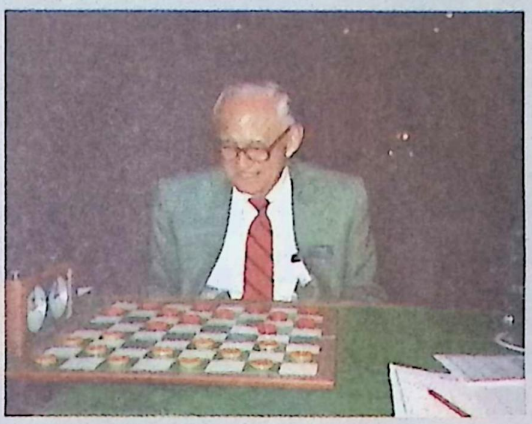
Man beats machine

World champion and professor of mathematics Marion Tinsley had won every tournament he had played in since 1950, when he fought Chinook in 1992. Dr. Tinsley won, four games to two with 33 draws. Chinook's two wins were only the sixth and seventh games Dr. Tinsley had lost in over 40 years. In a 1994 rematch, Tinsley had to withdraw in poor health after six draws. He died of cancer seven months later. Though Chinook beat other human opponents with ease, the unfinished battle with Dr. Tinsley raised questions over Chinook's claim to be the best draughts player of all time. Alexander Moiseyev, the current world champion, has never faced Chinook. He uses computers to analyse games but does not play against them, readily conceding that people are no longer a match for computers.



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needed to be computed.

The solvability of a board game generally depends on two factors: the number of possible positions, or "state-space complexity," and the difficulty of deciding on the best move, or "decision complexity." Noughts and crosses is simple on both counts. Checkers is complex in both regards.

As for chess, it is obviously harder to solve than checkers, with a state-space complexity of 10^{46}. Decision complexity in chess is difficult to quantify, but it is clearly very high. Artificial intelligence has created game-*playing* programmes, such as DEEP BLUE for chess. But *solving* a game means achieving perfection in chess. Until recently this was thought to be impossible, as mathematicians and programmers considered chess to be an "infinite game." But Chinook is now considered a significant step towards finding such a solution. Nevertheless, Schaeffer says new tools are needed before that can happen.

"Chess and Go cannot be solved with the type of technology that we have today," he says. The game of Go, played on a 19 by 19 grid, is considered by many to be the hardest conventional game to crack, with approximately 10^{100} possible positions.

In fact Dr. Schaeffer is taking a shot at cracking poker next -- a whole new game in which opponents' positions are not openly revealed. His program Polaris is currently taking on world champion poker players in Texas Hold 'Em poker. What the stakes might be is anyone's guess!

Fur your own good

Primates spend much of their time going through one another's fur to relax and cement social relationships all round. A common conception is that those who are on the receiving end benefit. But a recent study of 'Barbary apes' finds that grooming benefits the groomers even more



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than the groomed. Primatologists from Roehampton University in London followed a group of macaques on the Rock of Gibraltar over 2 months, recording grooming behaviour and collecting faeces to analyse the stress hormone cortisol. The animals who tended others the most had as little as half the cortisol levels as those who spent less time grooming others. And, surprisingly, there was no correlation between cortisol levels and being groomed. The study suggests that more active groomers are less stressed because they have stronger social support networks.