The Flavor of the Game

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It is a truism to enthusiasts that go is the world's greatest game of strategy — but why? There is the delicate balance between intuition (shape) and calculation (reading), and the subtle interaction of local and global (tactics and strategy). But in a way three specific consequences of the rules give go much of its characteristic flavor, supporting its uniqueness and appeal as a stool is supported by its three legs.

We all appreciate the extraordinary simplicity of the basic rules of go: who hasn't used the line about "five minutes to learn, a lifetime to master?" But when one tries to precisely formulate the rules of go, three areas stand out as requiring special care: these are 1) ko; 2) the definition of a living group; and 3) the determination of the end of the game. Not coincidentally, these also turn out to be three of the most interesting areas for anyone interested in precisely formulating the rules of go, and/or in designing a reasonable computer go program.

Two Eyes Are Better Than One

One of the giant hurdles for the beginning go player is the concept of life and death -- when is a group unconditionally alive? Most beginners play numerous games before this concept becomes even vaguely clear; some, who learn the game on their own, must actually discover the principle of two eyes for themselves! Even dan-level players continue to profit from working life-and-death problems, and continue to be fooled by false eyes (or "virtual" eyes -- the ones that exist only in the mind's eye while trying to read out a *semeai*!) One can say without exaggeration that after learning the rules, a grasp of what constitutes a living group is the bread-and-butter of go.

Most versions of the rules of go based on the Japanese rules, including the World Amateur Go Championship rules used by the AGA, include some specification of what constitutes a living group. This is necessary, if for no other reason, in order to define *seki* and to specify those empty points surrounded by living stones which should *not* (according to Japanese rules) be counted as territory. The WAGC definition of "life," however, tends to be somewhat less than explicit:

> A group of stones is termed "alive" if it possesses at least two eyes as specified in paragraph 15(i), or if it can secure at least two eyes for itself through alternate play.

For the beginner, the picky, the pedant or the computer programmer, this may not be satisfactory. Can a beginner therefore claim that a group of stones left within an opponent's territory is alive if a much stronger player could, with proper play, defend it? The WAGC Rules go on to specify that all issues of defensibility

of stones within opposing territory are to be resolved by actual play, but this isn't a very satisfactory definition of life!

It is an interesting exercise (which has been carried out at least once in the pages of this Journal many years ago) to explicitly specify the conditions for "absolutely unconditional life" of a complex of stones. Some approaches to programming a go tactician (tsume-go program) start from a programmatic version of such a characterization of absolute life. (Others depend on brute force — a group is alive if no possible sequence of moves can kill it!) In any case, most go players sooner or later come to realize that there's more to life and death than meets the eyes.

Twinkle Twinkle, Little Ko

To the beginner, ko often seems a blemish on the seamless surface of the game of go. Ko, with its apparently artificial constraint on repeated capture, seems a distraction from the "essence" of the game — the creation of territory, influence, thickness. Multi-step and multi-stage kos just make things worse, and most beginners tend to shy away from initiating kos, and to shake their heads and mumble when forced by stronger players to fight them.

Yet, little by little, as players get stronger they begin to appreciate the spice a ko fight contributes to the game. (If the notion of a living group is the bread and butter of go, ko is the mustard and relish!) They begin to look for opportunities to force a ko for life instead of dying in *sente* (or letting the opponent live in *gote*). They begin to play so as to leave ko threats available "just in case," and rub their hands over "flower-viewing" kos. Comes the day (probably around the time they reach *shodan*) a player finds himself or herself positively relishing a game-deciding ko fight. Having achieved this understanding, who would deny that this is one of the unique, characteristic pleasures of the game of go?

Although most of us never face one in a lifetime of playing, triple kos, quadruple kos, round-robin kos and the like are anathema to rule-makers. The Nihon-Kiin has a virtual bestiary of mutant cases, each requiring special handling, some leading to the rather unsatisfying "game ends with no result." Most if not all these special cases can be eliminated at a stroke if one adopts the so-called "super-ko rule", which states that "it is illegal to move in such a way as to exactly recreate a game position with the same player to move." This includes the ordinary rule of ko, but also handles all the special cases revolving around endless repetition (although not always in the same way as the Nihon Kiin precedents!)

The strongest objection to this rule is that, especially at the amateur level, it is practically impossible to guarantee that the players will notice such a repetition after a number of complex, intervening moves. But unnoticed repetitions, like overlooked *tesujis*, simply do not become factors in the game. And if a suspicion arises, the game can be recorded. In any case, ordinary (American) amateurs are unlikely to know the specifics of Nihon-Kiin precedents for such special cases, and are thus likely to be forced to seek expert advice, which can be at least as annoying and disruptive as having to record one's moves!

Is It Over Yet?

Every beginning go player experiences a certain amount of confusion about the end of the game. Along with a grasp of ko and the notion of a living group (two eyes), a feeling for the end of the game could be said to be one of the things which gives the game its characteristic flavor (the dessert?). And like ko and the notion of a living group, the end of the game also poses special problems for those trying to precisely define the rules of go, and to program a computer to play the game.

The WAGC Rules state that the game is over when both players agree (by passing in turn), after filling all neutral points (dame) and making all necessary defensive moves within their own territory. The rules also provide for the resumption of play, however, if the players disagree over the status of some group at the end of the game. They say little about how such resumed play is conducted, however. The newly revised Nihon Kiin rules have an elaborate provision for a "confirmation" stage to handle special cases after the "end" of the game. The rules for handling ko are different during this stage (one cannot recapture a specific ko even after playing elsewhere under certain circumstances, for example), and many players are still unsatisfied with the ad-hoc character of these rules, which seem somewhat lacking in elegance. How ironic that the hardest thing about the game for the pros as well as the beginner, in a certain sense, should be specifying when the game is over!

Many of the problems with the definition of the end of the game evaporate if one uses a Chinese-style definition of territory — living stones plus any surrounded empty points. This approach also simplifies counting — prisoners are irrelevant, and only one side need count (although frequently both do so!) The use of Chinese counting also eliminates some of the Japanese "special cases," which are "special" only because neither player would choose to play so as to resolve them, as it would cost them points. While in the short run the Chinese rules are unlikely to replace the Japanese as dominant in the international scene, together with the "super-ko" rule, they seem to provide a more satisfying aesthetic whole.

The problem isn't just one of rules. Amateur players (and all the computer go programs I've seen) frequently leave situations at the end of the game which aren't completely resolved — most often because one player, with proper play, can turn a small "territory" into seki. Even single-digit kyu players frequently leave the position in Diagram 1, which is actually a sente seki for Black, and under time pressure, I recently left the position in Diagram 2 (which my opponent promptly turned into a seki!)

To get some idea of the magnitude of the problem, consider a game between weak amateurs which ends with nine points in the corner surrounded by one player, say White, in the configuration shown in Diagram 3:

Is this territory? If Black plays in, at the 2-2 point, can he get a seki? Or maybe even kill White's group? Or is he just giving White a free prisoner? If this problem seems too simple, consider a 4x4 or 4x5 territory, or any shape you please. For this reason, it seems unlikely that a computer program can ever be confident that

the game is really over without the ability to solve dan-level tsume-go problems such as these!

Life, ko and the end of the game; in a very real sense, this is what go is all about. Of course, the sophisticated player will build on these basics and enjoy savoring the proper flavor of "joseki, tesuji, sabaki, miai," and all the other aji the game has to offer, just as a gourmet will prefer steak and sushi to bread and butter alone (even with relish and dessert!) But none of us is likely to empty our plates of the pleasures and surprises of life-and-death, ko-fights and yose calculations in our lifetimes — thank God!