprising, but look at the doubles column. The Cardinals had 252 doubles for the season, slightly below the league average. Their opponents had 295, 43 more than St. Louis. That left the opposition with 2256 total bases. The Cardinals had 2081. What really is amazing, though, is that despite the figures just mentioned the Redbirds outscored their opponents by a total of 105 runs. Runs created suggests that the Cardinals should have been outscored by their opponents by somewhere in the neighborhood of twenty runs (remember the figure above was reached using a substitute 'caught stealing' value). So we're talking about a swing of around 125 runs, an impressive amount.

Two categories that the Cardinals did hold significant advantages over their opponents in were walks and stolen bases. Both of these are contained in the runs created formula so they don't explain how St. Louis managed to pull off this 125 run turnaround. The effects of stolen bases on run scoring are, of course, widely debated and discussed, and while most agree that this effect is minimal (if it exists), the 1987 season totals suggest that the Cardinals probably did indeed benefit from their larceny on the basepaths. But it's the walks first of all that get us on the trail of the 125 runs we're looking for.

The Cardinals walked 111 times more than their opponents in 1987. Adding the walk totals to the 'hits' and 'hit by pitch' totals shows St. Louis with 2111 baserunners, their opponents with 2044. So the Cardinals had 67 more baserunners than their opposition. That's a small but significant difference. Still, with the edge their opponents held in hits, total bases, and extra base hits, giving them a twenty-six point advantage in slugging percentage, you would expect them to score a higher percentage of their baserunners. But the chart above shows that that's not so. It's not even close. The Cardinals scored 37.8% of their runners, about a percentage point and a half above the league average and a startling four percentage points better than their opposition. So what you have is this:

	RUNNERS ON	% SCORED	RUNS SCORED
CARDS	2111	37.8%	798
OPPONENTS	2044	33.9%	693

So we know, in a sense, how the Cardinals did what they did. They got more runners on base than their opponents, and they scored a higher percentage of these runners. A much higher percentage in fact. But we don't know how they managed to do this.

There are several factors which could have contributed, and chances are that all did to some degree. I've already suggested that the Cardinal stolen base total may have been partially responsible. Obviously they were moving baserunners along in some way that their opponents were not, and the slugging percentages above indicate that it wasn't with the bat. So it's quite possible that the Cardinals were making unusually effective use of the stolen base in 1987.

Clutch hitting may have also been partially responsible. We won't have statistics for clutch situations, etc. until the STAT BOOK is published, but there is some evidence that the Cardinals were better at hitting with runners on base and bunching their hits together to get maximum production than their opponents were. Look at the chart below, which shows the number of times scoring one, two, three, etc., runs in an inning in 1987.

RUNS	1	2	3	4	5	6	7	8	9	10	TOTALS
CARDINALS	220	114	49	31	10	2	0	1	1	0	798
OPPONENTS	228	106	48	12	8	1	1	1	0	0	693

You see that in innings of one, two, or three runs the Redbirds and their opponents were basically even. But in innings of four or more runs, the Cardinals scored 203 runs to only 109 for the opposition. They had 45 such innings while allowing only 23. So it does appear that the Cardinals outperformed their opposition in '87 when it came to big innings, suggesting that their hitting was more timely than that of their opponents.

Now don't get the idea that I'm giving all of the credit to the offense. After all St. Louis was slightly above the league average in percentage of runners scored but their opponents were well below the league average. Cardinal pitching did not walk a lot of hitters, and the team was well below the norm in stolen bases allowed. I don't have any official stats at this time but I know that the Cards had about fifteen more double plays than their oopponents. They also committed only 116 errors as compared to 150 by the opposition. There were only 26 games all season in which St. Louis made two or more errors. They were 12-14 in these games. On the other hand, they were 27-14 in the 41 games in which their opponents committed two or more miscues. So there is plenty of evidence that the pitching and defense contributed too. If you don't walk many hitters, don't give up a lot of stolen bases, turn a lot of doubleplays and don't make many errors, you are not going to be susceptable to the big inning. Not unless your pitching is really bad.

There are other minor statistics whose totals were not presented in the first chart. St. Louis had 84 sacrifice hits in '87, their opponents 71. The Cards also led in sacrifice flies, 51-33. I'm not sure of the significance of these two advantages, but it's apparent that the team wasn't hurt in these categories.

So, by scoring so many more of their runners the Cardinals were able to outscore their opponents by 105 runs, all despite the fact that the runs created formula indicates they should have been the ones outscored. They were able to do this, we have speculated, by outperforming their opposition in

several offensive and defensive categories. Once they had accomplished all this, St. Louis had 798 runs. Their opponents had 693. Bring in the pythagorean projection formula.

With the runs scored totals above the Cardinals projected to finish at 92-70. That would have put them in a tie with the Mets. They actually finished at 95-67, three games ahead of New York. The Mets actually projected to 94 wins, so in all cases it seems that it was the Cardinals' year in the National League East. In fact, if you use the runs created in the chart from the beginning of this article, you get a projected record of 80-82. Maybe all those things they say about Whitey are true.

In fact I think it would be interesting if someone were to rate the managers based on runs created and pythagorean projections over the years. I've notice that in the last few years the Cardinals have almost always scored more than the runs created formula says they should have scored. It would be nice to know if there are managers who do this regularly, or if there are those who fall to match their runs created figures on a regular basis. That, however, is a different study. Here we're just looking at the '87 Cardinals, and it appears that the White Rat had a heckuva year.

(the distances varied from year to year) and probably was a major factor in Ashburn's statistics. Although there is a varying effect on other center fielders before, during and after Ashburn, there is evidence to allow me to suggest that a good centerfielder could take advantage of the area to produce high TC/G figures. However, only 77 games per year were played in Connie Mack Stadium. (Of course, a breakdown of home and away chances would be useful, but I lack the resources.) I found there was an effect from park illusion and team impact but no effect from left and right fielder statistics. Granting effect from park illusion and team impact, I did not find any one factor, or combination of factors, that would explain Ashburn's consistently superior TC/G statistics. While I cannot prove that Ashburn was the greatest defensive centerfielder, I can conclude and support the statement that Ashburn was an exceptional centerfielder who clearly was the dominant defensive centerfielder of the 50's in the National League.

PITCHERS' DEFENSIVE WINS AND LOSSES

By Neil Munro

In my article *Batters' Offensive Wins and Losses* in the October, 1984 edition of the Baseball Analyst, I outlined a method for calculating the number of offensive wins that a batter contributed to his team by his offensive production (assuming that his club yielded an average number of runs to the opposition). This time I want to develop a similar calculation for determining the number of defensive wins and losses that a pitcher contributes (assuming that his team's offensive production equals the league average).

To make comparisons between offensive and defensive wins meaningful, I assign a total of 162 defensive games to a team for a full season. Since I used this number of total team offensive games, my first assumption considers offensive and defensive contributions to be of equal value to a team's success over the course of a full season. While I have read many articles which argue that either offense or defense (usually the latter) contributes to more than 50 percent of a team's final won-lost record, I firmly believe that a 50-50 ratio of offense to defense is the only one which makes sense for a game in which both sides have exactly the same opportunity to score runs - namely 27 outs. I could be persuaded that the defense might play a more significant role in a game such as football, where it can strongly influence the time which the opposition has to operate its offense or the position on the field where the other team takes possession of the ball. No such advantage is accorded the defense in baseball however..

I have less confidence in applying my second assumption and that deals with the relative values that pitching and fielding are to be assigned out of the total 162 defensive games. Arbitrarily I awarded pitching two-thirds or 108 defensive games and fielding one-third or 54 defensive games out of the 162 total. I suspect that a pitching staff consisting mostly of power pitchers who accumulate a large number of strikeouts, should be assigned more defensive games than a staff which which relies more on ground ball outs for it's success. This difference in value is probably not large and may well average out over the course of a pitcher's career. In any case I shall outline the method by which I have divided up those 108 defensive games among a team's pitching staff and then use the results to compare the top season and career pitching records over that last 65 years.

I begin by calculating a pitcher's Defensive Won-Lost Percentage (DWL%), by using a modified version of the Pythagorean method for finding the Offensive Won-Lost Percentage (OWL%). In this case a pitcher's runs allowed per game are compared to the league average where a game consists of 9 innings pitched. The actual formula is:

$$DWL\% = \frac{(R/G)^2}{(R/G)^2 + (L/G)^2} \qquad (1)$$

where R/G represents the runs allowed by the pitcher per nine innings pitched and L/G represents the average runs scored by all teams per nine innings played in the league during the season.

For the figures listed in Tables I and II below, the runs allowed by a pitcher are adjusted for the ball park in which he works. The figures in Tables III and IV are have no ball park adjustments made in the calculations. I should mention that a pitcher's ERA can be used in comparison to the league ERA in exactly the same way, however I chose to base the calculations on runs allowed rather than earned runs allowed. After all the final outcome of each game is decided on the basis of runs and not on earned runs.

Next I attempted to build in an adjustment to balance out the advantage that a relief pitcher has in the number of runs (or earned runs) allowed in his record. This advantage occurs because he often enters a game in the middle of an inning in a situation where he needs only one or two outs to get out of the inning without having any runs charged against him. This advantage has been studied to some extent by Sabermetricians. In his article *Relief Pitcher's ERA Advantage* in the 1977 Baseball Research Journal, Bill James concluded that a relief pitcher's ERA should be adjusted upward by about .20 for accurate comparisons with starting pitcher's ERA's. In the book *The Hidden Game of Baseball* by Thorn and Palmer, Pete Palmer calculates the potential runs scored for the bases empty as .454 runs for zero outs, .249 runs for one out and as .095 runs for two outs. In determining the ERA of a relief pitcher, the case of no runners on base applies to every game that the pitcher enters because any runners on board at that time will be charged to some previous pitcher if they should happen to score. Thus a good adjustment to the relief pitcher's ERA could be calculated by determining the number of occassions when he entered the game with none, one or two outs in the inning and averaging these on the basis of part-innings pitched.

A further indication of this difference in ERA between starting and relief pitchers can be found using the bountiful statistics provided in *The 1985 Elias Baseball Analyst*. For 1984 the cumulative ERA's of all relief pitchers was 3.61 and for starting pitchers was 4.16 in the American League, and in the National League the average ERA of starters was .42 more per team than for relief pitchers. For my calculations I have increased the runs allowed per game by .21 for the innings pitched in relief and decreased the runs allowed per game by .09 for innings pitched in games started for the 1984 season. This difference of .30 runs per nine innings, adjusted in this way, balances to keep the league DWL% at .500 for all pitchers, since starters accounted for approximately seventy percent of all innings pitched in 1984. For years prior to 1984 I kept the .30 runs per game overall difference the same but changed the adjustments slightly to account for the fact that starting pitchers accounted for more than seventy percent of the innings pitched.

Finally I tried to devise a system for determining the number of "defensive games" assigned to a pitcher that would more properly account for the importance of the relief ace than simply using nine innings pitched as representing one game. To do this I based the number of defensive games on the number of times that a pitcher started or finished a game as well as on the number of innings that he pitched.

For this one instance, finished games includes the number of complete games pitched and the number of games finished in relief. I used the number of games finished by a relief pitcher as a factor rather than saves for two reasons. A relief pitcher on a winning ball club generally has more opportunity to accumulate saves than does one on a losing club, and the DWL% method is supposed to calculate a pitcher's record on the assumpption that his team always scores an average number of runs. Secondly, the sum of games started, complete games and games finished will always equal 324 for 162 games played, and this constant figure along with the relatively constant number of innings pitched by a ball club, can easily be converted to the required total of 108 defensive games for pitchers on the team.

The following formulas are used to determine the number of defensive games (DG) awarded to a pitcher for a season, and the corresponding number of defensive wins (DW) and losses (DL) that he made, based on his own adjusted DWL%. As indicated by formula (2), I allowed the number of innings pitched to be of equal value to the number of games started and finished by a pitcher, in calculating his total defensive games. Both the sum of GS + CG + GF and the term 2xIP/9 will be approximately 324 for any team over a full 162 games. Consequently DG will be the 108 figure arbitrarily selected earlier.

$$DG = \frac{GS + CG + GF + (2xIP)/9}{6} \qquad (2)$$

$$DW = DWL\% \times DG \qquad (3)$$

$$DL = DG - DW \qquad (4)$$

where GS, CG, GF and IP represent games started, complete games, games finished and innings pitched respectively

Using this method the number of defensive games awarded to either a starting pitcher or to the relief ace of the staff will be very nearly the same, which I think actually does approximate their real value to the team. Also the number of defensive games awarded a pitcher is almost the same as the offensive games given to a regular position player by the method which I outlined in my previous article in the Baseball Analyst. A pitcher starting 36 games, with 12 complete and 270 innings pitched, a bullpen artist with no starts who finishes 76 games while pitching 144 innings and a batter who makes 684 plate appearances are all credited with 18 defensive or offensive games.

The lists of top pitchers for 1984 and the best season and career pitching performances since 1920, as determined by this method, follow. The 1920 cutoff date was used for a couple of reasons. Generally, the data for games finished by pitchers before 1920 is not available without going through the box scores. Also prior to the advent of the lively ball in 1920 (actually 1921 in the N.L.) the top pitchers had so many innings pitched with such a large number of complete games that comparisons with modern players are almost meaningless.

I will illustrate the actual calculation of the DWL% using Rick Mahler's 1984 season with the Braves as an example. Mahler had 222 total innings pitched (TIP) of which 16 were in relief (RIP). He made 29 starts, had 9 complete games and finished 1 game in relief while giving up 86 runs (R). His adjusted runs per 9 innings (AR/9I) is thus given by:

$$AR/9I = \frac{R \times 9}{IP} - \frac{[(TIP - RIP) \times .09] - (RIP \times .21)}{TIP}$$

$$= \frac{86 \times 9}{222} - \frac{[(222 - 16) \times .09] - (16 \times .21)}{222} = 3.418$$

This adjusted runs per game figure is multiplied by Atlanta's park factor and then used in formula (1) to determine his DWL%. This turns out to be .612 for Mahler. Since he is determined to have 14.7 defensive games by formula (2), he ends up with a record of 9.0 DW and 5.7 DL by formulas (3) and (4). His difference of defensive wins minus losses of 3.3 does not quite make the top 10 in the N.L. for 1984 (he is twelfth actually). The top 10 for each league are shown.

TABLE I - 1984 N.L. LEAGUE LEADERS IN DEFENSIVE PITCHING WINS ABOVE .500

PLAYER	TEAM	DWL%	DW - DL	DIFFERENCE
Bruce Sutter	S.L.	.796	11.98 - 3.06	8.92
Rick Rhoden	Pitt	.672	10.31 - 5.02	5.28
Dwight Gooden	N.Y.	.661	9.52 - 4.89	4.63
Steve Bedrosian	Atla	.733	6.18 - 2.35	3.94
Alejandro Pena	L.A.	.646	8.65 - 4.73	3.91
Charlie Lea	Mont	.629	9.21 - 5.44	3.79
Larry McWilliams	Pitt	.621	9.36 - 5.72	3.64
Bill Dawley	Hous	.709	5.76 - 2.37	3.39
Orel Hershiser	L.A.	.626	8.37 - 4.99	3.38
Rick Sutcliffe	Chic	.665	6.70 - 3.37	3.33

TABLE II - 1984 A.L. LEAGUE LEADERS IN DEFENSIVE PITCHING WINS ABOVE .500

PLAYER	TEAM	DWL%	DW - DL	DIFFERENCE
Willie Hernandez	Detr	.813	13.45 - 3.08	10.36
Dave Stieb	Toro	.734	12.89 - 4.67	8.22
Dan Quisenberry	K.C.	.705	11.26 - 4.70	6.55
Bert Blyleven	Clev	.685	11.23 - 5.18	6.06
Doyle Alexander	Toro	.670	11.74 - 5.79	5.95
Mike Boddicker	Balt	.660	11.89 - 6.13	5.76
Frank Viola	Minn	.645	10.99 - 6.05	4.95
Doug Corbett	Calf	.793	6.59 - 1.72	4.87
Bud Black	K.C.	.642	10.71 - 5.97	4.74
Dave Righetti	N.Y.	.689	8.54 - 3.86	4.68

I was a little surprised to see the extent that Willie Hernandez ranked ahead of all other pitchers last year. In fact he produced the second best record for a relief pitcher in history in terms of DW - DL. Only John Hiller with the Tigers in 1973 had more defensive wins above .500 with a record of 12.6 DW and 2.0 DL. There is no doubt in my mind that Hernandez was the legitimate winner of the Cy Young Memorial Award for 1984. The most difficult statistic to find for pitchers for these calculations, is the number of innings pitched in relief. For pitchers like Steve Carlton (who never pitch in relief) or Bruce Sutter (who never start) this is no problem, but I had to determine most of this data by reading through all of the box scores for the 1984 season. This information was not even in *The 1985 Elias Baseball Analyst.*

The next list contains the top fifteen single season records since 1920. The number of innings pitched in relief is available in the 1969 editiion of the *MacMillan Baseball Encyclopedia* for years up to 1968. Sadly, MacMillan chose to drop this information from all subsequent editions of their encyclopedia so the data had to be found by looking through the players' official day-by-day record sheets at Cooperstown. I did this only for pitchers with the very best records since 1968 and simply estimated the figures for all others. Since the 1920 season, there have been only 29 pitchers who, on 41 separate occassions managed to produce a difference of 10 defensive wins minus losses in a season. That Gibson should top the list by such a large amount seems to me to be perfectly reasonable. It is rare for any pitcher to produce a season DWL% mark of .800 or better. A few relief pitchers have DWL% marks over .900 for years when they did not pitch many innings. Walter Johnson's 1913 DWL% record of .880 is the best for any starter. The records in the last two tables are not adjusted for ball park effects.

TABLE III - SEASON LEADERS IN DEFENSIVE PITCHING WINS MINUS LOSSES

PLAYER	YEAR	R/GM	DWL%	OW - OL	DIFFERENCE
Bob Gibson	1968	1.37	.863	18.7 - 3.0	15.7
Sandy Koufax	1966	1.98	.810	18.9 - 4.4	14.5
Dolf Luque	1923	2.47	.795	18.6 - 4.8	13.8
Steve Carlton	1972	2.10	.775	19.1 - 5.5	13.6
Bob Feller	1946	2.38	.744	20.5 - 7.1	13.4
Carl Hubbell	1933	1.99	.800	17.9 - 4.5	13.4
Dean Chance	1964	1.75	.843	16.4 - 3.1	13.3
Carl Hubbell	1936	2.35	.800	17.7 - 4.4	13.3
Sandy Koufax	1963	1.89	.803	17.3 - 4.2	13.1
Lefty Grove	1931	2.59	.798	17.4 - 4.4	13.0
Red Faber	1921	2.86	.762	18.9 - 5.9	13.0
Hal Newhouser	1945	2.04	.785	17.9 - 4.9	13.0
Pete Alexander	1920	2.32	.744	19.8 - 6.8	13.0
Tom Seaver	1971	1.84	.819	16.4 - 3.6	12.8
Vida Blue	1971	2.03	.785	17.3 - 4.7	12.6

R/GM represents the average number of runs allowed per nine innings pitched, adjusted for innings in relief. The DIFFERENCE column is simply DW subtract DL.

Finally, in Table IV, I list the top careers in defensive wins minus losses. I considered only the seasons that a pitcher played since 1920 in determining his career record so that Johnson and Alexander do not make the list. For interest, I have also given the career records of the five pitchers since 1900 who would have made the top ten. For these five, their games finished are estimated for every year before 1920 that they pitched.

TABLE IV - CAREER LEADERS IN DEFENSIVE PITCHING WINS MINUS LOSSES

RANK	PLAYER	R/GM	DWL%	DW - DL	DIFFERENCE	CLR9I
1	Lefty Grove	3.61	.674	197.0 - 95.4	101.6	5.112
2	Warren Spahn	3.39	.630	239.2 - 140.7	98.5	4.383
3	Tom Seaver	2.97	.659	196.1 - 101.5	94.6	4.068
4	Jim Palmer	3.09	.652	176.6 - 94.2	82.4	4.164
5	Carl Hubbell	3.42	.649	169.5 - 91.9	77.6	4.602
6	Bob Feller	3.60	.635	176.3 - 101.5	74.8	4.684
7	Whitey Ford	3.08	.664	147.6 - 74.7	72.9	4.313
8	Bob Gibson	3.21	.628	169.6 - 100.6	69.0	4.068
9	Gaylord Perry	3.50	.587	216.8 - 152.4	64.4	4.090
10	Steve Carlton	3.36	.598	195.3 - 131.5	63.8	4.057
11	Robin Roberts	3.69	.591	197.6 - 136.6	61.0	4.389
12	Don Sutton	3.39	.599	183.7 - 122.8	60.9	4.098
13	Hoyt Wilhelm	3.26	.637	130.0 - 74.0	56.0	4.232
14	Sandy Koufax	3.06	.666	112.2 - 56.4	55.8	4.195
15	Billy Pierce	3.55	.614	147.8 - 92.8	55.0	4.431
16	Dazzy Vance	3.74	.629	133.7 - 79.0	54.7	4.816
17	Bert Blyleven	3.26	.617	144.0 - 89.4	54.6	4.123
18	Don Drysdale	3.32	.611	145.6 - 92.5	53.1	4.131
19	Juan Marichal	3.33	.605	150.5 - 98.5	52.0	4.041
20	Lefty Gomez	3.87	.644	116.0 - 64.0	52.0	5.155

CAREER RECORDS OF TOP PITCHERS BEFORE 1920 SEASON (RANK FOR ALL PITCHERS)

RANK	PLAYER	R/GM	DWL%	DW - DL	DIFFERENCE	CAL9I
1	Walter Johnson	2.86	.686	301.7 - 137.9	163.8	4.176
2	Cy Young	3.85	.641	351.0 - 196.5	154.5	5.156
3	Pete Alexander	3.17	.653	246.5 - 131.1	115.4	4.258
4	Christy Mathewson	3.01	.647	229.5 - 125.0	104.5	4.017
9	Eddie Plank	3.07	.628	199.2 - 117.9	81.3	3.972

The column under CLR9I represents the league average number of runs scored per nine innings during the course of that pitcher's career, weighted on the basis of the number of innings pitched each year. The years from 1929 to 1939 in the American League represent by far the period of greatest run production by either league during this century, and while the batting records of the players of this era are generously inflated, the pitching records of Lefty Grove and others are all the more impressive. R/GM represents the adjusted runs allowed per nine innings, over the pitcher's career.

(Continued on page 20, bottom of page.)

FORMULAS : AWARDS

One thing Bill James does in the annual Abstracts is attempt to formulate voting opinion, on such matters as who will make the Hall of Fame. In this article I'll propose a few formulas for predicting who might win various post-season awards. I've developed them by hit-and-miss efforts over the past few seasons. These formulas do NOT intend to say who most DESERVES to win an award, and they do not attempt to imitate whatever thinking process goes on in a sportswriter's mind (I doubt that Peter Gammons of Sports Illustrated sits down with his calculator to figure how to cast his MVP vote). The formulas try to express what a group opinion is, in a hopefully simple mathematical form. Because they are usually fairly accurate, I hope that they help us determine what the media and fans in general perceive to be the most important assets of the best batters, pitchers, or managers. I'll place some observations concerning this last area, media opinion, at the end of each section of the article.

MVP

The basic MVP formula is : 2 * (batting average) + 4 * (home runs) + (RBIs) + (stolen bases) + bonus of 40 pts for being on a division winner.

There are a few adjustments that can be made to increase the formula's accuracy (and complexity):

- Drop the 40 point bonus rule, and add these others:
- Figure a team score by subtracting games behind from team wins, and add 20 for the division winning team. In 1986, the Red Sox get 95-0+20= 115, and the Yankees get 90-5= 85.
- Add the (team score) * .8 to a player's total if the player played catcher, second base, or shortstop; add (team score) * .5 for everybody else.
- Add points by the equation (RBI + SB/2 - 80) * (team score - 60) / 40. If the terms on either side of the multiplier are negative, ignore the equation.

These additional rules award points to players who make key contributions to pennant contenders; "key contributions" in the voters' eyes being things like driving in oodles of runs or playing an important defensive position.

In order to include pitchers in the MVP voting, take the Cy Young formula (which I'm about to propose on the next page), and A) multiply the result by 5, B) add 1 point for each save, and C) add 800 for AL pitchers, 700 for NL pitchers.

The following is a table showing a comparison of actual voting results (on the left) with the formula's predicted results (on the right):

86 NL		86 AL		85 NL		85 AL	
ACTUAL	PREDICT	ACTUAL	PREDICT	ACTUAL	PREDICT	ACTUAL	PREDICT
Schmidt	Schmidt	Clemens	Clemens	McGee	McGee	Matngly	Matngly
G Davis	Bass	Matngly	Matngly	Parker	Parker	Brett	Brett
Herndz	E Davis	Rice	Rice	Guerero	Guerero	Hndrson	Hndrson
Carter	Raines	?	Carter	Gooden	Gooden	Boggs	Murray
Parker	Carter	?	Puckett	Herr	Herr	Murray	Sabrhgn

MVP

A few notes about the MVP formula:

- It seems to be changing over time. Every year I make small adjustments; and every year I have to weight RBIs a little higher.
- If you want to predict 1987 results, probably you'll have to add about 50 points to all pitchers' totals, since ERAs have shot upward.
- Some people's reputations affect their standing, beyond what statistics can measure. A positive example of this would be Keith Hernandez, for whom you have to add about 40 points. Conversely, subtract about 25 points for Darryl Strawberry.
- What does this say about the people who do the voting? Well, you probably suspected that drawing walks and winning gold gloves didn't count for much. Obviously, players are evaluated in the light of their team's success, particularly for middle infielders and catchers. And, looking at last year's prediction fiasco in the NL, it appears that the formula places players with a multitude of skills too high (Bass, E Davis, Raines), and underrates those with one very visible superior quality. Along this line, one serious error that does not appear in the previous table is that in 1986 I foresaw Rickey Henderson finishing in the top 12; he did not appear on anyone's ballot.
- What could be done to improve the formula? Hmmm... I suspect a term is needed to upgrade the prediction for those players that dominate in one category (Coleman, Boggs). Possibly adding points for leading the league in different categories would work. Also, one could modify the team score to reflect how the team finished where it did (September charge or slump). I guess it depends on how big a formula you want to have.

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CY YOUNG

The Cy Young formula is : 4 * Wins - 2 * Losses + Shutouts - 10 * ERA + Saves - (team wins) / 3 + bonus of 8 pts for being on a division winner.

- What does this say about the people who do the voting? An interesting point in comparing the Cy Young and MVP awards is that frequently a pitcher will receive consideration for compiling a good record with a bad team, like Valenzuela in 1986. This is the reason for subtracting the term "(team wins) / 3". On the other hand, did you notice any sportswriters voting for Harold Baines because he drove in 88 runs for a team that only scored 644 ? Curious double standard, I would say. Of course, pitching for a division winner still helps a pitcher's cause also, and so the result is that in 1986 both Mike Witt and Teddy Higuera finished ahead of Jack Morris, in spite of the fact that Morris won 21 games. Witt got the "played an important role in winning the division" vote, and Higuera got the "poor guy, he pitched for the Brewers" vote.

- What could be done to improve the formula? Probably by adding bonus points for leading the league in ERA, innings, KOs, and CGs, and for tossing a no-hitter. And who knows? - in a few years, we may have to add points for quality starts.

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MANAGER OF THE YEAR

Manager of the year points = (team wins) - (games behind) + bonus of 10 pts for winning the division - (one half of last year's wins) - 2 * (predicted finish when the year began, in terms of rank in the division).

For "predicted finish", the Sporting News writers' poll could be used. Please don't use Sports Illustrated or Sport Magazine. In 1986, the formula foresaw McNamara (BOS) easily over Mauch (CAL) and Valentine (TEX), and it had Johnson (NY) and Lanier (HOU) in a virtual tie, with Craig (SF) a distant third.

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Formula for predicting the firing of a Yankee manager: An interesting thought, but not to be taken seriously.

If anybody has any other ideas on formulating baseball stats or voting, feel free to drop me a line.

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The top career DWL% for pitchers are much lower than the best career DWL% for batters even though the average must be .500 for either one. This probably occurs because a position player can exhibit defensive skills, particularly the middle infielders and catchers, that can keep them in the lineup on a regular basis even though they may be far below the league average on offense. Also the pitchers' batting records help to lower the league offensive averages which other batters are compared to, except for the years since 1973 in the American League, of course. However, it would appear that regardless of the batting or fielding skills demonstrated by a pitcher, he just doesn't get much opportunity to accumulate a pitching record if he can't get batters out on a regular basis.

I believe that this system of calulating a pitcher's DWL% and DW minus DL makes for a good comparison between relief pitchers and starting pitchers and also between pitchers and position players in general. Now all that remains is to assign the defensive won-lost records for the remaining 54 defensive games to the nine fielders on the ball club. I must say that I don't presently have a system for this calculation, but I am working on developing one.