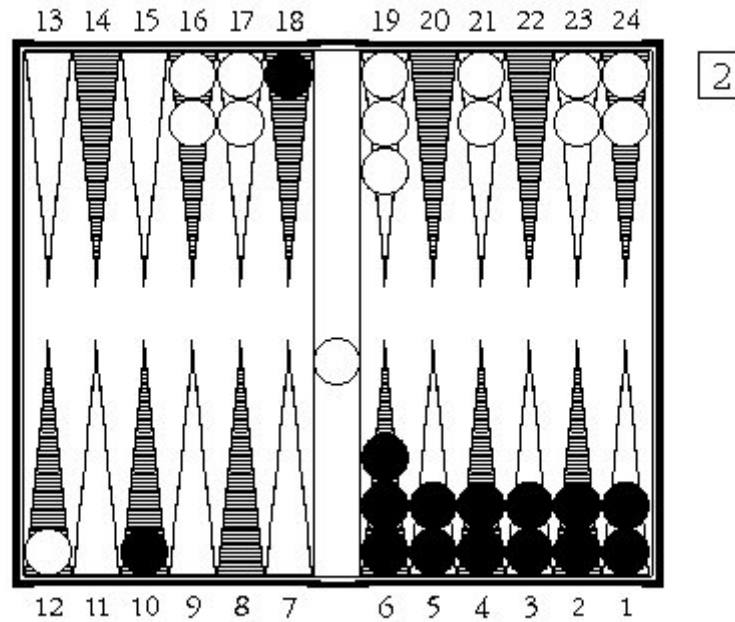# Backgammon

An Independent View

Revisited

by

Chris Bray

<u>Introduction</u>

The original book, "Backgammon – An Independent View" was published in 1998 and used material going back as far as 1994. At that time we had already seen the emergence of TD-Gammon, the first 'neural network' based backgammon program. It had been developed by Dr. Gerry Tesauro, in the IBM laboratories in White Plains New York, as part of a research programme into neural network technology rather than to develop backgammon per se.

The first commercial neural net program, JellyFish, had arrived on the market but Snowie had yet to make its debut. Some of my material had been analysed using "Expert Backgammon" - a pre 'neural net' piece of backgammon software. The last seven years have seen very significant developments in the capabilities of what are now commonly known as the bots and Snowie 4 is far stronger than its predecessors. The software, coupled with the processing power of modern computers, gives us an analysis tool we could only have dreamed of, even in 1998.

I have recently been giving quite a lot of seminars and teaching newcomers to the game and have often made reference to the material in my first book. Fairly early on I spotted what I thought was an error in my analysis and a long and detailed rollout using Snowie confirmed my suspicions.

As a result I decided to review the whole book and re-analyse all the positions in depth using Snowie 4. I won't bore you with the details but suffice it to say that when the dust had cleared I was convinced that seven of the original solutions were wrong or at least questionable and there was one position for which I had originally given no clue as to the correct move. It is interesting that my own thinking, informed by the bots and the passage of time, picked up most of the errors when I re-read the book but a couple of them came as a surprise.

At this late stage it is not financially viable to issue a reprint but I can at least salve my conscience by issuing this monograph with updated solutions and commentary on the eight positions. (Please note that this does not affect my second book "What Colour is the Wind?" as that is already in its third reprint and changes have been incorporated in each new version to correct minor errors in earlier versions.)

The format of this short paper is straightforward. The position diagram and title are represented as they first appeared except in two cases where white was originally on roll. In those cases the colours have been reversed. If no dice are shown then the question is whether black should double or redouble and whether white should take. The page number from the book is also quoted as a reference and the original solution is listed. There then follow the revised solution and a new commentary on the position. Finally the relevant equities for black from Snowie 4 rollouts are listed (note that Snowie only deals in pure equities and does not take account of the value of the cube).

I hope that as far as "An Independent View" is concerned this sets the record straight, but who knows how our thinking will change as new programs emerge? As Niels Bohr said, "Prediction is difficult, especially about the future."

13 14 15 16 17 18   19 20 21 22 23 24

Pips: 151

64

Pips: 55

=

12 11 10 9 8 7   6 5 4 3 2 1
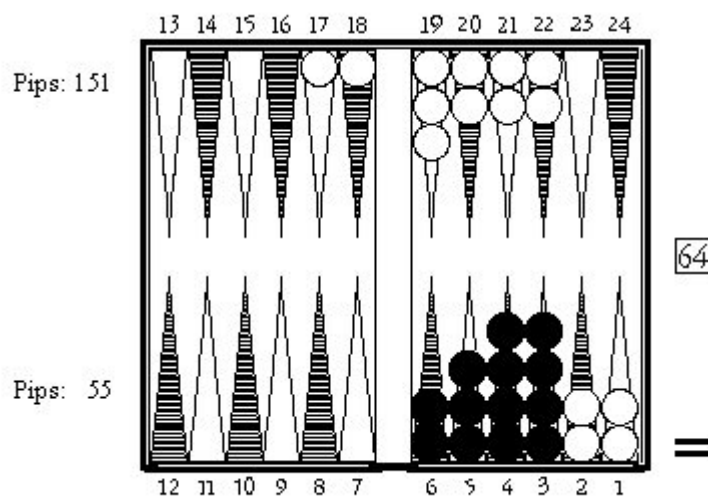
<u>Back Games</u>

This is the famous game involving Walter Cooke (black) and Jesse Sammis (white).

Cooke doubled this position (black has already borne off two men), Sammis took, Cooke rolled 65 and Sammis promptly redoubled (incorrectly) to 4. When he missed the double shot Cooke put the pressure on by redoubling to 8, which Sammis took. When Sammis got a later double shot he redoubled to 16! This time he hit, and the game was in the balance for a while, but on the last roll Sammis needed to roll 66 to win. Recognising that being 16-0 down in a match to 17 was hopeless, he redoubled to 32 and promptly rolled boxes!! An incredible game; but what about Cooke's initial double?

For many years most observers believed that Sammis had made an error by taking and in 1998 I shared that view. None of the bots played back games well enough that we could trust their judgement and so the consensus view prevailed. Snowie 4 plays back games very reasonably, so much so that given sufficient rollouts we can now believe its analysis. Kit Woolsey gives good reasons for why this is so in his excellent "The Backgammon Encyclopaedia – Volume 1".

Kit produces some excellent analysis on back games in general and goes some way to proving the revised rule of thumb that "one should wait to double a back game until you have three points to clear above your opponent's highest anchor". In the case of playing against a 1-2 back game that would imply you should clear the 6-pt before doubling. Whether your opponent has a take then depends on such factors as how your men are structured on the three points and the state of the defendant's home board.

In this particular position white's timing is perilous and one bad roll, double fours for example, could damage his chances irreparably. This fact makes the position slightly more volatile than many back game problems and this volatility implies that black can double now rather than wait until he has cleared his 6-pt.

Note however that it is the doubling decision that is close – the take is crystal clear and dropping would actually be a huge blunder. A significant change in thinking from 1998. Well played, Mr. Sammis!

Double/take:	0.794
No Double:	0.750
Double/Pass:	1.000

2005 Solution: Double/take
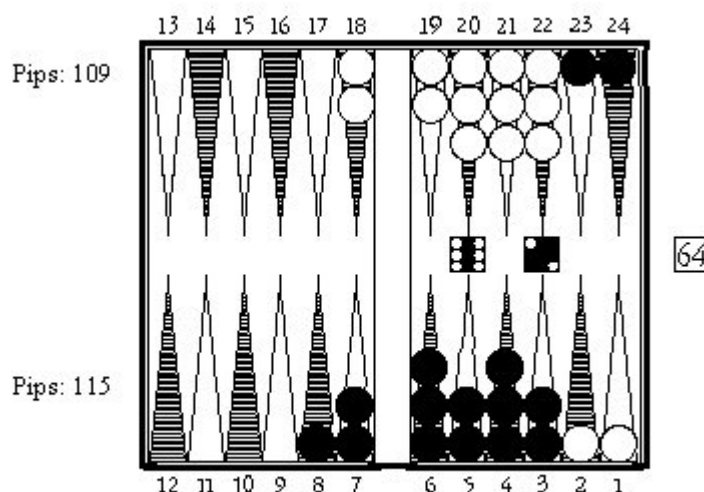
<u>Prime v Prime</u>

The original analysis made the classic error of studying two moves (a) 23/17, 8/6 and (b) 8/2*, 4/2 and choosing between them whilst simply overlooking that play (c) 23/17, 4/2* was an option.

The 1998 article happily and correctly makes its point about the preservation of timing in prime vs. prime games but fails to point out that the tactic of knocking your opponent away from the edge of your prime is a fundamental part of the strategy for this type of game. 23/17, 8/6 is a huge error, nearly a blunder in Snowie's terminology.

I have no idea why (c) was not analysed in the original article – I must put it down to a pure oversight. Anyway the error allows me to reinforce two key points:

1) Always make sure that you have considered all the candidate moves that meet the requirements of your game plan.
2) In prime vs. prime positions it is important to knock your opponent away from the edge of your prime if you can do so.

If you don't consider point 2 as part of your strategy you may well overlook plays such as (c) when evaluating point 1.

23/17, 4/2*:	0.624
23/17, 8/6:	0.527
8/2*, 4/2:	0.479

2005 Solution: 23/17, 4/2*
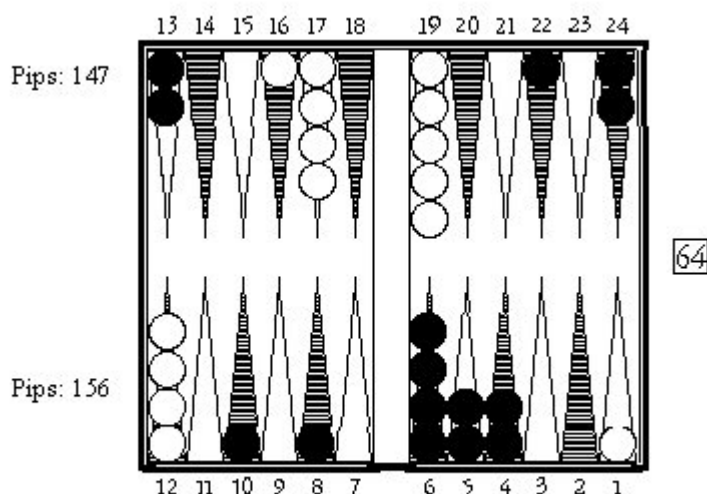
Rollouts

It is ironic that the answer to this problem was (marginally) incorrect. The purpose of the original article was to demonstrate the value of rollouts. Although it advocated the use of computers it also pointed out that this was no substitute for performing the rollouts yourself.

Time and experience have taught us otherwise. It is worthwhile rolling out a position by hand to get an idea of how the position develops and to get a better understanding of the features of a position. However, when it comes to rollouts the bots have gone beyond us. Today's processor speeds, neural networks and variance reduction techniques combine to give us massively powerful rollout capabilities that humans can't possibly hope to emulate. We would be dead of boredom, if not in fact, long before we could hope to perform enough rollouts on many positions to a degree of statistical accuracy that we would be happy with.

In this position black does not lose his market on enough sequences to quite give him a double and he does better to wait a roll and hope to give white a more difficult problem next time.

All these comments, of course, assume that you are playing a perfect opponent. With even a small percentage chance that white might drop this would become a strong practical double. The importance of knowing your opponent should never be underrated.

No double:	0.560
Double/take:	0.533
Double/Pass:	1.000

2005 Solution: No double/take
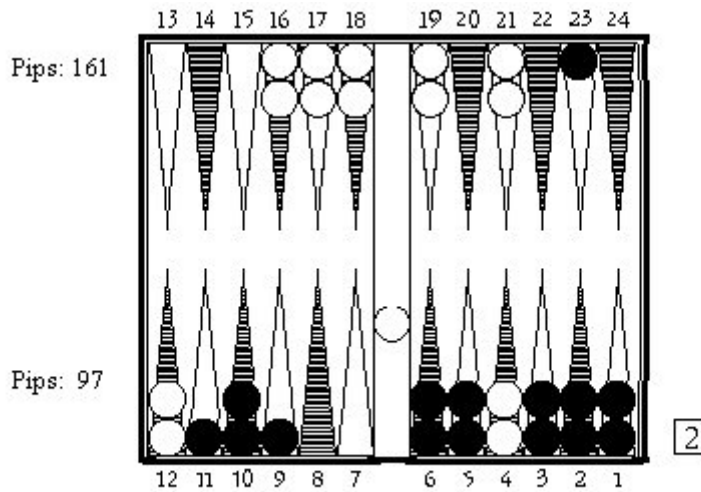
<u>Tricky Proposition</u>

In my original analysis of this problem I didn't spend much time on the doubling decision which I assumed to be a clear redouble. I was overly influenced by what had happened over the board and for whatever reason I assumed the redouble was correct – a clear error on my part. Instead I concentrated on the take/drop decision.

With hindsight it is clear that it is the decision to redouble that is questionable. I also think that nowadays, with the overall better understanding of the game that players have in 2005, very few people would drop this redouble as white although a weak box player may still be pressurised into dropping.

Although black has market-losing sequences there just aren't enough of them to warrant a redouble in this position. When black advances to the 20-pt (or beyond) and white fans black will either have lost his market or be too good to redouble but this only happens 25% of the time (325 out of 1296 to be exact). The position is therefore not volatile enough to justify a re-double.

With one bad sequence black could very soon regret having given the cube away – he does much better to hold on to it. Snowie's 2005 rollouts confirm that black would actually be committing a blunder by redoubling here and in fact he is not even strong enough to double from the centre.

No redouble:	0.535
Redouble/take:	0.383
Redouble/pass:	1.000

2005 Solution: No redouble/take
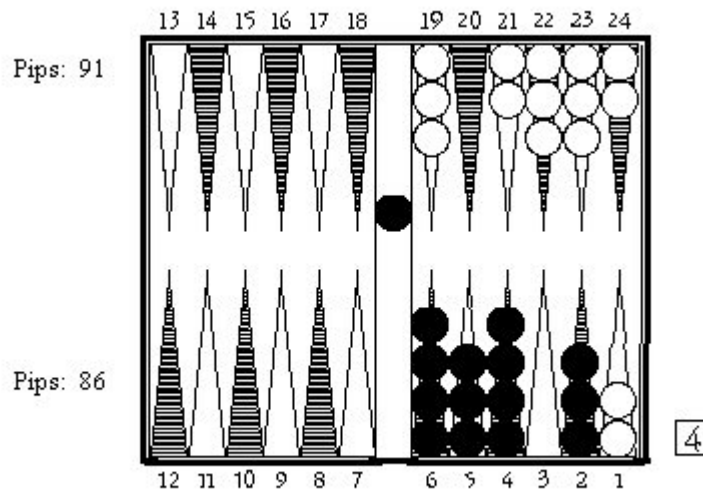
<u>Doubling from the Bar</u>

This is one where the passage of time and the improvement in the bots have changed the solution. What was a borderline redouble in an early version of Jellyfish has become a very clear "no redouble" with Snowie 4.

Again the original article focused on white's take/drop decision and no time was spent on evaluating the redoubling decision. This is very similar to the preceding problem in that the volatility is not high enough to warrant black giving away the cube. As before a poor sequence could see black facing a very powerful recube to 16 in only a few rolls time.

Doubling from the bar against a five-point board requires a very strong position elsewhere on the board. For example if two of the men on black's 4-pt were on his 3-pt then he would have a very clear redouble that white would have to pass. If the spare man on white's 6-pt were on his 1-pt (giving him many crashing numbers next time) then black would have a perfectly correct redouble that white should accept.

As with many backgammon positions the devil is in the detail. As the position stands black needs some improvement, albeit marginal, before he can venture a redouble.

No redouble:	0.586
Redouble/take:	0.516
Redouble/pass:	1.000

2005 Solution: No redouble/take
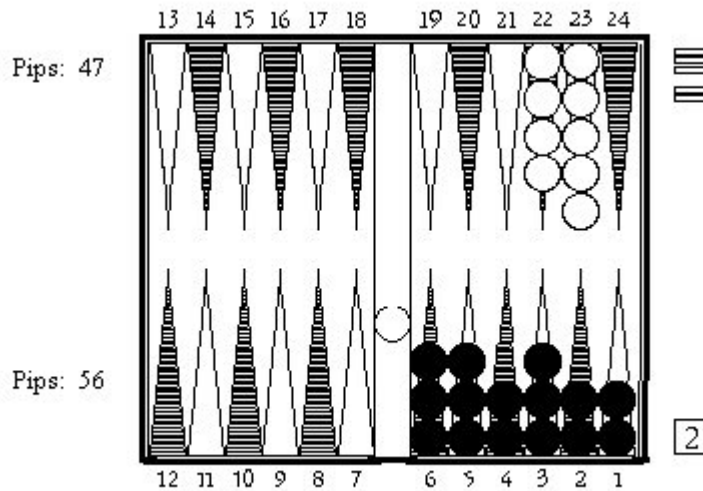
Ace-Point Hit

Once more the passage of time and the enhanced capabilities of our silicon friends have better informed our thinking on problems such as this one.

The original article was an attempt to demonstrate Robertie's rule of thumb for positions where one player is hit and closed out after bearing off a number of men. His original broad rule stated that if you have borne off five men then you can take a redouble.

As a rule of thumb it is still a good guide but we have learnt through the bots and the work of people such as Walter Trice and others that it is possible to be more precise about such positions. One variation of Robertie's rule should now read "if you have borne off exactly five men before being hit, then the rest of your men must be positioned in your home board such that you cannot subsequently fail to take off a man with any roll, once your straggler has reached home".

In the position above white will miss with 1's. This turns the potential take into a very clear drop. If white's four men on his 3-pt were on his 1-pt he would have an equally clear take.

The arrangement of black's three spare men in his home board also influences doubling decisions. The lower they are in his home board the worse off he becomes because he will often have to open his board having borne off only one man. This creates positions where the side being redoubled can actually take a redouble despite having taken off only four men – a point noted by Robertie in his "Advanced Backgammon".

No redouble:	0.992
Redouble/take:	1.154
Redouble/pass:	1.000

2005 Solution: Redouble/pass
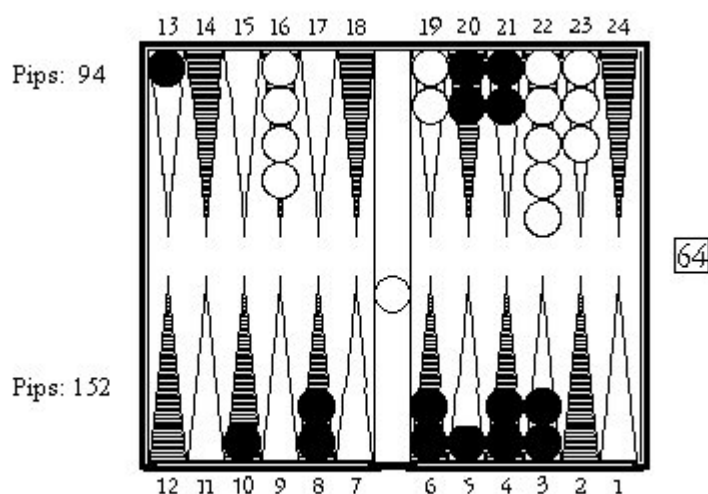
Abandon Hope?

This is another one where what was a take in 1998 has become a very clear drop in 2005. The one area where the bots have improved more than any other is in the playing of back games. The rollout data from all those years ago made this position the thinnest of takes but as you can see from the statistics below a take would actually be a blunder.

One of the benefits of quality rollout data is that you can use it to understand the strengths and weaknesses of a position. It often helps you to "see" things that you should have derived from first principles. What actually happens is that it structures your thinking so features of a position become easier to interpret when you have the rollout data to hand.

Once you know this to be a drop despite the 58-pip lead you want to know why. If black makes his 5-pt some of white's 4's or 5's (whether upon entry or subsequently) are truly horrific because they have to be played from his 6-pt, thus potentially exposing a second blot and increasing the percentage of gammon losses.

It is this short-term tactical consideration that makes the decision to drop correct. Take one of white's men from his 9-pt and place it on his 6-pt (thus giving him a spare 4 or 5 to play) and then the position becomes double/take. This reinforces the point that you must study every element of a position to arrive at correct decisions.

Decision-making based upon generalities can only take you so far in backgammon. After that attention to fine detail is required. In Einsteinian terms you must apply the "Specific" rather than the "General" theory of backgammon to be successful.

No double:	0.871
Double/take:	1.132
Double/pass:	1.000

2005 Solution: Double/pass
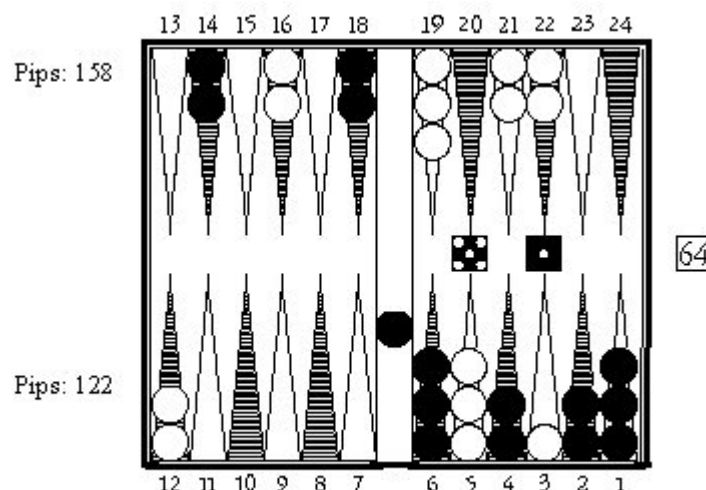
Thinking about Backgammon (Part I)

This position was part of one of the longer articles in the original book that tried to teach readers how to structure their thinking. It was based on the theory that very much like a golfer following a set pre-shot routine before each stroke so a backgammon player should also follow a pre-roll routine. Backgammon is a very complex game and imposing some rigour and discipline into the thinking process is very important. I'm glad to say that what I wrote seven years ago is even more critical to success in the modern game.

I simply forgot to give the answer to this position. Once you have rejected bar/24, 6/1 – you simply can't afford to bury another man – you are left with (a) Bar/20, 14/13 (b) bar/20, 18/17 and (c) bar/20, 4/3*.

(b) can quickly be rejected as it exposes black to multiple double hits and simultaneously destroys his key defensive anchor. (c) is imaginative and if black had more men within easy covering distance it could be correct but with white not having any other weaknesses that can be attacked whilst he is on the bar the move is not part of a thematic plan.

That leaves (a) which turns out to be the best play. There are some double hits but there are not as many as with (b) and they are less devastating. There is also some duplication of 1's. Crucially the key defensive anchor on white's bar-point is maintained. If you can consistently get awkward plays such as this correct you will be well on the way to successful backgammon.

Bar/20, 14/13:	**-0.456**
Bar/20, 4/3*:	**-0.499**
Bar/24, 6/1:	**-0.688**
Bar/20, 18/17:	**-0.839**

2005 Solution: Bar/20, 14/13

Bibliography/Further Reading

I have often been asked which are the best backgammon books to read to develop one's game. What follows is my Top Ten (in no particular order). Some of these are referred to in the text of this paper. The eleventh, " The Backgammon Book", should be read by those with an interest in the history of the game.

"Backgammon"	Paul Magriel
"Advanced Backgammon – Volumes 1 & 2"	Bill Robertie
"Modern Backgammon"	Bill Robertie
"Classic Backgammon Revisited"	Jeremy Bagai
"New Ideas in Backgammon"	Kit Woolsey & Hal Heinrich
"The Backgammon Encyclopaedia – Volume 1"	Kit Woolsey
"How to Play Tournament Backgammon"	Kit Woolsey
"Backgammon Boot Camp"	Walter Trice
"The Doubling Cube in Backgammon – Volume 1"	Dr. Jeff Ward
"Vision Laughs at Counting with Advice to the Dicelorn"	Danny Kleinman
"The Backgammon Book" (extended version)	Oswald Jacoby & John Crawford

Acknowledgements

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January 2005