BASEBALL Analyst

No. 23 4/86

Manny Mannitillo
"Mr. Missing Link"
Claypell's Circus
Highway 41
Monroe, Fla.

February 6, 1986

Mr. "Jim" Baker:

This thing in me says "You are so angry about it, why don't you write a letter to that son-of-a-bitch and tell him what you think of his base-ball journal." And that is why I am writing this to you. Where, I am told to ask, do you get off with ignoring me, one of base-ball's greatest short-stops, and one of the attendance wonders of the Minor Leagues?

When I first came to the U.S., I was ready to play ball. Now I am the top-drawing performer at a major Everglades Circuit Highway Circus Show. And yet, this base-ball journal that you do keeps ingoring me. I have yet to see an issue on myself, nor have my associates here at the circus told me that they have seen one. How can this be?

Let me inform you of the history of Manny Mannitillo, in case you are as ignorant as you seem. This is from my forthcoming biographical manuscript, The Side-Show Stooge.

When I came up to the U.S., I was a base-ball player from the word "go" -- I had my suit and I had my mitt. I was signed by the Vermont Greeners (of Bristol) in the Ethan Allen Boys League. What I didn't realize, due to my excitement and my poor English skills, was that I would wind up on a team where I was three years older than the manager. At 21, I felt awkward on the field in the middle of a "Junior Team" of 13-year-olds. But I played half a season anyway; my height being very close to the kids, no one in the crowd could tell the difference between us. Also, when the coach noticed that my hands were touching the ground even when I wasn't bending over, he felt that I would be of some advantage to the team. (My arms are the length of my body: since birth I could palm the ground while standing straight as an arrow.) He was the first in this country to see this as an asset, and I owe him

Continued on page 18

EDITOR: Jim Baker

FOUNDER/PUBLISHER: Bill James

BUSINESS MANAGER: Susie McCarthy

STATISTICAL CONSULTANT: John Borkowski

EDITORIAL OFFICE

20 Lincoln Street
Jersey City, New Jersey 07307
(201)656-3892

BUSINESS OFFICE

Box 171
Winchester, Kansas 66097

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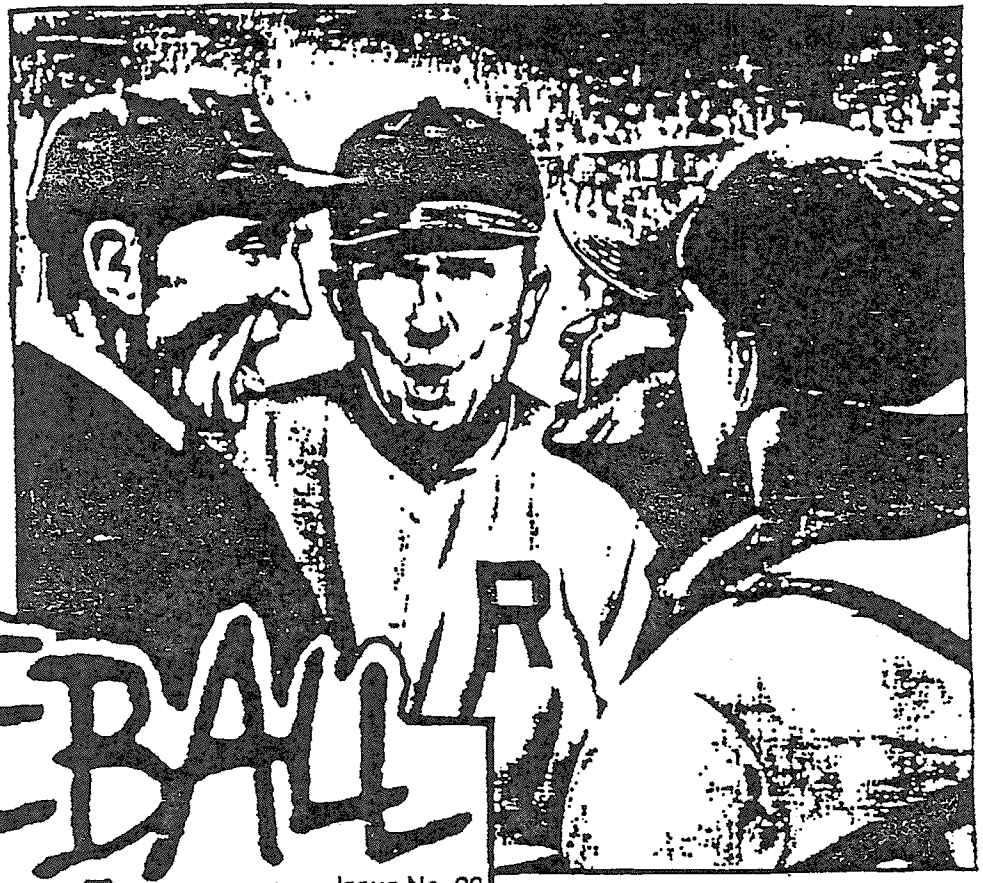

BASEBALL Analyst

April 1986

Issue No. 23

IN THIS ISSUE: Mike Kopf on Game Six of the 1985 World Series and Jess Boronico on "The Baseball Batting Sequence Problem." We also have a lengthy letter from a former player beginning on the preceding page. This letter was brought to my attention by Mr. Bob Murray of New Brunswick, New Jersey. Mr. Murray specializes in finding people to write me bothersome letters . . . Hello to new subscribers! I can't single you out individually, but you know who you are. A hello to old subscribers, too. I certainly don't want to alienate anybody . . . There seems to be a lot of talk these days of another baseball season beginning. I shall have to look into this and report back to you all. If this is true, I will get some tickets and attend a game or two! . . . A reminder to keep submitting your articles, comments and letters. This is YOUR magazine. Without your stuff we'll disappear forever and ever, Amen. . . . Quote of the year comes from Joe Nunziata of Queens. I heard it at the annual Project Scoresheet preseason meeting for Mets scorers at Rusty's (Staub) Restaurant in Manhattan. Joe said: "There's only one thing better than baseball, and that's sex--but it better be good sex."

ABOUT THE COVER: "The Babe cuts the cake, the Babe cuts the cake . . ." That's Babe and Bob Considine at the publishing party for their book, THE BABE RUTH STORY. This would probably be early 1948. The Babe still looks pretty good. His health was to deteriorate soon thereafter, however. Photo credit: Ben Mancuso/Cosmo-Silio Associates, 79 W. 45th St./NY, NY. Thanks to Elliott Graham for making it available to the ANALYST.

SOME REFLECTIONS ON THE "IORGY OF RECRIMINATION"
An Attendee Recalls Game Six of the 1985 World Series

Coupled With an Impassioned Appeal to All Project Scorsheet Participants

by
Mike Kopf

Maybe it's simply because I was there, in the flesh; my first World Series since 1954, but whatever the reason, the momentous events of the pivotal sixth game, culminating in the immortal "Iorgy of Recrimination," formed an obsession that took hold while the game was still up for grabs; stayed with me afterwards, as I deliriously quaffed beer after beer and attempted--in vain--to straighten it all out in my mind; obsessed me the next day as I devoured the local newspaper (MIRACLE ON I-70, headlined the KC Star), and into the evening as I watched the--to me--anti-climactic seventh game on television, enduring the amiable folderol of Al Michaels and company as best I could; and continues to the present day; indeed, I fear a long-term obsession has taken root; less destructive than Mr. Hinckley's for Jodie Foster surely, but still probably nothing to brag about. The reason I'm applying pen to paper is that there may be, short of shock therapy, an effective treatment for my burgeoning neurosis, and sabermetrics could be a part of it.

Until the bottom of the seventh inning, though, I was just another seriously concerned Royals fan. The game was scoreless, and I had the feeling, just as when Charlie Leibrandt and Danny Cox squared off in Game Two, that one run was worth a thousand on the open market. But in this turn at bat, there seemed little likelihood that the precious run was forthcoming, not with two men out, and Buddy Biancaletterman coming to the plate. Then suddenly, surprisingly, runners were perched on first and second, with the pitcher due up. I confess that I was not in this instance thinking a batter or two ahead, as Dick Howser unquestionably was. But it didn't take long for me to conclude what was coming; a pinch hitter, surely, for Leibrandt. "He's got to pull him," I said to the friend on my right. He seemed not convinced, and I vaguely wondered why.

Of course, we all know that Howser did not pull him; Leibrandt ended the inning striking out feebly. Now, two aspects of this strategic non-move amazed me. The first was the ecision itself; I could not believe that with the lead run in scoring position in the seventh inning of a game the Royals had to win; with runs in general as scarce as California Golden Condors; with Dan Quisenberry, Mark Gubicza, Steve Farr and possibly Bud Black (or for that matter, why not Bret Saberhagen?--no use holding back a starter for a Game Seven that many never be played) all available in the bullpen to hold the suddenly-anemic Cardinal bats in check for six more outs; given those factors I could not believe the continuation of Leibrandt.

But something else was equally amazing: the fan's attitude--or lack thereof. Everyone sitting near me thought Leibrandt batting in a game situation the most natural thing in the world. When I turned to my left and expressed my incredulous dismay to a

middle-aged gentleman, he simply said, "Too early." Too early? I suppose after the Titanic hit the iceberg it was too early to start loading the lifeboats; after all, no one had drowned yet. But such was the typical spectator reaction that night. Later it occurred to me that Royals fans have been so hopelessly corrupted by years of DH ball that they wouldn't know a managerial move if they saw one. Either the rules say the pitcher bats, or they say he doesn't, and God forbid that brain cells be taxed trying to decide which, although in fairness to the folks in the stands their reluctance to engage their cerebrums produces no worse results than the supposedly cogent thought processes of three managers in the last three DH-less World Series. Bob Lemon's ship was probably already doomed when he pinch hit for Tommy John in the sixth inning of the sixth game of the 1981 Series (it was tantamount to ramming the iceberg again), but Paul Owens wasn't even in deep water when, in the bottom of the sixth, GAme Three, 1983 Series, he passed up a chance to pad a flimsy 2-1 lead by letting a struggling Steve Carlton bat for himself, ala Leibrandt, while the National League's top reliever that year, Al Holland, cooled his heels in the bullpen. (Carlton, like Leibrandt, walked the plank the next inning, and the Phillies ship went bow-up shortly thereafter.)

And then there was Howser, who had seemingly already made shark's meat of himself with his refusal to go to Quisenberry in the fateful second game. I was in attendance that evening also and, strangely, it was my perception that the fans did not blame Howser for that apparent irredeemable loss. Further, it is my opinion that John Q. Fann had already long since turned agains Quiz--after all, on 37 saves this season--and had not confidence that he could have doused the flames if called upon. In fact, I'm convinced that had Quisenberry been summoned to face Andy van Slyke (as pinch hitter for Cesar Cedeno or Terry Pendleton), and had van Slyke produced an approximation of Pendelton's bases-clearing double, then Howser would've faced a fan mutiny such as might have unnerved even Coriolanus. As it was, only the media demured. (I should note that in the Game Two controversy, I am inclined to side with Howser and the spectators. Leibrandt was arguably still in control; if a mistake was made, it seems to me that it was walking Cedeno to fill the bases, forcing Leibrandt to come in to Pendleton.)

But to return to Game Six, seventh inning, and the Leibrandt at bat . . . Howser later stated (and who could blame him if, by then, finally, his brain cells had disconnected completely) that had there been one out instead of two, he might indeed have gone to the bench. This admission elicited no media comment that I am aware of, but contemplate it as often as I may, it makes absolutely no sense. If there's only one out and two men on, let Leibrandt have his feeble strikeout; Lonnie Smith can still give you the lead. Or am I missing something? If there's anyone out there who had mastered elementary Howserian logic I would appreciate hearing from them.

I suspect by now that I may have tried some readers' patience with my constant bemoaning about a game that, after all, the Royals did win. The same thing happened for a full week afterward: I would meet a friend, discuss the Series in general and Game Six in particular, and I would state my exceptions as I am stating them here, and the reply seemed invariably, "Howser got by with it, didn't

he?" or "It worked out all right in the end, didn't it?" And that makes me angriest of all, because he didn't get by with it, and it didn't work out all right; in fact, it blew up in his bleeping face! As it turned out, Howser handed the Cardinals the World Series on the proverbial silver platter, and the fact that the Redbirds passed it back two innings later (and even then Ragged Dick juggled it, but more on that shortly) does not mean that "he got by with it." For the record, Howser passed up a hot at the lead to continue a pitcher who promptly got knocked out, and by the time he none too percepitively made a change, the White Ratmen were one hit away from blowing the game open, and with the National League's leading hitter standing in. If that's "getting by with it" I'm not anxious to see a manager have intimate relations from the umpire positon (i.e. up).

One more meditation before moving on to the fateful ninth. Amidst all the hoopla of the Iorgy of Recrimination, very few seemed to remember who came out of the bullpen to keep the game close so that Dane Iorg could win it; who enticed the National League's MVP to ground into a force-out just as the fat lady took a deep breath: fellow by the name of Quisenberry. Howser I'm sure will deny it until the day he dies, but it seems obvious that he had lost faith in Quiz, at least against left-handed batters, and since for the Cardinals that's seemingly the entire roster, it's unlikely that he was ticketed to hold many leads from the outset. I can see Howser's point: lefty swingers did tatoo Quiz for over .300 during the season, so it was not exactly irrational to contemplate a diminished role for him. The only trouble with such decisions is that they become self-fulfilling prophecies: if Quiz is struggling against lefties, and never gets the call when they're on deck, then indeed he will never get lefties out. Long-suffering Royals followers will remember Jim Frey using a variation of this theory in the 1980 Series. Frey became convinced that lefty starter Paul Splittorf was incapable of containing Philadelphia's right-handed power, so he was scratched from the rotation in favor of right-handed (but sore-shouldered) Rich Gale. Well, who knows? Maybe Mike Schmidt and the Greg Luzinski would have taken Splitt to the cleaners--we certainly can't prove otherwise. What we can prove is that Rich Gale turned out something less than a mystery. Anyway, suffice it to say that when Quiz finally received the opportunity to shut the barn door with the horse not quite completely exited after all, he slammed it on no more than Willie McGee, batting left-handed.

So Quiz made the miracle of the ninth possible (silence, you cynics who say it was Don Denkinger; over the side with you) and since miracles do not grow on trees, we should be satisfied with whatever form they take. And yet I can't help but wonder, enjoyable as it was, did our miracle have to be that tough? Couldn't we have squeaked by with spontaneous cancer remission? Was the resurrection of Christ absolutely necessary? I'm going to raise a variety of questions now, and here's where the members of Project Scoresheet can be helpful, for you have the power to provide answers to these questions. Not today, maybe not even next season, but someday.

Specifically, runners on first and second, none out, Jim Sundberg at the plate. The sacrifice is on. At the time I thought it a surprising call, but after examining scoresheets for 158 regular season Royal games, I found that Sunny Jim was a nifty 4 for 4 on

sacrifice bunts. But . . . and here's the rub, what about other possible sacrifice attempts? Attempts that very well might not show up on the scoresheets because they were abandoned after the count ran to two strikes; in other words, botched sacrifices. So is Sundberg really as proficient a bunter as the sheets initially indicate? I managed to count up fifteen other potential sacrifice situations over the course of the season when Sundberg came to bat. Did he try, and fail, to sacrifice in any of those at-bats? Possibly not; Howser is not notably enamored of the sac bunt, and on many of the fifteen occasions Sundberg was batting in front of Onyx Concepcion or Biancaletterman, making a sacrifice, shall we say, unlikely. Still, it would be nice to know for sure. If you can find room in the "Notes" section of your scoresheets to mention all abandoned sacrifice attempts, fellow Projectiles, it would prove useful.

All right, Sundberg stands in, he squares to bunt, but takes ball one. Next pitch, he squeezes again but holds back--ball two. And meantime something very interesting--and daring--is taking place. Defensively, the Cardinals have their entire infield playing rotation: first and third basemen charging, shortstop breaking for third, second basemen covering first. They're gambling with their i es. You can call this a sophisticated defensive scenario if you like--and I guess it is--but it's also a sophisticated variant of the Chinese fire drill. And when you apply such a defense, pitch after pitch, you are, in my considered opinion, begging the opposition to have its way with you. If it's true, as they say, that infielders playing-in for a play at the plate adds one hundred points to anyone's batting average, then how many points will be added if you've given the privilege of swinging against a rotation defense? I'll wager it's considerably more than one hundred, but we'll never know for sure until those of us in Project Scoresheet start keeping track of it, as well as all "infield-in" situations.

So there stands Sundberg with the count 2-0 and a rotation defense staring him in the face. We can only imagine the level of his salivation as he waits, hopes--probably prays--for the hit privilege. Sitting in the stands, I was suddenly as sure as I have ever been of anything that Sunny had the green light; that he was sitting on the fastball that was sure to come, that when he connected, with the infield halfway between Shanghai and Hong Kong . . .

He bunted foul. So much for baseball fan's intuiton, although on that particular pitch you'll never convince me that I was wrong; it was the offensive situation of a lifetime--Howser simply missed the boat. But that did not prepare me for what happened two pitches later, with the count 2-2, when Howser attempted to torpedo the boat by keeping the sacrifice on. Why? Was he terrified of the double play? He's entitled to some concern, but Sundberg is not Jim Riceberg; wasn't this year anyway. I want to know--here I go again Project Scoresheet folk--what percentage of sac bunt attempts are successful when laid down with two strikes, as opposed to one or no strikes? I know it isn't often done, except by pitchers, but eventually, after a few years, we might be able to draw some conclusions that would interest Jim Sundberg--if we start keeping track now.

So the greatest hitters' opportunity since Alexander Cartwright envisioned bases ninety feet apart went for naught, and Sunny Jim bunted into a force at third. But because of what occurred shortly thereafter, the world will little note nor long remember, and on reflection it behooves me to wonder if maybe I've been asking too much; maybe the questions I've raised are trivial compared to the big question, the overriding question, the seemingly unanswerable question now--in my case--so emphatically answered. For years I've wondered, what was it like to be in the Polo Grounds when Bobby Thomson consummated the Miracle at Coogan's Bluff? How did if feel to be in Yankee Stadium the day Don Larson retired 27 consecutive Dodgers; what went through people's minds in Fenway Park as they watched Carlton Fisk body-English his way into immortality? I never pass up a book that describes any of those games, and yet no matter how well-written it may be (and some are very well-written indeed), it inevitably fails in this one respect: it cannot make you feel what the fans in the stands felt as the miracle occurred, and after; that is the unanswerable question: how did it feel? And now, thanks to Fate, and Dane Iorg, I know. And you know something else? I think I'll carry that feeling with me for the rest of my life; I think the radioactive half-life of witnessing a mircale ball game is 9,000 years. Here it is the beginning of the next season and I still wake up smiling. And at this moment I honestly believe that in future damp, drizzly Novembers of my soul, remembrance of the Iorgy of Recrimination past will serve me as well as a long-ago whaling voyage once served a man called Ishmael.

I hope you'll forgive the seeming lack of objectivity throughout this essay, but as I stated at the outset, it was born of an obsession, an obsession with a great baseball game that I witnessed, a game which continued many important aspects almost totally obscured by the hue and cry over Denkinger and Joaquin Andujar. Someday maybe I'll be privileged to use another ball game as wonderful, and if so I'm sure it'll raise new questions and stir a new obsession. But by then--with the help of Project Scoresheet--maybe I'll have the answers to the questions I've raised and I can lay one obsessin at least to rest. Then again, maybe not, but that's okay too, because I've decided after all that some obsessions are just plain fun. I know I wouldn't have missed this one for the world.

THE BASEBALL BATTING SEQUENCE PROBLEM:
Problem Formulation and Preliminary Results

by
Jess Boronico

Abstract

A formulation for the batting sequence problem is developed, and modeled as (1) a Markov process, (2) an accompanying dynamic program, and (3) a mathematical program. Each formulation's merits and limitations are discussed, and a small scale prototype problem is analyzed recursively as a Markov process and dynamically. Preliminary results are then drawn from the numerical outcome.

Formulation

Two of the more significant studies in batting sequence are found in Cook<1> and Freeze<2>. One of Cook's conclusions was that the batters should be arranged in decreasing order of productivity, so that the best hitters are due up first. This is counter to traditional baseball thought, where the best hitters are normally placed in central spots. Cook's analysis is far from complete. Freeze's study dealt with a Monte Carlo simulation of 200,000 games, and he concluded that the effect of interchanging batters has a small influence on productivity, with magnitude of approximately 10-15 runs per season. His conclusion was that the traditional lineup is superior to one ordered in decreasing productivity.

In order to make the problem mathematically tractable, let us simplify the game. For any hitter, let us define his complete set of statistics by the following vector:

$$S = (0,w,1,2,3,4)$$

where the elements are the total number of outs, walks, singles, doubles, triples and homers for the year. Sacrifice flies will be counted as outs, as well as errors. Runners will not advance on outs. There will be no double plays. Singles and doubles will all be long. That is, a single will advance a baserunner two bases, while a triple will always result in a runner advancing to home. If this simplified

***Mr. Boronico requests comments and feedback on this paper, with any additional information anyone would care to provide. Address them in care of the ANALYST.

version is solvable we may eventually include some of these and other finer aspects of hitting. Given the total amount of plate appearances for a hitter we may then generate the following probability spectrum for S: $P=(p_o, p_w, p_1, p_2, p_3, p_4)$. Data for the above may be found in The Baseball Encyclopedia[3]. The state of a baseball inning may be described by the number of outs (0,1,2,3) and the position of runners on the bases, of which there are 8. There are 25 such states. These are listed in Figure 1.

State	Outs	Bases Occupied			State	Outs	Bases Occupied		
		1	2	3					
1					13	1			x
1	0				14	1	x		x
2	0	x			15	1		x	x
3	0		x		16	1	x	x	x
4	0	x	x		17	2			
5	0			x	18	2	x		
6	0	x		x	19	2		x	
7	0		x	x	20	2	x	x	
8	0	x	x	x	21	2			x
9	1				22	2	x		x
10	1	x			23	2		x	x
11	1		x		24	2	x	x	x
12	1	x	x		25	3			

Figure #1

Given a hitter's probability vector we may determine the probability of moving from an initial state, i, to a subsequent state, j. State i does not necessarily map into all subsequent states j, but will map into a subset of the j states allowed. Based on the assumptions mentioned, the following transition matrix may be established for each hitter:

Figure #2 here

The reward for making the transition from state i to state j will

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	p_h	p_{ws}	p_d		p_t				p_o															
2	p_h		p_d	p_w	p_t	p_s				p_o														
3	p_h	p_s	p_d	p_w	p_t						p_o													
4	p_h		p_d		p_t	p_s		p_w				p_o												
5	p_h	p_s	p_d		p_t	p_w							p_o											
6	p_h		p_d		p_t	p_s		p_w						p_o										
7	p_h	p_s	p_d		p_t			p_w							p_o									
8	p_h		p_d		p_t	p_s		p_w								p_o								
9									p_h	p_{ws}	p_d		p_t				p_o							
10									p_h		p_d	p_w	p_t	p_s				p_o						
11									p_h	p_s	p_d	p_w	p_t						p_o					
12									p_h		p_d		p_t	p_s		p_w				p_o				
13									p_h	p_s	p_d		p_t	p_w							p_o			
14									p_h		p_d		p_t	p_s		p_w						p_o		
15									p_h	p_s	p_d		p_t			p_w							p_o	
16									p_h		p_d		p_t	p_s		p_w								p_o
17	p_o																p_h	p_{sw}	p_d		p_t			
18	p_o																p_h		p_d	p_w	p_t	p_s		
19	p_o																p_h	p_s	p_d	p_w	p_t			
20	p_o																p_h		p_d		p_t	p_s		p_w
21	p_o																p_h	p_s	p_d		p_t	p_w		
22	p_o																p_h		p_d		p_t	p_s		p_w
23	p_o																p_h	p_s	p_d		p_t			p_w
24	p_o																p_h		p_d		p_t	p_s		p_w

Note: state space j/i could be increased by removing prior simplifications, i.e. s-short s_1, long s_2 ....

Figure #2

be given in the amount of runs the transition generates, denoted r_{ij}. The reward matrix corresponding to the above transition matrix is shown in figure 3.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	1																							
2	2		1		1																			
3	2	1	1		1																			
4	3		2		2	1																		
5	2	1	1		1																			
6	3		2		2	1																		
7	3		2		2	1																		
8	4		3		3	2		1																
9									1															
10									2	1	1													
11									2	1	1		1											
12									3		2		2	1										
13									2	1	1		1											
14									3		2		2	1										
15									3		2		2	1										
16									4		3		3	2		1								
17																	1							
18																	2		1		1			
19																	2	1	1		1			
20																	3		2		2	1		
21																	2	1	1		1			
22																	3		2		2	1		
23																	3		2		2	1		
24																	4		3		3	2		1

Figure #3

The sequencing problem may be modelled as a Markov process. The general form for a standard Markov process with rewards is:

$$v_i(n) = \sum_{j=1}^{N} p_{ij}(r_{ij} + v_j(n-1)) \quad \begin{array}{l} i=1,2,\ldots,N \\ n=1,2,3,\ldots \end{array}$$

where: $v_i(n)$ = expected total earnings in the next n transitions if the system is currently in state i.

If the system makes a transition from state i to state j, it will earn r_{ij} plus the amount it can expect to earn if it starts in state j with one fewer transition remaining. To find the total expected earnings, these earnings must be weighted by the appropriate transition probabilities, p_{ij}.

To incorporate this structure to the baseball sequencing problem, we must note the following. (1) As the number of transitions increases, $v_i(n)$ is necessarily nondecreasing. (2) We wish to maximize the number of runs after some finite value of n is attained. That is, we want max $v_i(k)$, where k represents the number of batters who bat in a game. K is a random variable, whose mean may be determined, if we know the nine batters who will play. The probability of any hitter making an out will be assumed to be independent of both the state the system is in and the sequence of hitters being used. One notes that the expected reward after n transitions is not independent of either.

Given a particular sequence of hitters we may find $v_i(n)$ for that sequence by utilizing the following:

$$v_i(k) = \sum_{j=1}^{24} p_{ij/k} r_{ij} + \sum_{j=1}^{24} p_{ij/k} v_j(k+1) \qquad k=K,K-1, \ldots ,2,1$$

k represents the kth hitter up in the game, K is the total expected number of hitters in the game. $p_{ij/k}$ is the transition matrix for the kth hitter up. To illustrate, let K=36. The value of the 36th hitter is simply the immediate reward he generates, as there are no hitters expected up after him.

$$v_i(36) = \sum_{j=1}^{24} p_{ij/36} r_{ij} + 0$$

The value of the 35th hitter is the immediate expected reward he generates, plus the expected value attained from the hitter batting behind him.

$$v_i(35) = \sum_{j=1}^{24} p_{ij/35} r_{ij} + \sum_{j=1}^{24} p_{ij/k} v_j(36)$$

The same formula may be used recursively through the leadoff hitter.

Observe that $p_{ij/k} = p_{ij/k-9}$ as there are 9 hitters in the sequence. k=1 represents the leadoff hitter. From this information it is possible to determine the appropriate transition matrix for the initial calculation $v_i(K)$.

Our objective is to maximize $v_i(K)$. To simplify the problem, let us use the following heuristic: max $v_i(9)$. Let us find the optimum sequence of hitters, where optimum implies maximizing expected runs scored going through the lineup once. We may model the above as follows:

$$v_{i,N_n}(n) = \underset{k \in N_n}{\text{MAX}} \left(\sum_{j=1}^{24} p_{ij/k} r_{ij} + \sum_{j=1}^{24} r_{ij/k} v_{j,N_n/k}(n+1) \right) \qquad \text{(A)}$$

where: n= current stage, n^{th} spot in the batting sequence
n=1,2,...,9
k= the batter up at stage n
N_n= the set of hitters unassigned at stage n
N_n/k represents the above set excluding player k

Although this formulation will find the optimum sequence for one pass through the lineup it will not necessarily be the optimum sequence for the problem Max $v_i(K)$.

The formulation given may be solved recursively as a dynamic program, illustrated later.

This formulation may be written as a mathematical program, with the set of decision variables x_{kn}= (1, if player k bats in spot n, and 0, otherwise.)
The objective and constraint set are given below:

Obj: Max Z= $v_i(K)$

S.T.:

$$\sum_{k=1}^{9} \sum_{j=1}^{24} x_{k,K} p_{ij/k} r_{ij} = v_i(K) \quad \forall\ i=1,2,\ldots,24$$

$$\sum_{k=1}^{9} \left(\sum_{j=1}^{24} x_{k,K-1} p_{ij/k} r_{ij} + \sum_{j=1}^{24} x_{k,36} p_j v_j(K) \right) = v_i(K-1) \quad \forall\ i=1,\ldots,24$$

$\vdots$

(con't next page)

$\vdots$

$$\sum_{k=1}^{9} \left(\sum_{j=1}^{24} x_{k,2} p_{ij/k} r_{ij} + \sum_{j=1}^{24} x_{k,2} p_j v_j(3) \right) = v_i(2) \quad \forall\ i=1,2,\ldots,$$

$$\sum_{i} \left(\sum_{j=1}^{24} x_{k,1} p_{ij/k} r_{ij} + \sum_{j=1}^{24} x_{k,1} p_j v_j(2) \right) = v_i(1)$$

$$\sum_{n=1}^{9} x_{k,n} = 1 \quad \forall\ k$$

$$\sum_{k=1}^{9} x_{k,n} = 1 \quad \forall\ n$$

$$x_{k,9+n} = x_{k,n} \quad \forall (k,n)$$

$$x_{k,n} = (0,1)$$

No solution method to the above program has offered any computational advantages over full enumeration. This is a case where the price of analytical rigor is the considerable complexity of implementation.

Another approximation to the original objective, max $v_i(K)$, may be found by utilizing a Markov process to arrive at the expected value after n iterations.

Given $P_{ij/k}$ for each hitter,k, the product:

$$\prod_{n=1}^{9} \sum_{k=1}^{9} x_{kn} P_{ij/k}$$

yields a stochastic matrix representing the markings p_{ij} over one run through a batting sequence. If this matrix is regular, then the steady state probabilities may be determined by $\underset{\sim}{\pi} P = \underset{\sim}{\pi}$, where $\underset{\sim}{\pi}$ is the state probability vector. If the matrix is not regular, the limiting matrix may or may not exist. If P^T is diagonalizable we may find the limiting (steady-state) probabilities by finding an independent set of eigenvectors, creating a model matrix containing the eigenvectors, M, solving $MP^TM^{-1}=D$, and then finding the limiting matrix, L, with $L=M \cdot \lim D^n \cdot M^{-1}$. If no power of P is positive, then the limiting matrix cannot be found, even if P is irreducible; although in this case the average of k successive powers of P will converge to some limiting matrix with one of the convergence properties required.

Once the steady-state probabilities are found, we may determine the expected gain over each transition. This gain represents the slope of the linear function the Markov process converges to asymptotically. The gain may be determined for any sequence, and the sequence with the largest gain will yield the highest expected value over n transitions, for n large. Drawbacks are the following: the number of hitters in a game is finite, usually between 27 and 45, whereas for the limiting process n goes to infinity. Thus we are only going through the batting sequence between 3 and 6 times (the stochastic transition matrix now is not one whole cycle but the linear). The approximation may be improved by using several whole cycles, 160 games. Now we will have between 480 and 960 transitions. The problem now is that there are 160 stopping points where we return to the leadoff hitter to begin the next game, instead of beginning the next game from the hitter the prior game finished at. To arrive at an exact solution, transient properties will need to be considered. As a heuristic, this approach will give a rough estimate of what sequence is superior, but will not guarantee optimality over a small number of transitions. We may calculate the expected gain mentioned earlier by calculating the following:

$$\underset{\sim}{q}^T \cdot \underset{\sim}{r}, \text{ where } q^T = \text{steady state vector}$$

r = a vector whose ij element is found by: $p_{ij} r_{ij}$

Illustration

To illustrate the above theory we will consider a small scale baseball game. The game has only two bases: home and first, and is played with only two outs per inning. Thus there are only 4 base-out states: 0 out, none on; 0 out one on; 1 out, none on; and 1 out, one on. The only types of batting results are: homerun, single, and o-out. Runners do not move on outs. We will consider two types of hitters, good and bad. A lineup will consist of four hitters, 2 good and 2 bad. We wish to find the optimal batting sequence for these 4 hitters.

Define :

state	outs	base occupied?
1	0	no
2	0	yes
3	1	no
4	1	yes

Note: 2 out none on is equivalent to returning to state 1

G-Good Player

$$P_{ij} = \begin{pmatrix} .15 & .25 & .6 & 0 \\ .15 & .25 & 0 & .6 \\ .6 & 0 & .15 & .25 \\ .6 & 0 & .15 & .25 \end{pmatrix}$$

where

$P_s = .25,\ P_h = .15,\ P_o = .6$

B-Bad Player

$$P_{ij} = \begin{pmatrix} .05 & .15 & .8 & 0 \\ .05 & .15 & 0 & .8 \\ .8 & 0 & .05 & .15 \\ .8 & 0 & .05 & .15 \end{pmatrix}$$

where

$P_s = .15,\ P_h = .05,\ P_o = .8$

The reward matrix is $R_{ij} = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 2 & 1 & 0 & 0 \\ 0 & 2 & 1 & 0 \\ 0 & 0 & 2 & 1 \end{pmatrix}$

Utilizing (A), we may solve dynamically:

Stage 4: $N_4 = (G)$

i=1 v=.15
i=2 v=.05
i=3 v=.15
i=4 v=.05

$N_4 = (B)$

i=1 v=.05
i=2 v=.25
i=3 v=.05
i=4 v=.25

At stage 4, the second term in (A) must be zero.

Stage 3: N_3=(GG)

i=1 v=.15 + ((.15)(.15)+(.25)(.55)+(.6)(.15))=.40
i=2 v=.55 + ((.15)(.15)+(.25)(.55)+(.6)(.55))=1.04
i=3 v=.15 + ((.6)(.15)+(.15)(.15)+(.25)(.55))=.40
i=4 v=.55 + ((.6)(.15)+(.15)(.15)+(.25)(.55))=.80

N_3=(GB), decision:bat G

i=1 v=.15 + ((.15)(.05)+(.25)(.25)+(.6)(.05))=.25
i=2 v=.55 + ((.15)(.05)+(.25)(.25)+(.6)(.25))=.77
i=3 v=.15 + ((.6)(.05)+(.15)(.05)+(.25)(.25))=.25
i=4 v=.55 + ((.6)(.05)+(.15)(.05)+(.25)(.25))=.65

N_4=(GB), decision:bat B

i=1 v=.05 + ((.05)(.15)+(.15)(.55)+(.8)(.15))=.26
i=2 v=.25 + ((.05)(.15)+(.15)(.55)+(.8)(.55))=.78
i=3 v=.05 + ((.8)(.15)+(.05)(.15)+(.15)(.55))=.26
i=4 v=.25 + ((.8)(.15)+(.05)(.15)+(.15)(.55))=.46

Stage 2: N_2=(GGB), decision:bat G

i=1 v=.15 + ((.15)(.25)+(.25)(.77)+(.6)(.25))=.53 (bat G 3rd)
i=1 v=.15 + ((.15)(.26)+(.25)(.78)+(.6)(.20))=.54 (bat B 3rd)
i=2 v=.55 + ((.15)(.26)+(.25)(.78)+(.6)(.46))=1.06(bat B 3rd)
i=2 v=.55 + ((.15)(.25)+(.25)(.77)+(.6)(.65))=1.17(bat G 3rd)
i=3 v=.15 + ((.6)(.26)+(.15)(.26)+(.25)(.46))=.46 (bat B 3rd)
i=3 v=.15 + ((.6)(.25)+(.15)(.25)+(.25)(.65))=.50 (bat G 3rd)
i=4 v=.55 + ((.6)(.26)+(.15)(.26)+(.25)(.46))=.86 (bat B 3rd)
i=4 v=.55 + ((.6)(.25)+(.15)(.25)+(.25)(.65))=.90 (bat G 3rd)

N_2=(GGB), decision:bat B

i=1 v=.05 + ((.05)(.4)+(.15)(1.04)+(.8)(.4))=.546
i=2 v=.25 + ((.05)(.4)+(.15)(1.04)+(.8)(.8))=1.066
i=3 v=.05 + ((.8)(.4)+(.05)(.4)+(.15)(.8)) =.51
i=4 v=.25 + ((.8)(.4)+(.05)(.4)+(.15)(.8)) =.71

N_2=(GBB), decision:bat G

i=1 v=.15 + ((.15)(.13)+(.25)(.49)+(.6)(.13))=.37
i=2 v=.55 + ((.15)(.13)+(.25)(.49)+(.6)(.33))=.803
i=3 v=.15 + ((.6)(.13)+(.15)(.13)+(.25)(.33))=.33
i=4 v=.55 + ((.6)(.13)+(.15)(.13)+(.25)(.33))=.73

N_2=(GGB), decision:bat G

i=1 v=.05 + ((.05)(.26)+(.15)(.78)+(.8)(.26))=.388 (bat B 3rd)
i=1 v=.05 + ((.05)(.25)+(.15)(.77)+(.8)(.25))=.378 (bat G 3rd)
i=2 v=.25 + ((.05)(.26)+(.15)(.78)+(.8)(.26))=.748 (bat B 3rd)
i=2 v=.25 + ((.05)(.25)+(.15)(.77)+(.8)(.65))=.898 (bat G 3rd)
i=3 v=.05 + ((.8)(.26)+(.05)(.26)+(.15)(.46))=.34 (bat B 3rd)
i=3 v=.05 + ((.8)(.25)+(.05)(.25)+(.15)(.65))=.36 (bat G 3rd)
i=4 v=.25 + ((.8)(.26)+(.05)(.26)+(.15)(.46))=.54 (bat B 3rd)
i=4 v=.25 + ((.8)(.25)+(.05)(.25)+(.15)(.65))=.56 (bat G 3rd)

Stage 1: N_n=(GGBB), decision:bat G

i=1 v=.15 + MAX
((.15)(.37)+(.25)(.893)+(.6)(.33))=.62678=GGBB
((.15)(.378)+(.25)(.898)+(.6)(.36))=.6412=GBGB
((.15)(.388)+(.25)(.748)+(.6)(.34))=.6472=GBBG

decision:bat B

i=1 v=.05 + MAX
((.05)(.53)+(.15)(1.17)+(.8)(.5))=.652=BGGB
((.05)(.54)+(.15)(1.06)+(.8)(.46))=.604=BGBG
((.05)(.546)+(.15)1.066)+(.8)(.51))=.6452=BBGG

batB:Max=.652=BGGB is optimum

We see that for one transition through the whole lineup, the optimum sequence of hitters is BGGB, with an expected run contribution of .652 runs. This suggests that the best strategy would be to place your best hitters in the central location of the lineup, which has been done traditionally. We must be careful, however, in defining Good and Bad. In this case Good dominates Bad, but in professional sports, one hitter rarely if ever dominates another in all facets. What, then, is good? This is an open question.

We now examine the same problem by finding the steady state probabilities, and looking at the problem from a Markovian view. We first determine the transition probabilities and expected reward matrix for one pass through the lineup. A decision tree illustrating all possible outcomes and associated rewards is shown in figure#4.

Figure #4 here

A table listing all explicit 4-tuple outcomes , together with the state reached after the lineup is completed and associated rewards is given in Figure 5.

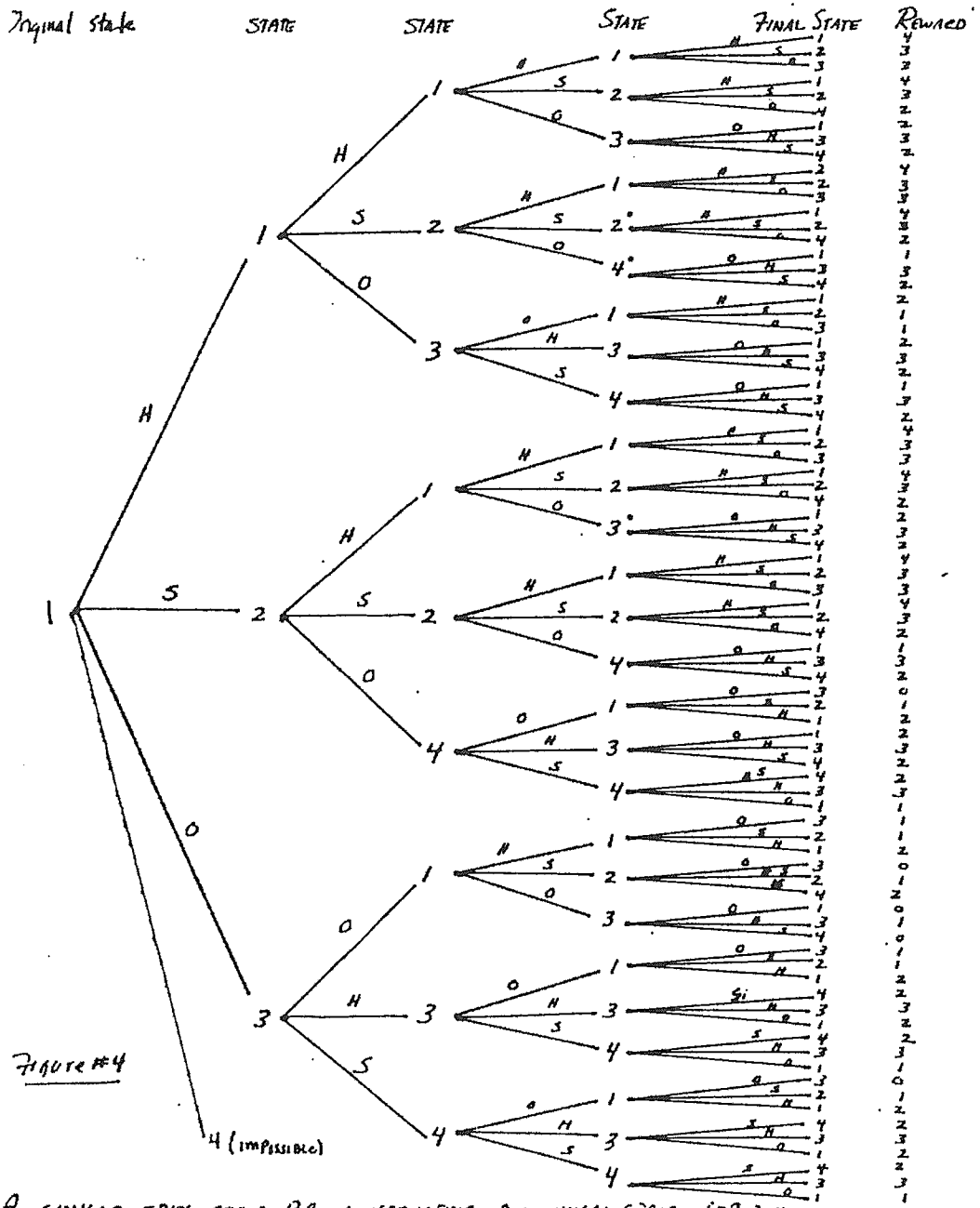

FIGURE #4

A SIMILAR TREE COULD BE CONSTRUCTED FOR INITIAL STATE $i = 2, 3, 4$.

Figure # 5

Sequence: Batter 1	2	3	4	*	Initial State $i = 1$: Final State	Reward	Final State	Reward	Final State	Reward	Final State	Reward
H	H	H	H	H	1	4	1	5	3	4	3	5
				S	2	3	2	4	4	3	4	4
				O	3	3	3	4	1	4	1	4
H	H	S	H	H	1	4	1	5	3	4	3	5
				S	2	3	2	4	4	3	4	4
				O	4	2	4	3	1	2	1	3
H	H	O	O	O	1	2	1	3	3	2	3	3
				N	3	3	3	4	1	3	1	4
				S	4	3	4	4	2	3	2	4
H	S	H	H	H	1	4	1	5	4	4	4	5
				S	2	3	2	4	3	3	3	4
				O	3	3	3	4	1	3	1	4
H	S	S	H	H	1	4	1	5	2	3	2	4
				S	2	3	2	4	4	3	4	4
				O	4	2	4	3	1	2	1	3
H	S	O	O	O	1	2	1	3	3	2	3	3
				N	3	3	3	4	1	3	1	4
				S	4	2	4	3	2	3	2	4
H	O	O	H	H	1	2	1	3	3	2	3	3
				S	2	3	2	4	1	3	1	4
				O	4	2	4	3	2	3	2	4
H	O	S	O	O	1	2	1	3	3	2	3	3
				N	3	3	3	4	1	3	1	4
				S	4	2	4	3	2	3	2	4
S	H	H	H	H	1	4	1	5	3	4	3	5
				S	2	3	2	4	4	3	4	4
				O	3	3	3	4	1	3	1	4
S	H	S	H	H	1	4	1	5	2	3	2	4
				S	2	3	2	4	4	3	4	4
				O	4	2	4	3	1	2	1	3
S	H	O	O	O	1	2	1	3	3	2	3	3
				N	3	3	3	4	1	3	1	4
				S	4	2	4	3	2	3	2	4
S	S	H	H	H	1	4	1	5	3	4	3	5
				S	2	3	2	4	4	3	4	4
				O	3	3	3	4	1	3	1	4
S	S	S	S	H	1	4	1	5	2	3	2	4
				S	2	3	2	4	4	3	4	4
				O	4	2	4	3	1	2	1	3
S	S	O	O	O	1	2	1	3	3	2	3	3
				N	3	3	3	4	1	3	1	4
				S	4	2	4	3	2	3	2	4
S	O	O	O	O	1	2	1	3	3	2	3	3
				S	2	3	2	4	1	3	1	4
				N	4	2	4	3	2	3	2	4
S	O	N	O	O	1	2	1	3	3	2	3	3
				N	3	3	3	4	1	3	1	4
				S	4	2	4	3	2	3	2	4
S	O	S	S	S	1	2	1	3	3	2	3	3
				N	3	3	3	4	1	3	1	4
				O	4	2	4	3	2	3	2	4
O	O	N	O	O	1	2	1	3	3	2	3	3
				N	3	3	3	4	1	3	1	4
				S	4	2	4	3	2	3	2	4
O	O	S	O	O	1	2	1	3	3	2	3	3
				N	3	3	3	4	1	3	1	4
				S	4	2	4	3	2	3	2	4
O	O	O	O	O	1	2	1	3	3	2	3	3
				N	3	3	3	4	1	3	1	4
				S	4	2	4	3	2	3	2	4
O	H	O	O	O	1	2	1	3	3	2	3	3
				N	3	3	3	4	1	3	1	4
				S	4	2	4	3	2	3	2	4
O	H	N	O	O	1	2	1	3	3	2	3	3
				N	3	3	3	4	1	3	1	4
				S	4	2	4	3	2	3	2	4
O	H	S	O	O	1	2	1	3	3	2	3	3
				N	3	3	3	4	1	3	1	4
				S	4	2	4	3	2	3	2	4

						(14)	
3	0	3	1	1	0	1	0
2	1	2	2	4	1	4	1
1	2	2	3	3	1	3	1
4	2	4	3	2	2	2	2
3	3	3	4	1	3	1	3
1	2	1	3	3	2	3	2
4	2	4	3	2	2	2	2
3	3	3	4	1	3	1	3
1	1	1,	2	4	1	4	1

For each initial state, i, we may find P_{ij} by summing over all sequences terminating in state j. When done over all i and all j we obtain the transition matrix for the given lineup we are utilizing.

3 lineups were examined: GGBB, GBGB, and BBGG. The probability transition matrices for these 3 orders are given in figure 6.

Lineup: GGBB	1	2	3	4
1	.4313	.0734	.3965	.0987
2	.4313	.0734	.3965	.0987
3	.4183	.0737	.3766	.1306
4	.4183	.0737	.3766	.1306

Lineup: GBGB	1	2	3	4
1	.4280	.0741	.3991	.0988
2	.4280	.0741	.3991	.0988
3	.4183	.0737	.3450	.1609
4	.4183	.0737	.3450	.1609

Lineup: BBGG	1	2	3	4
1	.3672	.1169	.3519	.1640
2	.3672	.1169	.3519	.1640
3	.3618	.1274	.3431	.1639
4	.3618	.1274	.3431	.1639

Figure 6

Close examination of figure 5 will explain the coincidence of rows 1-2, 3-4 in each transition matrix. The above represent the probability of moving from state i to state j with 1 transition, a transition being one pass through the 4-tuple lineup.

The award matrix for each of these three lineups may also be determined from figure 5. To determine the conditional expectation for state j we may use the following:

$$E(R/\text{transition from } i \text{ to } j) = \sum_h \frac{R_{hij} P_{hij}}{\sum_h P_{hij}}$$

where h is a sequence as given in figure 5

The reward matrices (expected) for the three batting orders are given in figure 7, below.

Lineup 1:GGBB	1	2	3	4
1	.643107	.87960	.49461	1.15200
2	1.14820	1.8574	1.31303	1.68693
3	.56533	.60285	.334600	.79572
4	1.0202	.92342	.66226	1.27201

Lineup 2:GBGB	1	2	3	4
1	.64813	1.12652	.49142	1.15081
2	1.10510	1.73785	1.32103	1.68522
3	.56533	.60285	.36528	.64608
4	1.0202	.92342	.84705	1.25076

Lineup 3:BBGG	1	2	3	4
1	.5496	1.08383	.62660	.83155
2	.88790	1.53636	1.02643	1.00229
3	.64760	.36264	.51585	.82881
4	.87535	.48430	.64852	1.14542

Figure 7

Noting that each transition matrix is regular, we may calculate the steady state probability vectors $\underset{\sim}{Q}^T = (P_1\ P_2\ P_3\ P_4)$ with $\underset{\sim}{Q}^T \underset{\sim}{P} = \underset{\sim}{Q}$. Calculating the steady state probabilities for our three lineups yields:

	GGBB:	GBGB:	BBGG:
P_1 =	.422845	.418645	.360145
P_2 =	.073216	.073117	.120852
P_3 =	.384758	.367955	.343300
P_4 =	.114630	.129705	.163949

From this information, we may find the "gain" for each Markov process using:

$$G = \underset{\sim}{Q}^T \cdot \underset{\sim}{T}$$

where $\underset{\sim}{Q}$ is the steady state vector
T is a vector whose ij element $= \sum_j p_{ij} r_{ij}$

The gain represents the incremental reward created over one transition in steady state. The gains for the 3 lineups are shown below:

Lineup 1: GGBB G= .673125
Lineup 2: GBGB G= .691678
Lineup 3: BBGG G= .705125

The lineup which is best is the one with the highest gain, BBGG. As found earlier, stacking the best hitters at the top of the order is suboptimal. This method provides us with a crude estimate, as it is based upon an infinitely large amount of transitions. From the dynamic program, the respective values of lineups 1, 2, and 3 are .62678, .6412, and .6452, which are consistent in their ranking with the Markovian gains.

How much of a difference do the lineups make? We may estimate this in rough terms. Using the data for the G and B hitters, we may calculate the E(outs) for one time through the order. This turns out to be 2.80 . If our fictional game consists of two outs per inning, and 9 innings per game, we would expect approximately 6.428 rotations per game (6.428- 18 outs/2.80). We would therefore be bounded between 6 and 7 rotations per game. The lineup BBGG would therefore produce approximately (6)(.705125) up to (7)(.705125) runs per game, i.e. $4.23 \leq R \leq 4.936$. For comparison, the GGBB lineup produces $4.03 \leq R \leq 4.712$ runs per game. The difference is approximately 1/5 run per game. Over a 160 game season this would be about [illegible] run difference. This could be a few victory difference, depending on the dispersion of the runs.

Conclusion

The baseball batting sequence problem was modelled as a dynamic program, a math program and a Markov process. The dynamic problem would explode combinatorially if utilized on full scale, while the math program has no efficient method of solution (it is nonlinear, [illegible]). The Markov solution works from steady state, and requires a large number of transitions. In order to insure a large amount of transitions we would need to assume a large number of games. This causes a complic[illegible] in that the terminal position of one game is not the initial position of the next.

Utilization of the Markov process and Dynamic program on a small scale problem both concluded that it is better to place superior hitters towards the center of the lineup. How this would translate to professional baseball is uncertain, as it is rare that one player dominates another in all facets of hitting.

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dressing me as a chimp and making me dance around at Seventh Inning Stretch. Before the game, he made me do almost the same thing, except I had to taunt the other team with a bunch of bananas. This didn't last long, and I was soon where I belonged -- on the field doing what no other man could do. I was now up to $5.00 a game (twice what the other players were getting, I understand) and was getting offers to do promotional work -- mostly hardware stores (I was seen installing roofing without a ladder). Finally, the owner of the team approached me to do a Corning Glassware give-away gimmick, with me swinging through the "Jungle of Savings." When I said no, I was traded again, this time to the Dunkirk Pin-Men, and it was only when I showed up for my first game that I found out it was a men's professional bowling team, trying to make a go at the big time. My spikes ruined most of Alley 5 as I slid around, but I bowled a 290 because my fingertips touched the one pin on my follow through. They offered me 20% of their winnings and 5% of the league if I stayed, but they demanded I learn English first, and besides, bowling was not what I came to the U.S.A. to do.

Before the season ended, I was signed by my first Pennsylvania -- the state I came to love so much -- team -- the Sugarcreek-Frankiln Oil-Men of the Oil-Men's League. However, since every team in the league was called the Oil-Men, the standings were impossible to follow, causing many fights over who belonged in first place. Since most of these fights were on the field, not many games were completed, and the league folded. In the fights, however, I was usually able to hit as many as three men in one long swing, developing the reputation as a "brawler" that I have to this day. When the league dissolved, most of us players were picked up by nearby teams. I went to the California, Pennsylvania Cokes in the southern part of the state. Here I became cocky again, this time about my newfound reputation. I yelled from the field before one game that "Coal work was for girls." It took over two hours to pull the crowd off me. By the time I was released from the infirmary, a new season was beginning and I had been sent east to the Carlisle Blue Mountaineers. Every game on our schedule was

my long and fascinating career, but I don't think I ever knew his real name, only that he told me to call him "U.S.A. Charlie" and that he made me swear loyalty to the flag. He realized I could do more for another team, and so he had the wisdom to move me on. I was sold to the St. Johnsbury Pilots (of the Truckmen's League) for a large sum of money which modesty prohibits me from disclosing here. But I saw the wad of cash my new boss handed to the coach, and it made quite a figure.

I was more at home on the Pilots; the men were closer to my age. But they had a hard time sdjusting to the idea of my arms. Sure, I made incredible plays -- anything within six feet of me on either side I could get without moving an inch. That was my reach -- six feet. The same held true for hard-to-get line drives -- one arm up and I could pull down anything they could hit. In half a season with them, I had only 5 errors, and those when I tripped over my own wrists. At the time (1956), I was paid $3.50 a game -- one of base-ball's highest salaries at the time I was told. Off the field, however, it was not so easy. The name "Monkey Man" was an obvious pain to me. As was "Kid Banana," which was written in indelible ink on my jersey by none other than Jake "Slosher" McCabe, "The Hot Corner Drunk" himself.
I had one close friend on the team, Julio Juantez, the excellent second baseman that I often handed double play balls to. But one day, when I tried to speak to him in our native Spanish, he slid away saying, "No my dialect, monkey man." I didn't know there were many different dialects, and was hurt for the rest of the season.

The next season, I was sent to another team, where they thought I might be happier. I was out of Vermont and on my way! I was short-stop for the Hornby Hornets of the Corning Oven-to-Table Glassware League in Chemung County, New York. The nicknames, however, followed me, even though my ability proved I could do the job. I saw other men leaping and diving to make plays that I did with one hand. I soon became resentful and cocky, appearing on the field with a soda in one hand while I grabbed at liners with the other. This got me in dutch with the manager, though, and he punished me by

at night, which surprised me since the team's budget forced us to buy balls and bats, etc. But I figured this all out at the first game when I arrived to find that our "stadium" was on the pavement of Interchange 16 of the Pennsylvania Turnpike, underneath the bright tollbooth lights. This worked well for a while, as not many cars got on and off this exit at 10:30 at night (our starting time). However, the ball took some funny bounces, many of them above even my reach. In all, 14 men on our team alone were seriously injured. Soon, no team would show up to play us, and we were dropped from the league.

It was then that I got my major break. I was finally playing on a big-time team -- the Pittsburgh Panthers, the farm team for the farm team for the A ball Minor League team of the Cleveland Indians! The American League! Real white uniforms, a real stadium, dugouts, the works. Unfortunately, due to all the excitement of opening day I panicked, and a simple rolling grounder went clean between my legs, causing me to step on my palm with my cleats. I was laughed off the field; and of course the names started again. Within two days I was a board certified alcoholic, drinking three quarts of "Monongahela Mud Bourbon" a day. By the third week of the season I was playing slow-pitch soft-ball in a West Virginia strip mine league. The made me pitch and called me "El Grande Wind-up." But, they paid my drinking tabs, which were many, because I was bringing in moms and kids.

This is when "General" Tom Scargent first asked me to become a clown. I told him then to shove it, but when he pointed out my options I was forced to consider it.

He let me tour with the "Travellin Buckaroos" -- a clown base-ball team. I played short-stop once again, but this time in either a gorilla suit or dressed as "The Ball Machine." Once they had me try to walk along the outfield wall at Rolling Rock Stadium in Latrobe. I met many of my old teammates on the road, and they seemed happy for me, or at least for some reason. Anyway they smiled hard or laughed. Meantime I kept hitting the bars, drinking mostly anything the barkeep had to offer. At closing time, I would attack the cleaning woman's cart, unscrewing caps in a frenzy. She, also from my country, would laugh at me while tilting her thumb toward her mouth. Local breweries were big then, and more than one analyst has traced their disappearance from the area to mine. I was never seen without a bottle of "Old Skinhead" under my arm. On the field, I hid a glass flask inside my mitt, which led to severe pain for me, but comic results for the fans.

I was on the Buckaroos for nine years, two of which I really remember well. They tell me I was great, and I must have been to be signed up with the Claypell Circus Troupe of Monroe, Fla., on the Everglades Circuit. I have never been happier than I am now as "Mr. Missing Link," drawing over 70 men, women, and children off Highway 41 each day.

As for base-ball, I say a big "Go to Hell." And to you too, Mr. "Jim" Baker. Take your journal and shove it way up there. If Manny Mannitillo isn't good enough for you, then I am told by the voices to tell you to screw with a switchblade. I am happy in Florida.

I leave you with this: if the Claypell Circus comes to your town, you better hide somewhere far from my long reach.

Drop Dead,

Manny Mannitillo
"Mr. Missing Link"

P.S. I have also sent similar letters to the Hall of Fame in Cooperstown and to the Commissioner of Base-ball.

MM "M.M.L."/
typed by Ethel Grobner
Fat & Bearded Lady
Claypell Circus
Under exclusive contract