

Rockies 2017 - Week #6

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Trevor Story: Colorado Rockies shortstop.

“Baseball is the only field of endeavor where a man can succeed three times out of ten and be considered a good performer.” – Ted Williams

Table 1: NL West Standings

Tm	W	L	W-L%	GB
Colorado Rockies	24	15	.615	–
Los Angeles Dodgers	22	16	.579	1.5
Arizona Diamondbacks	21	18	.538	3.0
San Francisco Giants	15	24	.385	9.0
San Diego Padres	14	25	.359	10.0

Table 2: Current Rockies Results as of 2017-05-15

Wins	Losses	Win.Pct	Runs	Runs.Ag	Predicted Season Wins
24	15	61.538	187	180	84

Week #6

The Rockies had a better than even week since Monday, May 1 with seven wins and five losses. The Dodgers came to town and hand us two losses before leaving. However, by the Sunday (May 14), the Rox are still tops in their division with a 25 & 15 record.

Personally, I had a pretty busy week and weekend, so the **Featured Graphics** section will get short shrift this week. I have been working on summarizing Carlos Gonzalez's batting performance for the years in his MLB career leading up to this season. The premise is that Cargo takes some time each season to hit his stride and that this season is no difference. The hope being that he will be hitting in MVP territory before the end of the year, if not sooner. Anyway, if I get time to refine the graphics this week while in Nashville, I just might be able to include this in next week's newsletter.

For this week, I decided to appeal to your sense of wonder when you first encountered logarithms in Algebra. We present a graph of log data corresponding to a particular statistic belonging to Cargo. Your job is to figure what the real value of Cargo's "performance" in this instance for 2009 and 2017. Should be fun!

Here is a synopsis of what is included this week.

- **Featured Graphics**
 - A Trip Down Mathematics Memory Lane and A Quiz
- Colorado Rockies Dashboards
 - Rockies Win/Loss Graphs for 2017 and 2007
 - National and American League Standings
 - Game-by-Game Results of the past week.
 - **Pythagorean Theorem** prediction of the number of wins.
 - Batting Statistics
 - Pitching Statistics

Most of the source data for this article can be found at URL <http://baseball-reference.com>.

Let me know what other special interest statistics you might like to see. Remember to refer to the Glossaries at the end of the document if unfamiliar with one or more of the statistic abbreviations in the tables.

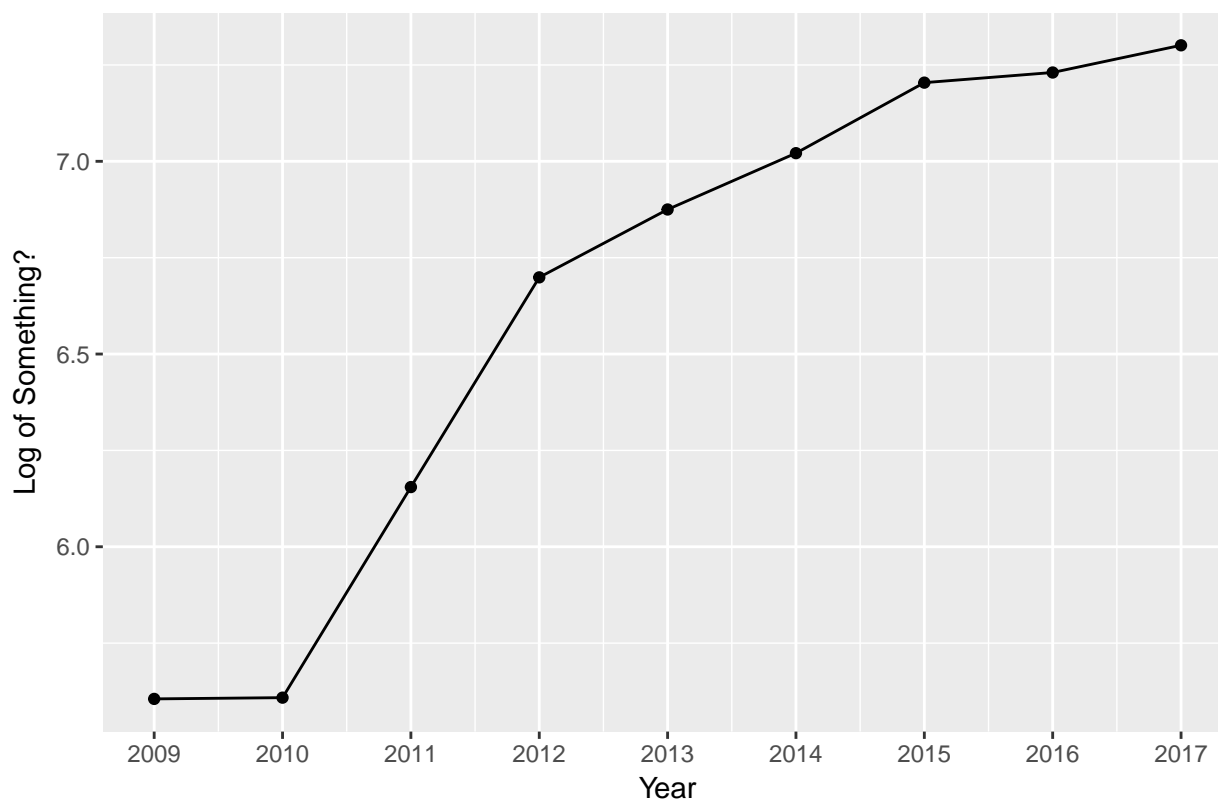
Featured Graphics

A Trip Down Mathematics Memory Lane and A Quiz

Do you remember taking Algebra? I remember it as magic, linear equations, quadratic equations, polynomials, and, of course, logarithms. Logarithms, especially were magic to me: take the logarithm of two numbers, take these new values and add them together, take the antilogarithm of the result and you got the **product** of the original two values! Wow, multiplication by adding! The difficulty comes when you have to look up the antilogs from tables. We used the **CRC Standard Mathematical Tables and Formulae**. The so called **magic** of the process wore off after performing a handful of these multiplications, looking up the antilog, interpolating between two values. Boring, but a powerful concept, just the same.

Following is a graph of logarithmic values based on a metric for Carlos Gonzalez in last week's article. Your mission is to identify the metric and the **real** lowest and highest value in the graph below.

Carlos Gonzalez Mystery Statistic



Have you guessed what represented is here? It is all about **antilogs**. Read further to get more hints.

Solve for x in the following equation to get the real value of a statistic for Cargo's **2017 season**.

$$\log_{10}(x) = 7.301030$$

Solve for x in this equation to get the value of this unknown statistic for Cargo's **2009 season**.

$$\log_{10}(x) = 5.605305$$

Here is another clue:

Take the antilog (base 10) of each side, yielding, for the latter equation above:

$$x_{2009} = 10^{5.605305}$$

Likewise, the first equation resolves to:

$$x_{2017} = 10^{7.301030}$$

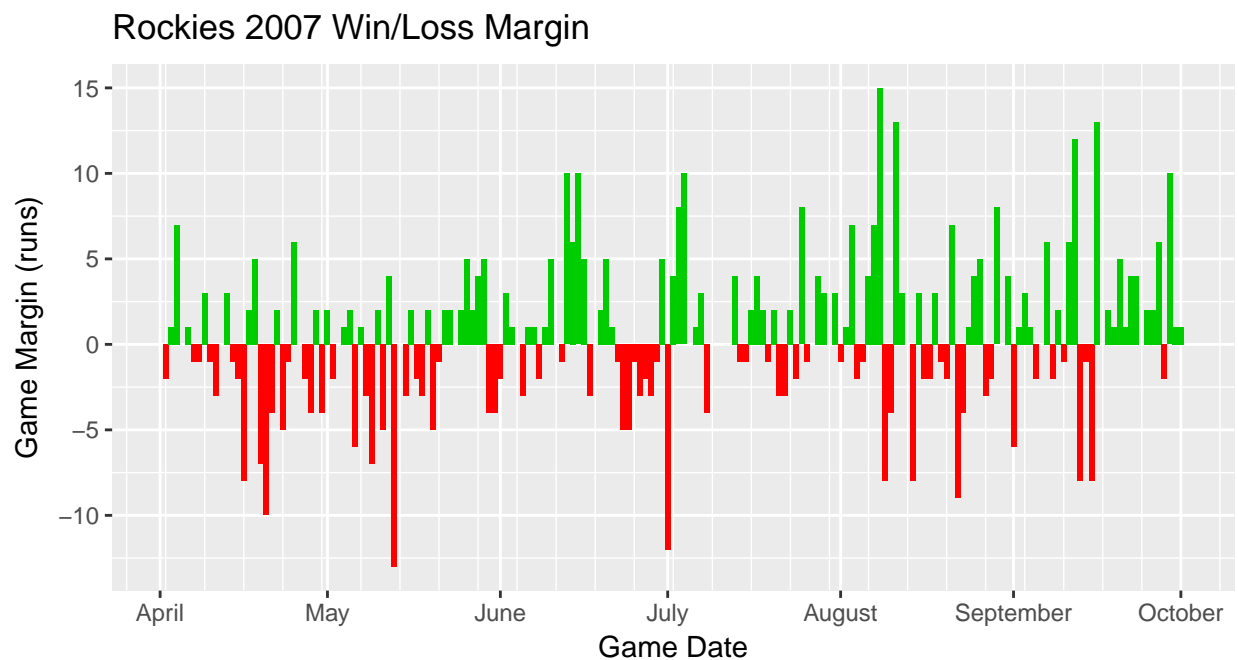
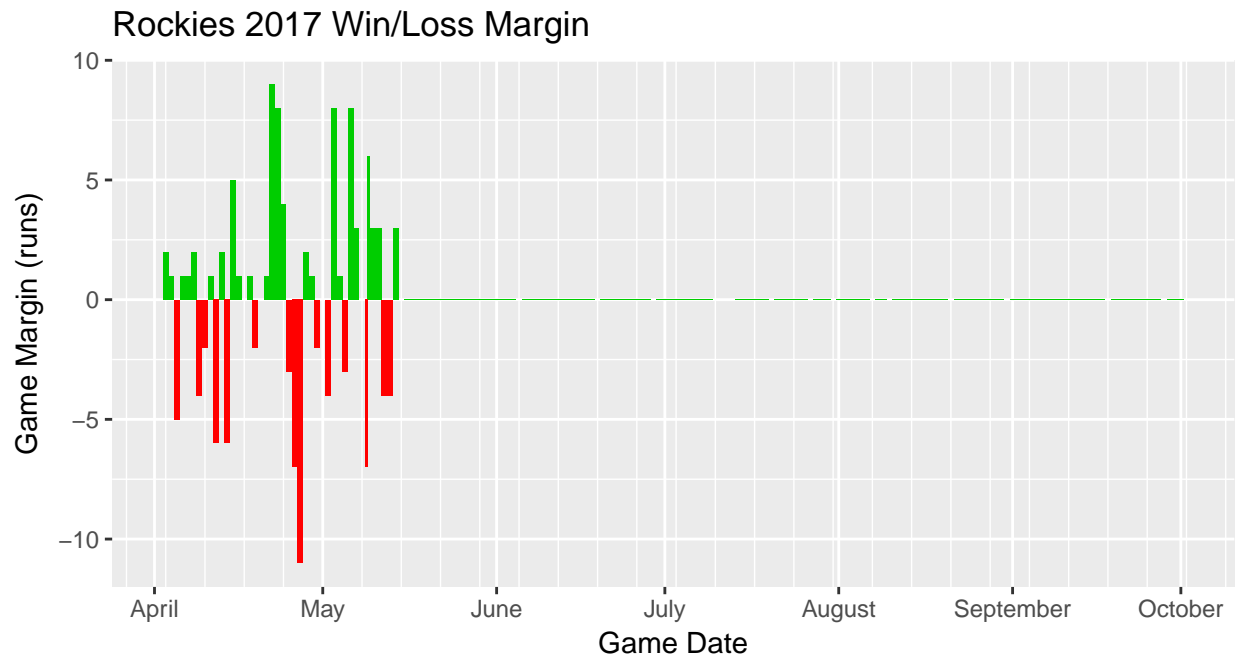
Send me your answers in email or printed on a crisp hundred-dollar bill. I'll let everyone know our winners next week. Just send your answers to jdreed@q.com. No need to copy all!

Rockies Dashboard

Win Loss Margin

One of the many ways to visualize a teams performance is to show wins and losses as the margin of the win (positive) or loss (negative). In the graphs below, we show the current season performance. For emphasis, wins are displayed as green (above the zero) and losses as red (below).

Following the current season's graph, I have included the Win/Loss margin chart for our benchmark season of 2007 when the Rockies won the National League pennant.



National League Standings

Table 3: NL East Standings

Tm	W	L	W-L%	GB
Washington Nationals	24	13	.649	–
New York Mets	16	20	.444	7.5
Philadelphia Phillies	14	21	.400	9.0
Miami Marlins	14	22	.389	9.5
Atlanta Braves	13	21	.382	9.5

Table 4: NL Central Standings

Tm	W	L	W-L%	GB
St. Louis Cardinals	21	15	.583	–
Milwaukee Brewers	21	17	.553	1.0
Cincinnati Reds	19	18	.514	2.5
Chicago Cubs	18	19	.486	3.5
Pittsburgh Pirates	16	22	.421	6.0

Table 5: NL West Standings

Tm	W	L	W-L%	GB
Colorado Rockies	24	15	.615	–
Los Angeles Dodgers	22	16	.579	1.5
Arizona Diamondbacks	21	18	.538	3.0
San Francisco Giants	15	24	.385	9.0
San Diego Padres	14	25	.359	10.0

American League Standings

Table 6: AL East Standings

Tm	W	L	W-L%	GB
New York Yankees	22	13	.629	–
Baltimore Orioles	22	14	.611	0.5
Boston Red Sox	19	18	.514	4.0
Tampa Bay Rays	19	21	.475	5.5
Toronto Blue Jays	17	21	.447	6.5

Table 7: AL Central Standings

Tm	W	L	W-L%	GB
Minnesota Twins	19	15	.559	–
Cleveland Indians	19	17	.528	1.0
Detroit Tigers	18	18	.500	2.0
Chicago White Sox	17	18	.486	2.5
Kansas City Royals	16	21	.432	4.5

Table 8: AL West Standings

Tm	W	L	W-L%	GB
Houston Astros	26	12	.684	–
Texas Rangers	19	20	.487	7.5
Los Angeles Angels of Anaheim	19	21	.475	8.0
Seattle Mariners	17	21	.447	9.0
Oakland Athletics	16	21	.432	9.5

Rockies Game-by-Game Schedule/Results

Gm#	Day	Date	H/A	Opp	W/L	R	RA	Win	Loss	Save	D/N	Streak
1	Mon	Apr 3	A	MIL	W	7	5	Estevez	Marinez	Holland	D	+
2	Tue	Apr 4	A	MIL	W	6	5	Anderson	Davies	Holland	N	++
3	Wed	Apr 5	A	MIL	L	1	6	Peralta	Chatwood	Feliz	N	-
4	Thu	Apr 6	A	MIL	W	2	1	Dunn	Feliz	Holland	D	+
5	Fri	Apr 7	H	LAD	W	2	1	Freeland	Ryu	McGee	D	++
6	Sat	Apr 8	H	LAD	W	4	2	Dunn	Kershaw	Holland	N	+++
7	Sun	Apr 9	H	LAD	L	6	10	Maeda	Anderson		D	-
8	Mon	Apr 10	H	SDP	L	3	5	Diaz	Chatwood		N	-
9	Tue	Apr 11	H	SDP	W	3	2	Senzatela	Diaz	Holland	N	+
10	Wed	Apr 12	H	SDP	L	0	6	Lee	Freeland		D	-
11	Thu	Apr 13	A	SFG	W	3	1	Rusin	Bumgarner	Holland	N	+
12	Fri	Apr 14	A	SFG	L	2	8	Cueto	Anderson		N	-
13	Sat	Apr 15	A	SFG	W	5	0	Chatwood	Moore		D	+
14	Sun	Apr 16	A	SFG	W	4	3	Senzatela	Samardzija	Holland	D	++
15	Tue	Apr 18	A	LAD	W	4	3	Rusin	Ryu	Holland	N	+++
16	Wed	Apr 19	A	LAD	L	2	4	Kershaw	Anderson	Jansen	N	-
17	Fri	Apr 21	H	SFG	W	6	5	Chatwood	Cueto	Holland	N	+
18	Sat	Apr 22	H	SFG	W	12	3	Senzatela	Moore		N	++
19	Sun	Apr 23	H	SFG	W	8	0	Freeland	Samardzija		D	+++
20	Mon	Apr 24	H	WSN	W	8	4	Estevez	Romero		N	++++
21	Tue	Apr 25	H	WSN	L	12	15	Romero	Marquez		N	-
22	Wed	Apr 26	H	WSN	L	4	11	Roark	Chatwood		N	-
23	Thu	Apr 27	H	WSN	L	5	16	Gonzalez	Senzatela		D	—
24	Fri	Apr 28	A	ARI	W	3	1	Freeland	Ray	Holland	N	+
25	Sat	Apr 29	A	ARI	W	7	6	Estevez	Rodney	Holland	N	++
26	Sun	Apr 30	A	ARI	L-wo	0	2	Delgado	Lyles		D	-
27	Tue	May 2	A	SDP	L	2	6	Cahill	Chatwood		N	-
28	Wed	May 3	A	SDP	W	11	3	Senzatela	Weaver		N	+
29	Thu	May 4	A	SDP	W	3	2	Qualls	Hand	Holland	D	++
30	Fri	May 5	H	ARI	L	3	6	Greinke	Marquez	Rodney	N	-
31	Sat	May 6	H	ARI	W	9	1	Anderson	Corbin	Rusin	N	+
32	Sun	May 7	H	ARI	W	5	2	Chatwood	Walker	Holland	D	++
33	Tue	May 9 (1)	H	CHC	W	10	4	Senzatela	Arrieta		D	+++
34	Tue	May 9 (2)	H	CHC	L	1	8	Lackey	Freeland		N	-
35	Wed	May 10	H	CHC	W	3	0	Marquez	Hendricks	Holland	D	+
36	Thu	May 11	H	LAD	W	10	7	Hoffman	Ryu	Holland	N	++
37	Fri	May 12	H	LAD	L	2	6	Kershaw	Chatwood		N	-
38	Sat	May 13	H	LAD	L	0	4	Wood	Anderson		N	-
39	Sun	May 14	H	LAD	W	9	6	Senzatela	Urias	Holland	D	+

The Rockies current record is 24 Wins and 15 Losses. So far, the Rockies have scored 187 runs and have had 180 runs scored against them.

Pythagorean Win-Loss Theorem

$$predictedW\% = \frac{R^k}{R^k + RA^k}$$

Using the commonly used values of k, the Rockies predicted wins for the 2017 are shown in the table below. Remember this statistic will vary widely over the course of the season.

Table 10: Predicted Wins for Entire 2017 Season

Wins (k=1.81)	Wins (k=1.83)	Wins (k=2.00)
84	84	84

2017 Colorado Rockies Batting Statistics (non-pitchers)

Table 11: Rockies Batting Statistics (1 of 2).

Rk	Pos	Name	Age	G	AB	R	H	2B	3B	HR	RBI	SB	CS	BB
1	C	Garneau	29	22	68	5	14	7	0	1	6	0	0	4
2	1B	Reynolds	33	38	135	26	44	5	0	12	33	1	1	17
3	2B	LeMahieu	28	39	149	17	44	6	1	1	11	2	2	16
4	SS	Story	24	33	111	18	20	6	0	6	15	1	0	17
5	3B	Arenado	26	38	147	27	44	13	1	9	27	1	0	11
6	LF	Parra*	30	31	100	12	27	2	0	3	13	0	1	3
7	CF	Blackmon*	30	38	155	25	48	9	6	8	27	2	2	9
8	RF	Gonzalez*	31	34	127	14	27	7	0	2	11	0	0	13
9	LF	Desmond	31	14	56	9	17	2	0	2	7	2	1	1
10	C	Wolters*	25	17	52	12	18	3	1	0	3	0	0	3
11	UT	Valaika	24	20	41	8	11	4	0	3	9	0	0	2
12	UT	Amarista*	28	19	35	6	11	3	0	1	6	0	0	1
13	OF	Cardullo	29	15	28	2	4	0	0	0	3	0	0	3
14	C	Hanigan	36	6	23	2	7	0	0	1	6	0	0	1
15	IF	Adames#	25	12	13	1	0	0	0	0	0	0	0	1
16	LF	Tapia*	23	4	8	0	0	0	0	0	0	0	0	1

Table 12: Rockies Batting Statistics (2 of 2).

Rk	Pos	Name	Age	SO	BA	OBP	SLG	OPS	OPS+	TB	GDP	HBP	SH	SF	IBB
1	C	Garneau	29	24	.206	.260	.353	.613	50	24	1	1	1	0	0
2	1B	Reynolds	33	33	.326	.399	.630	1.028	148	85	5	0	0	1	0
3	2B	LeMahieu	28	23	.295	.367	.369	.737	84	55	3	1	0	0	0
4	SS	Story	24	48	.180	.289	.396	.685	67	44	1	0	0	0	0
5	3B	Arenado	26	27	.299	.350	.585	.935	125	86	7	2	0	3	0
6	LF	Parra*	30	22	.270	.298	.380	.678	66	38	1	1	0	0	0
7	CF	Blackmon*	30	34	.310	.353	.600	.953	129	93	0	2	2	1	0
8	RF	Gonzalez*	31	30	.213	.282	.315	.597	48	40	1	0	0	2	1
9	LF	Desmond	31	17	.304	.322	.446	.768	87	25	2	1	0	1	1
10	C	Wolters*	25	11	.346	.393	.442	.835	106	23	2	1	0	0	1
11	UT	Valaika	24	9	.268	.302	.585	.888	112	24	0	0	0	0	0
12	UT	Amarista*	28	8	.314	.333	.486	.819	99	17	1	0	0	0	0
13	OF	Cardullo	29	7	.143	.250	.143	.393	2	4	0	1	0	0	0
14	C	Hanigan	36	7	.304	.333	.435	.768	88	10	0	0	0	0	0
15	IF	Adames#	25	6	.000	.071	.000	.071	-80	0	0	0	0	0	0
16	LF	Tapia*	23	1	.000	.111	.000	.111	-68	0	0	0	0	0	0

- * - bats left-handed, # - bats both, else - bats right, ? - unknown; OPS_{lg} for OPS+ does not include pitchers.

Rockies Pitching

Table 13: Rockies pitching statistics (1 of 2).

Rk	Pos	Name	Age	W	L	W-L%	ERA	G	GS	GF	CG	SHO	SV	IP	H	R
1	SP	Senzatela	22	6	1	.857	3.31	8	8	0	0	0	0	49.0	43	19
2	SP	Chatwood	27	3	5	.375	5.25	8	8	0	1	1	0	48.0	43	28
3	SP	Anderson*	27	2	4	.333	6.43	8	8	0	0	0	0	42.0	48	32
4	SP	Freeland*	24	3	2	.600	2.93	7	7	0	0	0	0	40.0	35	15
5	SP	Marquez	22	1	2	.333	4.88	4	4	0	0	0	0	24.0	23	13
6	SP	Gray	25	0	0		4.38	3	3	0	0	0	0	12.1	11	6
7	CL	Holland	31	0	0		1.06	17	0	17	0	0	16	17.0	9	2
8	RP	Oberg	27	0	0		5.40	18	0	3	0	0	0	15.0	14	11
9	RP	Ottavino	31	0	0		3.60	16	0	0	0	0	0	15.0	11	6
10	RP	McGee*	30	0	0		2.51	15	0	3	0	0	1	14.1	10	4
11	RP	Dunn*	32	2	0	1.000	3.38	15	0	0	0	0	0	10.2	10	4
12		Rusin*	30	2	0	1.000	2.53	12	0	3	0	0	1	21.1	15	7
13		Lyles	26	0	1	.000	7.94	11	0	4	0	0	0	17.0	25	15
14		Estevez	24	3	0	1.000	7.94	13	0	2	0	0	0	11.1	13	11
15		Qualls	38	1	0	1.000	2.45	7	0	4	0	0	0	7.1	6	3
16		Hoffman	24	1	0	1.000	5.40	2	1	1	0	0	0	6.2	7	4
17		Carle	25	0	0		0.00	1	0	1	0	0	0	1.0	0	0

Table 14: Rockies pitching statistics (2 of 2).

Rk	Pos	Name	ER	HR	BB	IBB	SO	HBP	BK	WP	BF	ERA+	FIP	WHIP
1	SP	Senzatela	18	6	14	0	29	3	0	0	201	153	4.46	1.163
2	SP	Chatwood	28	9	22	0	37	0	2	2	196	96	5.28	1.354
3	SP	Anderson*	30	10	14	0	42	1	2	2	185	79	5.18	1.476
4	SP	Freeland*	13	1	18	1	26	2	0	0	172	173	3.53	1.325
5	SP	Marquez	13	2	8	1	21	0	0	0	103	104	3.34	1.292
6	SP	Gray	6	1	7	0	9	0	0	1	53	118	4.31	1.459
7	CL	Holland	2	0	5	0	23	0	0	2	62	483	1.19	0.824
8	RP	Oberg	9	1	8	0	15	1	0	3	67	95	3.68	1.467
9	RP	Ottavino	6	1	11	0	16	0	0	2	64	142	3.94	1.467
10	RP	McGee*	4	1	5	0	17	0	0	0	58	204	2.59	1.047
11	RP	Dunn*	4	1	4	0	14	0	0	0	45	153	2.73	1.313
12		Rusin*	6	1	4	0	19	0	0	0	82	201	2.40	0.891
13		Lyles	15	4	5	0	16	2	0	1	80	64	5.42	1.765
14		Estevez	10	0	4	1	10	0	1	1	52	65	2.30	1.500
15		Qualls	2	0	2	0	3	0	0	0	30	213	3.01	1.091
16		Hoffman	4	2	2	0	10	0	0	0	29	97	4.81	1.350
17		Carle	0	0	0	0	1	0	0	1	4		1.01	0.000

* - throws left-handed

Topics for Future Articles

Here are a few suggestions, but I would prefer to hear from you, dear reader, on what interests you.

- Analysis of Carlos Gonzalez batting trajectory year by year. Does he always have a slow start?
- Player Value - I am personally just getting familiar with this concept. Work In Progress (WIP)
- What is the OPS+ statistic and how is it calculated.
- Survey MLB ticket prices.
- A suggestion from a work colleague that we investigate what budding talent we have in the Rockies farm system. I will look into this and see what I can find.

Let me know what you would like to see in future articles. Send me email at jdreed@q.com.

Yours truly,

Jim Reed

Appendix

Glossary

Batting Statistics

Statistic Abbreviation	Definition
<i>G</i>	number of games (participated)
<i>PA</i>	plate appearances
<i>AB</i>	at bats
<i>R</i>	runs scored by player or team
<i>RA</i>	runs allowed
<i>H</i>	hits
<i>2B</i>	doubles
<i>3B</i>	triples
<i>HR</i>	home runs
<i>RBI</i>	runs batted in
<i>BA</i>	batting average
<i>OBP</i>	on-base percentage
<i>SLG</i>	slugging percentage
<i>OPS</i>	on-base percentage plus slugging percentage
<i>OPS+</i>	This statistic normalizes a player's OPS. It adjusts for small variables that might affect OPS scores (e.g., park effects).

Pitching Statistics

Pitching Statistic	Definition
<i>Rk</i>	Rank This is a count of the rows from top to bottom. It is recalculated following the sorting of a column.
<i>Pos</i>	Position
<i>Name</i>	Player Name
<i>Age</i>	Player's age at midnight of June 30th of that year
<i>W</i>	Wins
<i>L</i>	Losses
<i>W-L%</i>	Win-Loss Percentage $W / (W + L)$ For players, leaders need one decision for every ten team games. For managers, minimum to qualify for leading is 320 games.
<i>ERA</i>	$9 * ER / IP$
<i>G</i>	Games Played or Pitched
<i>GS</i>	Games Started
<i>GF</i>	Games Finished
<i>CG</i>	Complete Game
<i>SHO</i>	Shutouts No runs allowed and a complete game.
<i>SV</i>	Saves
<i>IP</i>	Innings Pitched
<i>H</i>	Hits/Hits Allowed
<i>R</i>	Runs Scored/Allowed
<i>ER</i>	Earned Runs Allowed
<i>HR</i>	Home Runs Hit/Allowed
<i>BB</i>	Bases on Balls/Walks
<i>IBB</i>	Intentional Bases on Balls First tracked in 1955.
<i>SO</i>	Strikeouts
<i>HBP</i>	Times Hit by a Pitch.
<i>BK</i>	Balks
<i>WP</i>	Wild Pitches
<i>BF</i>	Batters Faced
<i>ERA+</i>	$ERA+ 100*[lgERA/ERA]$ Adjusted to the player's ballpark(s).
<i>FIP</i>	Fielding Independent Pitching
<i>WHIP</i>	$(BB + H)/IP$ For recent years, leaders need 1 IP per team game played
<i>H9</i>	$9 \times H / IP$ For recent years, leaders need 1 IP per team game played
<i>HR9</i>	$9 \times HR / IP$ For recent years, leaders need 1 IP per team game played
<i>BB9</i>	$9 \times BB / IP$ For recent years, leaders need 1 IP per team game played
<i>SO9</i>	$9 \times SO / IP$ For recent years, leaders need 1 IP per team game played
<i>SO/W</i>	SO/W or SO/BB For recent years, pitching leaders need 1 IP per team game played.

Fielding Statistics

Fielding Statistic	Definition
<i>Name</i>	Player Name Bold can mean player is active for this team or player has appeared in MLB * means LHP or LHB, \# means switch hitter, + can mean HOFer.
<i>Age</i>	Player's age at midnight of June 30th of that year
<i>G</i>	Games Played or Pitched
<i>GS</i>	– Games Started
<i>CG</i>	– Complete Game
<i>Inn</i>	– Innings Played in Field
<i>Ch</i>	– Defensive Chances Putouts + Assists + Errors
<i>PO</i>	– Putouts
<i>A</i>	– Assists
<i>E</i>	– Errors Committed
<i>DP</i>	– Double Plays Turned
<i>Fld%</i>	– Fielding Percentage (Putouts + Assists) / (Putouts + Assists + Errors)
<i>Rtot</i>	– Total Zone Total Fielding Runs Above Avg The number of runs above or below average the player was worth based on the number of plays made. This number combines the Rtz, Rdp, Rof, Rcatch numbers into a total defensive contribution. See the glossary section for a more complete explanation. Provided by BaseballProjection.com
<i>Rtot/yr</i>	– Total Zone Total Fielding Runs Above Avg per 1,200 Inn The number of runs above or below average the fielder was worth per 1,200 Innings (approx 135 games). This number combines the Rtz, Rdp, Rof, Rcatch numbers into a total defensive contribution. See the glossary section for a more complete explanation. Provided by BaseballProjection.com
<i>Rdrs</i>	– BIS Defensive Runs Saved Above Avg The number of runs above or below average the player was worth based on the number of plays made. This number combines the Rpm, Rbdp, Rbof, Rbcatch numbers into a total defensive contribution. Provided by Baseball Info Solutions
<i>Rdrs/yr</i>	– BIS Defensive Runs Saved Above Avg per 1,200 Inn The number of runs above or below average the fielder was worth per 1,200 Innings (approx 135 games). This number combines the Rpm, Rbdp, Rbof, Rbcatch numbers into a total defensive contribution. For pitchers, this is set to 200 Innings. Provided by Baseball Info Solutions
<i>RF/9</i>	– Range Factor per 9 Inn $9 * (\text{Putouts} + \text{Assists}) / \text{Innings Played}$
<i>RF/G</i>	– Range Factor per Game $(\text{Putouts} + \text{Assists}) / \text{Games Played}$
<i>PB</i>	– Passed Balls
<i>WP</i>	– Wild Pitches
<i>SB</i>	– Stolen Bases
<i>CS</i>	– Caught Stealing

Fielding Statistic	Definition
<i>CS%</i>	– Caught Stealing Percentage $CS / (SB + CS)$
<i>lgCS%</i>	– League Caught Stealing Percentage League Expected $CS / \text{Players } SB + \text{Players } CS$
<i>PO</i>	– Pickoffs Runner picked off a base. May include cases they were safe on an error. Also includes Pickoff Caught Stealing plays.
<i>Pos</i>	Summary – Positions Played The positions either followed by the games played at that position or in order of games or innings played. For a single season, * indicates they played at least 2/3rds of the team games there Positions after / indicate less than ten games played at those positions. For career, a + sign means more than 300 games at that position and a - sign means less than 30 games.

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