Preface to the Second Edition

The half-life of a tournament victory seems to be about six months. No one offers unsolicited congratulations past that point, and after a full year, not even your closest friends will remember whether you actually attended. There's certainly no trace left of the prize money . . .

To my great delight, writing a book lasts longer. It's rare for me to attend an event where someone doesn't introduce himself and mention how much he enjoyed reading this book. That doesn't get old. And I'm still more amused than annoyed when my up-to-now silent opponent suddenly quotes back to me the precise selection of my sarcastic prose most appropriate for ridiculing the checker-play blunder I've just committed. These things wouldn't happen if no one were reading, and being read is what makes writing worthwhile. So—thank you all. I'm very glad you're here.

Why a second edition? Well, the first one sold out (thanks again, guys). Also, I was never that happy with its layout and production. As I look at a copy now, I see that the interior margins were too small, and the main diagrams too big. Too much white space. The cover was too flimsy. Who published this thing? Oh, that's right—I did. Two books later (and I should mention that anyone who enjoys high-quality backgammon writing will certainly want to read *Backgammon Boot Camp* by Walter Trice, and *Backgammon Praxis* by Marty Storer), I've had more of a chance to discover what works on the page. I hope this new design works for you.

A final motivation for this edition was to make some changes to the text. Problem #32 now mentions the best play, which is generally considered a plus. Problems #52 and #68 include new lines of reasoning. Some paragraphs were edited to fit a single page. Pip counts were corrected, typos retyped. A complete list of substantive changes can be found in Appendix C. I'm relieved to report that my single claim in the Introduction has stood the test of time (four years of it, at least): Each solution provided in this book (either edition) still rolls out to be better than the one originally published, according to the most modern software available.

Jeremy Paul Bagai
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Introduction

I've always been a book learner. Why struggle to recreate the wheel when its blueprints are already published? My first transformative experience with a text that contained "The Answers" came during my pool-playing days, from *Byrne's Standard Book of Pool and Billiards*. Accurate, complete, entertaining; to this day it is regarded as the one classic work on the sport. Who would have thought so much useful information about an ostensibly physical skill could be contained within a book? I enjoyed a perverse thrill in winning matches over players technically more proficient, because of knowledge I had acquired in bed next to a reading lamp. Louis Watson's *Play of the Hand at Bridge* had a similar impact upon me. On the lighter side (but of no less achievement), so did *The Complete Juggler* by Dave Finnigan and *String Figures and How to Make Them* by Caroline Furness Jayne. These great expository works—each with its own voice, yet each so clear, so graceful, so entertaining—are dear to me far beyond their simple instructional value. I regard them as artistic achievements of the highest order. They are the fruits of noble endeavors. Put a few beers in me and I may well hold forth on their advancement of the human spirit.

But there is a downside to learning from books: sometimes they teach the wrong things. I remember playing one of my first ever backgammon money-games against a much more experienced opponent. He opened with a 21 and split, 13/11 24/23, leaving a shot in the outfield. I rolled a 64, the only number to hit the blot. After some thought, I elected to make a different play. "Why didn't you hit?" he asked, and I replied, "Because I didn't want to help your timing." This is a comment that only a book learner (in fact, only a very specific Cooke-book learner) would ever make.

We all know about Barclay Cooke, but isn't he an anomaly? What about the other classic backgammon authors? Over and over again you'll hear it at tournaments, at clubs, on the Internet: "Whenever I get into a slump, I just go back and reread Magriel. All the fundamentals are made so clear. It's the backgammon bible." Indeed it is; this is one instance where hyperbole seems entirely justified. Paul Magriel's *Backgammon* is an amazing work.

However, it's also full of errors. Big errors. Juicy errors. Far above and beyond some random misplayed-ace-in-the-bear-off-which-loses-a-millionth-of-a-point-type errors. We're talking huge, conceptual, monster-equity-sacrificing blunders. And how could it be otherwise? Unlike chess or bridge, backgammon is as difficult to analyze as it is to play. Prove something in chess, and you've proved something. "Prove" something in backgammon and there's a good chance you'll soon hear the question, "Care to play that as a prop?" Dwek's *Backgammon For Profit* has such errors too. So do Jacoby and Crawford's *Backgammon Book*, Robertie's *Advanced Backgammon*, and yes, Cooke's *Paradoxes and Probabilities*. Here they are, in one place, reanalyzed.

The Cast Of Characters

**The Backgammon Book*, by Oswald Jacoby & John Crawford (1970).*
"[T]he first work on backgammon to approach the game from an analytic point of view," writes Robertie. On top of that distinction, it is also still the best all-around introduction to the game, with chapters on backgammon's history, chouette play, settlements, the running of tournaments, and etiquette (!)—topics hardly touched upon in backgammon literature thereafter. Although it doesn't actually contain all that much analysis, that which is there is surprisingly accurate by modern standards. Indeed, only four of their problems have made their way into this book. (This does not include the chapters on the opening move and replies thereto: there the commentary does show its age, and no such positions were analyzed for this book. For a modern take on the first two rolls, see *Inside Backgammon*: Volume 8, #1, #3, and #4.)

**Backgammon*, by Paul Magriel (1976).*
A masterpiece of such scope, insight, and, above all, clarity, that it still has the power to astonish the uninitiated. Not merely a collection of problems, but in fact a textbook that presents a logically structured sequence of concepts, each supported by many illustrative examples. What is most striking upon a close rereading is the consistent simplicity of the positions. They are never chosen to display the possible depth of analysis or the dazzling complexity that can appear over the board; instead, each is constructed to illustrate a specific theme—and one theme only—in the most clear and direct manner possible.

Which makes it all the more surprising that it's full of errors. How could such clear analysis be wrong? Well, sometimes everything written about a position is correct (and informative), but turns out to be dwarfed by some other factor neglected entirely. Sometimes a contrasting example doesn't contrast quite enough (see the discussion of The Inflated Comparison in the first problem of this book). And, most rarely, sometimes the intended theme itself is wrong altogether.

Backgammon for Profit, by Joe Dwek (1976).
Another great book with the power to turn beginners into solid intermediates, though never lauded to quite the same degree as Magriel's _Backgammon_. Dwek covers much the same material as Magriel, albeit in a more conventional, problem-oriented rather than encyclopedic, manner. It has been described as a collection of simple problems, the solutions of which are nearly all correct; yet neither aspect of this perception is very accurate. In fact, many of the problems are far more complex than those found in the pristine, primary-color world of Magriel; and in fact, many of the solutions are in error. Still, Dwek's was certainly the most advanced and generally accurate book of its day.

Dwek and Magriel studied together shortly before they wrote their respective books, which may shed some light on why there is so much overlap between them. Four problems that appear in both works are reanalyzed here, along with others unique to each author.

Paradoxes and Probabilities, by Barclay Cooke (1978).
An infamous work. The oft-repeated conventional wisdom has been that nearly a third of the solutions are wrong, but this is a significant understatement. A third of the solutions are _badly_ wrong; well over half are wrong to some degree. Why then, does the book live on while so many other artifacts of the backgammon boom of the '70s have long since faded into obscurity? Partly because the problems, misanalyzed or not, are so interesting. Cooke never shies away from the complex or ambiguous, and the result is a book that looks, but doesn't read, like high-level modern backgammon. Another reason, trivial though it may seem, is Cooke's always engaging prose. Where else can one find a reference to Debussy and an extended baseball analogy together on the same page, much less accompanied by a backgammon position? Danny Kleinman provides a deadly pastiche of Cooke's writing in his _Advice to the Dicelorn_.

***Advanced Backgammon*, by Bill Robertie (1984, 2nd edition 1991).**
Universally acknowledged as a classic and yet still underrated, Robertie's work organizes and explicates more high-level backgammon concepts than have ever appeared together, before or since. Even now, nearly a decade into the computer era, no other book is like it. In particular, no one to this day has been remotely so ambitious in the analysis of cube actions. In an era when the prevailing wisdom was that hand rollouts of cube actions were useless because of the many thousands of trials one would need to produce a reliable result, Robertie took a different perspective: he happily rolled out interesting positions in 108 game sets, fully understanding that many of his conclusions would be inaccurate, and fully expecting to become a much stronger player for the experience. He was correct on both counts: many of the positions in *Advanced Backgammon* are quite wrong; Robertie won the Monte Carlo World Championship in 1983 and again in 1987. In this book, all references to *Advanced Backgammon* are to the second edition.

Conspicuously absent from this list are the works of Danny Kleinman, backgammon's first and foremost mathematical theoretician. They are missing not for any single good reason, but rather for several arbitrary ones: his books are self-published and have never found quite as wide an audience as those listed above; although he covers a range of material, his signature work is strongly on the technical side; it's difficult to determine which of his material to reexamine, given that his books include match analyses and articles on pure theory; and, perhaps most tellingly, he has written so very much and this book is big enough already. In recent years, Kleinman has partnered with Antonio Ortega to produce some of the best backgammon books ever: *Fascinating Backgammon*; *Costa Rica 1994* (with Mario Madrigal); *Cubes and Gammons Near the End of the Match*; *Jerry Grandell: His Most Important Matches;* and *Backgammon With The Giants: Neil Kazaross*. Keep the faith, Danny.

The Computer Era

This project would not have been possible a scant five years ago—would not have been conceivable a decade ago, before backgammon entered its computer era. In 1990, Johnson's Expert Backgammon became the first commercially available software package that allowed the user to roll out

positions, providing empirical, statistical data about the number of wins, losses, gammons, and backgammons that result from any given position. (The initial release was for the Mac only; Johnson and Weaver released a version for the PC in 1992.) It was also the last package to be based on conventional programming techniques. That is, its programmers attempted to capture backgammon strategy in rules and algorithms of their own devising. This is quite difficult, to say the least, and Expert Backgammon achieved the level of weak intermediate. Meanwhile, Gerry Tesauro had pioneered the application of neural networks to backgammon strategy throughout the late '80s, and the effectiveness of this approach quickly became evident. Rather than following a static set of rules, Tesauro's TD-Gammon *learned* to play based on its own experience. As computer speed increased, allowing the program to look one or two rolls ahead in real time, its level of play approached (perhaps surpassed) that of the best players in the world. Although a basic version of the program was eventually released by IBM, a full package including rollout capabilities was never created for the public. Markets have a way, however, and in 1994, Frederik Dahl's JellyFish became the first commercially available neural network package for backgammon, changing the landscape of our game forever. 1998 marked the debut of Snowie, created by André Nicoulin and Olivier Egger. A neural-network package of comparable strength to JellyFish, it initially distinguished itself by way of its far superior user interface. In particular, Snowie could be instructed to analyze an entire match, rather than forcing the user to individually analyze each position of interest.

Subsequent versions of Snowie and JellyFish implemented various cosmetic and conceptual improvements, but a real breakthrough came with the arrival of Snowie 3 in December of 1999. There were two key advances. First, Snowie 3 fully integrates the doubling cube into its analysis of positions. This means that the program knows to make smaller plays when they are likely to lead to efficient doubles, knows that cube ownership can influence checker play, and knows that future cube efficiency can influence present cubeful equity. These are advanced topics and far beyond the scope of any previous software. Second, Snowie 3 performs truncated cubeful rollouts with variance reduction, achieving a fifty-fold increase in speed while simultaneously improving the accuracy of its results. As late as 1999, a meaningful analysis of a Double/No-Double decision might well have taken weeks; a better analysis now requires mere hours.

Methods and Goals

Every position included in the five books listed above (with the exception of those found in Chapters #1–3 of *The Backgammon Book*: "For Beginners," "The Opening Move," "The Reply to the Opening Move"; and in Section 1 of Magriel's *Backgammon*: "Basics") was entered into Snowie 2 for a full 3-ply analysis. All positions where the recommended play was found to be at least .05 points-per-game better than the next best alternative were eliminated. All remaining positions were rolled out with Snowie 2, with a beta version of Snowie 3, and finally with Snowie 3 itself, as each successive software version became available. This book consists of those positions for which an alternative play was found to be at least .05 (cubeful) points-per-game better than the originally recommended play. All rollouts were conducted enough times to ensure that the lower bound of a 95% confidence interval around that equity difference never dropped below .025. See Appendix A for a full discussion of the rollout techniques employed.

Note that .05 points-per-game is a conservative criterion for error, ensuring that the problems in this book do not represent trivial oversights. For perspective on just how conservative, consider that Ortega and Kleinman use .03 as their criterion for errors in their recent book *Jerry Grandell: His Most Important Matches*, and that Woolsey and Heinrich use .04 in their *New Ideas In Backgammon*. Or consider the wise musings of David Montgomery: "Errors bigger than .05 . . . no, you don't want to make those."

Furthermore, please note the overall conservative nature of the claims I make for this book:

- I do not claim to have uncovered every position in the five books listed above for which the given solution is significantly wrong. There were several positions for which Snowie's initial 3-ply opinion (that a published solution was in error) was eventually contradicted by way of a subsequent rollout. Of course, these positions do not appear in this book. However, there may likewise have been many positions for which Snowie's initial 3-ply opinion (that a published solution was correct) *would* have been contradicted by a rollout had one been performed. Thus, I do not claim this book to be exhaustive.

- I do not claim to have always found the best play. I hope and believe that I have, but I wouldn't be too terribly surprised to discover a few positions where the best play placed so low in the initial 3-ply analysis that I never considered it to be a candidate worth rolling out. (However, the play recommended here should still be better than the one given by the original author.)
- I do not claim that all the plays recommended here are better than their originally published solutions by a margin of at least .05 points-per-game. Rollouts are inherently probabilistic, and any result that turns up as .055 now may well become .045 after another 10,000 trials. .05 is an arbitrary value, designed to provide a healthy margin of error for my one explicit claim:
- I do claim that each solution provided in this book is better than the one originally published.

Of the five authors represented in this book, three orient their diagrams counterclockwise, two clockwise. Two pose problems for White, one for Black, one for Red, one for X. For the sake of consistency, all positions in this book have been recast for Black, moving clockwise. Pip counts are provided at the far left of each diagram. Cubeful equities of candidate plays are included at the end of each problem, ordered from best to worst. The equity difference from the best play is indicated (in parentheses) next to the originally published solution. For cube decisions, the proper action is indicated by a row of three asterisks.

When quoting directly from an author's text, I have taken the liberty of substituting the color name and point number appropriate for my diagrams. Thus, Cooke's original sentence "W5 is valuable, but since Red has W4, it is hardly worth breaking W8 to make it," has become "The 5 point is valuable, but since White has the 21 point, it is hardly worth breaking the 8 point to make it." Standard practice would be to indicate such substitutions with brackets: "[The 5 point] is valuable, but since [White] has [the 21 point] it is hardly worth breaking [the 8 point] to make it," but these were omitted for clarity.

The positions have been ordered by topic. While this book was never intended to be a complete guide to backgammon (some tricky concepts are overrepresented while many simpler concepts are not explicitly covered at all), I am quite pleased with how comprehensive it has turned out to be. It can be read on its own, or used as a study aid in conjunction with the original works. Appendix B is an index of positions by author, in their original order.

In J.D. Salinger's *Seymour—An Introduction*, Buddy Glass recalls that his older brother once advised him to write the story that he, Buddy, most wanted to read. This project was undertaken in much that same spirit: I set out to write the book that I believed would most help my game. I hope it helps yours.

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Jeremy Paul Bagai
Philadelphia, Pennsylvania
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