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Early 1991 Review

by Larry Kaufman, I. M.

While 1990 was a fairly dull year for the dedicated commercial chess computers, things are getting a bit more lively this year. We have several major events involving computers to report, and some exciting new models have been announced, though not yet offered for sale. I'm glad we switched to a three issue per year format, as there was not enough news to warrant a new issue a month ago. Four months seems just about right. We're a bit late due to waiting for test results on the Novag Diablo and the "ChessMachine".

On the Super Computer front, IBM's Deep Thought 2 made its debut with a reported 22 processors and about ten times the speed of its predecessors. It played in a German tournament at Hanover in march against seven International Masters and Grandmasters, scoring 2 1/2 - 4 1/2 for a performance rating of F.I.D.E. 2412, or around 2500 USCF. This is a bit below the 2514 USCF rating of the old Deep Thought. The Deep Thought team says the evaluation function of the new Deep Thought is still very primitive compared to the old Deep Thought, and a look at some of the poor positional play by DT2 in the event supports this claim. Once the evaluation is refined, DT2 is supposed to be the half way mark towards the goal of defeating Kasparov. We shall see.

In the microcomputer arena, three major events were held in May. The World Micro software section was won by "Gideon", the Schroeder RISC program, with Mchess on a 33 MHz 486 second and Mephisto (Lang) 68030 third. The Spracklens' RISC program for Saitek made its debut here but was relegated to fifth place out of 15. The other major event was the Harvard Cup competition between computers and human grandmasters. The computer prize went to "Alpha", by Don Dailey and myself, followed in order by Fidelity, RexChess, and Mephisto Lyon. Alpha defeated two of the grandmasters. Time limit was game/25 minutes. Finally, in the Aegon tournament, pc programs MChess and Rexchess both made suberb results against very strong human opponents at 40/2, finishing above all commercial dedicated chess computers and even above HiTech. See the separate stories on these three events.

Another event of some interest was a blitz tournament in Solingen, Germany, in which Mephisto Lyon 68030 took first place ahead of two current World Championship candidates, one former World Champion (Spassky), 8 other grandmasters, 3 I.M.s, and 9 other strong players. Mephisto scored 19 out of 23 (including two forfeit wins), the Soviet GM Dreev was second at 18 1/2, Short was third at 18, and Tukmakov and Spassky were next at 17. The computer was required to duplicate its moves on a normal chess board, and its operators were only given two extra minutes per game to accomplish this. This achievement surpasses the 2662 W.B.C.A. (World Blitz Chess Assoc.) rating achieved last year by RexChess. The superiority of computers at blitz chess is becoming very obvious. This same Mephisto also made a plus score in a long series of blitz games with former World Champion Tal.

On the commercial model front, there are several new models recently announced and expected to be available very soon. From Novag, the good news is that the switch to the 16 bit 68000 chip has at last been made, and the new models will feature the same processor speed and RAM size as the Fidelity Mach III. As usual, the top Novag program will be offered in both Wood Autosensory and plastic models, at prices about 50% above the comparable 8 bit models. The faster speed of the 68000 chip and the use of hash tables should put Novag back in the running for performance oriented purchasers. In the four digit range, Mephisto has insured its top place by coming out with a 20 MHz 68020 version of the Lyon, which should be the first commercial Senior master to sell for under $4000, and by marking down its standard 12 Mhz model to below $2000.

Another new product of interest is the "Chess Machine", a RISC device that is inserted into a pc. The $750 model should perform near the USCF 2400 level based on a few preliminary tests, and should appeal to pc owners who cannot afford a 486 computer needed to achieve that level of play with a pc program.

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THIS ISSUE:

In the low price range, Fidelity has three new models of interest. In the hand-held category, the new Fidelity Travel Master will be the first inexpensive Expert level model. It is by far the cheapest Expert level chess computer ever made. A table top version is also expected soon, to be called "Table master." A cheaper version of the talking Chesster called "little Chesster" which should play close to the 1900 level has been announced. It is especially suited for kids.

On a personal note, I would like to remind readers that they can call me toll-free at Fidelity on Wednesdays, 10-3:30, at 1-800-634-4692 (outside Florida) with questions about computer chess. I was unavailable for several weeks to first to a broken arm and then to Fidelity's moving to new quarters, but everything is back to normal now.

As always, all articles in CCR not otherwise attributed are by me, so blame me for any errors!

For the benefit of new readers, I would like to introduce myself as an International Master, co-author (with Don Dailey) of pc programs Rexchess and "Alpha", and USCF Ratings Committee Chairman. All CCR ratings given herein are by my own methods and not to be confused with CRA ratings, which are the only ones recognized by the USCF. I have worked for Novag, Mephisto, Fidelity, and Heuristic Software (Saitek's programmers) over the last few years in various capacities, the last two currently, but I have no commercial interest in any dedicated chess computers and am under no pressure from anyone to favor one brand or another. I do have a commercial interest in Rexchess, but I try to retain my objectivity here too. If I fail, please forgive me.

1991 World Microcomputer Chess Championship

by Mark Lefler

Strong programs, back room bartering and many entries characterized this year's World Microcomputer Championship.

MEPHISTO won the Manufacturers prize by default (they were the only entry in that category) *[probably because of the $4000 entry cost vs. $1000 for the software section-ed.]*. GIDEON was the surprise winner of the software trophy, winning 6 of a possible 7 games. MEPHISTO had to be satisfied with 5 out of 7. The last round was especially interesting, since MEPHISTO beat GIDEON.

The final play-off between MEPHISTO and GIDEON was rather controversial. In the first two games, MEPHISTO won one and drew the other. In the next two games, MEPHISTO thought that it was about a pawn down in each [played concurently-ed]. The operators came to a gentlemen's agreement. If MEPHISTO would resign one game, then GIDEON would accept a draw on the other. This gave both parties .5 points and a tie for overall champion. The MEPHISTO team could not risk losing to the fast RISC-based GIDEON program. *[Why did the officials allow such a deal??-ed]*

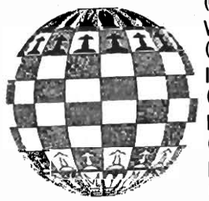
M CHESS got a whopping 5.5 points *[clear second-ed]* to win the World Microcomputer PC Championship. Some programers speculate that programmer Marty Hirsch may have sold his soul to the devil to make his program this strong.

Two amateurs tied in points for the Amateur Prize. On tie break, HIARCS beat out NOW.

Even the "weaker" programs did well. One program which finished in the bottom 4 was still able to draw with IM Mike Valvo in a 5 minute speed chess game between rounds. Also, it was a shame that some of the other strong commercial PC programs like REXCHESS and ZARKOV could not make it this year.

The entries were of two major categories, microcomputer *[CISC - ed]* and RISC based systems as shown below:

RISC-based	PC/CISC based
GIDEON (ARM 86010)	MEPHISTO (50 MHz 68030)
THE KING (ARM 86010)	M CHESS (33 OR 40 MHZ 80486)
SPRACKLEN X (SPARC 1+)	NOW (40 MHz 80386)
HIARCS (SPARC 1+)	PATZER (33 MHz 80386)
CUMULUS (RISC R3000)	CENTAUR (80386)
	BRAINSTORM (68030)
	WOODPUSHER (25 MHz 80486)
	INNOVATION (MAC II fx, 40 MHz 68030)
	ECHECS (25 MHz 80486)
	NIGHTMARE (80386)



Final Standings:

		SCORE	SB (tiebreak points)	
1st.	GIDEON	6	27.5	*Software Champion*
2nd.	M CHESS	5.5	33.5	*PC Champion*
3rd.	MEPHISTO	5	30.5	
4th.	THE KING	5	29.5	
5th.	SPRACKLEN	4.5	30.5	
6th.	HIARCS	4	24.5	*Amateur Champion*
7th.	NOW	4	19	
8th.	BRAINSTORM	3.5	25.5	
9th.	NIGHTMARE	3.5	23.5	
10th.	ECHEC	3.5	23	
11th.	PATZER	3	18	
12th.	CUMULUS	2.5	29.5	
13th.	WOODPUSHER	2.5	20	
14th.	INNOVATION	2.5	19	
15th.	CENTAUR	1	19.5	*[This Soviet program scored only the Bye. The Russians don't do quite as well in computer chess as they do in the human game - Ed]*

Finally, a quick "fish that got away" story. My program NOW was paired against SPRACKLEN X in the first round. For the first two hours, all went well, with NOW actually ahead about 3 pawns. After two hours, the program began to move faster and faster, finally making moves with only a one ply search (0.1 seconds or so). Naturally, moves made quickly are generally bad. After almost 6 hours of play, NOW finally blundered, losing a clearly drawn position. If NOW had hung on for 10 more minutes, the game would have been adjudicated a draw. The problem was a set of missing parenthesis in the NOW source code "tournament time" control which made the program think it had only 2 hours to make all of its moves, instead of the two extra hours it actually had. Thank God I don't program nuclear missiles!

Editor's note: I (Larry Kaufman) would have liked to attend, perhaps with Rex or Alpha, but the event conflicted with the Harvard Cup event which was more appealing to us, and anyway we only had time and funding for one event. I do feel that for a PC championship to have meaning, all contestants must play on comparable hardware, although this either requires limiting the title to programs that run on the 386 family or else making some judgement on comparing 486 with 68030 chips, etc. How about just stating that all programs must run no faster than the highest speed at which the CPU is officially rated by the manufacturer, and that the computer used must be advertised for sale publicly below $5000? Otherwise the event becomes a spending contest. Also, the manufacturers' section should be cancelled in the future unless two or more contestants enter. The fact that only Mephisto chose to spend the $4000 to enter should not have entitled them to a playoff with Gideon; the awarding of the manufacturer's title by default is not appropriate, I feel.

Postscript: "Gideon" is being sold at a bit over half the speed it ran at in the World Micro as "The Chess Machine".

1991 Aegon Tournament

The Aegon (Netherlands) tournament is an annual event in which 20 strong chess computers of all types face 20 strong human opponents in a six round event at 40/2. The human players are nearly all at or near the USCF master level in strength, and no less than five were Grandmasters this year. As the event finished just a day before my deadline, I'll have to be content with a summary of the results.

The winning computer was MChess, running on a 25 MHz 486. It scored 4 out of six, including a win over Grandmaster Larry Christiansen (FIDE 2590), possibly the highest rated player to lose to a computer at 40/2 to date. Its performance was an outstanding 2439 FIDE (USCF ratings run nearly a hundred points higher than FIDE ratings).

Second place was shared by Mephisto (Lyon, perhaps with some improvements) on a 68030 at 60! MHz, and Rexchess on a 486/25, each with 3 1/2. Mephisto beat Grandmaster Sosonko and drew Grandmaster Larry Christiansen. Its performance rating was an even more incredible 2526, since it faced only 1 player under 2500 FIDE!!! Rexchess, while facing somewhat less formidable opposition, actually made the best result of all, as it lost the first round on time in a position the human would have resigned, because the operator did not allow for operator time in setting the time limit. Counting this as a win would give Rex 4 1/2 and a performance rating of 2536 FIDE. Rex drew with GM Piket (2550), lost to former World Champion Challenger David Bronstein, and beat two players in the vicinity of 2300 FIDE.

Next in order of score and tiebreak were Mephisto Lyon (processor unstated), Fid Elite 7, and Novag Super Expert B at 3. Then came HiTech (!!), last year's winner and the favorite, along with Mephisto (Lyon?) 68030, Chess Machine K, Quest, Mephisto Polgar, and another "Chess Machine" all at 2 1/2, then Fid Elite 10 and Zarkov at 2. Next came Fid Elite 9, Chess Player x, "Fritz", and Novag SE C at 1 1/2, then Novag Super Forte at 1, and finally "Echecs" at 1/2. The poor results of HiTech, the two "Chess Machines" with the Schroeder RISC, and the top Fidelity models (9 & 10) were rather surprising.

As for the human players, the winner with a 6-0 shutout of the computers was GM van der Wiel, followed by GM Piket, IM Cifuentes, FM Wind, and V. Tudjman at 5-1, then GM Christiansen and A. van den Berg at 4.5, and GMs Sosonko and Bronstein at 4.

It seems clear from this event that the days when top human players could count on beating computers are over. While none of the programs are yet of GM level, they are good enough to take quite a few points off the Grandmasters (6 1/2 out of 30 to be precise). Aegon is a most important event for computer chess, and I hope it continues every year.

The Second Harvard Cup

The Harvard Cup is an annual event in which four top chess computers each play against four top International Grandmasters, one to one, at a time limit of 25 minutes per player per game. No allowance is given for operator time, so the computers must be set internally for only 20 minutes per game. In the first event, although three of the four computers were powerful university research projects (Deep Thought, Hitech, and ChipTest), the grandmasters won overwhelmingly, by 14 1/2 to 1 1/2.

This year's event was held on May 3 at Harvard University. The grandmasters were the same as in the previous event, with the substitution of America's newest grandmaster, Patrick Wolff, for Lev Alburt. There was a $600 prize for the top scoring GM, with $400 for second, so they would be well motivated. This year, it was decided to include only commercial (or soon-to-be commercial) chess programs, and furthermore none of the entrants ran on hardware exceeding about $3,000 in price. Therefore it was quite a surprise that the computers did much better than last year, losing by only 12-4 this time.

First place among the computers went to Heuristic Software's "Alpha", the new pc program being developed by Don Dailey, myself (Larry Kaufman), and Heuristic Software. It defeated two of the four grandmasters (Wolff and Michael Rohde); so far as we know no pc program has ever defeated any grandmaster before on even terms except in blitz or casual games. Commercial plans for

Alpha have not yet been announced, but we hope it will appear this fall. It ran on a 33 MHz 486 based IBM pc clone. Both the wins were nice games; Wolff fell victim to a decisive piece "sacrifice" in a complex position, while Rohde (America's third rated player at 2648) sacrificed a rook for a mating attack that didn't quite work due to clever defense by Alpha, then missed a nice way to save a draw by perpetual check. As for the losses, Dlugy outplayed Alpha positionally, while Gulko built up a classic king side attack in a closed position and sacrificed a piece to win just as Alpha's queen side counterplay was getting serious.

Second place, rather surprisingly, went to the three year old Fidelity Mach IV, which was substituted for the current model Elite Version 6 (which has learning and a more varied opening book) because it is so small and portable. It scored a win (against former Soviet champion Boris Gulko) and a draw (against America's top ranked blitz player Max Dlugy), but lost badly to Rohde and Wolff. Dlugy reached a pawn up queen ending, but in trying to avoid perpetual in time pressure he actually allowed the Mach IV a chance to win, but the Mach IV lacked enough time to see it. Perhaps with an Elite 9 or 10 the win would have been found. We all felt that Fidelity was foolish not to supply the Elite 9 or 10, but the final result was excellent anyway.

Third place with 1/2 point, a draw with Gulko, was RexChess. Rex was handicapped (relative to Alpha, anyway) by having to run on an unusually slow 486 machine, with an effective speed of only about 60% of the one used by Alpha. Since Rex was given free entry as a late replacement for Saitek when they decided not to play (why??), I shouldn't complain too much about the hardware supplied by the Harvard Chess Club. Rex has beaten many grandmasters at blitz, but this was its first encounter with GMs at more serious levels.

Last place, most surprisingly, went to the pre-event favorite, Mephisto Lyon 68020, which lost all four games, most of them rather badly. Certainly, Mephisto made a big mistake in failing to supply its much more powerful 68030 model, but last year the Portorose 68020 managed one draw and another "near draw" so we expected at least some score by the improved Lyon. Perhaps the grandmasters benefited from the experience of playing the Portorose, or perhaps it was just bad luck. Things have come a long way for a commercial chess computer to be expected to score against grandmasters! A new 20 MHz version of the Lyon 68020 has just been announced, but apparently it was not ready in time for the event, and the 68030 unit was presumably not sent for reasons of cost, even though it would have been returned after the event.

After the event, GM Rohde gave a post-mortem review of his loss to Alpha for the spectators. Dlugy was awarded the $600 prize for the best score against the computers (3 1/2), with Wolff and Rohde tied for second at 3 and Gulko last at 2 1/2. A curiosity of the event was that Don and I were responsible for bringing all four of the programs to Harvard.

Next year it is expected that Deep Thought or its successor will return, along with Alpha or its successor and three other top level programs yet to be chosen. The event is planned for New York and is being expanded to 5 GMs and computers. It is my feeling that next year's event will be a closely contested match.

The Harvard Cup was sponsored by the Bankers Trust Company, the Harvard Chess Club, the American Chess Foundation, and Malcolm H. Wiener. Danny Edelman was the organizer.

Fidelity Review

The most interesting new product by Fidelity since the last review is the Travel Master, a pocket sized unit that promises to make all others obsolete in view of its high playing strength and low price. It is not yet actually available, but as I conducted the testing on the prototype for Fidelity I can report on it with some authority. For only eighty dollars, one can now own an upper expert level chess computer. This is about half the price of the cheapest table top expert models, and is about two classes (!) above any comparably priced chess computer, either table top or hand-held. It is by far the strongest pocket model ever made, and is nearly as strong as the top hand-held model by Mephisto, the MM5 Mobil, which is larger than pocket size, has short battery life, and costs about five times as much.

Before discussing how this breakthru was achieved, let's take a look at the Travel Master. It operates in a unique way-- you enter your moves by touching the squares, but the computer indicates its moves by LCD display. You do not press the squares for the computer's moves as in all other pressure boards. It offers the full range of features you might hope for in a pocket model and then some. For example, you can set up positions, take back a large number of moves, choose from 64 levels, turn selectivity off or on, display your choices in rotation of evaluation, depth, nodes per second, time, and up to four plies of analysis. Sound can be turned off, countdown clock for sudden death is available, there is an easy mode for novices, and you can choose full book, tournament book, aggressive or passive book, or no book at all. Levels include the usual range from 5" to tournament, game in x, fixed depth, infinite, and mate solve. The unit comes with both stand-up and flat cut-out pieces. Battery life is very long (200 hours claimed).

So how does this marvel play? Well, to begin with it is quite impressive on tactical problems, other than endgames. Its performance on middle game tactics is close to the master rated Mach III. My problem set predicts a 2154 rating. In my test games at game in 10' it performed in the high Expert range, losing only to the Mach III (2-4), but beating Designer Display 2100 4 1/2 - 1 1/2, beating Saitek Prisma 4-2, beating CXG Dominator (a mid-expert model) 4 1/2 - 1 1/2, and even beating the Mephisto MM5 by 3 1/2 - 2 1/2! At game in 30, it lost narrowly (3 1/2 - 4 1/2) to the upper Expert Mach II L.A., lost 2 1/2 to 1 1/2 to the Mach III, lost 1 1/2 - 4 1/2 to the Mephisto Lyon 16 bit, but surprisingly beat the Mephisto Polgar by 5-3. While it appears to be relatively stronger at fast levels than at slow ones, I am reasonably confident that at serious levels it will still outperform the Designer 2100 Display and should rate above the 2100 level. But one word of caution: its play is more uneven than more expensive Expert level models -- its tactics are near master level models, its positional play is perhaps like a low Expert rated computer, and its endgame is well below the level of all other Expert level machines, though probably still better than any other pocket model. There is reason to believe that the endgame play may be improved by turning off selectivity once an ending with few pieces is reached. The opening book offers fair variety and good lines, but it is not very deep.

How was this breakthru achieved? First of all, the Hitachi h-8 chip was used, a far superior processor to any other used in "single chip" chess computers. At its ten MHz speed, it is said to be around the speed of an 8 Mhz 6502, which makes it faster than the chip in such powerful models as the Novag Super Forte C and the Mephisto Polgar or MM5. On the downside, it comes with only 1/2 k of RAM and 16 k ROM, so its chess knowledge and search techniques are both much more limited than in the 6502 models, but the programmer, Franz Morsch, is widely recognized as the best in the world at working with minimal memory, as he had already demonstrated with the Mephisto Europa/Marco Polo, which have only 1/4 k RAM. In fact the Travel Master program is really an adaptation/upgrade of the Marco Polo, but since the RAM is double and the speed about quadruple it is not surprising that a full class jump in strength was achieved. Aside from the speed, the Travel Master has enough memory to avoid restrictions on the capture search that weakened the Marco Polo (a mid class A model) and even to utilize a simple type of selective search. Morsch estimates that the selectivity may be worth 50 points, and in the middle game he may be right, though it often goes astray in the ending. As for the low price, this is due to the single chip design and the fact that it was made for Fidelity in China (where wages are very low) by CXG. One word of caution: quality control is minimal on such cheap items, and a certain percentage will surely go bad, but all Fidelity products now come with a year's warranty, and such a tiny unit is easy to return for service if need be. The Travel Master is expected to go up to $99 soon; even so it will still be a bargain.

A table top version of the Travel Master, to be called "Table Master" is expected soon. It will probably cost about the same as Designer 2100 Display. The housing is different and attractive. Although the Table Master should be stronger overall, the much larger book and more consistent level of the "2100" may make the choice a difficult one.

Another new model of interest is "Little Chesster", a less expensive version of the talking "Chesster". The program is the one used in the latter models of "Excellence"; similar to but not identical to the Par Excellence program used in the regular Chesster. It runs at only 2 MHz instead of 5, and has less ROM and RAM and a much smaller opening book, so it should play around the USCF 1900 level. One innovation for Fidelity is that for the first time a genuine novice level has been added. It is supposed to play around the 800 level, and this was confirmed when my 8 year old son, rated around 900, beat it by 2-1. In the past Fidelity models usually offered only a 1 ply search as the lowest level, but such a level still plays in or near the Class D range and is far too strong for novices.

The Fidelity Mach III (and the nearly sold out Mach II L.A.) both remain the strongest machines in their price categories, in fact more clearly than ever with the Novag Super C discontinued and the new Novag 68000 and the top Mephisto 8 bit models priced far above the Mach III. But in the wood autosensory class, the Elite 2 will probably be eclipsed by the Novag Diablo unless Fidelity drops it into a lower price category. The more powerful Elites are a bit less appealing than the comparably priced Mephisto Lyon models, considering both playing strength and quality of construction.

Mephisto Review

The only new product announced since our last review is a 20MHz version of the Lyon 68020 model. The program is basically the same, though some small changes have reportedly been made. As the speed ratio is 5:3 over the present 68020 model, this should be worth about 50 points. This should put it well over 2400, making it the first Senior Master dedicated chess computer under $5000. The price is now $4000. As it is nearly midway in strength between the standard 32 bit and the 68030/36 MHz, but much closer to the cheaper model in price, it should appeal to some. There are no plans to offer a "Mephisto Vancouver", in view of the short time interval since the Lyon event and the fact that the Schroeder RISC machine "Gideon" won the only contested section at Vancouver.

As for the question of how much the improvement from Portorose to Lyon was, the "Ply" ratings now show only about 40 points (weighting the three models by the number of Lyon games played so far), Eric Hallsworth shows an average of 43, while my new CCR test shows about 50 and the CCR games even more, so perhaps a fair estimate would be 45.

Just before going to press two Mephisto Lyon models have been drastically reduced in price. The Modular 16 bit has been cut from $1399 to $999, while the Munich 32 bit has been cut from $2799 to $1999, both of which are the lowest prices ever offered on similar models. CCR urged Mephisto to take this step to make these suberb machines affordable to a larger segment of the chess public, and to remove the incentive to wait for RISC or other new models, and Mephisto listened. Both of these are really good buys, and I hope that many readers will take advantage of these specials. The Lyon is the world's best chess program in my opinion, given comparable hardware, and now is reasonably priced.

As for the 8 bit programs, the standard Polgar and the MM5 continue to run neck and neck. MM5 is six points

higher in the "Ply" ratings, Polgar is five points higher on Eric Hallsworth's list. The CCR problem test favors MM5, but our games results favor Polgar. But it's rather moot as only the Exclusive Polgar is being offered at a reasonable price ($699), also a sharp reduction. The Polgar has a much bigger and better book than MM5 and many more features, since it is 64k ROM vs. 32k for MM5. If you want a wood autosensory board, near master strength, a host of useful features, and the quality of construction for which Mephisto (the Mercedes of chess computers) is famous, all for a decent price, this may be your choice. The Novag Diablo appears to be stronger but costs $100 more. One should also consider style: the Polgar is better at positional play, the Novag will almost certainly be a stronger tactician. The MM5 remains the world's strongest hand-held model, but it is only slightly stronger than the Fidelity Travel Master and about five times the price. Also, it is not pocket-sized and has short battery life, unlike the TM. To be fair, the MM5 is a far better made, elegant unit, and is much less apt to need repair after a year or so.

In the hand-held category, the Marco Polo remains the strongest peg-style board, but it is at least a full class weaker than the Fidelity Travel Master and hence somewhat obsolete.

NOVAG REVIEW

After years of clinging to the 8 bit 6502 chip while the competition went to 16 bit and hash tables, Novag has finally joined the bandwagon! Well, better late than never. Novag has switched to the 16 bit 68000 chip at 16 MHz for its high level models. The 68000 version of the Super Expert (same wood autosensory housing) is being named the "Diablo" and should sell for under $800, while the plastic, pressure sensitive board (which will replace the Super Forte, though the board has been redesigned) is named the "Scorpio" and should sell for under $600. The program and hardware are identical--96k ROM, 64k RAM for an 8192 position hash table (same size as Fidelity Mach III), and 32k positions opening book. The program is a revised version of the Super C adapted for the 16 bit chip and hash tables, with a year's further improvements to the program. Since I just reveived the Diablo a day before final deadline I don't yet have game data (except by Max Harrell on pre-release versions), but I can make some educated guesses about its strength from what I do know. The basic speed of the hardware without hash tables is about 33% faster than the Super C, worth perhaps 30 points, although the Diablo is not actually any faster because Dave Kittinger, the programmer, has chosen to use the extra speed to improve the quality of the selective search and to add more search extensions--the Super C missed a few more tricks than he would like. The selectivity used is the same as in the "B", not the "C", perhaps because the improved quality of the selectivity made the "C" technique unnecessary. The default is back to three ply as in the "B" since without the "C" technique it is rather risky to go beyond three, although it is quite possible that 4 sel may prove to be the best despite this--owners are encouraged to experiment with this and let us know the results. The hash tables should probably be worth around 40 points or so--they help only a little in the middle game but very much in the endgame, where Novag has always tended to be a bit weak. Together with other improvements we can expect a net gain of 80-100 points, and the preliminary data does seem to be reasonably consistent with this "forecast". My problem test shows a gain of 94 points. The new models also have a learning table similar to that in the Fidelity Elites, which allows the computer to learn to avoid losing errors in specific positions. Features are mostly similar to the Super C models, but the Diablo and Scorpio won't take the Novag printer.

The style of play should not differ much from the Super C, since it still uses the piece value tables and the "RexChess" rulebase (with many changes, of course). Because the evaluation is piece value based, not dynamic, it should (like all prior Novags) tend to be stronger at fast chess than at tournament speed, relative to other computers. All Novags are unusually sharp at tactics, but a bit weak on positional play due to lack of a "mobility" component to the evaluator. Nearly all other high end computers count mobility in their evaluation, which slows them down somewhat, thus weakening them tactically a bit, but it does seem to help their positional play. Probably for fast chess the speed is more important, but for tournament levels the positional errors are more to be feared.

It seems likely that the new Novag models will be very solid masters and the strongest models on the market priced below the Mephisto Lyon 16 bit. I feel that the plastic Scorpio is a bit pricey for a pressure model at nearly double the Fidelity Mach III, but the Diablo is certainly worth the small premium over the Fidelity Elite 2 if its strength is close to my forecast. If you want a master level wood autosensory unit without spending 4 digits the Diablo is your choice, although if you don't require wood and want maximum strength for an extra $200 the Lyon 16 bit Modular is almost surely stronger.

Novag has not yet announced plans for a 68020 version of the Diablo, but surely one will be offered before too long, at perhaps double the price. While the Novags are unlikely to be a threat to the corresponding Mephisto Lyon models in playing strength, they will probably be the choice of many value oriented purchasers in view of the higher Mephisto prices. Novag has added new spice to the competition at the top. Bravo!!

In the moderate price range, Novag doesn't have much new of interest. Its Super VIP has been dramatically surpassed in strength by the Fidelity Travel Master, and the SuperNova doesn't look very competitive with the similarly priced Fidelity Designer 2100 Display, Fidelity Table Master, or the Saitek Simultano, all of which are stronger.

Saitek Review

The long awaited Spracklen RISC program made its debut in Vancouver at the World Micro, but only finished fifth and would have finished a point lower were it not for a silly bug in the pc program "Now" (see story). This only indicates that much work needs to be done before the RISC module is strong enough to offer for sale. To be fair, I believe that the Spracklens were running at the same speed as a future model will actually run at, while the top programs at the Micro ran on faster hardware than in commercial versions. It could still perform well in the test that commands the most respect world-wide--the "Ply" ratings. Whether the module will be released this fall as originally planned remains to be seen.

The h-8 module with hash tables by Franz Morsch has also been delayed, apparently not yet having reached the desired strength. Unfortunately it now appears that it will only be offered at 10 MHz, not 15 as I had expected, so it is unlikely to be a threat to the Novag 16 bit models (the Galileo + module and the Novag Diablo are fairly close in price), though this is not certain. In the meantime, a new, stronger 6502 based module is also a possibility, though no announcement has been made.

The two year old Simultano is now being offered on close-out sale for $179, at which price it is an attractive value. When it was new it was priced at levels that were quite non-competitive, but now I can recommend it. Its low Expert strength is close to the Fidelity Designer 2100 and Chesster models, but the LCD screen alone is worth the extra $30 and the Simultano has many other features to recommend it. It is basically the same as the Radio Shack Champion "2150" except that the Champion is only 3 MHz while the Simultano is 5, which makes the Simultano at least 50 points stronger, and the Simultano has the ability to play 8 simultaneous games. The Corona (same program and speed as the Simultano) and the "Blitz" (same program and speed as "Prisma", C.R.A. rated 1963) each remain the least expensive models in their respective categories (wood autosensory and plastic autosensory respectively) and are both good buys at $300 and $200 respectively. The new Turbo King II is somewhat stronger than the Simultano, perhaps 50 points, but unless it is offered at a reasonable price in the U.S. we won't see it here.

If you have any suggestions or comments, positive or negative, send us a line! CCR Bits & Pieces, c/o ICD, 21 Walt Whitman Rd, Huntington Sta. NY 11746
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RISC and Chess

Since RISC based chess programs are making their appearance this year, it is time to explore what RISC means to computer chess fans. We are sure to hear more about RISC as time passes.

The processors used in personal computers and most chess computers are said to be "CISC" processors, for "Complex Instruction Set Computing". They have the capacity to do a great many things, some of which are vital for chess, and some of which are useless for chess. RISC stands for "Reduced Instruction Set Computing", which means that a RISC processor only has the capacity to execute those instructions which are most frequently used. This not only keeps the cost of the RISC processor down, but allows most or all instructions to be executed in a single machine cycle, so that a 20 MHz RISC chip might in theory be able to execute nearly 20 million instructions per second. The disadvantage is that if your program uses any of the less common instructions, several RISC instructions might be needed to accomplish what one CISC instruction could have done. Fortunately for chess players, chess programs normally use only the common instructions, so RISC makes sense for chess.

It must be emphasized that the classification of a processor as RISC or CISC is not a black and white issue. Recently, the most powerful CISC processors (68040, 80486) have adopted some of the techniques of RISC, a trend which is expected to accelerate when the 05 generation of these processors comes out. They hope to have their cake and eat it too--offer the speed of RISC with the full instruction set available. RISC should always be faster and cheaper, but if the gap is too small the CISC processors will be favored for personal computers at least due to the wide variety of software they can accommodate. The RISC label is also sometimes applied to inexpensive chips (such as the h-8 used in the Fidelity Travel Master and Saitek Blitz), because they have a limited number of instructions, but these chips do not approach the 1 cycle per instruction target that true RISC chips aspire to achieve. There are some processors that lie in between RISC and CISC and can legitimately be labeled either way.

There are several types of genuine RISC processors. Some of the ones likely to be used for chess are the "SPARC", "MIPS", and "ACORN". The SPARC is perhaps the best known RISC, and has the advantage that ever faster versions are expected in the coming years. A very fast SPARC called the "Lightning" is planned for later this year, and is expected to be the brains of the future Saitek top end model with the Spracklens' program. The MIPS chip is likely to be used in a dedicated version of our "Alpha" pc program, while the ACORN chip is used by Schroeder's "Gideon" and one or two other programs. The ACORN is the least expensive of the lot, and because it requires much less power than the MIPS or the SPARC it is more suitable for a small, medium priced machine.

Rating the Commercial Chess Computers

Veteran readers of CCR will know that we have always placed our faith in computer vs. computer testing. While I continue to believe in the validity of this method, we at CCR are no longer able to play a large enough number of computer-computer games at the longer time levels with each new program, even down to game/30, for statistical reliability. This is especially true in view of the proliferation of pc programs recently. The problem is illustrated by the statistical analysis in "Ply" magazine (Sweden) that indicates that even after a thousand games there is a five percent chance of an error greater than 22 points either way, while for a not very satisfactory margin of 50 points plus or minus we still need around 200 games per program! Of course we can wait for the folks at "Ply" to play a thousand games (they sometimes reach this figure within two years), but by then the model in question is obsolete. I have known about this problem for years but have never had a satisfactory solution except to combine our own CCR results with data from Sweden and elsewhere and hope to minimize the problem. Results from human tests such as C.R.A. and comparable European tests are even more subject to error as the number of games are small (30-48 typically) and the playing conditions vary widely. Results from problem tests have not correlated well enough to replace computer-computer testing, though some tests do rate most of the computers fairly close to their relative ratings in "Ply".

To remedy this problem I have spent much of the last couple months developing my own problem set specifically designed to measure the true strength of chess programs. The problems are not necessarily pretty or interesting to humans, though some are, but were chosen to show up the strengths and weaknesses of a wide range of programs. At this writing the set consists of 28 problems of a tactical nature, including quite a few endgames in which knowledge may assist the search. All of the problems have clear, non-controversial solutions. Most importantly, I have tried to avoid including any problems that a computer might solve for the wrong reasons. Half are my own creations, while the balance come from such diverse sources as the Modul B-T test, books on opening traps, Ross Withey's "test your computer's chess", Jens Nielsen's test, Fred Reinfeld's "1001 Winning Chess Combinations", "Test Your Chess IQ" by Livshitz, and the Bratko- Kopec test. For information on my original method for timing and scoring, see the separate problem article.

While it may be pointed out that a test with no middle-game positional problems is deficient (a deficiency I hope to remedy in the future), the amazing fact is that my test "predicts" the "Ply" rating of all 25 computers tested so far on that list within a maximum error of 46 points, over half of them within 20 points. These numbers are comparable to the margin of statistical error in the "Ply" ratings themselves--in other words even if the test were "perfect" the maximum deviation from "Ply" ratings would not drop too much further. The largest deviation is seen in the case of Mephisto Lyon 68030, and my test is almost certainly more correct than "Ply" in this case because "Ply" shows the Lyon 030 only 7 points above the Portorose 030 while it shows the Lyon an average of 49 points above the Portorose on the less expensive models. If the "Ply" rating of Lyon 030 were to rise to 49 points above the Portorose 030 with more games my test would be only 4 points above "Ply". Probably the reason that the lack of positional problems doesn't seem to matter is that the programs are closer to each other in positional play than in tactical strength, and also that programs which are weak in positional play do poorly in my endgame tests. If someone wrote a program with substantial endgame knowledge but little middle game positional knowledge my test would overrate it, but no such program has come to my attention so far.

There are several advantages to using this test for ratings. To begin with, it takes only a few hours to test a strong computer, or a few days for a weaker one, with no need for constant monitoring. It is not necessary to test a program running at more than one speed, such as Polgar 5 and 10 MHz, since once one model has been tested the times for the other model can be calculated simply by multiplying or dividing by the speed ratio (2 in this case). The test is particularly good at telling whether a new program is an improvement over its predecessor, and by how much. To measure a 20 point improvement accurately by playing games would require thousands! The test is fully reproduceable in theory by anyone, except for the small variations due to randomizers in certain programs, which are unlikely to affect the results by more than a point or two. An exception to this is the Mephisto programs with Hash Tables, whose times seem to vary randomly depending on such factors as what was in the computer before, how fast the move key is hit, whether the position had to be retested at a different level, etc. Even so, I doubt that the error from these factors exceeds 5 points over the whole test. The test is not specific to a particular time control (one objection to the "Ply" ratings) but reflects strength over a wide range of time limits.

One factor that can be considered either a plus or a minus is that the test does not consider the opening book at all. This means that a book "rigged" to defeat other computers will not show as well on this test as against other computers; on the other hand some computers have books that are designed to put them in positions that suit their style, so my test may not do them justice. Since many programs have either separate opening modules available or a choice of books, I tend to feel that it is just as well to separate the evaluation of the book from the evaluation of the program. The folks at "Ply" have maintained that the opening book has little effect on their ratings anyway, although they have never done a thorough test on this question by rating two identical programs with different opening books. One drawback to my test is that it takes no account of how different programs allocate their time, which can be significant. Although my test does not consider the value of thinking on the opponent's time, every model worth testing does this; if any program lacked this ability I would "fine" it a flat 30 points.

I am not prepared to publish my test fully at this time, in part because if programmers use it to develop their programs, they may ruin its predictive value. I hope that my readers will take it on faith that I am tabulating the results with the same care and accuracy as I have done with computer vs. computer games in the past. Although I have not had enough time to test all relevant models yet, I have tested nearly all of the newer and stronger dedicated chess computers and some of the pc programs, which were tested on my 486/25 MHz machine to save time. Because many of the problems are moderately difficult (at least for some computers), the test is not intended for use on programs below around the USCF 1900 level. It is also not suited for Deep Thought or other future Grandmaster level computers because the problems will mostly be solved by such machines in just a few seconds. I guess over time I'll have to replace the easier problems with harder ones to keep up with the rising level of computer play.

Since the last issue I have managed to run a great many 10' games, and so I include "speed ratings" based on these. I prefer this level to blitz (5') for testing because the time needed to transmit moves between the games is too big a percentage of the actual thinking time in a blitz game. Also, some programs are not fully operating as intended at blitz, because a certain depth is required for the program to act normally; fortunately nearly all programs reach this depth consistently in a 10' game. The level of this speed list is set to match the other lists on average, and hence should be thought of in relative terms. A rating of 2200 in the speed games should be thought of as meaning that the unit in question plays speed chess about as well as the average computer with a 2200 rating (in slow chess). The actual strength of the computers at 10' chess is about 200 above the numbers I quote if the human player also adheres to the 10' time limit; but if he treats the games as serious tournament games while forcing the computer to play 10' chess then the rating of the computer should be about 250 below my figures.

Regular readers of CCR will note that I have discontinued the practice of "contracting" "Ply" ratings by 20%. While I still believe that some contraction is appropriate, the top computers are not so clearly overrated on the "Ply" list as they used to be, and so even 20% now seems too much. It is hardly worth the trouble to bother with a contraction of 10% or so, and in view of the uncertainty as to the correct figure and the advantage of being able to quote up-to-the minute "Ply" ratings at any time simply by adding 200, I've chosen to go that route. My own study of all the computers rated by both "Ply" and C.R.A. (since testing went to open tournament format), with adjustments for differences in processor speed when necessary, came up with an average difference of almost exactly 200 points (well, 201 actually!) so I feel that this value is correct. I continue to use a contraction factor (25%) for the faster CCR games, since it is clear that differences in processor speed loom larger and larger at faster time limits.

All computers run on the 6502 processor unless otherwise stated. The processor and MHz are listed primarily to avoid confusion between models with similar names but different "guts".

All Ply ratings are based on a minimum of 40 games, and my 10' ratings require a minimum of 30 games. The column labeled "CCR games" includes all games at 30" per move or slower or 30' per game or slower. Regular readers will note that ratings are a bit lower than in the past, reflecting the fact that some recent C.R.A. tests have come out lower than expected, perhaps due to a growing familiarity with chess computers.

Computer	MHz	CCR test (problems)	"Ply" +200	CCR games	10' games
Meph Lyon 68030	36	2497	2451	(2468)	
Meph Port 68030	36	2448	2444	(2393)	
Meph Lyon 68020	20	2433	****	(2408)	
Mchess 1.19 80486	33	****	2430		
ChessMachine 512k	16	2416	****	****	****
Fid Elite10 68040	25	2389	****	(2388)	
Meph Lyon 68020	12	2378	2353	2365	2348
ChessMachine 128k	16	2373	****	****	****
Rexchess 80486	33	2350			
Zarkov 2.5 80486	33	2345			
Meph Port 68020	12	2329	2332	2292	
Fid Elite9 68030	32	2327	2325	(2330)	
Meph Lyon 68000	12	2323	2320	(2316)	
Mchess 1.32 80386	33	2305	2348	2375	2342
Meph Port 68000	12	2270	2243	2262	
Rex 2.3 80386	33	2268	2248	****	2250
Zarkov 2.5 80386	33	2263	****	****	2209
Fid Mach IV 68020	20	2258	2292	2278	2220
Novag Diablo68000	16	2247	****	****	
Fid Elite5 (2x68)	16	****	2234	2226	
Meph Polgar 10	10	2225	2245	2223	2239
Meph Roma 68020	14	2222	2233	2219	

Computer	MHz	CCR test (problems)	"Ply" +200	CCR games	10' games
Meph Mondial68000	12	****	2183	2164	
Meph MM5	5	2173	2179	2109	2139
Fid MachIII 68000	16	2164	2204	2193	2174
Fid Travel Master	10(h-8)	2154	****	2179	2166
Novag Super "C"	6	2153	2146	2216	2253
Meph Polgar	5	2149	2173	2164	2151
Meph Roma 68000	12	2134	2165	2149	
Fid Mach II L.A.	12	2130	2116	2121	
Meph Mega IV	5	2118	2114	****	2067
Saitek Maestro D	10	****	2112	2088	
Saitek TurboKingII	5	2104	2088	2004	
Novag Super "B"	6	****	2098	2183	
Meph SupMondial II	4	2097	****	2121	
CXG Sphinx Galaxy	4	****	2078	2097	2113
Meph MM4	5	2075	1904	2112	
Fid Des 2100 Disp	6	2069	****	2057	2043
Novag SuperExp A	6	****	(2049)	2111	
Fid ParEx + Des 2100 + Chesster + Phantom	5	2049	2020	2030	
Sait Simult + Corona	5	2031	2000	2017	
Fid Des 2000	3	1990	****	1992	
Sait Prisma/Blitz	10(h8)	1941	1913	1938	2041
Novag SuperNova	16(6301)	****	1931	****	
Novag Super VIP	10(6301)	1885	1880	1933	
Final Chesscard		****	1884	****	
Meph Marco Polo	8(6301)	****	1880	1832	
USCF Academy	8(6301)	****	1880	1832	
Novag VIP/Primo	8(6301)	****	1832	1852	
CXG Super Enterp		****	1757	****	
Saitek Galileo	(6301)	****	1668	****	

Some comments are in order. The very high ratings on both my problem and speed lists for the Travel Master will probably not hold up at slower time limits, because the TM is stronger at tactics than at positional play, which becomes increasingly important with more time. I have only had time to run 26 games at a USCF rateable time limit, game/30, which gave TM a 2179 rating, but this sample is too small to take very seriously. My feeling is that it will end up about 2150 on my list after more games, and about 2125 on the "Ply" list since they only rate 40/2 games. If Travel Master goes for a C.R.A. Action chess rating, as is under discussion, I believe a master rating is likely, since the only previous such test (Mega IV Turbo) produced a rating 152 points above the 40/2 C.R.A. rating.

The wide disparity between the fast and slow ratings of most Novag models is probably due to Novag's foregoing extensive end- node evaluation to emphasize speed and tactical strength. The pattern is quite consistent. I regret that I received the Novag Diablo only a day before final deadline, so I only had time to run my problem set; no actual games yet. Readers will have to wait for the next CCR or call in for game results. Since the problem test is particularly good at comparing related programs, I would expect that the 94 point improvement shown over the Super C should also roughly apply to game results.

Bits & Pieces

(Readers' Letters And Replies)

Leon D. Stancliff, Murfreesboro, Tennessee

I started playing chess at age 12. I am now 64. for most of those years I have longed to have a master chess player available to teach me at my own convenience. I have also desired to play a 10 game match with a master at 40/2 just to see how the games would go. Needless to say, neither was possible. Masters have better ways to spend their time than toying with fish.

I have owned the Boris, Sargon 2.5, Morphy, Elite A/S, Novag Expert, Novag Super B, and now the Novag Super C. Finally, I have what I have longed for all these years. The Super C can be set anywhere from true beginner level to true master level. In addition, it provides a very nice looking piece of furniture. Here are several lines of proof that the Super C does actually operate above the 2200 USCF master level.

1) The Bednorz and Tonissen rating test assigns a 2205 to the Super C. The B&T system does, as you say in CCR, seem to be relatively reliable.

2) My own application of the Pierre Nolot rating test afforded the Super C a 2246 rating.

3) Playing in the American Open, the original Super Expert obtained a 2164 by the CRA of the USCF. The Swedish "Ply" magazine (1/91) shows an 1849 rating (adj. for MHz difference) for the original Super Expert and a 1946 for the Super C, making a differential of 97 points. Contracting this difference by 25% as you suggest for computer-computer ratings we would still have 74 points difference. Adding this 74 to the 2164 leads us to a 2238 rating for the Super C.

4) The Fidelity Mach III is rated at 2265 by the CRA. Your own figures in CCR (Vol.1, No.4) show the Super C as being 48 points below the Mach III. Again, a 25% contraction reduces this to 36. Subtracting 36 from 2265 leaves us with 2229.

5) I have done some analysis on the Ply ratings directly from Ply magazine. The Statview 512 program has been used to do a regression on those machines for which I have both a Ply rating and a CRA rating. A very nearly straight line curve results. Using this curve to predict a CRA rating from the Ply rating, I have obtained a predicted CRA rating for the Super C of 2160. This result may be suspicious due to necessary speed adjustments for two models *[any error from this factor could not exceed 2 or 3 points - ed.]*. It is probably a little low.

6) In your CCR (Vol.1 No3) Eric Hallsworth rated the Mach III at 2194 versus the CRA rating of 2265. This is a difference of 71 points. Hallsworth rates the Super C at 2191. Adding 71 points to his 2191 gives us 2262. This is probably high. I expect Hallsworth needed more games than he had available at this time.

7) The Super Expert A is listed in your CCR as having performed at a 2117 level in human tournaments. You list the Super C as 80 points above the Super Expert A. This gives a rating of 2197 for the Super C vs. humans. I anxiously await direct human tourney results with Super C. I anticipate that they will be above the 2200 level.

8) Taking the average of the seven ratings listed above we arrive at 2220. Ply magazine gives a plus or minus 26 points for their reliability. Until I have further evidence I will consider the 2220 as a best estimate of the USCF rating on the Novag Super C, with almost no doubt that it is over the 2200 level.

[Reply: Thanks for your thorough analysis. Points 3,4,and 6 are dubious because they rely on comparison with CRA ratings of models that got higher than expected CRA ratings--if you had compared with Mondial xl you would get much lower figures. Still, even without these three figures your remaining four average 2202, right on the border of masterhood. I have always felt that the C was indeed right on the border. In any case, the new Novag 68000 should be a solid master by any reckoning.]

Neil Gundel, 11 Dickinson St., Amherst, MA 01002

In the Games section of the 4th quarter CCR, you showed the Novag Super Expert C throwing away a won game against the Portorose 16-bit due to "some bug". I believe that I have isolated the cause of this bug, and have found a cheap fix.

First of all, this is not a software bug--it is a design deficiency...I know because my Expert "C" has the same problem. When I bought my computer as a "B" model, it performed about as expected, but occasionally it would make a serious blunder. Invariably it would evaluate its position at almost 27 points plus. Or, it would reset the clocks and beep "overstep" from time to time. These occurrences were infrequent enough that I simply lived with them, although I often found that my "victories" were the result of this bug.

Just recently, the USCF upgraded my computer to the "C" version. Then the bug was much worse. The "C" lost two of every three games to a Mephisto MM3, and bungled winning positions constantly. Autotesting had level 1 outperforming level 7! I tested it with your "Is Something Wrong?" problems, and it passed the test, but only on the infinite level. I tested it to see if it would make the same blunder that the "Games" Expert made, and it did--sometimes. Other times it made the correct moves. In fact, when I took back the bad moves and gave the computer a second chance, the machine would sometimes repeat the mistakes, sometimes not. But the severity of this problem was so bad that it would rarely finish a game without a serious blunder. On any level, I beat this computer consistently--believe me, I'm not that good a chess-player! I have owned 8 chess computers, and I believe I played enough computer chess to know that these were not "computer moves," but real bugs.

Because the bugs seemed so random, I suspected that rather than being a software bug, the computer was being disturbed by some stray radio frequency interference, and in fact this was the problem. It seems that the Novag Expert has two main PC boards. One of them, the "brain" of the machine, is attached to the other, which seems to be related to the autosensory board and LED driver. These two boards are separated by a roughly 7" x 10" piece of cardboard, whose purpose is to prevent these boards from shorting each other out.

I took this piece of cardboard out, covered one side with aluminum foil to make an RF shield, and covered the aluminum with paper to prevent shorting out the boards. With this shield installed, the machine always plays flawlessly. When I take out the shield, the bug always returns. Apparently, the circuitry driving the LED's emits enough RF energy to disturb the brain of the computer. Not always, but often enough to be a problem.

I don't know how common this problem is, but since the machine in your games section *[a European unit--ed]* appears to suffer from it, it may not be all that uncommon. This could explain why the "C" results seem to vary so much; perhaps one or more of the machines in the testing pool has this flaw. This would be easy to miss when testing the machine, since even at its worst my machine only messed up every twenty moves or so, and always passed the power-up autotest...If Novag would replace the cardboard shield with one that also shields RF, that might eliminate many "bugs" from their computers, and perhaps even improve their standing in the "Ply" list.

[For a free explanation of a simple procedure to fix the problem, send a SASE to Neil Gundel, 11 Dickinson St., Amherst, MA 01002]

[Reply: I believe you are correct. I have also occasionally observed absurd blunders that are only sometimes repeated after take-back in my 8 MHz "C", though much more rarely than you describe. Perhaps upgraded units are more susceptible than regular "C" units. Since the game quoted in CCR was by a Super Forte C, apparently it too can have this problem, as you later pointed out. I believe that my low rating for the "C" in action chess in the last issue may have been due to this problem, since my own unit did throw away at least one of those games from this "bug", and since one of our other testers used an upgraded unit. How widespread the problem is will remain a mystery, and we may never know whether the "Ply" rating may have suffered from it. Judging from the previous letter and other satisfied owners, the problem cannot be too widespread, at least in the severe form you report. I hope that Novag will make sure that the problem does not recur in the new 68000 series; CCR has alerted Novag to Mr. Gundel's findings.]

Ed Parry, Sepulveda, CA

Being an active chess enthusiast, I decided to make a wish list for what I would like to see in pocket chess computer. Here is what I came up with:

1) Small LED chessboard & pieces screen. (No pieces to lose.)
2) Master or better strength.
3) Rating (800-2100+) & time levels with sudden death option.
4) Fair variety of openings & opening variations.
5) User enters all moves mode.
6) Long battery life
7) TRULY pocket sized or smaller.
8) Flip down protective top.
9) Setup & problem solving modes.
10) Automatically save game when power is turned off.
11) Standard chess computer features, i.e. castling, en passant, selectable piece promotion, takebacks, mate in XX alert.
12) A fair price

I suspect that something like this is a few years away...Until then, I am sure we'll get by fine with our fantastic selection of chess computers and computer chess software.

[Reply: The Fidelity Travel Master has nearly everything on your list after the first two points. So far no one has used an LED screen with a strong program, but of course there is no reason that it couldn't be done. The Travel Master is "only" Expert strength; I believe if programmer Morsch is allowed to use the more expensive version of the h-8 chip with twice the RAM and ROM and if it can be run 50% faster (likely in a year), he could create an true pocket master that would sell for under $150. But that doesn't mean that it will happen.]

Chess Playing Software for the PC

Since our last review there have been no strong new pc programs, but there have been new versions of existing programs and a new pc card, the ChessMachine, to review.

To begin with, there have been no new versions of RexChess since 2.30, because Don Dailey and I have been too busy with the new "Alpha" program. The commercial name and release date are not yet announced, but the chess playing part is finished and appears to be stronger than Rex at serious time limits though not at blitz. It will be the version that beat the two GMs in the Harvard Cup (see story), with some minor bugs corrected and a few other refinements. Since the features and interface are being handled by others this time, I can't say anything about them. As for Rex, since there have been no new versions for a year it is being reduced in price to just below $50, in which price bracket it has no competitor in playing strength. Rex's 2662 WBCA blitz rating (on 486/25) is still by far the highest computer rating of any sort, but I should point out that the Mephisto Lyon 68030 model would be over 2700 WBCA if its recent blitz results in Europe (including a 15-9 score against World Blitz champion Mikhail Tal) were WBCA rated.

Zarkov has improved steadily and with the latest version (2.5) it is in the same strength range as Rex. Rex scores a mere 5 points better on my problem test; Zarkov 2.5 scored better in some testing vs. other programs by an amateur tester in California; and Rex did much better in the Aegon tournament in Holland (see story), finishing third among computers vs. 14th for Zarkov. Zarkov has yet to achieve any noteworthy success in competition vs. humans, but this may be due more to lack of opportunity than anything else. Because Zarkov is rather more expensive than Rex now, its main appeal will continue to be the "book-up" tie-in.

Mchess has improved only slightly over the last few months (the Swedish ratings show a 1 point drop with the latest version, which of course means nothing) but that is because it was already so strong that it's difficult for programmer Marty Hirsch to make it much better. This doesn't stop him from trying; he has a new version about once a week. Mchess has had a string of successes: top pc and second place in the World Micro, top pc and third place in "Ply" rating list (behind only Lyon and Portorose 68030) and top computer of 20 in "Aegon" tournament, where it beat the strongest grandmaster (Larry Christiansen) ever to lose a 40/2 tournament game to a computer, all on 486 computers. Mchess is more expensive at $100 than other programs, but its strength justifies the price. I believe most of its strength derives from its tactics, and perhaps from the use of scoring tricks to avoid tactical pitfalls. The opening book has been gradually improving and is no longer an embarrassment. Its performance on my tactics test, while better than all other pc programs tested, is somewhat below its results in comp-comp testing, which I find puzzling since it seems to win its games thru tactics. Perhaps my test needs more refinement to pick up more of the tactics at which Mchess excels. In my opinion, the program bears a rather strong similarity to the Saitek 6502 programs, but Mchess is much faster and this makes all the difference.

In case you are wondering what type of pc to purchase to run your chess programs on, I would now recommend either a 40 MHz 386 or a 486 sx, both of which are just coming on the market now, as offering the maximum strength for $2000-$2500. Consider these two as equal, since the 486 (sx or regular) is nearly twice the speed of a comparable MHz 386, but the sx runs at only 20 MHz. The reason these two chips are more suitable than a regular 486 is that the standard 486 includes a math coprocessor which is useless for chess but adds considerably to the price. So a 486 at 25 MHz is better than an sx for chess, but only because of the 25% speed difference, not enough to justify a large price premium for the full 486. It may be possible to purchase a 486sx (or 386/40 MHz) machine for close to $2000 once they become popular, which may be quite soon. This may be sufficient to reach or at least approach the Senior Master (2400 USCF) level with Mchess.

Now it's time to discuss the new "ChessMachine", a 32 bit RISC (ACORN) processor card with Ed Schroeder's program that is on a card that plugs into a pc (XT or AT). Since the card replaces the computer's own CPU, it makes no difference for the program's performance whether you own a slow XT or a 486/33. The RISC chip runs at 16 MHz and claims to do 12 MIPS, about equal to a 486/25 MHz if these are "Chess Mips" (see last year's CCR for explanation). Frankly, I doubt this, as some comparisons with the Schroeder 8 bit programs suggest a figure around 8 Chess Mips, or about like a 386/33 MHz. Claims that the card is 4 times faster than a 386/33 are absurd. Still, since Schroeder is one of the two best chess programmers along with Lang in my opinion this card should play very well indeed. The card runs a little over half the speed of the "Gideon" unit which won the World Micro this year (see story). While I have not yet received a test unit and hence have no games to go by, I did run my full problem test over the phone on both the 512k and the 128k versions, and got predicted ratings of 2416 and 2373 USCF respectively. I suspect that my formula overrates very strong machines a bit because it ignores the decreased value of speed increases at high levels; I hope to correct this problem soon. My best guess is that the $750 model will play around the 2400 level and the $500 unit around 2365, but of course until I play test games it's only a guess. The program seems to combine the best points of the Mephisto Polgar and the Mephisto MM5, plus introducing variable selectivity (5 ply in early game, 3 in endgame) which combination should approach the 2200 level on a 5 MHz 6502. The speed of the RISC card should boost this to around 2350, while the addition of hash tables should bring the 512k version up another 50 points or so (the 128k unit has small hash tables worth perhaps 10-20 points). Conclusion: if you own a pc slower than a 386/33 the 512k card will give you higher performance than any pc program, and will probably play at least as well as the $2000 Mephisto Lyon 32 bit, but of course you must be willing to play off a monitor instead of playing on a beautiful wooden electronic chess board. If you own a 486, Mchess should be just as strong and a lot cheaper, while on a 386/33 the 512k unit is apt to outperform Mchess only slightly. The ChessMachine is indeed an exciting new product, but it is not for everyone. I look forward to a ChessMachine vs Lyon 32 bit match! The ChessMachine has many other features besides playing strength, which I plan to discuss in the next CCR after receiving a test unit.

Since my problem results were based on phone calls with a distributor, and since we have no game results yet, interested readers are invited to call me at Fidelity on Wednesdays or to call I.C.D. to get confirmation of the problem results and actual game results once I receive an actual production unit of the "ChessMachine".

Testing Computers on Problems

With this issue I would like to propose a new method of testing computers on tactical problems (not mates) to evaluate their abilities. The old methods each have drawbacks. One method is to count how many problems are solved in a given time, say 3 minutes, but this is very crude, because it gives only a yes or no answer for each problem. A better method is to time how long it takes for the solution to appear in the display in infinite mode, but this has several objections. First of all, some programs report a change of best move as soon as it is found while others wait until the move is fully evaluated and proven to be best. This difference makes a direct comparison of times a bit unfair. Another problem is that some programs look at tactical moves ahead of positional moves, which artificially improves their scores on tactical tests. Furthermore, some programs attempt to sort the initial moves by how good they appear to be, and since most tactical problems involve moves that appear to be bad until the point is seen, these programs will be unfairly penalized. So what do we do?

My solution is based on the fact that every commercial program and nearly every research program for practical play uses a technique known as "Iterative Deepening". Regardless of whether the program is selective or full width, it searches all the moves to a depth of 1 ply, then re-searches them all to a depth of 2 ply, then 3 ply, etc. My idea is that when the solution to a problem is found the program is required to complete the current iteration, and the total time used at that point is recorded. This is not possible on mate problems because many programs do not finish the iteration after finding mate, while some do so hoping to find a shorter mate. This method minimizes the effect of varying move order and avoids the issue of moves being reported before they are fully evaluated. Another practical advantage is that you need not watch the machine, provided it has fixed depth levels and displays total time used on the last move. You need

merely to set the depth to 1 ply and then retract the move and increase the depth one ply at a time until the solution move is played. If need be, you can leave it running all night and check for the solution in the morning.

Once an iteration time for a problem is known, the computer can be rated on that problem by means of a formula such as the "Renard" formula given in an earlier CCR. The formula is based on the well established rule that each doubling of processor speed is worth a set number of points, perhaps 75. Actually the value of a doubling declines gradually with increasing rating, and a more elaborate formula could deal with this. The formula has a parameter that reflects the difficulty of the problem, which would be measured by testing programs of known strength on the problem. Alternatively the parameter can be set at one value for a whole set of problems, with its value chosen to best fit the ratings of computers tested on the whole set.

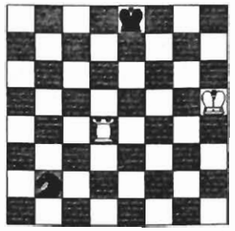
To estimate the tactical rating of a chess program, it would then be necessary only to average the individual problem ratings over a set of problems. The critical factor then becomes the selection of the problems. The most important point is that the problems must be ones that cannot be solved without fully understanding the solution. This means that the correct move must appear at first to be a poor one, usually a sacrifice or declining an opponent's offer. Another way is to require that the machine display the correct analysis as well as the correct move, but this may require judgement, and some computers don't display more than 3 or 4 plies of analysis. The next point is that the problems must cover a wide range of tactics. In particular, this means that only a modest percentage of the problems should involve mating threats, and also that checks should not appear in the solution to a majority of the problems.

Furthermore, spectacular sacrifices should occur in only a small minority of the problems. Since most published problem collections are full of spectacular sacrifices and mating attacks it is necessary to select or devise problems to emphasize the dull but critical tactics that occur in nearly every game, at least in the analysis of the players. A reasonable percentage of the problems should feature endgame tactics. Finally it is necessary to choose problems that will show up the weaknesses of various programs, which in turn requires some knowledge of them. For example some programs are rather blind to discovered attacks, or to attacks on defended but immobile targets. A good test should uncover these weaknesses.

An interesting question that springs to mind is this: What single test position comes closest to predicting the relative strength of the many chess programs? It seems ridiculous to think that one position could tell much of anything, but in fact there are positions that do correlate fairly well with playing strength. I don't know what is the best test position, but I will give an example of two that do rather well.

The first one involves winning a trapped piece in the endgame. Put a white king on h5, a rook on d4; then a black king on e8 and a knight on b2. Since the knight is trapped, white can win it by Kg4 followed by Kf3 and Ke2, then Rb4. Black is helpless. This is rather easy for a human player to see, but for a computer it is rather difficult; they are apt to try to mate directly, which is not possible. Here are the times needed to find Kg4

BLACK



WHITE (2+2)

and complete the iteration for a number of different programs (in all cases the correct continuation for white is given) (pc programs run on a 486/25 MHz), and the indicated rating from this single problem: Lyon 32 bit 12 MHz -- 21"-- 2402, Roma 32 bit -- 21" -- 2402, Mega IV Turbo 18 MHz -- 56" -- 2295, Mach IV -- 71" -- 2269, Polgar 10 Mhz -- 121" -- 2209, Mach II LA -- 141" -- 2192, Mach III -- 189" -- 2159, Fid Travel Master (Full Width mode) -- 200" -- 2153, MM5 -- 308" -- 2104, Novag Super C -- 279" -- 2083, Corona II -- 512" -- 2047, Corona -- 591" -- 2031, Prisma -- 829" -- 1993, Fid Travel Master (sel) -- 1860" -- 1902, Novag Super VIP -- 2260" -- 1880, Novag Primo -- 3370" -- 1835. As for the pc programs, Rex 2.3 takes 88", MChess 1.32 takes 110", Zarkov 2.5 57", and our current version of "Alpha" just 36". Most of these ratings look quite reasonable, except for Roma, Super C, the placement of Mach II above Mach III, and the low figure for Travel Master in selective mode. This last item reinforces my opinion that the selectivity should be turned off in Travel Master once a reduced endgame is reached.

My second problem also has the trapped piece theme. Such problems seem to correlate well with playing strength because trapped pieces cannot be recognized nearly as easily as forked or pinned ones, and so a program cannot solve such problems just by a few simple rules. Put a white king on f2, bishops on c7 and e2 and a pawn on g3; give black a king on g6, knights on a1 and g7, and a pawn on g4. White to move should decline the pawn on g4 and play Bd1!, trapping the knight on a1 which can ultimately be won by the other bishop. Here are the times and ratings to completion of solution iteration (pc programs run on 486/25): Lyon 32 bit 12 MHz -- 5"-- 2375 , Portorose 32 bit -- 6" -- 2358, Alpha -- 6.3"-- 2353, Lyon 16 bit -- 9" -- 2318, Portorose 16 bit -- 10" -- 2307, MChess -- 11" -- 2297, ChessMachine 512k -- 14" -- 2272, Zarkov 2.5 -- 15"-- 2265, Mach IV -- 15" -- 2265, Roma 32 bit -- 15" -- 2265, ChessMachine 128k -- 18" -- 2245, Rex -- 18" -- 2245, Polgar 10 Mhz -- 24" -- 2215, Novag Diablo -- 29" -- 2194, Mach III -- 34" -- 2177, Mach II L.A. -- 40" -- 2159, Polgar -- 48" -- 2139, Mega IV -- 48" -- 2139, MM5 -- 53" -- 2128, MM4 -- 57" -- 2120, Marco Polo -- 57" -- 2120, Travel Master -- 59" -- 2116, SuperMondial II -- 62" -- 2111, Designer 2100 Display -- 72" -- 2094, Par Excellence/Chesster -- 86" -- 2074, Novag Super C -- 103" -- 2054, TurboKing II -- 122" -- 2035, Corona -- 127" -- 2031,

-- 2004, Novag Super VIP -- 285" -- 1940, Novag VIP -- 384" -- 1905. The ratings for Novag Super C and Diablo and for ChessMachine are too low because this problem is rather tough for highly selective programs, while the rating for Marco Polo is way too high because the shortcuts it takes don't affect this problem, but most of the other ratings are believable or at least within a reasonable margin of a real rating. If anyone can find a single problem that better orders the strength of programs than this one I would love to hear about it!

GAMES

Harvard Cup--Computers vs. Grandmasters Challenge Match May 1991

Time Limit: 25 Minutes per player for the game.
White: Heuristic Software's "Alpha" (unreleased pc program running on 486/33 Mhz pc)
Black: Grandmaster Michael Rohde
Comments based on post game analysis by Rohde.

1 e4 e6 2 d4 d5 3 exd5 (Computers don't play the closed French lines well, hence I booked this line--LK. Rohde wrongly assumed that we chose this line because we wanted a draw.) exd5 4 Nf3 Bd6 5 Bd3 Ne7 6 o-o o-o 7 b3?! Nbc6?! (7...c6!) 8 c4 dxc4 9 bxc4 Nb4 10 Be2 c5 11 a3 (11 d5 seems even better) Nbc6 12 d5 Ne5 13 Nc3 Bf5 14 Nh4 Re8 15 Re1 a6 16 Bg5 Qd7?! (This loses the exchange, but black gets an attack as compensation. Rohde overlooked that the Knight can be rescued after taking the rook.) 17 Na4!? (Since white looks a bit better and the text seems to lead to a draw with correct play, perhaps it was not objectively the best move.) f6 18 Nb6 Qd8 19 Nxa8 fxg5 20 Nxf5 Nxf5 21 Qb1! Nd4 22 Nb6 Nxe2+ 23 Rxe2 Nf3+ 24 Kf1 Rxe2 (24...Nxh2+ is unclear) 25 Kxe2 Qe8+! 26 Kxf3 g4+ 27 Kxg4 Qe2+ 28 Kh4 Be7+ 29 Kh3! (playing for the win) Qh5+ 30 Kg3 Bh4+ 31 Kf4 Bg5+ 32 Ke4 Qe2+ 33 Kf5 Bd2! 34 Na4!! (prevents ...Bc3 in some lines) g6+ 35 Kf6 Qxf2+ 36 Ke7 Bg5+ 37 Kd6 Qf8+ 38 Kc7 b5 39 cxb5 Bf4+ 40 Kb6 Qd6+ 41 Ka7 Qb8+ 42 Kxa6 Qa8+ 43 Kb6 c4?? (Black can still draw by ...Bd6, threatening perpetual check.) 44 Qe4 Qd8+ 45 Kc5 and black overstepped, but he was quite lost anyway. Black had several chances to draw by perpetual, but was searching for a win in vain. Even in the post-mortem no win could be demonstrated.

Harvard Cup -- May 1991 -- Game/25 minutes

White: Grandmaster Patrick Wolff
Black: Heuristic Software's "Alpha" on 486/33

1 d3 (This took Alpha out of book!) e5 2 Nf3 Nc6 3 c3 d5 4 g3 Nf6 5 Bg2 Be7 6 o-o o-o 7 Qc2 Re8 8 Nbd2 a6 9 a3 h6 10 b4 Bf5 11 e4 de4 12 de4 Bh7 13 Bb2 Qd7 14 Rad1 Rad8 15 Rfe1 Bf8 16 a4 Qd6 17 b5 Ne7 18 Nc4? (white had the edge but lets it slip here) Bxe4! 19 Nxd6 Bxc2 20 Nxe8 Bxd1 21 Nxc7 e4 22 Nd4 Bxa4 23 bxa6 bxa6 24 Nxa6 Ned5 25 Ra1 Nb6 26 Bf1 Rc8 27 Nb4 Rc5 28 Be2 Bd7 29 Bd1 Nc4 30 Bc1 Ne5 31 Bd2 Rc4 32 Ra8 Ne8 33 Nbc2 Rc5 34 Ne3 Rc7 35 Bb3 Rb7 36 Bd5 Rb2 37 Nf1 Nc7 38 Ra5 Nxd5 39 Rxd5 Bh3 (black wins a piece now) 40 f4 Rb1 41 Kf2 Ng4 and black announced mate next.

Harvard Cup -- May 1991 -- game/25 minutes

White: Fidelity Mach IV
Black: Grandmaster Boris Gulko

1 e4 d6 2 d4 Nf6 3 Nc3 c6 4 Be2 g6 5 Nf3 Bg7 6 o-o o-o 7 Bf4 Nbd7 8 Rb1 b5 9 a3 a6 10 Qd3 c5 11 e5 Nh5 12 Qe4 Nxf4?! (A dubious sac. Better 12...Nb6). 13 Qa8 cxd4 14 Nxd4 Qb6 15 Qe4 Be5 16 Nc6 Bb7 17 Nxe7+ Kg7 18 Ncd5 Qc5 19 b4! Bxd5 20 Qxf4! Qc3? 21 Nxd5 Qxc2 22 Qf3 Re8 23 Rfe1 Qa2 24 Nc7 Rc8 25 Rbc1 Nf6 26 Qh3 Rd8 27 Nxa6 Bd4 28 Qf3 d5 29 Bxb5 Qb2 30 Rc7 Rf8 31 Nc5 Qd2 32 Rd1 Bf2 33 Kf1 Qc2? 34 Ne6+ and black resigned.

World Microcomputer Chess Championship--Vancouver, Canada May 1991, 40/2, Software division

White: Mephisto (R. Lang program on 68030/50 Mhz)
Black: Gideon (Ed Schroeder program on ARM 86010 RISC)

1 e4 c6 2 d4 d5 3 Nc3 dxe4 4 Nxe4 Bf5 5 Ng3 Bg6 6 Bc4 e6 9 N1e2 Nf6 8 Nf4 Bd6 9 Bb3 Qc7 10 Qf3 Nbd7 11 o-o a5 12 c3 c5!? (safer 12...o-o, but perhaps then Gideon wrongly feared 13 Bxe6, which "wins" rook & two pawns for bishop and knight but is not good for white) 13 Bxe6!? (better here than after 12...o-o) fxe6 14 Nxe6 Qb6 15 Nxg7+ Kf7 16 N7f5 cxd4 17 cxd4 bxg3 18 Nh6+ Kg7 19 Qxg3 Rhe8 20 Rd1 Kh8 21 b3 Rac8? (21...Nd5! blockading the passed pawn would favor black, as the three pawns are not then mobile and hence worth less than the knight) 22 d5! (Now the white bishop will reach the long diagonal to black's king, giving him the edge) Re2 23 Be3 Qb5 24 Bd4 Rce8 25 Bc3 Qb6 26 d6 Qd8 27 Qg5 b6 28 f4! Rf8 29 f5 Be8 30 Re1 Bh5 (or 30...Rxe1+ 31 Rxe1 and the threat of 32 Re7 decides) 31 Qxh5 Rxe1+ 32 Rxe1 and Black resigned.

World Microcomputer Chess Championship -- Vancouver, Canada May, 1991, 40/2. Playoff match between section winners.

White: Mephisto (R. Lang program on 68030/50 MHz)
Black: Gideon (Ed Schroeder program on ARM 86010 RISC)

1 d4 b6 2 Nf3 Nc6 (obviously this throws the game out of book; it is not a good move objectively) 3 d5 Na5 4 Nc3 e6 5 dxe6? (a positional error. With 5 e4 white can maintain the advanced pawn on d5 and retain a clear advantage.) fxe6 6 e4 Bb7 7 Bg5 (I prefer simply 7 Bd3--LK) Be7 8 Bxe7 Nxe7 9 Bb5?! (provoking ...a6 makes no sense to me) a6 10 Be2 o-o 11 o-o Ng6 12 Qd4 (maybe 12 g3, but black is already better) d6 13 Rad1 Nf4 14 b4? (a tactical error, but the refutation is very nice) c5! 15 bxc5 Rc8! (the point! If 16 Qxd6 Qxd6 17 Rxd6 Rxc5 and white's in trouble. Or 16 cxd6 or b6, ...Rxc3 17 Qxc3 Nxe2+ wins.) 16 Rd2 Rxc5 17 Nd1 Qc7. At this point Mephisto resigned in return for getting a draw on their concurrent game as black, in which they were also in trouble due to the book line chosen by both computers favoring white. While resignation is premature here, black will probably win a pawn and retain the initiative, for example

18 c3 e5 19 Qe3 Nc4 20 Bxc4 Rxc4, and the e pawn is lost. I think the Gideon team was foolish to accept the deal, as they were unlikely to score less than 1 1/2 out of the two games, but might easily have won both. Although both Lang and Schroeder work for Mephisto, I don't think collusion was involved, since the Schroeder RISC program does not belong to Mephisto. If there were any hanky-panky going on, the match would have been won by Mephisto, not tied as it was. I think the Gideon team just got cold feet! There were claims that Mephisto would have won the match were it not for special booking by the Gideon team, but the only game in which the book left Mephisto in trouble was the one agreed drawn in the package deal. So maybe the shared result was indeed the fairest one after all.

World Microcomputer Chess Championship -- Vancouver, Canada, May, 1991, 40/2, Software division

White: Spracklen X (running on SPARC 1+)
Black: Cumulus (running on RISC R3000)

1 e4 c6 2 d4 d5 3 Nc3 dxe4 4 Nxe4 Nd7 5 Bc4 Ngf6 6 Nxf6 exf6?! 7 Ne2 Bd6 8 Bd3 Nb6?! 9 c4 Bb4+ 10 Bd2 Bxd2 11 Qxd2 (white is better) o-o 12 Qc2 h6 13 o-o Be6 14 a4 a5 15 Qc3 Qc7 16 Rfe1 Rfd8 17 g3 Bg4 18 Nc1 c5?! (why give white a passed pawn for free?) 19 d5 Nc8 20 Bc2 Nd6 21 Ne2 Re8 22 Nf4 Rad8 23 b3 Qb6?! 24 Rab1 Qb4 25 Qxb4 axb4 26 Rxe8+ Rxe8 27 Kg2 b6 28 Ra1 g5 (better was 28...Ra8 to prevent an eventual a5 break) 29 h3 Be2 30 Nxe2 Rxe2 31 Ra2 Kf8 (white threatened B-h7+) 32 a5! bxa5 33 Kf3 Rd2 34 Ke3 Rd4 35 Rxa5 Nxc4+ (desperation; if 35...Nb7 36 Rb5 wins) 36 bxc4 Rxc4 37 d6! Rc3+ 38 Kd2 Rc4 39 Bd3 Rd4 40 Rxc5 Ke8 41 Rc8+ Kd7 42 Rc7+ Kd8 43 Rxf7 Rxd6 44 Rb7 Rd4 45 Ke3 Kc8 46 Rb5 (46 Kxd4 is a much simpler win. Apparently the "trade-down when ahead" bonus is too small in this program.) Rd6 47 Rxb4 and white soon won. The early endgame was nicely played by white.

Aegon Tournament - Holland, June 1991

White: M-Chess (running on 80486 25MHz)
Black: GM Larry Christiansen (2637)

1 c4 e5 2 Nc3 Nf6 3 Nf3 Nc6 4 g3 Nd4 5Nxe5 Qe7 6 f4 d6 7 Nd3 Bf5 8 Nb4 c6 9 d3 d5 10 a3 a5 11 Nc2 Nxc2+ 12 Qxc2 dxc4 13 e4 o-o-o 14 Be3 cxd3 15 Bxd3 Bxe4 16 Nxe4 Nxe4 17 o-o-o f5 18 Bb6 Rd6 19 Rhe1 Qd7 20 Bxe4 fxe4 21 Qxe4 Be7 22 Qe5 c5 23 Qxg7 Bf6 24 Qxd7+ Rxd7 25 Bxa5 h5 26 Kc2 Rg8 27 Bc3 Bd4 28 Bxd4 cxd4 29 Kd3 h4 30 gxh4 Rg4 31 Re8+ Kc7 32 Rc1+ Kb6 33 Re6+ Ka7 34 f5 Rxh4 35 Rc2 Rf4 36 Rf6 Rh7 37 Rd2 Rh3+ 38 Kc4 d3+ 39 Kc3 Rf1 40 b4 Ra1 41 Kb2 Rh1 42 Rd6 R1xh2 43 Rxd3 Rxd3 44 Rxh2 Rf3 45 Rh5 Ka6 46 a4 b5 47 a5 Rf4 48 Kc3 Rc4+ 49 Kb3 Rf4 50 Rh6+ Ka7 51Rf6 Rf3+ 52 Kc2 Rf4 53 Kc3 Rc4+ 54 Kb3 Rf4 55 Rf8 Rf3+ 56 Kc2 Rf4 57 Kc3 Rc4+ 58 Kb3 Rf4 59 f6 Kb7 60 f7 Ka7 61 Kc3 Kb7 62 Kd3 Rf1 63 Ke4 Re1+ 64 Kf5 Rf1+ 65 Ke6 Re1+ 66 Kd6 Rf1 67 a6+ Ka7 68 Kc5 Rf5+ 69 Kc6 Rf6+ 70 Kxb5 Rb6+ 71 Kc4 Rf6 72 b5 Rf4+ 73 Kc5 Rf5+ 74 Kc6 Rc5+ 75 Kd6 Rxb5 76 Ra8+Kxa8 77 f8Q+Ka7 78 Kc7 Rb1 79 Qc5+ Kxa6 80 Kc6 **1-0**