

# Computer Chess Reports Quarterly

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## Quarterly Review

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As 1990 draws to a close, I cannot escape the conclusion that this has been a very dull year for computer chess, with one exception, Mephisto Lyon. There have been no dramatic breakthroughs in either the micro or mainframe worlds, just incremental progress. In both cases, I have the feeling that we are experiencing the lull before the storm. Next year may be very exciting with a 10x faster successor to Deep Thought expected, and with RISC and other new processors likely to debut in commercial chess computers. Still, there have been a few new developments in the micro world and some tournaments.

The first commercial 68040 chess computer has come out (by Fidelity), and it showed that the '040 is 2.3 times faster for chess than the 68030 at the same Mhz. Even at "only" 25 Mhz, it is somewhat faster than the fastest (50 Mhz) '030, presently used only in special non-commercial tournament models. Since even faster versions of the '040 are expected in '91, perhaps there may be even more powerful (and expensive!) Fidelity models with the same program, or even a Mephisto '40, but don't count on it.

Two new models of interest are the Mephisto Lyon and the Mephisto MM5. The Lyon program (on 48 Mhz '030) tied for first at ACM with Deep Thought (see story), but five games tell us little. My own testing shows a marked improvement over its predecessor (Portorose), which appears to be due to the introduction of Deep Thought's "Singular Extension" idea; the Lyon is the first micro to utilize this. The MM5 has done very well in the early Swedish testing and on problem sets, and may be the first master (or near master) level program available in a hand-held unit.

In the pc software field, the new "Mchess" (superceding "A. I. Chess") is proving to be very strong and now offers real graphics. It earned a USCF equivalent rating of 2334 in 19 rounds of tournament play in Austria and Holland, running on a 25 Mhz 486. This exceeds the USCF 2318 performance of RexChess at the U. S. Open on the same hardware (Rex used a 386 for 4 of its 12 games), previously the high water mark of pc chess programs. At blitz, Rex on the 486 was awarded an amazing 2662 rating by the WBCA and was featured on the cover of Walter Browne's magazine "Blitz Chess". Can Mchess top this?

On a personal note, I continue to work with Don Dailey on an all new chess program, currently mostly in "C". It recently played in the Miami Chess Club Thanksgiving Classic, time limit game in 1 hour, and won clear first place in the open section with 5 1/2 out of six. Its performance rating (C.R.A. formula) was over 2530! Needless to say luck contributed to this result, as did the hardware (486/25 Mhz). Of course six games is a tiny sample. I myself was relegated to a tie for third, or should I say a tie for second

human? This new program will almost certainly not be on sale before mid '91, as it still lacks many features and may even be translated to assembly language to boost its strength.

I also wish to alert my readers to the fact that I have agreed to answer phone inquiries about computer chess one or more days per week at Fidelity International. The toll-free number is 1-800-634-4692. At this writing I am there on Wednesdays, 10-4. Since Fidelity distributes all brands of chess computers except Saitek, and since Saitek is not yet releasing any information about its planned RISC modules, I will be at liberty to give objective answers to all questions. In the past I have done opening books (and even part of the Super C program) for Novag, have operated computers at C.R.A. events for Mephisto, and have supervised a C.R.A. test for Saitek, so with the present agreement with Fidelity I will have done something for all of the big 4. Don Dailey and I are also now sharing research findings with Julio Kaplan, so perhaps our work may find its way into Saitek modules in 1991.

One bit of good news for consumers is that Novag is no longer being distributed in the U.S. solely thru Fidelity, so the monopoly situation is not so bad as in '90. While there is no certainty that Novag prices will drop, at least the large price increase that was expected has been averted. On the downside, the fall in the dollar vs. the German Mark is expected to mean higher prices for Mephisto models in the U.S., and perhaps also for Saitek and CXG.

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## ACM Tournament

The 1990 North American Computer Chess Championship, the "ACM" tournament, was held in New York in mid November. There were to be ten entrants, but one, "Zerker" (said to be much faster than Deep Thought!), failed to work and so there were only 9. The event was a five round swiss, with for the first time a sudden death time limit, namely game in 2 hours.

The winners were Deep Thought (still with only two processors) and the new Mephisto Lyon 68030 running at 48 Mhz, each with 4 points. Deep Thought beat Mephisto, HiTech beat Deep Thought, and Mephisto beat HiTech on time after 145 moves in a drawn ending. Under normal sudden death rules the game might have been adjudicated a draw before this, but Berliner had convinced the participants that all games should be played to the bitter end, and was "rewarded" by forfeiting on time, because it takes longer to type in moves to HiTech than merely to play them on Mephisto's board! Consequently HiTech was relegated to a tie for third at 3 1/2 with Mchess, running on a 33 Mhz 486 machine except for one game (a loss to Mephisto, for which Mchess had only a 25 Mhz 386). Mchess beat Belle and drew BeBe, and also beat "Nightmare" and got a bye. Next at 2 1/2 were Bebe and Zarkov. Zarkov is a pc program, but because it is in "C" it will also run on very powerful computers, and for this event it ran on a \$200,000 "MIPS 6000" machine running at 38 times the speed of the old 8 Mhz "IBM AT", or nearly three times the speed of the fastest pc compatible (a 486 33 Mhz). Zarkov drew HiTech and beat BeBe, but lost to Mephisto and Deep Thought. Next at 2 points were Belle, with a new host computer and some improvements (estimated speed 150,000 nodes per second), and the German pc program "Nightmare" on a 386. Last at 1 (a bye) was "Now", an American amateur pc program on a 386. A game in 20' endgame tourney was also held and won by Mephisto, but Deep Thought and HiTech did not participate.

Naturally such a short, small event as this ACM cannot tell us too much, but it is becoming clear that the gap between the micros and the special purpose chess machines is not what it used to be. This is partly because the micros now have the power of mainframes of a few years ago, and also because the micros tend to be full-time or at least half-time projects which are much more easily refined than a machine with the chess knowledge built in. Deep Thought, HiTech, BeBe, and Belle are all running on ageing hardware, and there are rumors about all of them switching to new, much faster hardware next year. In particular, Deep Thought is expected to switch to ten times faster hardware in '91 as an intermediate step towards the goal of beating a machine capable of beating the human World Champion. The results of the past couple of ACM tourneys do suggest that chess knowledge can compensate to a fair degree for speed, and so the IBM/Deep Thought team would be well advised to keep this in mind.

## 1990 World Micro

The 1990 World Microcomputer Chess Championship was held in late November in Lyon, France. Only the "software" section was contested, with Mephisto/Lang winning the manufacturers' section by default. The rules seem to allow dedicated machines in the software section, but only Mephisto among the dedicated manufacturers entered machines. Mephisto Lyon by Richard Lang, an upgrade of the Portorose program running on a 68030 at around 50 MHz, won first place with 6 1/2 out of seven games. Second place was a tie between "Gideon", the RISC version (on a 16 MHz ARM 2 processor) of Ed Schroeder's (Mephisto Polgar, MM5) latest program, and a French pc program "Echec 1.9" by M. Baudot on a 33 MHz 486 computer, each with 5 1/2. Fourth was the Dutch "The King", also using the ARM 2 RISC, by J. de Konig, at 4, and fifth was the German "check check" on a 386/33 MHz at 3 1/2. At 3 points we find the British "Chess Simulator" on a 28 MHz 68030 by Ch. Whittington, the German "Patzer" on a 25 MHz 386 by Kock & Schafer, and the French "BB" (not to be confused with American "BeBe") on a 20 MHz 386 by Christophe Jolly. The French "Cumulus" by Jean Wiell and the German "Nightmare" (386 20 MHz) by R. Gellner were next at 2 1/2. Finally, the tail-enders were the French "Nest" (286 at 12 MHz) and the Dutch "Delta" (386 33 MHz) at 1 1/2. With the exception of last place "Delta", the programs finished in nearly the same order as their hardware speed in MIPS, which points out the need for tournaments where all contestants run on identical or at least comparable hardware. True, it is hard to state what MHz 68030 is equal to what speed 80386 or ARM 2, but some standard (probably Dhrystone) could be adopted for this purpose.

As for individual results, Lang beat Schroeder's "Gideon", while each of them drew with the French "Echec 1.9", which in turn drew with "Nightmare".

The next micro is planned for mid-year '91, which makes much more sense in terms of having commercial versions out in ample time for the Christmas season. I have a feeling that the '91 micro will be well contested, with Saitek likely to enter a RISC machine by the Spracklens, and several other strong programs now under development. Still, there is a widespread feeling that the World Micro is not a meaningful test of programs, since the hardware used is generally much more powerful than commercial units. For most knowledgeable computer chess fans, the real "World Micro" is the Swedish "Ply" rating list.

## Fidelity Review

One new model of interest since our last review is the long awaited Elite Version 10, utilizing the 68040 processor. Admittedly it is of only academic interest to all but a few in view of its high price, but for the non-millionaires it gives a view of things to come in the medium price range in future years.

The program and features are all identical to the other Elites, but the 68040 processor runs at an effective speed of 1.8 times the Version 9's 68030 32 Mhz processor. In fact, I tested both units on about a dozen problems, and in every case the ratio was 1.8 (plus or minus a percent or two). Thus, Version 10 is the equivalent of a 68030 model running at 58 Mhz. This should put it about 50 points over the Version 9, putting it just over 2400. Both Versions 9 and 10 come with 1 Megabyte of RAM, but only Version 10 has room for added RAM; a second Megabyte should speed it up another 7-8% for an added 7-8 points in strength. Since the ideal minimum amount of RAM is proportional to the processor speed, it follows that if Version 6 comes standard with 512k and Version 9 (about 1.9 times faster) comes with 1 Megabyte, version 10 should really be ordered with 2 Megabytes for near optimum performance in relation to cost. In each case, adding more RAM will still improve performance a bit, but not enough to justify the cost.

The Elites and the Designer Mach III Master share the same program, which differs from the C.R.A. rated Mach III and Mach IV only in that the hash table has been refined, making the newer models a tiny bit faster on average. In an earlier CCR I reported that the Designer Mach III was 10% faster than the original, but this turns out to be due to a slow clock on the early Designers--it solved problems 10% faster by its own clock, not by real time. The problem has been corrected and the current Designers have an accurate clock. I understand that the new Designers are much more reliable than the early ones. If you buy a Designer Mach III be sure to check the clock for accuracy--if it runs 10% slow you are getting stuck with an old unit. Both Mach IIIs remain the only master rated (both by C.R.A. and CCR) machines under \$300 and so remain excellent values. The opening book is twice as large on the Elites as on the two Mach III models, but I personally feel that the smaller book is of higher quality; the Elites sometimes choose dubious openings, but not too often.

How does the Elite 10 compare in strength to the Mephisto Lyon models? The superiority of the Lyon program to that in the Elites is apparently enough to offset a hardware handicap of between 3 and 4 to 1, so clearly the Elite 10 is stronger than the Lyon 32 bit (it enjoys nearly a 6 to 1 hardware edge) but weaker than the super expensive Lyon 68030, which runs only 1.6 times slower than the Elite 10. My feeling is that the Elite 10 should fall about midway between the two top Lyon models in strength. In the under \$200 category, the Mach II L.A. (6097) still remains the world's strongest chess computer. No more are being made, and it should sell out soon. The Designer 2100 Display and the talking Chesster (same program, but Designer is 6 Mhz and Chesster is 5) remain best buys under \$150, but serious players should spend the extra \$50 for the 6097. Its 16 bit processor, hash tables, added chess knowledge, and lights on every square are certainly worth more than \$50; also, the popular sudden death levels do not work properly on the Designer Display 2100 and 2000 (the machine

goes into suicidal instant play at the halfway mark) while Chesster does not even offer these levels. Sudden death works fine on the Mach 3 models, the 6097, and the Elites.

Another new model, the "USCF Chess Academy Computer", is in fact the Mephisto "Chess School" with the accompanying instruction course revised to be more suitable for children. It utilizes the Mephisto Europa computer in a Fidelity housing. I feel the choice of name is most unfortunate and seems to be an attempt to mislead people into thinking they will get the fine Mephisto Academy computer, a much stronger, more expensive model than the Europa. The Europa is amazingly strong for a computer that has only 256 bytes of RAM, perhaps over 1900, but it still cannot compare to the less expensive Fidelity Designer 2000 or the comparably priced Chesster or Designer 2100. The USCF Academy is not a bad chess course, but don't consider buying it merely for the chess computer it utilizes.

A new version of the Phantom, "Phantom Chesster", is simply the phantom (same program & speed as Chesster, but moves its own pieces) with the same voice and vocabulary as Chesster. This is certainly the most entertaining chess game yet, and will probably be bought by many non-chess players. With Phantom Chesster you might well forget that you have no human opponent; if your opponent plays like a human, talks like one, and moves his own pieces like one, he might as well be one! Is this a hint of what life will be like in the 21st century?

As for the future, I expect that in 1991 Fidelity will begin to offer other Mephisto programs in Fidelity boards, now that Fidelity no longer has its own programmers (who now work for Saitek). If you like the aggressive Fidelity style, there is little chance of any further upgrades and hence little reason to delay purchase.

Fidelity has several models cheaper than the "Designer 2000" but none of these plays a decent game of chess, unless you count the discontinued Excellence, nearly as strong as the "2000". You simply can't get a decent machine for much less than \$100 today.

## Mephisto Review

The Mephisto Lyon is now out, with the same choice of boards (Munich, Exclusive, Modular) and processors (68000 12 MHz, 68020 12 MHz, 68030 36 MHz) as with the Almeria and Portorose. Those who own these models can purchase do-it-yourself upgrade kits. I am quite impressed by the Lyon, and feel that the upgrade is well worthwhile. The Lyon program won the London Computer Olympiad (over Schroeder's RISC machine) and tied for first at ACM (see story) with Deep Thought. It won the World Micro manufacturer's title in Lyon by default, and defeated the Schroeder RISC machine to win the software section. Mephisto is claiming a 60-90 point improvement over Portorose, while the programmer (Lang) is quoted as claiming only 40 points. My own early testing shows an 80 point gain at game/30, about 45 at blitz, and somewhere in between at game/10. Eric Hallsworth's testing on a prototype showed a 62 point



gain, or 50 after contraction, and this prototype still had the Portorose opening book. The early testing at 40/2 on the three Lyon models shows an average improvement of 83 points after contraction (48 games). Considering all this it looks like the gain is probably between 60 and 80. This suggests that the Lyon 16 bit is equal to or stronger than the Portorose 32 bit, quite an achievement. Even if the prices are raised somewhat as expected, the Lyon 16 bit will be far cheaper than the Portorose 32 bit was, so in terms of the price needed to reach 2300+, the Lyon is a much better buy. Similarly the Lyon 32 bit appears to be only slightly weaker than the Portorose 68030 and about a quarter of the price.

The principal source of the improvement in the Lyon is said to be the implementation of "Singular Extension" (Deep Thought's idea), which greatly improves tactical strength by extending forcing lines. This shows up dramatically on problems: based on the 30 problems of the "B-T" test (see problem article) the Lyon has the strength of a 4x faster Portorose and hence rates 120 points better by the formula I give in that article. Other improvements include improved tactical/sacrificial ability, plus more knowledge of rook and pawn and pure pawn endings, and better handling of passed pawns and king safety. The opening book is said to be expanded to 105,000 moves, and now has a special tournament book with the bad lines weeded out, which undoubtedly contributed to its fine results in my comp-comp tests. The mate-solve bug reported in an earlier CCR ("No mate test") on the Portorose has been fixed. As for features, there are some new levels, one can change the normal values of the pieces vs. pawns, and programming the opening book has been made easier now. One odd feature which I expect almost no one will use is the ability to turn off pawn structure knowledge -- the only purpose might be to speed up solving of tactical problems. In the past, I felt that the Mephisto 16 bit models, while certainly stronger than the best 8 bit models (Polgar, Novag Super C), were not sufficiently stronger to justify the huge price gap; but with the Lyon the strength gap has grown to the point where I would not hesitate to recommend the Lyon to anyone who can afford it. Also, all three versions of the Lyon are now stronger than the most comparably priced Fidelity Elite models (6, 9, and 10 respectively), despite the huge hardware advantage of the Elites (Elite 6 vs. Lyon 16 bit is 2.75 times faster hardware, Elite 9 vs. Lyon 32 bit is 3 times faster, and Elite 10 (with 2 Meg RAM) vs. Lyon 68030 is 1.6 times faster). In a recent test by a reliable neutral party, the Lyon 68030 beat the Elite 10 by 5 1/2 to 1/2 at game/30 and did it again at game/10. These results are too good for me to accept without suspecting a flaw in the Elite 10 unit being tested; based on my own tests of Lyon 68020 vs. Mach IV (each about 3 1/2 times slower than the top model, and each with same program), the Lyon should have only a modest edge. The Lyon is quite impressive in the endgame, and also impresses by its ability to announce long mates quickly in practical play.

The newest 8 bit Mephisto model to reach the market is MM5, a module that can be used in the Munich,

Exclusive, and Modular boards and even in the hand held "Mobil" housing. So far the MM5 has not reached America except for my test unit. In Europe it is priced somewhat below the Polgar, because it is only 32k, but surprisingly its early Swedish results are above the Polgar, as is its "problem rating" (see article). My own results to date are better for Polgar. Probably the MM5 and Polgar are about equal; the MM5 is tactically sharper, but the Polgar has more endgame and positional knowledge and a much larger opening book. A separate opening module is available for the MM5, but the combination is not cheap. The Polgar offers many more features and levels than the MM5. Since in the U.S. the Polgar is already being well discounted while the new MM5 is fully priced, the MM5 is at present of interest in the U.S. only for the hand-held unit, which does not accommodate the Polgar. The continued progress of Ed Schroeder from each model to the next (MM3-MM4- Mega4-Academy-Polgar/MM5) is most impressive and deserves high praise. A gain of 192 points per "Ply" (or 154 with my 20% contraction factor) from MM3 to MM5 is most remarkable, since the hardware is identical and MM3 was state-of-the-art when new. When the Schroeder program finally becomes available on RISC hardware that supports hash tables, I am sure that it will be most impressive. The Polgar and MM5 both run at 5 MHz, but a 10 MHz version of the Polgar is sold in Europe and is a good buy in terms of strength vs. price. Since it is easily the strongest model (along with Fidelity Elite 5) under \$1000, I would recommend it if it becomes available in the U.S. No 10 MHz MM5 is planned. The standard Polgar has dropped in price to the point where it may be considered a good value in the U.S. For those who want a very strong hand-held unit, the MM5 Mobil is a class above all non-Mephisto models, possibly of master strength, but is expensive and requires keystroke move entry. Also, battery life is quite short, so an adaptor is necessary for non-travel use, and there is no provision for retaining a game when shut off. All the recent Schroeder programs play a well-balanced game, with very few ugly "computer moves", and are reasonably aggressive but not sacrificial.

Another model that deserves mention is the new Monte Carlo IV, a wood autosensory model with nearly the same program and speed (4 MHz) as the "Mephisto College" or "Supermondial II". It is the least expensive wood autosensory mid-expert model now out.

What about RISC? Schroeder has been playing his program in tournaments running on an "ARM 2" or "ARM 3" RISC card in a pc, which allows him to use hash tables. This is a relatively cheap RISC processor. His results suggest a playing strength somewhere near 2400, but there is too little data to be more specific. If it proves to be stronger than the Lyon 68020 and less expensive I would expect it to be marketed in a dedicated machine sometime in 1991, but it remains to be seen whether these conditions will be met. I hear that a RISC board with this program for pc compatibles has already been announced by a Dutch firm and may sell in the U.S. for around a thousand dollars. In my opinion, Schroeder's

programs are excellent, and I am sure that his RISC program with hash tables will be much stronger than the Polgar 10 MHz, but the present 16 MHz speed of the Risc board is probably not fast enough to threaten the Mephisto Lyon 68030 at 36 Mhz. When faster RISC chips become available, Schroeder's model may well be a rival for the top spot in commercial computer chess.

## Novag Review

Novag has no new high-end models since the last quarterly, but some of the less expensive models should become available at reasonable prices now that the Fidelity exclusive on novag product has ended. The "SuperNova", which looked like it might be a contender in the under \$200 market based on its 16 MHz 6301 processor and new program, has turned out to be weaker than expected in the "Ply" ratings, only 21 "contracted" points over the Super V.I.P. at this writing. This is less than the 5-3 MHz ratio would indicate. This is probably due to small sample size (129 games for S.N.), but it seems unlikely that there has been much improvement in the program. It appears to be near the level of the old "SuperConstellation", but as the Fidelity Designer 2100 Display and "Chesster" are both stronger and cheaper the SuperNova will interest only those who like the Novag style or housing better than the Fidelity Designer models. The Beluga, with the same processor but less ROM and RAM is apt to be about 50 points weaker, but neither CCR nor "Ply" has tested it yet. It is priced near the Designer 2000 Display, which is probably a bit stronger, but again its style and housing will appeal to some, and it is likely to be the first non-Fidelity model below \$150 to reach high class A level. I hope to test it before next CCR. As for the Mentor 16 and its hand-held equivalent "Amigo", results from Europe suggest a high class B (U.S.) level, not bad for under \$100 but not at all competitive with the Designer 2000 or the Mephisto Europa/Marco Polo.

The Super Expert/Forte C, which rose sharply in the "Ply" ratings last quarter, has fallen back behind its rival Mephisto Polgar, but still rates 45 points (36 with my contraction factor) above its predecessor Super Expert B. In CCR testing, the C did extremely well at a minute a move level, but has done rather poorly at game/30, for which I have no explanation. The Super Expert C is still the strongest wood autosensory board for under \$600, and its many features and permanent memory still warrant keeping it on the recommended list. The C is a superb tactician, capable of solving many problems that leave other similarly rated computers stumped for much longer. It has an aggressive, human-like style, but is still not quite up to its rivals in the endgame, I feel. It rates well on ease of use and construction.

The hand-held Super V.I.P. has become a better buy than ever, now that its rival Mephisto Marco Polo is unavailable. If keypad move entry is acceptable, this is the best hand-held unit, unless you want to pay about four times the price for the much stronger Mephisto MM5 Mobil.

As of this writing, Novag has still not indicated any intention of switching to one of the new, powerful processors. I feel that they must do so in 1991 or risk becoming a page in history. Novag has been making other games than chess lately, mostly aimed at kids. I hope that they will not abandon real chess players.

## Saitek Review

The only really interesting new Saitek model is the "Blitz", which is the first auto-sensory model to drop below \$200 retail. Since it has the same program as the Prisma, C.R.A. rated 1962, it cannot be considered a strong machine by today's standards, but since all stronger autosensory models cost at least twice as much it has a definite place in the market. Because of its board and its program, which is reasonably fast, it is a good opponent for speed chess (hence the name), unlike the 6502 based Saitek models. It earned a master rating from the World Blitz Chess Association and is being promoted on this basis; it does deserve this rating, but most Expert level chess computers would also be master rated at blitz. One point about the Prisma & Blitz is that they are surprisingly fast in mate solve mode as measured by my "no mate" test; nearly four times faster than the Corona program, which is certainly stronger. This suggests that the Hitachi h-8 processor in the Prisma & Blitz, running at 10 MHz, is indeed quite fast, and the relative weakness of the Prisma & Blitz must be blamed on the limited memory (1k RAM). To me, this indicates that with added memory the Hitachi chip can carry a very strong program.

Now a word about the Galileo, now being sold for \$299. It is a very nice board, easy to use, attractive, and reasonably priced. But it is advertised as having a "powerful program", a most misleading claim. It contains only a class B, single chip program of about the same level as the 9 year old Fidelity Sensory 9, and so the purchase of a module is necessary for any real strength. Despite the ads, there is no module on sale yet that has any real claim to being of "Master strength"; the 10 MHz "Analyst D+" is a strong Expert by all accounts. So, as of now, the Galileo + Analyst is still not an attractive value relative to Fidelity Elite 2, Novag Super C, and Mephisto Polgar, all of which are stronger and comparably priced. I expect that Saitek will offer true Master strength modules in 1991, probably using the same Hitachi h-8 chip as the Blitz & Prisma but with big RAM for hash tables, but until this is confirmed and the price is known I can't recommend the Galileo.

RISC modules (probably SPARC) are also planned for 1991, programmed by the Spracklens. There is no word on pricing, but I would expect a range from perhaps \$1,000 to \$5,000 depending on the processor and memory. A super fast (and expensive) SPARC called the "Lightning" is due out next summer, so perhaps that will be the one used in their top priced module. If the Spracklens stick to the full width program as they did for Fidelity, I believe they will lose out to Mephisto, but if they have learned to do selective search with the help of Julio

Kaplan I would expect Mephisto to have a real rival for supremacy. We shall have to wait and see.

## Brains Vs. Brawn

One question I am sometimes asked goes something like this: my computer often makes silly positional moves; will a new faster model do any better in this respect? Doesn't the program need more chess knowledge to avoid these errors? Isn't knowledge more important than raw speed?

It is certainly true that a stupid program will not benefit as much as a smart one from additional speed. For example, if a program does not evaluate pawn structure at all, it might still choose a fatally weakening pawn move after a 20 ply search, provided the pawn is not actually lost within that depth. Even in this extreme case, though, the computer will probably see with a deep search that it must post its pieces on poor squares to defend the weakness. The point is that the computer need not "understand" why a move is bad to avoid it; it only needs to see deep enough to see that there will be some undesirable consequences. This is the "secret" to the strength of Deep Thought; its authors admit that it is probably 300 points weaker than the best micro programs given equal hardware, but the great depth of search on its special purpose hardware obscures its ignorance. If this 300 point figure is correct, then a program as good as the latest Mephisto running on Deep Thought hardware would be in the class with Kasparov and Karpov, but it may be that the Mephisto program is incompatible with such hardware.

The main advantage of putting chess knowledge into a program is that it allows the program to discover things at a shallower depth than would otherwise be possible. For example, the minority attack in the Queen's Gambit Exchange Variation, when successful, leaves black with a backward or isolated pawn. Any program with any knowledge of pawn structure should thus be able to "invent" the minority attack if it can search deeply enough to see the weakening of black's pawns. But if a program is encouraged to expand its minority under the proper conditions it should play the right plan even with a shallow search. There are many such examples which illustrate the value of chess knowledge.

The minus side to chess knowledge is that "every rule has exceptions". If a program is told to value castling very highly, for example, it may allow its pawn structure to be ruined in order to castle, when it could have prevented the ruining and then castled later, beyond its search horizon. Generally, such positional "horizon errors" can only be avoided by a deeper search. It is thus my belief (along with many others) that increased chess knowledge is a benefit to a program if and only if the "cost" in search time is small.

Another point to consider is that in quick games, tactics tend to predominate, while at tournament levels evaluation becomes more important. Therefore dumb, fast programs tend to do better at the fast levels, while

slower, smarter programs need time. For example, as Mephisto upgraded annually from Amsterdam to Dallas to Rome (prior to the use of hash tables), more and more knowledge was added, at some cost in speed. The improvement was not clear at 30" or faster per move, but at 1' or slower it was clear that progress had been made, especially from Amsterdam to Dallas. Similarly the improvement by Fidelity from Mach II LA to Mach III seems to be little more than can be accounted for by the speed difference in action chess or faster, but the improved evaluation in the newer model does seem to be a benefit at tournament level. Conclusion: the faster the hardware, the more chess knowledge should be in a program. A doubling of processor speed may only be worth 60 points for a given program, but the gain will be greater if some of the extra speed is used to add more "smarts".

Recently, we tested our experimental pc program in "C" with full pawn structure scoring vs. the same program without any pawn structure knowledge at various search depths, playing hundred game matches with each version taking white once in 50 different openings. Pawn structure scoring slowed the program down by 10-15%, so the question was whether the "smart" version would win by enough on fixed depths to compensate for this. On 1 ply searches the "smart" version actually lost by 48 1/2 to 51 1/2, on 2 ply it was 50-50, on 3 ply "smart" won by 53 1/2 to 46 1/2, on 4 ply "smart" won by 55-45, on 5 ply by 53 1/2 to 46 1/2, and on 6 ply it currently leads by 38 1/2 - 28 1/2. Considering the slowdown, I would say that pawn structure knowledge is wasted below 3 ply, and is only slightly beneficial from 3 to 5 ply. Perhaps once our pawn structure scoring becomes more accurate we will see an increase in these win ratios. But the point is that the deeper the search, the more the payoff of chess knowledge, as the frequency of tactical blunders declines. In human terms, these results suggest that there is no point in learning positionally sophisticated ideas if you still make serious tactical errors nearly every game. Only when your tactics reach a decent level do positional factors come into play. This seems to apply equally to humans and computers.

## Rating Computers By Problems

There are three methods of rating chess computers--playing them against humans in tournaments (costly and subject to varying conditions), playing them against each other (more practical, but may not correlate perfectly with human results), and rating them by performance on sets of problems. This last method is the cheapest and quickest, and moreover is repeatable in theory. As long as there is no randomizer in use, every tester should get the same result. The disadvantage is that no problem set measures all the factors that go into playing strength, and even if one did the proper weighting would be impossible to determine.

There have been several attempts to construct such tests. The Bratko-Kopec test, given in earlier CCR issues,

measured one aspect of positional play (levers), and attempted to measure tactical strength, though most of the problems are too easy for today's strong computers, as is also the case with the Colditz test given in part in an early CCR. A set of 14 problems published in "Europe Echecs" by Pierre Nolot was reprinted in CCR and found to correlate fairly well with playing strength, but the problems measured only tactics and most were also too easy for strong machines. A huge compilation of around 100 positional and endgame problems plus 21 tactical ones by Jens Baek Nielsen of Denmark has been published in the Austrian magazine "Modul". He has devised a weighting scheme to maximize the correlation with the "Ply" rating list (comp vs. comp games at 40/2), with fair but not overwhelming success. In my mind, his test lost credibility when Deep Thought was tested in 1988 and scored less than the top micros. His scoring underweights tactics, in part because most of his tactical problems can be solved in under a minute by the top micros. Since he records times only in minutes his test cannot distinguish between a 2200 and a 2600 machine on most of the tactical problems.

The most successful test to date in my opinion is the "BT" test by Hubert Bednorz and Freddy Tonissen of Germany, also published in "Modul". This test has thirty problems, about 2/3 tactical and 1/3 positional (a couple have both aspects). This feels like the proper balance to me. The test is rather difficult, much more suited to master level computers than the above mentioned tests. Every problem looks like it came from a real game, or at least easily could have. Hardly any of the solutions are ambiguous or controversial, unlike some of the earlier mentioned tests. Best of all, some 29 programs have already been tested and the results published in "Modul". On the minus side, all of the tactical problems involve checks or pawn promotion, which means that a large class of tactics not involving checks or promotion is completely without weight in the test. Consequently machines with minimal check extensions tend to be underrated by this test, since their superior performance on tactics not involving checks goes unrewarded. On the other hand, recent Fidelity models tend to look very good as they do more check extension than other programs. One problem, from a Karpov game, is simply too difficult for all commercial machines. Still, these factors do not seem to be serious enough to ruin the test; I hope that another ten tactical problems without checks will be added soon to remedy that omission.

The scoring method used by B&T is very simple but much too unscientific for any real accuracy. I have devised my own rating method which can be used on any test. It is based on the assumption that a doubling of processor speed will always be worth 60 points against humans. The method is to add the N best times (in seconds), where N is half the number of problems; if less than N problems are solved in the allotted time (15 minutes per problem on BT), add the time limit times (N minus the number of solved problems). For example, if only ten problems are solved in a total of 50 minutes, or

3000 seconds, add 5x15x60 to the 3000 to get 7500. Next, divide by the lesser of N or the number of problems actually solved, which in this example gives us 750. Then take the logarithm (base 10) of this number, multiply by 200, and subtract from K. I set K to 2630 for this test to correlate closely with C.R.A. ratings; use a lower number for European ratings. An easier test would require a lower K value. In our example the log of 750 is 2.875, times 200 gives 575, and subtracted from 2630 gives 2055. The method is not very accurate for weak programs that can solve only a few problems, but is reasonable good for programs capable of solving a third or more of the set. The test rules require that all problems be run the full 15' on infinite mode to insure that the chosen move remains chosen at deeper levels. If a correct move is rejected, it must be re-selected to count, with the time of re-selection being the one used. Note that this test is only suitable for expert or better models, as any model that solved just 1 problem would be guaranteed an 1824 rating. On the upside, a computer could theoretically get a rating above 2630, if it averaged less than one second per problem. To get a rating above Kasparov (assume 2900 USCF = 2800 FIDE), it would have to solve all thirty problems in a TOTAL of one second! Surely any such machine would indeed be a formidable rival for Gary.

Here are the calculated "problem ratings" for 28 programs (I omit Chessmaster 2000 on Commodore 64 because it only solved 2 problems!) whose test results were published in "Modul", plus the two \$10,000 models whose results are extrapolated based on the speed ratio to their closest cousins, plus three models I tested myself: Lyon 32 bit (68020) 2413 (amazingly high), Elite 10 2406, Portorose 68030 2401, Elite 9 2355, M Chess on 386 25 Mhz 2338, Mach IV 2308, Portorose 32 bit 2292, Mach III 2257, Elite 5 2250 (strange as it should be 35 points or so above Mach III), Portorose 16 bit 2250, Rexchess on 386 25 Mhz 2236, Polgar 10 Mhz 2220, Super Forte C 2205, MM5 2199, Academy 2181, Almeria 16 bit 2171 (too low), Polgar 2160, MM4 Turbo (16 MHz) 2155 (too low), Super Forte B 2145, New Corona 2126, Conchess T 8 MHz 2123 (too high), Roma 16 bit 2113 (too low), Elite Glasgow 8 MHz 2107 (implies 2047 at the normal 4 MHz), Super Forte A (5 MHz) 2099, Supermondial II 2099, MM4 2096, Simultano 2082, Sphinx Dominator Vers. 2.00 2071, Galileo Analyst D 8 MHz 2062, Forte A 2059, Super Nova 2022, Super VIP 1989, Prisma 1969. These last three solved too few problems for the rating to be accurate.

To me, the interesting thing about this list is that it agrees even more closely with C.R.A. ratings than do ratings obtained from comp-comp games. The following models from the above list also have C.R.A. ratings, with the difference (C.R.A. minus problem rating) given in parens, with adjustment for MHz difference in the case of Super Forte: Portorose 68030 (-25), Mach IV (17), Mach III (8), New Corona (-81), Super Forte A (49), and Prisma (-7). Also, the Mondial 68000 xl is C.R.A. rated 25 points (adjusted for 6-5 hardware speedup) above the problem rating of the quite similar Roma 16 bit, and the Mega IV Turbo is C.R.A. rated 21 points (adjusted for 4.5 to 1 MHz



ratio) below the problem rating of its slightly stronger successor Supermondial II. All eight of these differences are less than twice the 41 point standard deviation of the C.R.A. ratings, and six are within one deviation, about what one might expect statistically if the test were perfect! A few of the ratings look a bit suspect, such as the nearly 100 point spread between the Mach III and the Polgar, and the very high Lyon rating; in general the test tends to underrate selective programs (except Lyon!) vs. full-width, but only mildly. It may be argued that this apparent bias is relevant for predicting results vs. humans, because humans are more likely to play for sacrifices such as are seen in so many problems, but the evidence is not clear on this.

Although the BT test is too new to have been used in the development of any of the above programs, soon it will join its predecessor tests by becoming an industry benchmark. This will destroy its usefulness as a measuring rod, since it is easy to modify a program to do well on a particular set of problems. The only solution is to switch to a new set about once a year. In my opinion, problem ratings can never replace comp vs. comp and comp vs. human testing, but they do provide an interesting supplement.

## PC Chess Playing Programs

Until recently, there were only three or four decent programs for the IBM pc and compatibles, and they were no match for the dedicated chess machines, in part because of the slowness of the pc. However, in the last few years the speed of the pc compatibles has grown at an astounding rate, far outpacing the speed gains of the dedicated models in a given price range. This has inspired the development of a number of pc programs aimed at real chess players. It's time to take another look at them.

RexChess, of which I am co-author with Don Dailey, has several claims to fame. It has the highest established USCF rating of any pc program (2315), by far the highest pc ratings on both the "Ply" and "Selective Search" (Eric Hallsworth) rating lists, and most impressively a World Blitz Chess Association rating of 2662 (no, this is not a typo!), making it the number 12 rated blitz player in the world, five points behind World Blitz Champion Mikhail Tal and well ahead of such prominent Grandmasters as Lev Polugaevsky, Boris Gulko, Lev Albur, Joel Benjamin, Larry Christiansen, Roman Dzindzichashvili and too many others to list. All of these ratings are based on using fast 386 or 486 based computers -- a 25 Mhz 486 was used for the Blitz games. This makes a great difference -- people who play Rex (and other programs) on both a pc/xt and a 386 remark that it does not feel like it's even the same program. Please keep in mind that most computers rate higher at blitz than at slow chess due to the many blunders humans make with little thinking time. Also, I must acknowledge that luck played a part in Rex's amazing blitz rating, as well as the unfamiliarity of its

opponents with computer chess. The blitz games and most of the other ratings mentioned above were earned with version 2.30, the one now being sold. On the downside, Rex works erratically on slow pc/xt models, it lacks color and mouse support, and it sometimes locks up as you are about to deliver mate. Curiously, not too many people report this problem, perhaps because they never mate Rex! We are working on a new program, in "C", which will not have these deficiencies, but don't expect it before mid '91. We hope to make it stronger than Rex, but at this writing it is not clear which is stronger, although the new program turned in a 2530 performance in a recent 6 round Swiss (game/1 hour, 486/25 Mhz). Versions of the new program for the Mac and other computers are likely, but not of Rex, since Rex is written in Assembly language. Rex does offer a full range of features, including allowing the user to do his own opening book or even to add to Rex's, but it does not attempt to compete with the vast number of features offered by some of the mass market programs, in particular Chessmaster 2100. Our goal was to offer high playing strength plus the most useful features for a reasonable price, and in that respect I feel we were successful. Although Rex will run on slow (4.77 Mhz) pc/xt models, I do not recommend using Rex on such machines.

Of all the new programs, ranging from weak ones like EGA Chess and Sargon 4 to the fairly strong Zarkov, only one can lay claim to being stronger than Rex. I would like to be able to say that my progeny is #1, but I feel duty bound to lay that wreath at the feet of Mchess, by Marty Hirsch. Mchess is a successor to A. I. Chess, a very strong program that never took off due to atrocious graphics and excessive (\$300) price. Marty has finally given the program real graphics, and it is even in color for EGA and VGA machines. The graphics have slowed the program down a bit, particularly at fast time limits, but other improvements to the program have more than offset this, and I believe that the net result is that Mchess is clearly stronger than A. I. Chess. Best of all, the price has now dropped to the reasonable level of \$100--more than any of the others, but deservedly so. Mchess is strong; very strong. Its results against dedicated machines are very impressive, so much so that on an equal "Chess MIP" basis, it has a very good claim to being among the world's strongest chess programs, with only Mephisto Lyon clearly superior. It is advertised as "delivering solid Senior Master performance on fast PCs". This is a bit overstated, but on 486 machines a rating over 2400 does seem justified by CCR comp-comp testing, and even on a "mere" 33 Mhz 386 (now available for under 2 grand), my action chess tests against top dedicated models put it at 2389 after 24 games. Early results from 40/2 "Ply" testing are consistent with this. Even on a mere 10 MHz xt it performed at 2152 in 18 action games. It should perform in the 2200s on nearly any 286 computer and in the 2300s on most 386 systems. There have been few rated games against humans yet; in the 9 round Austrian Open it performed at 2250 (= 2375 USCF by the "Ply" formula) on a 486/25, and in Holland it performed at

2121 (=2297) in a ten round event on the 486. So its combined rating in human events is USCF 2334 for 19 games on the 486, a good rating but not in line with its comp-comp results. It is likely that the program does not perform quite as well against humans as against computers, because it has a poor opening book and because its strength is primarily due to its tactics, which many humans try to avoid but which other computers welcome. Even so, I expect it to perform very well against humans in future events. Its play is extremely bold--it will sacrifice pawns more readily than any other program I know of, even the old Novag Superconstellation. On the minus side, its evaluations are often quite unrealistic, the copy protection scheme used is annoying (nearly all other chess playing programs are not copy protected), and the opening book is too shallow for a master level program. While it has less features and levels than most other programs, it has most of the really important ones. Conclusion: if high playing strength is important to you, this program is worth the money.

As for Zarkov, extensive testing by Max Harrell has confirmed that the latest commercial version plays in the upper 2100s on his 25 MHz Cache 386, and so should rate over 2200 on a 386/33. This should make it the number 3 commercial pc program. Zarkov also learns from its mistakes (in the manner of the Fidelity Elites) and is designed to work with "BOOKUP".

I received a review copy of "Colossus Chess X" shortly before deadline, so I have not had time for slow test games. It is loaded with features, and especially designed for use with a mouse. It can be used without a mouse but not very easily. It has some bugs--the clock ran about 10% slow on my computer, and in mate solve mode if it doesn't find a mate it may play an impossible move. I find the menu system to be rather cumbersome to use compared to Mchess, Rex, and Zarkov. It will not allow you to complete a sudden death game once you have lost on time, which is annoying if your game is interrupted (for testing I set the opponent's time at a large figure to avoid this problem). On the two problems given in the last CCR article on p. 14-15 its time was by far the worst of any of the pc programs I have tested to date (3'27" on the Alekhine trap, 12'57" on the Morris trap). In both cases turning off its selective search greatly improved the times, to 1'22" and 53" respectively, but even these are not impressive times. To be fair, two problems is not much of a test, and so I ran ten blitz games on my 386/33 against Portorose 32 bit. Despite the large hardware advantage in favor of the pc, Colossus only scored 1 1/2 points, better than Chessmaster's 1/2 and near Zarkov's 2, but far below Rex at 6 and Mchess at 6 1/2. My impression is that the program is aimed at the mass market, not the tournament players market. Some test games by Max Harrell on his 25 MHz Cache 386 confirm that it is stronger than Chessmaster 2100 and not far behind Zarkov in strength. This makes it the strongest program likely to be found in software stores not specializing in chess, and the strongest in its price range (\$35). But it is no threat to the top three programs.

## Mac Vs. Mach

The following article is based on information supplied by Mr. Donald Gerue of Goleta California, who volunteered to run many problems on Sargon 4 on several Macintosh models.

People often wonder about the relative strength of dedicated chess machines vs. pc software. If they mean IBM pc compatible software, it is difficult to compare the same program on both platforms, because the Intel processors (8088, 80286, 80386 etc.) used in the personal computers are not currently used in any dedicated chess machines, so at best we can only compare a translated program. Since a translated program may have been bungled (i.e. Sargon 4 on IBM pc), this is not entirely satisfactory. Fortunately, the Macintosh family of computers uses the same processors (68000, 68020, 68030) as the top end Fidelity and Mephisto dedicated chess machines, so direct comparisons become possible. In particular, the Macintosh version of Sargon 4 is really just one of the Mach II programs, so it is interesting to compare the dedicated model Mach II L.A. with Sargon 4 on various MAC models. The programs are not identical, but close enough to be relevant. As far as I know, the MAC version of Sargon 4 is not bungled or degraded from the Mach II L.A., though it may be a slightly earlier and hence slightly weaker version.

Three MACs were tested for comparison with the Mach II on 12 problems printed in the 1988-89 CCR, from Pierre Nolot's test set in "Europe Echecs". They are the MAC Plus (68000 at 7.83 MHz), Mac II (68020 at 15.67 MHz) and MAC iICX (68030 at 15.67 MHz), all tested in black & white (in color the CX ran about 8 percent slower). The Mach II L.A. uses a 12 MHz 68000 processor. After getting the solution times, Mr. Gerue calculated the rating for each MAC using the formula given in the 88-89 CCR. This seems quite appropriate in this situation, because that formula gives a rating of 2136 for the Mach II L.A., very close to ratings estimated by both comp-comp and human vs. comp games. Therefore it is likely that the MAC problem ratings for the very similar Sargon 4 program will also be quite accurate.

The resultant ratings are: Sargon 4 on MAC Plus 2061, on MAC II 2170, and on MAC iICX 2189. On average, the MAC II ran 3.54 times as fast as the MAC Plus, or 1.77 times as fast adjusting for the 2-1 MHz ratio. This implies that the 68020 is 1.77 times as efficient for chess as the 68000 at the same speed. My own tests on the Mephisto Portorose models with hash tables turned off show a ratio of only 1.65; perhaps the MAC models have different amounts of overhead, or perhaps the Fidelity program happens to benefit more from the 68020. The CX showed a ratio of 4.38 to the Plus, or 2.19 at equal MHz, which implies that the 68030 is 1.24 times faster than the 68020, again somewhat higher than the 1.15 ratio I estimated from tests on the Portorose 68030 model. Mr. Gerue attributes this advantage to the fast data cache in the 030, and points out that the 68030 would perform better if software were written especially to take advantage of its

extra registers and memory paging. To date, neither Mephisto nor Fidelity has written software designed to exploit the extra powers of the more expensive processors, explaining that the advantage of doing so is not great enough to warrant the expense.

As for the comparison of the Mach and the Mac, the geometric mean of the times for the Mach II L.A. was 2.38 times faster than for the MAC Plus, or 1.55 times faster adjusted for MHz. There was some variation from problem to problem, since the two programs are not identical, but for most of the problems the ratio was close enough to the average to rule out program differences as the major factor in this discrepancy. Since both the Mach II and the MAC Plus use the same (68000) processor, it must be concluded that the MAC is slower than a dedicated chess computer of the same speed by about a 3-2 ratio. Whether this is due to system overhead, weight states, or something else is not clear to me, but the conclusion is that you need a MAC with at least a 68020 to achieve the performance of the dedicated Fidelity Mach II L.A. Furthermore, since the Mach III is roughly the equal of a 20 MHz Mach II (allowing for its 16 MHz speed and some software improvement), one needs at least the 68030 MAC to equal its performance.

In conclusion, if you already own a MAC with a 68020 or faster processor, you need not bother to buy a dedicated model to get master or near-master level chess. But if not, a 68020 based MAC costs an awful lot more than the various 2200 level dedicated models, so you better have other uses for the MAC!

## Rating The Commercial Chess Computers

Due to the growing popularity of sudden death time limits, especially "action chess" or game/30', I have decided to do a separate rating list for action chess games only. These games are "free style" (computers choose their own openings, but no repeat openings allowed), and are conducted by CCR testers, mostly by myself, Max Harrell, and Raymond Yeo. I feel that this is especially valuable because even those players who wish to play at slow time controls are apt to set their computer on an intermediate level like action chess. This is the most efficient way to train, unless you are unable to purchase a computer which outrates you by a significant amount. In one case, the Mach IV, I included games played at 30" per move because these were needed to reach my 30 game minimum and the level is close to Action chess. For those who like to set their computers at 40/2, I give the Swedish "Ply" ratings, adjusted to U.S.C.F. levels as determined from C.R.A. tests in major tournaments, with adjustment for speed in those cases where the C.R.A. unit ran at a different MHz than the Ply tests. Our own action ratings are also similarly scaled, which means that they are not true action ratings but tournament level ratings as based on computer vs. computer games at action chess. Overall, I find that the results of action games between computers agree well

with 40/2 games, especially on the newer models which have good sudden death algorithms. For a true action chess rating, the reader is advised to add 100 points to the list, since computers have generally performed at least that much better in action tournaments vs. humans.

One problem I have wrestled with for some time is the proper handling of the same program running at different speeds, as well as the handling of closely related versions of a program. Ideally, each version/model should be rated independently, but this would leave the sample for each version too small for accuracy. CCR requires 30 games for a rating ("Ply" requires 40, C.R.A. 48), but I much prefer larger samples. There is simply not time/manpower enough to get these larger samples on every slightly different version or processor speed. Accordingly, I am instituting a new policy with this issue, which works like this:

If a new model or program comes out that appears to differ only slightly (based on problems) from a previously rated one, with no difference in processor speed, I assume that it made a 15-15 score against its near-clone, making their ratings equal initially. As more games are played the two models may diverge, but this method insures that the two ratings will be close until proven otherwise. In the case where the new model differs in processor speed from an older one, I again assume a 30 game match between the two, but this time with the score calculated based on the assumption that a doubling is worth 80 points comp-comp at action chess, or 56 points vs. humans. This will tend to insure that different speeds of the same program are rated realistically vs. one another. If a particular model benefits much more or less than normal from a speed-up, it will still reach its proper level eventually, but this needs to be proven by many games. I believe these new rules will significantly improve the accuracy of the whole list. In cases where the same program runs on different processors (i.e. 68000 and 68020), I simply measure the average speed ratio and then use the above method.

Although I contract the 40/2 "Ply" ratings by 20%, and used 25% last issue for 60/1 games, I am using a 30% contraction for my action chess list, on the grounds that the faster the time limit, the greater the superiority of the faster/stronger models. Ratings adjusted for different processor speed are puts in parens, and estimated ratings (by analogy to closely related programs) are followed by "e". All machines use 6502 processor unless otherwise stated. Test games on RexChess were run by Max Harrell, not myself, to avoid conflict-of-interest.

The human results list includes both C.R.A. and foreign tournament results, with foreign ratings adjusted per the "Ply" study. A minimum of 48 games is required, and only results at 2 minutes per move or slower are included. Events more than four years old are excluded on the theory that players have become more familiar with how to defeat computers.

Because the Mephisto Lyon is so new, none of the three models yet has the 40 games required for a "Ply" rating. However there are a total of 48 "Ply" games to

date for the three models, and based on the implied improvement over the Portorose (83 points after 20% contraction) I list "Ply" ratings on the assumption that all three models end up with the same gain.

Computer	MHz	CCR	"Ply" (30') adjusted	Human results
Meph Lyon 68030	36	(2489)	2488e	
Meph Portorose 68030	36	(2408)	2405	2408
Fid Elite 10 68040	25	(2402)	(2361)	
Meph Lyon 68020	12	2386	2401e	
Fid Elite 9 68030	32	(2353)	2310	
Meph Lyon 68000	12	(2338)	2327e	
Meph Portorose 68020	12	2305	2318	2356
Fid Mach IV 68020	20	2297	2285	2301
Meph Almeria 68020	12	2286	2283	2264
Meph Polgar 10	10	2285	2253	
Meph Portorose 68000	12	2251	2244	
Fid Elite 5 2x68000	16		2237	
Meph Polgar	5	2231	2193	
Meph Dallas 68020	14	2228	2224	2162
Meph Almeria 68000	12	2220	2224	
Fid Elite 2 68000	16	2216	(2219)	
Meph Roma 68020	14	2212	2233	
Novag Super Ex/For B	6	(2212)	2129	
RexChess 2.3 386 cache	25	2209	(2195)	
Fid Mach III 68000	16	2207	2213	2219
Meph Mondial 68000 xl	12	2195	(2195)	2170
RexChess 2.3 80386	20	2186	2160	
Meph Mega IV	5	(2168)e	2142	2158
Meph Roma 68000	12	2163	2183	
Novag Super Ex/For C	6	2163	2165	
CXG Sphinx	4	2159	2108	2064
Fid Mach II LA 68000	12	2156	2144	2150
Meph S.M.2/Monte Carlo	4	2151	(2124)e	
Meph Academy(not USCF)	5	2150	2155	2173
Novag Super Ex/For	6	2146	(2085)	2117
Meph Dallas 68000	12	2136	2187	
Meph MM4	5	2136	2131	
Meph MM5	5	2123	2212	
Saitek Maestro D & D +	10	2107	2138	2012
Sait Simul/Corona	5	2087	2046	
Fid Des. Display 2100	6		(2082)e	
Fid Chesster/Par Ex	5		2066	2029
Fid Excel 68000 B	12	2063	2091	
Novag Forte B	5		2059	2102
Mephisto Rebell MM3	5		2058	
Novag Forte	5		2051	2007
Fid Des. Display 2000	3		(2022)e	
Saitek Stratos	5.6	(2021)	2051	2094
Saitek New Corona	5	2018	(2078)e	2045
Saitek Turbo King	5	2012	(2040)	
Radio Shack Champ 2150	3	2010	(1996)e	
Novag Super Constel.	4		1988	
Novag SuperNova 6301	16		1977	
Final Chesscard for PC	4		1965	
Meph Marco Polo 6301	8		1952	
USCF Chess Academy 6301	8		1952	
Novag Super VIP 6301	10	1945	1956	
Sait Prisma/Blitz h-8	10	1942	****	1962
Novag Primo/VIP 6301	8	1888	1914	
CXG Adv StarChess 6301	8		1852	
Saitek Galileo 6301	12		1782	

A number of models are missing from the Action list because they either have no Action chess level (notably

Par Ex, Chesster, USCF Chess Academy, older Novag models), or the Action level does not work properly (Designer 2000 & 2100 Display). Others are missing because the machines were not available for testing.

A few models require special remarks. The CXG Sphinx tested by CCR had a newer, apparently better program than the one tested by "Ply". The old Fid Excel 68000 B has a low action chess rating because it played much too fast on sudden death levels, a problem which was fixed in the Mach II L.A. The Saitek 6502 models were reset to 5" level at the 5 minutes remaining mark since otherwise they unnecessarily go into instant move mode and self-destruct. The Fid Designer 2100 & 2000 Display and Chesster which all use the Par Ex program have wider, less optimized opening books, and so might rate a bit lower than the estimated "Ply" ratings given (only the original Par Ex was tested). The Novag Super C performed so much better at 1 min/move (see last CCRQ) than at Action chess that I feel its placing on this list does not do it justice. Similarly my 10' testing of MM5 and the "Ply" rating are both well above the listed Action rating, so I believe its low rating here is due to small (32) sample size.

I note that the largest single deviation between the CCR Action list and the Ply 40/2 list is 83 points. Considering the margin of statistical error and the difference in the type of time control (sudden death vs. normal tournament), this is a remarkably good agreement. I would also note that in several instances, machines which performed well on this action list did somewhat worse at a minute a move level in the last quarter's list (Polgar comes to mind), while some that did poorly on the action list did very well at a minute a move (Super Expert C, Meph Academy). How much of this is due to insufficient sample size and how much to a genuine level effect is anyone's guess, but I would consider all the lists in making a purchase decision.

I notice that the correlation between the human results and the two comp-comp lists is also very good. In the two worst human results (relative to the comp-comp lists), it is likely that the program which played was an early, weaker version of the one tested by CCR. Perhaps someday there will be a model that plays drastically better against humans than against computers or vice-versa, but so far it hasn't happened.

I have begun to compile a 10' rating list, using 35% contraction, for the stronger new models. My ratings so far, 30 game minimum, are: Lyon 32 bit 2360, Mach IV 2281, Polgar 10 MHz 2273, Mach III 2223, MM5 2187. By next issue this list should be much larger.

## This Program Is Overrated!

How often I have heard that complaint! In some cases, the "rating" is simply a spurious claim by the manufacturer or distributor, but here I refer to ratings by a reputable agency or magazine, such as C.R.A., "Ply" magazine, European national rating agencies, Eric Hallsworth's list, or CCR. Let's look at some of the reasons for this complaint.



First of all, the program may actually be overrated. This is usually due to small sample size. The 30 games (England, Holland, CCR), 40 games (Ply, France), or 48 games (C.R.A.) required for a rating are simply not enough for great accuracy; the standard deviation for 48 games is about 40 points, and deviations of twice that amount may occur 5% of the time just by chance. Moreover, in the case of formal tests like the C.R.A., the manufacturer can reject a rating and try again, which it will do if it feels its rating is on the low side. Only when hundreds of games have been played (as Ply does) can a rating be deemed statistically accurate, but by then the program is apt to have been superceded! What a dilemma.

The next factor to consider is time limits. Ratings are based on games played under strict time controls. Most of the ratings are based on games played at or near 40/2 or at the fastest 60/2; in the case of CCR and Hallsworth's list faster games between computers are included, but the level of the list is based on games with humans at a minimum of two minutes per move. It is true that computers generally perform even better at faster levels, but only if the human strictly adheres to this faster time control. Many people set their computer on a fairly fast level but take their own sweet time. Of course there is nothing wrong with this; indeed I recommend it for training, but don't expect the computer to play at its indicated rating on those terms. Similarly, don't expect a rating earned in blitz chess to hold up at slow time controls, although there is a good correlation—blitz ratings run about 200-300 points high.

A very big factor in computers' high ratings is the high incidence of blunders by human players in tournaments. Whether due to fatigue, poor motivation or mental attitude, or just human limitations and imperfections, blunders are a very big part of chess, regardless of the nature of the opponent. Since good programs are immune from the more blatant errors, they will invariably rate higher than a human would of otherwise like ability. Naturally an owner who takes back his blunders against his computer will perform much better than their relative ratings would predict.

Now comes the issue of familiarity. While most players now have at least some familiarity with chess computers, some are only familiar with older, weak machines or have misconceptions about how to play against machines. One master in a C.R.A. test played extremely quickly on the theory that he would thus deprive the computer of the opportunity to think on his time! He thus weakened the computer by 30-40 points, but weakened his own play by several hundred and was crushed in about 15 moves. Also, what works well against one type of computer may be quite inappropriate against another. An owner soon becomes familiar with his unit and learns its weaknesses. Even without repeating specific opening lines that lead to wins, he can aim for K-side attacks, endings, closed games, or whatever strategy seems to work best. For this reason a computer's effective rating against its owner drops sharply after a while.

For all of these reasons, ratings you see in various publications for computers are best thought of as expected performance against strangers in tournaments, not as likely performance against owners. Therefore you should never buy a computer near your own rating (unless you cannot afford better), but should aim to buy one rated at least 300 points above your own strength. In this way you can be assured of a challenge even if you take more time than the computer, learn its weaknesses, and perhaps even if you "cheat" by taking back your blunders. If you want a teacher rather than an equal opponent under these conditions, it might even be worthwhile to buy a computer 400 or more points above yourself. If it were not for this, there would be no market for the various master level computers, since the number of masters willing to part with the price of these models is too small to warrant their production. Fortunately, enough people realize the merits of "buying up" from their own level to insure a continued flow of master level machines. But when affordable machines reach the grandmaster level, perhaps around the turn of the century, I wonder if there will be enough demand for continued improvement to maintain the rapid progress.

## For Patzers Only

by Paul DeStefano

Years ago the most often heard complaint in the computer chess industry was "This machine is too weak" or "This machine takes forever to make a decent move". Today the tables are turned and the common complaints are "This machine is too strong" or "This machine is so strong, I don't understand the moves it makes".

After a complaint that the Portorose on the lowest level was still overpowering, I decided someone had to find out what the weakest playing computer available was. Being Larry Kaufman was a bit busy testing 2300+ rated machines, I felt it was my duty to find a class D monstrosity that would lose even to Sundance, my cat. This was no easy task.

Unfortunately, most low-end machines, such as the Fidelity Excellence, are still quite reasonable players at their lowest levels, and could easily discourage a novice or child that you would like to have learn the game. In fact, of the units and levels tested, level 1 on the Excellence was the strongest.

From there I went to the Saitek Cavalier, to level 0(!), which the manual claims "even rank beginners should be able to beat". True, it played horribly, and was about equal to the strength of level 1 on Fidelity's Chess Coach 1500, but I knew I could find a weaker player.

I tried Fidelity's Micro Chess Challenger, a tiny hand held unit. Now we were getting somewhere! This machine hung rooks! Yet even being that weak, it beat the Fidelity Chess card on level A3-instantaneous response.

The Chess Card (named due to it being no larger than a credit card) had a lousy game - but not the lousiest. Would you believe the Chess Card beat the Mephisto Polgar?!?

The Polgar can be set by rating. So I set it to play at an ELO rating of 1. According to the manual, it wouldn't actually play that weak, but I'd figure it was worth a try. And the Polgar was Bad. Real bad.

Then I stumbled upon the King Of Patzers. A machine I was sure was capable of being as weak as balsa wood. The Super Expert/Forte C by Novag. The Novag, when set at level 41 - Novice 1, was totally chewed-up by the Chess Coach, mauled by the Micro and creamed by the Card. I then set up the First Annual Invitational CCR Patzer Championships. The worst level of the Polgar vs. the worst level of the Super Expert C.

The first game was tense - a stalemate on Polgar's move as black. The next game featured a unique opening by the Expert as black: 1 ..b4, 2 ..c4, 3 ..d4, 4 ..e4 and so on until the pawns had all advanced to rank 4. Intriguingly horrid. The game ended in a draw by 3rd position repetition. The third game between the two found the Polgar forking a queen and rook of the Expert's with a knight. The Expert did not defend. The next move, a desperate try to be the Best of the Worst, the Polgar did not capture either piece.

After that, however, it became clear that the Expert was capable of playing a much worse game than the Polgar as it lost on move 17! And then another loss! Finally the Novag had sunk to the bottom of the heap.

## Bits & Pieces

(Readers' letters and replies)

David Bessey, Strathmore, California

...My Forte A's durability really impresses me. I have had the machine for about four years and have played appr. 4000 games on it and it is still going strong. I don't know how people can afford to buy a chess computer, especially the expensive ones unless it is well built and comes with a very good guarantee.

The Forte A's chess board is almost 9 inches square. The 25% larger playing surface is paradise compared to an 8 by 8 inch playing board. The 8 inch board is really dinky and I don't know how people stand it. It is really a crime for companies to make a board this small. The 9 inch board is a real plus for Novag.

Novag also allows you to put an unfinished game in memory. Any chess computer that can't do this has a great void in its list of features.

The most limiting factor of my Forte A is its look ahead ability. If I am careful I can usually beat it because I can look ahead more plys. ... (computers) are sharp on most tactics but are quite weak on over-all strategy. I can't count the number of times I have had a laugh at the strategic blunders my Forte has made.

I was glad to learn that the Mach III and other models extend the checks to a much greater level than my Forte. Its lack here is a great weakness. It routinely falls prey to perpetual checks when it has a won game because of this weakness. It is a great annoyance to me and is the one

reason I would consider getting another machine. I would get the Mach III if it had the memory save and larger squares, but it does not.

[Reply: You need either the Fid. Elite or the Novag Super Expert or Forte C.]

I am somewhat disappointed over the pace of improvement in chess computers. Novag units have been running at 5 Mhz on the 6502 CPU for years now. Only in the last year they have increased the Mhz, to a whopping 6. If a regular computer company progressed at that pace they would bankrupt in six months.

[Reply: I concur.]

I am also staggered at the extremely high prices of chess computers these days. They are simply off this planet. I don't understand how chess players can afford them. The Mach III is a fair price for \$300 but the Polgar for \$800 is unbelievably priced. I can't believe they have even sold one Polgar at this sky high price. [They have come down somewhat.] The Elites are similar in giving only a modest increase in strength for a gargantuan increase in price. ...The Portorose 32bit, 36 Mhz unit is a marvelous playing machine but for nowhere near ten grand. In consideration of the cost of its parts \$1000 is plenty for it.

[Reply: I believe a fair price would be around \$5,000. The price must also reflect the cost of developing the program, as well as advertising, retail markups, etc. Only competition will bring it down. In general, chess computers are still cheaper here than in Europe, especially Fidelity.]

If companies don't watch out regular computers are going to be beating their dedicated machines.

[Some already do.]

Jay Cech, Bellevue, Washington

...I bought the two most recent issues of CCRQ to update my two old issues. I now have a Fidelity Chess Challenger 12 with the 1983 Budapest program running at 3 MHz. I have improved my chess sufficiently that it no longer provides a fast/good enough game. Perhaps I have just learned its style/limitations too well. Since I don't know the rating on the old machine, I read with great interest your recent tests in Vol. 1 No. 3 on pages 14-15 titled "Is something wrong with my chess computer?". I tried it on the Alekhine's trap. It found 5 d5! in 10-11 minutes. This is better than the Designer 2000 and slightly worse than the Excellence...On the other test, the George Morris trap, it took about 1'50". This is better than the Designer 2100 but not as good as the Mach II L.A. (6097). So now I have a few questions:

1. What is the rating of Challenger 12 on today's scale?

[Reply: The program was quite close to the original Fidelity Excellence, which came out about a year later, and both are 3 Mhz. However the opening book did not aim for favorable positions, only for variety, unlike the Excellence. Based on Eric Hallsworth's list and the

conversion formula used in the last CCR it would rate about USCF 1925.]

2. Why don't these newer machines do much better than the old challenger 12?

[Reply: Fidelity made rapid progress until 1983, when the 12 came out. After that, except for faster processors and better opening books, only moderate progress was made until the switch to the 68000 processor was made, which permitted hash tables. The Designer 2000 probably has better evaluation than the Sensory 12, but is not much different tactically. The superb time you report for the "12" on the Morris trap is a puzzle to me. Maybe it's just a fluke of move ordering, or else the "12" had some extensions that helped on this particular problem but were later dropped as too time-consuming in general. If I still had one I could find out by testing on other problems and comparing to the Excellence or Designer.]

3. Since by play, I have found the "12" to be no longer sufficient, what new model do I need to get significantly better utility. Is the Mach II L.A. strong enough for me to notice a big difference?

[Yes, it is perhaps three times faster, has much better evaluation and opening book, and is much superior in the endgame due to hash tables. This is the least expensive model that would be a suitable upgrade for you.]

4. ...The "12" sometimes makes antipositional "computer moves" which are easy to exploit with a plan. Even though the search depth may not be much greater, do the new machines play a better game? Is this where I would notice the most stylistic difference?

[Each later Fidelity model made less such silly moves than its predecessor, but they are still present in some positions, even in the new Elites. Most of the improvement came with the switch to the 68000. Also, you will find that the one extra ply of search depth you are apt to get on a Mach II or III over your machine will significantly improve the positional play as well as the tactical strength. This is due to dynamic evaluation, which depends on search depth.]

## Blitz Results

Blitz (meaning game in 5') chess is really too fast for accurate computer vs. computer testing, since operator time takes a significant fraction of average move time. Since computers think on each other's time, significant operator time may affect results in unpredictable ways. Nevertheless, blitz is a popular form of chess, and so I have run a goodly number of blitz matches among many models and pc programs on a 33 MHz 386 computer. The pc matches are especially useful because blitz on this hardware corresponds roughly to the popular action (30') level on a plain AT (8 MHz 1 wait state), or to game in 1 hour on an xt turbo (9-10 MHz). Hence the pc blitz results should denote relative performance at more casual levels on inexpensive hardware.

I played four ten game blitz matches with the Lyon 32 bit against some of the strongest available opponent

programs, namely the Fidelity Mach IV (C.R.A. 2325 rated), and Mchess, RexChess, and Zarkov each running on a 33 MHz 386 computer. The Lyon beat Rex by 5 1/2 to 4 1/2 (Portorose had lost 6-4), split 5-5 with Mchess (Portorose had lost 6 1/2 - 3 1/2), and beat Zarkov 8-2; not bad considering the 33-12 MHz handicap the Lyon was giving (the 68020 and 386 + Cache processors are similar class processors at same MHz). As an aside, Portorose 32 bit beat "Colossus X" by 8 1/2 to 1 1/2 and "Chessmaster 2100" by 9 1/2 to 1/2 each running on the same 33 MHz 386. The Lyon lost 5 1/2 - 4 1/2 to the Mach IV, and its indicated rating gain (after applying 30% contraction to blitz ratings) over Portorose was 45 points at blitz. The performance of the Lyon, while quite good, was better at 10' and 30' chess, presumably because at blitz it sometimes was unable even to complete a 1 ply full width search. For a similar reason the 4 & 5 MHz Schroeder programs all performed poorly at blitz (compared to action and slower ratings), as they were often unable to complete their full 3 ply selective search on top of 1 ply of full width. It seems that 10' chess is the minimum to avoid all of these problems except to a small degree.

To conclude, here are my blitz ratings for the most relevant models for which I have 30 games or more, with 30% contraction and with the level set to average 200 above C.R.A. ratings, as is typical of blitz results vs. humans. Lyon 32 bit 2565, Elite 6/Mach 4 2541, Portorose 32 bit 2520, Mega IV + TurboKit 18 MHz 2477, Portorose 16 bit 2449, Mach 3 2417, Maestro D + 10 MHz 2388, Roma 16 bit 2374, Mondial 68000 xl 2363, Super Expert (C) 6 MHz (2339), Super Expert (A) 6 MHz 2326, Mach II L.A. 2275, Excel 68000 2222, Prisma 2153, Turbo King (old) 2142, Excel Display 2120, Chess Champ "2150" 2015. As for pc programs running on a 33 MHz 386, Mchess comes out 2587, and Rex 2520. These ratings seem roughly in line with experience in human blitz tournaments; Rex actually has a WBCA blitz rating 142 points above my figure, but it ran on a 50% faster machine (486/25) and was undoubtedly lucky. If anything the above ratings are a bit conservative for strict blitz chess, as long as the computer is not charged for operator time, so it has a full five minutes thinking time.

## Games

### World Computer Olympiad, London, 1990

**White: Mephisto Lyon 68030** (actually a version between the Portorose and the Lyon)

**Black: Mephisto Polgar Archimedes** (Schroeder's RISC machine)

1 d4 d5 2 c4 e6 3 Nc3 Nf6 4 Bg5 Be7 5 cxd5 exd5 6 e3 c6 7 Bd3 Nbd7 8 Qc2 o-o 9 Nf3 Re8 10 o-o Nf8 11 Rb1 a5 12 a3 Ng6 13 Nh4?! (ECO gives 13 Bxf6 Bxf6 14 b4 with a slight edge thanks to the minority attack.) Ne4 (is 13...Nhx4 better?) 14 Bxe7 Qxe7 15 Nxg6 hxg6

16 Nxe4 dxe4 17 Bc4 Be6 18 Rbc1 f5?! (I would exchange the bad bishop) 19 Be2! Rf8 20 Qc5 Qxc5 (This makes white's edge clear) 21 Rxc5 Kf7 22 Rfc1 Ke7 23 Re5? (23 h4! was much better) Kd6 24 h4!? (positionally correct but leaves the R badly posted on e5) Rh8 25 g3 Bd5! 26 Kg2 Raf8 27 Rc2 b6 28 Rc1 (if white tries to centralize his king by 28 Kf1 black has at least a draw after 28...g5 29 hxg5 Rh1 + 30 Kg2 Rfh8 31 g4) c5 29 b4?! cb4 30 ab4 a4! (not 30...ab4 31 Rb1 b3 32 Bd1) 31 Rc3 Bb3 32 Rb5 Rb8 33 f3 Rhf8 34 fe4 fe4 35 Rg5 Rf6 36 Bb5 Rb7 37 Rc6 + Ke7 38 Re5 +! (most micros would probably grab the g pawn, but the passed a pawn would then be too dangerous) Kd8 39 Rc1 Re7 40 Rxe7 Kxe7 41 Rc3 Kd6 42 g4 g5?! (directly 42...Rf8, intending ..Ra8 looks more reasonable) 43 hxg5 Rf7 44 Rc6 + Kd5 45 Rxb6 a3 46 Bc6 + Kc4 47 Ra6 Rf3 (better 47...a2 but 48 b5 looks winning for white) 48 Rxa3 Rxe3 49 Ba4! (perhaps Polgar could not foresee on move 47 that 49...Kxb4 leads to a lost pawn ending) Bxa4 50 Rxe3 Kxd4 51 Ra3 Bc6 52 Ra6 Bb5 53 Rg6 e3 54 Rxc7 Kd3 55 g6 Kd2 56 Re7 and black resigned. A close game, and typical in that Schroeder programs always value passed pawns higher than Lang, while Lang weights pawn structure more heavily. This time the pawn weaknesses outweighed the passer, but just barely.

### 40/2 game without opening books, from "Modul" magazine

**White: Super Forte C**

**Black: Mephisto Portorose 16 bit**

1 e4 Nf6 2 e5 Nd5 3 d4 e6?! (with its book on it would play 3...d6) 4 c4 Bb4ch? (Surprisingly a tactical error, which would require an 8 ply search for a full width program with check extension, like Fidelity, to avoid) 5 Ke2! Nb6 6 c5 Nd5 7 a3 Ba5 8 b4 Nxb4 9 axb4 Bxb4 10 Nf3 d6 11 cxd6 cxd6 12 Bg5 Qb6 13 Nbd2 d5 14 Ke1! Nc6 15 Be3 Qo-o 16 Bd3 f5 17 exf6 gxf6 18 Qc2 f5 19 g3 Bd6 20 Qb3 Nb4 21 Kf1 f4 22 Bxf4 Bxf4 23 gxf4 Bd7 24 Rb1 Bb5 25 Qxb4? (why not just 25 Bxb5) Bxd3. If my limited knowledge of German is correct, this error was the result of some bug that caused Novag to score this and some earlier positions as nearly 8 pawns plus. Now Mephisto recovered its material and went on to win in 85 moves. The manner in which Novag consolidated its material advantage and untangled its pieces was impressive prior to the blunder.

The next game (also from "Modul") is a measure of the progress computer chess has made over the past decade. White is the Portorose 16 bit, black is the "Super System III", said to be the top model of 1980. The game is played at 40/2, with a slight equalizer - Queen odds! Remove white's queen.

1 Nf3 d5 2 Nc3 Qd6?! 3 e4 dxe4 4 Nxe4 Qd5 5 d3 Nf6 6 Nc3 (Port. knows to avoid exchanges when be-

hind) Qc5 7 d4 Qd6 8 Be3 Bf5 9 o-o-o Ng4 10 d5 Nxe3 11 fxe3 Nd7 12 Nh4 Bg4 13 Rd4 Ne5 14 Bb5ch Kd8 15 h3 Bd7 16 Bxd7 Kxd7 17 Nf5 Qa6 18 e4 Kc8 19 Ra4 Qb6 20 Rf1 h5 21 Ra3 g5? (why not g6) 22 Rb3 Qc5 23 Rb5 (finally white recovers part of his handicap) Qc4 24 Ne3 Qd4 25 Nf5 Nd3ch (to save the queen) 26 cxd3 Qxd3? (Qe5 saves the queen) 27 Rf3 Qc4 28 b3 Qxb5 29 Nxb5 e6 30 Nfd4 exd5 31 Rxf7 dxe4 32 Nxc7 Ba3ch 33 Kc2 Rab8 34 Nb5 Bb4 35 a3 Ba5?? (white already stands a bit better anyway) 36 Nd6 and mate next. It is most impressive to see white recover his entire handicap without any really gross blunders by black.

### 1990 World Micro Champ., Lyon, France

**White: "Gideon"** (Schroeder's RISC card, ARM 2 processor)

**Black: Mephisto Lyon 68030 50 MHz**

1 d4 d5 2 Bg5 c6 3 Nf3 Qb6 4 b3 Bf5 5 c4 e6 6 c5?! Qa5 + 7 Bd2 Qc7 8 Qc1?! Nd7 9 Bf4 Qa5ch 10 Qd2 Qxd2 + 11 Nbx2 b6 12 b4 Ne7 13 e3 bxc5 14 bxc5 Ng6 15 Bd6! Bxd6 16 cxd6 Rd8 17 Rc1 Nb8 18 Ne5 Nxe5 19 dxe5 f6 20 f4 o-o 21 Nf3 fxe5 22 fxe5 Rc8 23 Be2 Nd7 24 o-o c5 25 Bb5 Rfd8 26 h3 c4 27 g4 Bd3 28 Rf2 Nc5 29 Nd4 Rf8 30 Rf4 Rb8 31 h4 a6 32 Rxf8 + Kxf8 33 Bc6 Kf7 34 g5 h6 35 gxh6 gxh6 36 Kh2 Rb2 + 37 Kg3 Rxa2 38 Kg4 Rg2 + 39 Kh3 Rg8 40 Ra1 c3 41 Kh2 c2 42 Kh3 Rb8 43 Rc1 Rb1 44 Rxc2 Bxc2 45 Nxc2 Nb3 and white resigned. White was gradually outplayed this game.

### ACM Tourney, New York, 1990

**White: MChess 80486**

**Black: Mephisto Lyon 68030 50 MHz**

1 c4 c6 2 d4 d5 3 Nf3 Nf6 4 Nc3 dxc4 (the Slav defense seems to suit many computer programs well) 5 a4 Na6 6 e4 Bg4 7 Bxc4 e6 8 o-o Nb4 9 Be2 Be7 10 Bf4 o-o 11 h3 Bh5 12 Qd2?! Bg6! 13 e5 Nfd5 14 Nxd5 Nxd5 15 Bg5 f6 16 Bh4 Bb4 17 Qd1 Qb6 18 exf6 gxf6 19 Bg3 Rad8 20 Nh4?! Kf7 21 Nxg6 hxg6 22 Bc4 Rh8 23 Rc1 Bd6 24 Bxd6 Rxd6 25 Qd2? Rh4 26 Rcd1 Ne7 27 Qe2 Nf5 28 b3 Kg7 29 Rfe1 Nxd4 30 Qe3 e5 31 Qg3 Nf5 32 Qf3 Rhd4 33 Rxd4 Qxd4 34 Kh2 Qb2 35 Re2 Qc1 36 Ra2 Qb1 37 b4 Rd1 38 g3 Nd4 39 Qg2 Rg1! and white resigned. A fine positional victory by the Lyon.

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