

# Computer Chess Reports 1991-92

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## Late 1991 Review

by Larry Kaufman, I.M.

The big event of late '91 was the International Computer Chess Championship in New Mexico, won convincingly by IBM's Deep Thought II, with MChess a surprise second (see story). The final version of Deep Thought, with 1000 processors, is expected to be ready by the end of '93, with a challenge to Kasparov expected in '94. Somehow I think it will take a bit longer than that to perfect so complicated a machine, but for now I'll stick to my long standing prediction of '95 as the year in which the computer will surpass the human champ.

In the commercial microcomputer world, the most interesting new product is the Fidelity Elite Premiere, which combines the top Mephisto program with Fidelity's wood autosensory board for under \$1,000. It earned a Senior Master Action chess C.R.A. rating (prelim. est. 2430) after 48 games (see C.R.A. story), the first 2400+ C.R.A. rating ever. For those who don't mind small plastic pressure boards the Fidelity Designer 2265 (Mach III) and 2325 (Mach IV) remain the best values in terms of strength vs. price. Mephisto, Fidelity, and Saitek have all indicated that they will market RISC based models sometime in '92, probably in that order, but we'll have to wait for the details. Novag seems to have given up on the U.S. tournament players market by turning distribution over to a company that has nearly doubled prices.

In the pc market, MChess continues to do well in various events and remains the strongest by nearly all accounts. Chessmaster 3000 is out and is clearly stronger than its predecessor 2100 (and with more features), but it does not seem to be quite as strong as the top few programs after Mchess (Zarkov, Rex, Knight-Stalker). The "Alpha" program by Don Dailey and me, although completed in August '91, is still not ready for commercial release, while our new "Socrates" (for 386 and above only) is still being refined. We are hopeful that Socrates can surpass MChess, but this remains to be proven.

I am currently available to answer calls at Fidelity on the toll-free number (1-800-634-4692) on Wednesdays from 10

## ACM International Computer Chess Championship

The 22nd Annual ACM (Association for Computing Machinery) International Computer Chess Championship was held Nov. 17-20, 1991 in Albuquerque, New Mexico. In former years it was called the North American Championship; its new name reflects the fact that it has the prestige and strength of a World Championship, although that event is held only every three years. This year's ACM was surely the strongest computer chess event ever held,

with ten of the twelve entries rated (officially or by consensus) over 2300 USCF and seven over 2400. One indication of the strength of the event is that "BeBe", a four time runner-up in World Championship and ACM tournaments, finished next to last with only 1 point (a win from the tail-ender). Tony Marsland, Monty Newborn, and Mike Valvo ran a nice event, with many of the participants freely sharing ideas and research findings.

First place (\$4,000) went as expected to Deep Thought II with a perfect 5-0. Deep Thought was never in trouble, but it did look as though MChess might nick it for a draw in the ending. The IBM authors of DT II claim that its evaluation is now up to the level of the old Deep Thought, and since it searches over a ply deeper due to utilizing 24 processors instead of 2 it should rate at least a hundred points higher, which would put it at over 2600 USCF. Its performance in this event certainly does not contradict this claim. It generally won its games by winning a pawn or two and then cashing in the endgame.

Second place was a big surprise. MChess, on a 486/33 MHz according to author Marty Hirsch, won 4 games (including a quick KO of HiTech in the last round), losing only to Deep Thought. It was only in trouble against

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Socrates, which earlier held an advantage and later wrongly refused to settle for perpetual check. MChess is known as the strongest pc program on the market but was not expected to have much chance against the powerful mainframe and special purpose chess computers in the event. Its rating based on "Ply" testing on the same hardware should be near 2400 USCF, which would put it seventh in this field. Has MChess improved further or was it just lucky? Hard to say. MChess naturally received the trophy for "Best Small Computing System".

Tied for third and fourth with three points were (in tiebreak order) Cray Blitz and Mephisto. Cray Blitz runs on a \$25,000,000 Super Computer (Cray YMP with 8 processors) and was World Champion in 1983 and 1986 with lesser hardware. It plays so rarely against human competition in serious games that it has no meaningful rating, but 2500 USCF would be my guess. It lost to DT, drew ChessMachine and Socrates, and beat BP and Zarkov. Mephisto, running the Vancouver program on a 68030 at 50 MHz, snuck in through the back door without having to play any of the favorites, beating Lachex (solely because Lachex didn't know one can promote a pawn to a knight instead of to a queen), BeBe, and BP, while losing to Socrates and Zarkov. Since the strength of Mephisto Vancouver is well established, this again shows the great strength of this event.

Four computers shared fifth through eight place with an even 2 1/2 score. The were, in order, HiTech (1989 ACM champ), ChessMachine Schroeder (running 32 MHz, over twice the speed of the commercial version, and with an updated program), Zarkov (running on a powerful HP computer said to be four times faster than a 486 at 33 MHz), and Socrates (a pc program running here on a 486 at 33 MHz). Socrates is a new program by Don Dailey and myself (Larry Kaufman) for Heuristic Software, loosely related to "Alpha" but designed specifically for 386 and 486 based machines. Both are expected to be available this Spring. Socrates was finished only the day before the event and was still quite primitive then. HiTech is widely thought to be stronger than its low 2400s USCF rating, in view of some impressive results in foreign events. It beat LaChex and ChessMachine, lost to DT and MChess, and drew Zarkov. It was the third fastest entry with its special chess hardware. A 20x faster cousin, "Hiertech", had entered but was not nearly ready in time and so withdrew. ChessMachine Schroeder had tough pairings (it lost to HiTech and DT, drew Cray, beat Socrates and BeBe) but played well. At 32 MHz, it must be close to 2500 USCF.

Zarkov, by John Stanback, is a strong pc program written in "C", which made it possible to run on the HP 9000/732 instead of on a pc. Its strength is surely in the 2400s on this mighty machine. It won a nice game from Mephisto, beat the tail ender, and drew HiTech, while losing only to Cray and DT. Socrates upset Mephisto in the first round when Mephisto's king side attack failed to achieve tangible results and left its position overextended. We then drew a losing position against Cray, lost a wild topsy-turvy game with MChess, lost to ChessMachine rather quickly, and easily won from "Delicate

Brute". We were quite pleased with an even score for such a new program, begun only three months before the event from scratch.

BP, a non-commercial pc program running on a 486/33, took ninth place with two wins (from Bebe and Lachex), while Lachex was tenth with wins over Bebe and Delicate Brute. Lachex runs on a single processor Cray YMP (perhaps a fifth the speed of what Cray Blitz ran on, but still a multimillion dollar supercomputer) and has a 2330 USCF rating. Bebe, a famous Chess Engine by Tony and Linda Scherzer, could only beat Delicate Brute. Bebe is getting rather old and was apparently "sick" during one or more games in the event. When well, I think it is of low master strength. Finally, "Delicate Brute" lost all five games; it was an unfinished program on a Sun 4 computer by Univ. of London professor Don Beal, known for his original ideas of how computers should do their "search". I think he has many good ideas, but they were not properly or fully implemented in time for this event. Curiously, some of his ideas were similar to ones we had thought up and implemented in Socrates only days before talking to him at the tourney!

One entrant simply failed to show up: "Questx" by Franz Morsch, a pc program related to "KnightStalker" and "Fritz".

As for blitz (5') games with human opponents, there were quite a few played, since there were at least five International Masters present at times (Mike Valvo as TD, Danny Kopec, Mark Leski on the Socrates team, perennial Grand Prix winner Igor Ivanov, and myself). I can only report on the performance of Socrates, which made an even score in its eight games with IMs.

A conference was held on "Where is computer chess going?" with most of the participants now agreeing with my long standing prediction of a computer reaching the level of the human world champion in or around 1995. There was talk of a possible DT vs. Kasparov (assuming he's still champ) match in 1994, but this may be too early to expect a computer match victory.

In 1992 there will be a World Computer Championship (in Spain) so the next ACM is planned for 1993.

## New PC Software

Some new pc chess playing programs have come out since our last issue, so it's time for a review. The best known of these is Chessmaster 3000, so let's start with it.

The program is an upgrade of Dave Kittinger's Chessmaster 2100 program, not a complete rewrite. The differences though are quite significant. First of all, small hash tables have been added, which speeds up the search a bit in the middlegame and significantly in the endgame. Another important change is the introduction of "Null Move" pruning, as is also used in "Knight Stalker" (a.k.a. "Fritz"). This more than doubles the speed of the search in most positions, while occasionally taking an extra ply to see something. The two changes together plus other refinements appear to have made "3000" significantly stronger than "2100", though the strength of "2100" is controversial due to the existence of multiple versions. The program scores well on tactical tests -- on

a 486/33 it came out 2326 USCF on my problem set, only 12 to 22 points behind Zarkov, Knight Stalker, and Rex. However actual play results against various programs from independent sources are not as good as this, and some odd behavior has been observed--for example after 1 b4 e5 2 Bb2 Bxb4 CM3000 fails to regain the pawn by 3 Bxe5 but instead plays the blunder 3 a3? allowing black to keep the pawn by 3...Bd6. Still the program is probably of low master strength on 486 machines and of Expert strength on 386 computers. The main selling point though is not playing strength, since there are about half a dozen stronger programs now, but the myriad of features available on CM3000. I found it a bit more awkward to operate than several other programs, but this is probably a necessary consequence of the vast number of options available to the user. I am glad to note that Software Toolworks no longer tries to tie in their product with Fidelity, a claim that I felt was quite fraudulent on the "2100" since the Fidelity program was used only in non-PC versions such as Macintosh. In sum, this is a good product and a genuine upgrade from 2100, but is not the best choice for strong players.

Sargon V is the program that Sargon IV should have been. In other words it is pretty much a translation of the Sargon IV Mac version, which is to say a translation of the Fidelity Mach II program. The pc version of Sargon IV was hopelessly bungled and played very poor chess relative to all serious chess programs (including Sargon III), and the rights were sold to another company. This time the job was done better, and the program acts like it should on problems. On my problem test it scored 2346 USCF on a 486 at 33 MHz, comparable to Zarkov, Knight Stalker, and Rex. However results reported by independent testing against other computers have been very poor, so perhaps there is some bug that does not show up on problems. The program seems to be aimed at novice players, kids in particular, in view of the gimmicky display. I even had trouble telling which color was supposed to be "white" and which "black", though this can be corrected by the user. It does have most basic features but is in no way in a class with ChessMaster 3000 in terms of options, and it is not so easy to operate as several other programs. In sum, Sargon V might have been worth recommending if it had come out three years ago as Sargon IV, but in today's market I think not.

Another program I tested was "Chessplayer 2150" in French (I haven't seen an English version, but I presume it's the same). Its performance on a dozen problems I ran was clearly inferior to all of the above named programs, so I abandoned the testing.

As for new versions of older programs, experimental versions of Zarkov seem to show improvement over 2.5, but for some reason none have been released to the public at last word. Some testers have gotten very impressive results for some versions of Zarkov, but for some reason the "Ply" results have been rather poor. New versions of MChess have not demonstrated any improvement in the Swedish testing or on my problem set (I have version 1.53 at 2393 on my 33 MHz 486, almost exactly

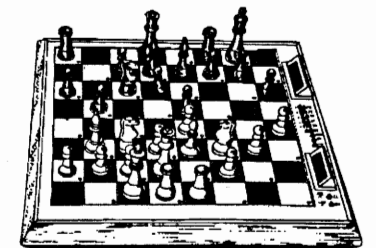
the same value as "Ply" reports for all MChess versions combined on that hardware). The BT test does show decent improvement in the recent versions, and the superb result of MChess (v.1.62 I believe) in the ACM event (see story) does suggest that there may have been some recent progress. MChess seems to retain a clear though diminishing lead in strength over all competitors on the market.

As for the programs of Don Dailey and myself, "Alpha" should be out this spring and its 386/486 specific cousin "Socrates" should be out this summer. The Alpha program is complete but is unlikely to surpass MChess because (like Zarkov) it is primarily in "C". Socrates, though, is in 386 assembly language and is still being refined. We intend for it to surpass MChess, but this remains to be proved. The commercial names of these two programs have not been announced. One bit of advice: if you are thinking of buying a new machine, Socrates will be the first chess program to benefit from large RAM (4 MB is recommended, 2 MB required) and the first to benefit from the superiority of a true 386 over a 386 sx at the same speed. Socrates appears to benefit more than any other chess program from running on a 486. Because Don and I are only responsible for playing strength in Alpha and Socrates, with Julio Kaplan's "Heuristic Software" handling the graphics and features, I can only report on the chess play now.

As for "KnightStalker" ("Fritz" in Europe), it is selling very well in Europe due to the "ChessBase" tie-in, the modest price, and the good playing strength based on computer-computer games and problem tests. But one word of warning: it will probably not seem as strong as other similarly "rated" programs (Zarkov, Rex) because its chess knowledge is so limited and its endgame so poor--just as its close cousin "Travel Master" did not perform up to expectations in its C.R.A. Action chess test.

## Fidelity Review

The gradual blurring of the line separating Mephisto from Fidelity (both owned by Hegener & Glaser) has now permitted an exciting new product, the Fidelity Premiere [shown right]. By putting the Mephisto Vancouver program into the Elite board, Fidelity has made it possible for the consumer to get a full size



wood autosensory board and a 2300+ program (appr. 2430 Action Chess C.R.A. rating, see C.R.A. story) for under \$1000, whereas previously one had to settle for a cheap board or a lesser program for that money. In addition, one also gets the old Elite program free with the Premiere (a switch selects which program to use), although since the Vancouver is about a hundred points stronger this feature is only a slight plus (note: only the Elite program "learns" from its mistakes). Be-

cause the hardware is identical to Elite version 2, the play differs in three ways from the Mephisto 16 bit Vancouver. On the plus side, the Premiere runs at 16 MHz versus 12.3 for the Vancouver, which should make it about 25 points stronger. On the other hand, ROM limitations forced the use of the previous year's (Meph. Lyon) opening book instead of the Vancouver's, a reduction of 33%. Finally, the smaller RAM in the Premiere forced a reduction in the hash table size to 1/3 of the Mephisto unit, which makes no difference in fast games (game/30 or faster) but costs about 10 points at 40/2.

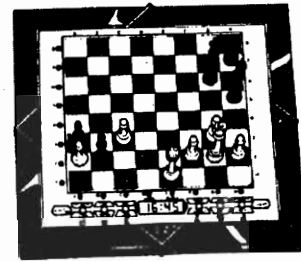
On balance, the Premiere is probably about 5 points stronger than the Mephisto model at 40/2 and about 15 points stronger in quick play. All of the features of the Vancouver remain operative in the Premiere, but are accessed in the manner of the Elite. One minor drawback of the Premiere is that any programmable opening book one creates will be lost if you switch between the Vancouver and Elite programs, so those who use the programmable book should disregard the Elite Option and just use the Vancouver (as most users will probably do anyway). The C.R.A. rating of the Premiere is only 2265 because only the old Elite program has been rated at 40/2, but with the Vancouver program around 2430 C.R.A. in Action chess it surely deserves a rating well over 2300 at 40/2. The Premiere is slightly stronger than the plastic Designer 2325 model because the 100 point program improvement more than makes up for the 7-3 hardware speed advantage enjoyed by the 32 bit 2325 model. For those who want both the speed of the 32 bit processor plus the power of the Vancouver program, it remains necessary to buy the Mephisto model, as no 68020, 30, or 40 Premiere model is planned. If you already own an Elite 2, it will be possible to upgrade to Premiere, though pricing is not yet announced. As for features, Premiere offers virtually all those found in the Mephisto Vancouver.

Another new model expected soon is a new Travel Master [right]. The original version plays well enough (2062 in C.R.A. Action test, 2125 by comp vs comp testing), but there are several annoying bugs in both the play and the design that cannot be corrected due to the bankruptcy of C.X.G. and the resultant decision of the programmer Franz Morsch to work for Saitek. Therefore it was decided to have another Mephisto programmer (one who previously worked on only very cheap models) write a new program for the h-8 processor in the Travel Master. Although Morsch is widely accepted as the greatest chess programmer of tiny memory models, the new Travel Master will have twice the RAM and ROM and so it is expected that the new TM will retain the strength of the old, if not surpass it. However this remains to be seen -- the program is said to be under testing now, but I haven't seen it. Hopefully the new model will be trouble free before its release. The same new program will also be offered in a table top



model to be called the "Miami" (Fidelity's home city) [shown right] instead of the previously planned name "Table Master".

As for older models, the Designer Mach III (C.R.A. 2265) [shown below] remains by far the strongest model under \$200, as is the Designer 2325 (in reality about 90 points stronger) in the under \$500 category. The Elite version 2 remains the



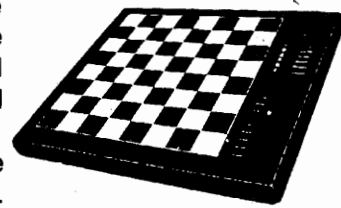
least expensive master rated wood autosensory board, while the Designer 2100 Display has fallen in price to a sufficient discount from the Mach III to be of interest to those for whom price is more significant than the extra playing strength (nearly one class). Finally, the Travel Master remains the ultimate bargain in terms of strength per dollar, but for home use a separate chess board is advisable, and be prepared for various annoying problems.

As for plans for the second half of '92, Fidelity plans one plastic table model expected to fall in between the Designer 2265 and 2325 in both price and strength, as well as a wood version of same. It will be 8 bit with a Schroeder program at 8 MHz, and with 32k RAM. Also planned is a RISC model with a Schroeder program (an upgrade of what's in the "ChessMachine", though probably at lower MHz and with the smaller size RAM).

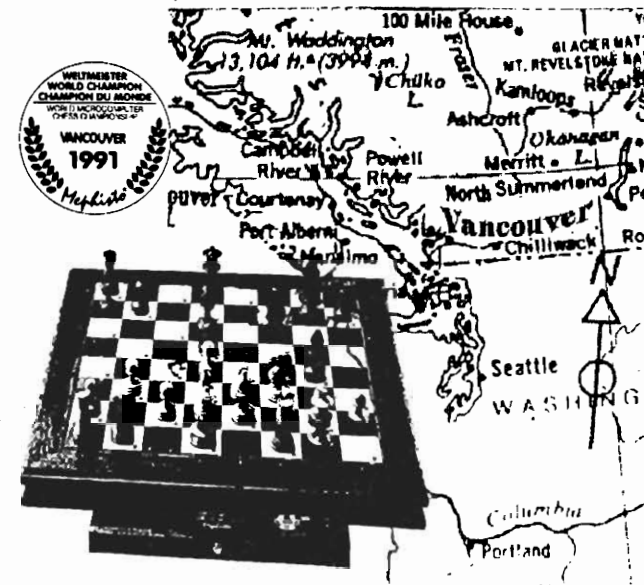
Fidelity has made a decision to attempt to get all of its new strong models C.R.A. rated, either at normal tournaments or in special Action chess events like that arranged for Travel Master and Elite Premiere. I expect to be doing a lot of travel this year!

## Mephisto Review

The Mephisto Vancouver has now been out for some time and evidence is now accumulating as to how much of an improvement it is over the Lyon. The new BT test [see article] shows a 33 point gain (on the 32 bit model), while my own test shows a tiny drop. Eric Hallsworth's list shows about a 13 point gain (averaging the three models), while the Swedish list still shows a slight loss on that basis. Probably the truth is that the Vancouver is about 10-15 points better, with perhaps half of the gain due to the enlarged opening book. Clearly this does not justify the costly upgrade if you already have Lyon, but it does add to the appeal for new buyers. I suspect that the 16 bit Modular Vancouver will not be sold much in the U.S. now that the Fidelity Premiere has the same program for the same price at higher MHz (16 vs. 12.3) and with a much larger, wooden board, but the Mephisto unit does offer four advantages: larger RAM for hash tables, newer and larger opening book (Premiere uses the Lyon book),



modularity, and the famous quality German engineering that is needed to offer a two year warranty in Germany. While U.S. purchasers only get a 1 year warranty, they are getting the same product as the German citizens get with their two year warranty. The 32 bit Vancouver is still the top commercial model (except for its big brother, the 68030/36 model at around \$8000) and will remain so until RISC hits the market.



The Mephisto Vancouver does have several impressive results under its belt. The 16 bit unit has an Action chess victory over 1989 U.S. co-champion Stuart Rachels. The 32 bit (12 MHz) model achieved a 5-5 tie score in a WBCA blitz match with six time U.S. Champion Grandmaster Walter Browne, founder of the World Blitz Chess Association and rated in the high 2600s in blitz. It also played twenty blitz games against masters rated around 2300, scoring 16 1/2 - 3 1/2, and received an official WBCA rating (for the thirty games) of 2610. This confirms my oft stated opinion that blitz ratings for computers run about 200 points above their 40/2 ratings. Finally, the Vancouver 16 bit program in the Fidelity Elite Premiere board (at 16 MHz) achieved an Action Chess C.R.A. rating after 48 games of around 2430, a very impressive figure.

What about RISC? Mephisto plans to offer the first RISC modul, for its three boards, in the second quarter of this year ('92), at about the same price as the 32 bit modul. It will have the latest Schroeder program, an upgrade of the "ChessMachine" program. The processor is the Acorn Risc Machine ("ARM"). If it runs at 14 MHz, near the 15 MHz speed of the ChessMachine, with 1 Megabyte RAM (twice the ChessMachine), as expected, the new Modul should be around 2450 strength, a clear upgrade from the Vancouver 32 bit and near the \$8,000 68030 model in strength. Early test results by Jan Louwman in Holland are even better than this (a decisive lead over Vancouver 68030 is claimed), but as he is associated with the programmer Schroeder these results must be confirmed by independent testers.

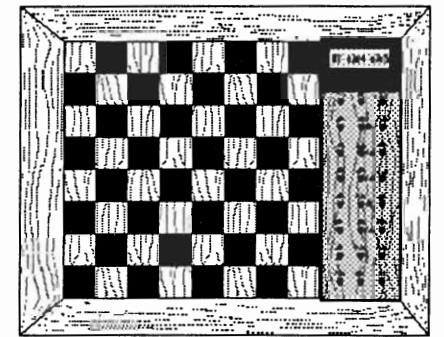
The Mephisto Milano, the laptop style 8 bit model with Schroeder's latest program, is a best seller in Europe and would be here too if not for the bargain basement sale on

the Fidelity Mach III at \$200. Since the two are of about equal strength, you must ask yourself if the game-save feature, the attractive appearance and laptop style, and the quality German engineering warrant a price difference of \$100-\$150. If the price gap should shrink the Milano may become a good seller in the U.S. too.

## Novag Review

Novag has not come out with any new models of interest to tournament players since our last review. However, there is much more data out now on the new Diablo & Scorpio models, so let's take a look. As usual with Novag, the range of ratings obtained from different sources and different methods varies more widely than with the other companies.

The Swedish "Ply" rating is quite a disappointment -- no better than the much less expensive Fidelity Mach III at around USCF 2200. On the other hand, Eric Hallworth has it at a respectable 2255 (63 above his Mach III rating), while my own Action chess games put it in the middle at 2236. Since "Ply" only rates 40/2 games while Eric's list includes many 1 minute/move games, this indicates that like all prior Novags the Diablo/Scorpio is relatively better at the faster time limits. This is probably because Novag does not score mobility in its evaluation, which strengthens it tactically (mobility takes time to calculate) but weakens it positionally, which shows up more at long time limits. On the "B-T" [see article] problem test Diablo [right] scores 2282, while against humans it has performed at USCF 2310 in 57 games according to Hallsworth. All this variation



could be due to chance and to differing time limits, but another factor may be that the early units had various problems, including at least one outright program bug, that were corrected in the second release. Novag does not officially admit to the existence of two versions, not wanting to have to replace or fix all the first run units, but it is easy to tell whether a given unit is "bad" or not -- the first run would not play a game on the levels where an exact time limit per move is chosen. Conclusion: the plastic Scorpio falls in between the Fidelity Designer 2265 and the 2325 in strength and therefore is overpriced at the same or higher price as the Designer 2325, but the Diablo remains the strongest wood autosensory model under \$800 unless an Exclusive Polgar 10 MHz can be obtained for that price. For those who like the active style of play for which Novag is known the Diablo holds appeal.

Novag has still said nothing about plans for any 32 bit or RISC model. Judging from past performance, Novag

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- Fidelity Designer 2100
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- Fidelity Chessier
- Fidelity Designer 2100 Display
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- Fidelity USCF Academy
- Novag Beluga
- Saitek Simulacao
- Fidelity Mach II LA
- Saitek Blitz
- Saitek Prisma
- Mephisto Milano
- Novag Super Nova
- Saitek Corona
- Fidelity Mach III Designer
- Fidelity Phantom
- Fidelity Chessier Phantom
- CEG Sphinx Commander
- Saitek Galileo
- Novag Scorpio
- Fidelity Designer 2325
- Fidelity Elite 2265
- Mephisto MMV Modular
- Mephisto Polgar Modular
- Novag Diablo
- Mephisto MMV Exclusive
- Mephisto Polgar Exclusive
- Fidelity Elite AG 5
- Mephisto 16 Bit Modular
- Mephisto MMV Munich
- Mephisto Polgar Munich
- Fidelity Elite 2325
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- Novag Solo
- Novag Exort
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- Saitek Traveller
- Novag Amigo
- Saitek Advanced Chess Trainer
- Fidelity Travel Master
- Saitek Chess Shadow
- Novag Super VIP
- Mephisto Marco Polo
- Mephisto Mobil MMV

## Chess For PCs

- Chessmaster 3000
- RoxChess
- Knight Stalker
- Zarkov
- M-Chess
- ChessMachine 128K
- ChessMachine 512K

## Other Games

- Fidelity Micro Chinese Chess
- Novag Chinese Chess
- Fidelity Bridge 2
- Fidelity Bridge 3
- Fidelity Talking Bridge 3
- Fidelity Bridge Challenger
- Saitek ProBridge 210
- Fidelity Deluxe Bridge Challenger
- Saitek ProBridge 500
- Saitek Pro Blackjack
- Monty Plays Blackjack
- Saitek Pocket Checkers
- Saitek Electronic Checkers
- Fidelity Micro Backgammon
- Fidelity Gammon Pal
- Saitek LCD Backgammon
- Saitek Sensory Backgammon
- Monty Plays Scrabble
- Master Monty Plays Scrabble
- Monty Plays Monopoly
- Shogi Master (Disk)
- Many Faces Of Go (Disk)
- Nemesis Go (Disk)
- Nemesis Josaki Genius (Disk)
- Nemesis Tactical Wizard (Disk)
- Nemesis Igo Dojo

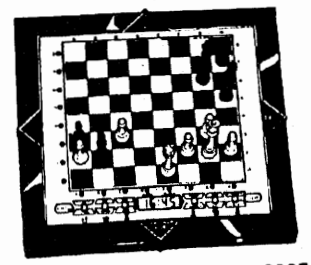
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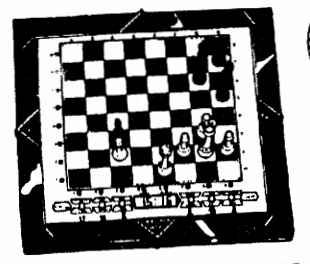
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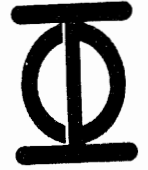


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will wait to jump on the RISC bandwagon until Mephisto, Fidelity, and Saitek have all come out with their models.

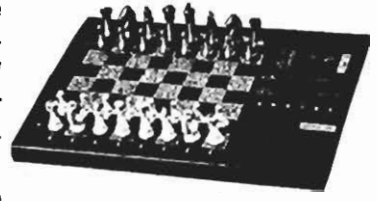
Just before press time, we learned that U.S. prices of all Novag tournament models have nearly doubled overnight, apparently due to Novag's decision to sell through a middleman, British Boston corporation. Obviously at these levels all Novag models are hopelessly non-competitive, and I cannot imagine what type of thinking led to such a foolish decision. Unless the decision is reversed, this means that only Mephisto/Fidelity and Saitek remain as serious competitors for the tournament players' market.

## Saitek Review

The bad news here is that the long awaited Spracklen Risc module for the Galileo and Renaissance boards has been postponed indefinitely, apparently because the strength is not high enough to justify the price. However work continues on the program, so hope remains. Saitek is said to have purchased the "King" program (the #2 program available as an option for the "ChessMachine") for use in a dedicated RISC model towards the end of this year. The advantage of this is that the "ARM" (Acorn Risc Machine) processor used in the "ChessMachine" is much cheaper than the SPARC processor (and associated hardware) chosen by the Spracklens. Franz Morsch is also said to be working on RISC for Saitek, so they could conceivably end up with three different RISC programs!

On the plus side, Saitek has acquired the rights to the Franz Morsch program used in the Travel Master, which will at last allow them to offer low priced Expert level models to compete with Fidelity's budget line. No less than five such models are expected this (1992) fall, all using the same h-8 chip and small memory (16k ROM, 1/2 k RAM) as the Travel Master, though the MHz may differ between models. The program is to be identical except for minor bug fixes. Two of the planned units are travel, peg-style games ("Travel Champion" and "Champion Advanced Trainer"), two are plastic pressure boards ("Turbo Advanced Trainer" [right] and "GK-2000", the latter offering a faster processor and a display), and one is a wood pressure board, the "Virtuoso". Prices should range from about \$100 to \$200, which would make all of these models good values today, but by the time they are actually produced the other companies should also have new models out, so we'll have to wait and see. I would like to see this program offered in the affordable, autosensory "Blitz" board, but so far no such unit has been mentioned.

As for what's available from Saitek now, the "Blitz" unit with its mid 1900s playing strength remains the least expensive autosensory unit and can be recommended to those for whom ease of operation is more important than high playing strength. I would like to correct here the earlier reports that the "Blitz" and "Prisma" (C.R.A. rated



1963) share the same program. The programs differ substantially, though I cannot yet say which is stronger. Some of the published rating data combines the two models, making it difficult to tell much about their relative strength. As for the Galileo, the failure of Saitek to offer either the planned "Brute Force" module or the Spracklen RISC module makes it of interest only to those for whom low Expert strength is sufficient since that is the strength of the module recently offered with the Galileo for \$300 total. That is indeed a very modest price for a wood autosensory model, but it is about a class weaker than the more expensive wood autosensory models of Novag and Fidelity.

## How Computers Play Chess Part II

### Checks And Other Tactical Extensions

In the last CCR we discussed the basics of how most computer chess programs work. Now it's time to discuss some enhancements that are widely used. In particular, moves that give check are often treated differently than other moves for two reasons: There are usually only a few legal replies, and checks are apt to be deadly at times -- after all, only a check can be a mate!

There are two categories of checks to consider: checks found within the main search depth, and checks found beyond that depth in the quiescence search. Let's start with the former.

When a move is tried in the main search and found to be a check, many programs grant a 1 ply extension. In other words, the check and the reply to check are counted as only 1 ply instead of two. This rule dramatically helps performance on mating problems involving many checks, and is generally thought to help somewhat in practical play, but there is some controversy about this since it does slow down the search significantly (perhaps 30% might be a typical figure for today's microcomputer programs at tournament level). There is little doubt that some check extension rule is important to a good program, but whether all checks should be extended or just certain ones is the real question. All of the Fidelity programs and nearly all of the Novag programs of the past decade have extended all checking moves a ply, as do most of the better pc programs (at least MChess, Zarkov, Rex, Sargon 5, and Chessmaster 3000, and "The King" program on ChessMachine), and most or all of the giants (Deep Thought, HiTech, Cray Blitz). However, several top programmers disagree. The Saitek programs of Julio Kaplan severely limit the number of check extensions, while the programs of Franz Morsch (Travel Master, Knight Stalker for pc) only extend replies to check that do not capture the checking piece. Ed Schroeder's programs seem to be the most restrictive in terms of check extension -- I don't know the exact rule, but for the most part he only seems to extend consecutive checks. It does seem to be the case that programs with hash tables can better afford to extend all checks, while those without hash tables benefit more by restrictions on check

extension. Our own experience is that it is difficult for a hash table program to benefit from restrictions on check extension, though I suspect that there exists some rule that is better than blindly extending every check. A few programs even extend both the check and the reply when there is only one legal reply, though I am not convinced that this is justified. As for the Richard Lang Mephisto programs, because of their unique structure it is difficult to say just what's going on, but I can say that over the years he has moved steadily in the direction of more and more check extensions.

The purpose of check extension is not merely to discover combinations based on checks. Perhaps even more important is the need to see past "horizon" (spite) checks. If I have a devastating reply to a move you want to make, but you can then check me four times before you must accept a loss, check extension will reduce by four plies the depth at which the danger can be seen. I feel that a good check extension rule must deal with this situation.

As for checks in the quiescence search, there are two issues here. One is the question of how to handle captures that happen to be checks, and the other is under what conditions we should look for non-capturing checks. Most microcomputer programs test to see if each capture happens to give check, and if so all legal replies are analyzed further. One variation on this used in the ChessMachine "The King" program and I believe in at least one version of the Mach II is that if there exists more than one legal reply to the capture check the side in check may "stand pat" (accept the score of the position as is). This is somewhat faster than analyzing all capture checks but risks missing the possibility that a capture check may be a fork. Some programs, especially the giants like Deep Thought, go a step further and don't even bother to test for whether captures are also checks, which risks missing capture mates but saves further time by making it unnecessary to consider captures of pieces whose value is less than the current material deficit. It is also possible to blend the ideas by doing a full check analysis of captures on the first ply or two of quiescence but not beyond.

Until a couple of years ago, few programs considered non-capturing checks in quiescence, but now that has become common. One algorithm is to consider checks but disregard those that have more than one legal reply (The King, the original Fidelity Avant Garde). Another is to consider all checks (except perhaps discovered checks, which are hard to identify quickly, and pawn checks) on the first ply or two of quiescence, as is done by Fidelity Mach III, Novag Super C, Rex, Zarkov, and the Saitek programs. Another idea is to look for checks in quiescence only if there were checks in the main search (Cray Blitz, Chess 4.5). All such check in quiescence algorithms cause the program to excel in mating problems, but whether this translates to actual playing improvement is not always clear in view of the resultant slowdown. For example, looking at all piece checks on the 1st ply of quiescence seems to slow programs down by an

average of somewhere around 20%. It seems to me that whether this is worthwhile depends on the details of the program in question.

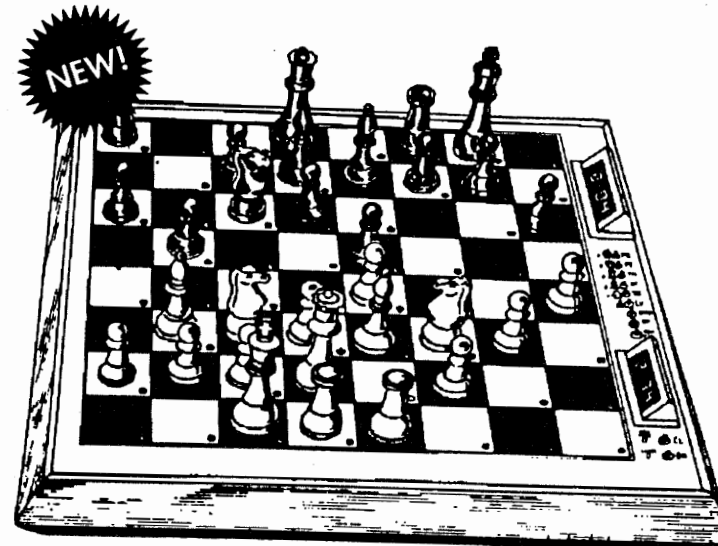
What about other tactical extensions, besides checks? One popular extension in the main search is certain recaptures. To extend all recaptures a ply slows the search down a bit too much, so I know of no program that does this. However, Hans Berliner in HiTech pioneered the idea of extending captures (usually but not necessarily recaptures) that brought the current score close to the expected score. Other programs, including MChess, use this or similar rules, while some researchers have tried and rejected the idea. Cray Blitz extends all recaptures of equal value to the piece just captured. Many programs extend on pawn to the 7th rank (at least on the last ply), while a few even extend on passed pawn advances to the sixth or perhaps even to the fifth rank (Cray Blitz for one). The ChessMachine Schroeder program seems to have some sort of extension rule for pieces attacked by lesser valued pieces, though I don't know the rule. Deep Thought and now other programs use "singular extension", a complex idea based on extending moves that appear to be significantly better than all others. One problem with this idea is that it is not generally possible to make this determination, and when it is possible it may slow the program down appreciably just to make this decision. Another idea from Deep Thought is "Threat Extension", whereby any move that looks good is extended if the side making the move is under attack. For details on these last two ideas see the ICCA Journal, June 1991. Finally, many micro programs extend various types of threatening moves if made on the last ply, or even if they occur in the quiescence search. Which of these myriad ideas are best depends on the program in question, and the choice is a complex question which requires extensive testing to answer.

### The BT 2450 Test

The BT test is a set of 30 problems, mostly tactical, designed to estimate the rating of chess computers. Authored by Hubert Bednorz and Freddy Tonissen, it was originally published in "Modul" magazine, and has since been revised via the replacement of 4 of the original problems with more suitable ones. The new version was published recently in "Computer Schach und Spiele" along with the results on every problem for no less than sixty different programs! I have run the test myself on several other programs. While the test is far from perfect, it does a fair job of sorting out the programs and the recent substitutions do seem to be for the better. Each problem is allotted 15' (use infinite level), and the time at which the solution is found is recorded. The problems are run for the full 15'; if the right move is found and rejected it must be found again before 15' with the time of re-solving being used. All problems not solved by 15' are counted as 15'. The

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total time for all 30 problems in seconds is then summed, with the sum divided by 60 to convert to minutes. Then, twice this figure is subtracted from 2450 to estimate the German Elo rating. German ratings are probably the strictest on earth, and run about 250 points below USCF ratings, so to estimate USCF ratings we will use 2700 in place of 2450. The range of possible ratings on this test is thus from USCF 1800 to 2700, so clearly this test is only for use on strong computers, say at least over 2000 USCF. Indeed the test is quite difficult; for example the Novag Super VIP, a 1900 vicinity model, can only solve 5 of the problems in the allotted 15'. One flaw in the test is that it neglects to include defensive problems (where the obvious move or moves lose) and so models with a strong defensive bias (notably the older Mephisto models like Amsterdam and Mondial 6800xl) are severely underrated. However most recent models are well balanced between offense and defense and so this flaw in the test has limited practical consequences. The test is also much too biased towards mating and queening combinations, and has too few positional problems, but the results are still interesting, especially for comparing consecutive programs by each programmer to observe the progress. Now let's look at the USCF ratings predicted by this test, one programmer at a time.

Let's start with Novag (Dave Kittinger). The Super VIP gets 1910, the Super Nova 1958 (this difference of 48 points is just about what one would expect from the 5:3 MHz ratio), both about right. The Forte A gets 1962 (a bit low), while Super Forte A (5 MHz) gets 2042. Super Forte B (6 MHz) gets 2114, and Super Forte C gets 2157. So the total progress on the 6502 processor from Forte A to Super Forte C was 195 points, of which only about 20 is due to the 20% increase in processor speed, implying a total software progress of about 175 points over about a 3 year period. Finally, the Diablo comes out at 2282 (somewhat higher than actual game results imply), for a gain of 125 points in going to the 16 bit 68000 processor with enough RAM for hash tables.

Now let's look at the 5 MHz 6502 programs of Saitek (Julio Kaplan). Simultano got 1995, Stratos II got 2075, and Turbo King II got 2115, for an indicated gain of 120 points over about two years, all in software improvement. As for the h-8 Saitek program in the "Kasparov Blitz", it solved only three problems in the allotted time and thus rated only 1859.

Next comes the Fidelity (Spracklen) programs. On the 6502, the old Elite Glasgow boosted to 8 MHz got 1993, while the later Avantgarde at only 5 MHz got 2013, implying perhaps 70 points software improvement over a couple years. Then, switching to the 68000, the Mach IIc got 2043 (it deserves more) at 12 MHz, while the Mach III at 16 MHz got 2207, implying a software gain of about 135 points, which coincidentally is almost the exact gain shown by C.R.A. tests on these two programs on identical 68020 hardware (2325-2188). However, all other data suggests that this figure is way too high; the fact that Mach III looks for checks in quiescence unlike the Mach II exaggerates the difference on a mate-rich problem set.

The Mach IV (= Designer 2325) got 2315 (the 108 point gap over Mach III being slightly more than one would expect from the 7:3 hardware ratio, the programs being identical), the Elite v.9 gets 2382 (about right for the speedup over Mach IV). Elite v. 10 was untested but should score around 2440 based on the 9:5 speed ratio to the v.9. The Elite Premiere using the Mephisto Vancouver (Lang) program and the 16 MHz 68000 processor got an impressive 2360.

As for the 5 MHz 6502 programs of Mephisto (Ed Schroeder), the MM4 got 2028, Academy got 2147, Polgar got a surprisingly low 2096, MM5 got 2143, and Milano earned an excellent 2233, for a 205 point gain in three years. Schroeder's RISC program in the ChessMachine (v.2.1, 512k, 15 MHz) scored 2407 versus only 2301 for an earlier version (at 16 MHz). The other ChessMachine program, The King by de Konig, scored an impressive 2456 on the test, confirming its reputation as a superb tactician.

The 16 and 32 bit Mephisto (Richard Lang) models show a nice steady gain, but this partly reflects the gradual change from defense to offense in successive versions. Looking at the 16 bit 12 MHz models, Amsterdam got an absurdly low 1981, Mondial xl (Dallas program) got an equally silly 1992, Roma got 2037, Almeria 2116, Portorose 2211, Lyon 2316 (finally up to snuff). As for the 32 bit 12 MHz models, Portorose got 2253, Lyon 2326, and Vancouver 2359. Finally, looking at the super expensive 36 MHz 68030 models, Portorose got 2334, Lyon 2413, and Vancouver 2467. If we consider only models with equal hardware (Almeria through Vancouver), the total software progress over 3 years is over 200 points on this test, though as I explained this is somewhat overstated for the Lang programs due to the offensive test bias.

To complete the list of dedicated chess programs, Travel Master by Fidelity (Franz Morsch) got 2062 (oddly, with selective search turned off it scored 2078), Dominator by CXG (Franz Morsch) got 2006, Mephisto Blitz (Ulf Rathsmann) got 1956, and Mephisto MM2 (Rathsmann) got 1961.

For the pc programs, it is difficult to make comparisons because they were run on a wide variety of computers. For this article only, I am adjusting all results on hardware other than 386/33 MHz as follows: 386/25 MHz I add 30, 486/25 I subtract 40, and 486/33 I subtract 70. On this basis, Psion 2.11 (Lang) got 2047, Cyrus (Levy) got 2126, Fritz = KnightStalker (Morsch) got 2269, Rex 2.1 (Dailey and Kaufman) got 2243 while the current version 2.3 got 2298, and MChess (Hirsch) went from 2280 on version 1.41 to 2301 on version 1.51 to 2334 on version 1.53, showing steady progress on this test at least.

In conclusion, all of the programmers have made good steady progress over the years according to this test, and instances of backsliding are rare enough to attribute to test error. It is usually a safe bet that a newer program by a given programmer on the same hardware will be at least some improvement over its predecessor, at least if several months have elapsed.

## A History of the Computer Rating Agency

The C.R.A. (Computer Rating Agency) was established by the U.S. Chess Federation for the purpose of rating commercial chess computers under supervised conditions. Prior to its creation, the ratings advertised for commercial computers were either made up by the manufacturers with little or no basis, or were actual ratings earned by souped-up machines, typically running twice the commercial speed. The goal of the C.R.A. was to insure that ratings were earned under tournament-like conditions, with the players well motivated and with the machines running at the same speed as commercial models. A minimum of forty games was required, later raised to 48, and the time limit has always been close to 40/2 (3 minutes/move), except for tests designated as "Action Chess" (game/30). The first three tests were run as private events, not rated for the human players, with small cash prizes for winners and less for draws. All subsequent events took place as part of major tournaments (except for Action Chess tests), so the games were rated for the humans, and cash prizes of at least \$50 per win and \$25 per draw were offered. C.R.A. representatives monitored play to insure that standard machines were used and that the manufacturers did not cheat. All of the big four manufacturers have participated in two or more tests.

The first test, in 1984, was by Novag. Its "Super Constellation" was thought to be close to 2000 USCF in strength, and Novag was rewarded for its courage with an Expert (2018) rating. Fidelity was next, waiting until they had a clearly stronger model in 1986 before earning a 2100 rating for the "Par Excellence". This rating was criticized (by myself and others) on the grounds that the prelims (used to estimate the desired level of opposition in the main event) were not included in the rating (this would have reduced the rating about 35 points), the FIDE formula was used instead of the correct USCF one (2 points), one or two repeat losses by the computer were disallowed and replayed with different openings, and players were forced to play on interminably in drawn positions until they blundered from exhaustion or insufficient motivation. Still, subsequent events around the world proved that the Par did deserve a US rating over 2000. The 2100 rating awarded the "Par" has also been awarded to several other Fidelity models using the same program and the same or faster processor, namely "Avant Garde 2100", "Designer 2100", "Designer 2100 Display", "Phantom", and "Chesster", although in most cases a different opening book was used. At the same time, the Mephisto Amsterdam, a vastly more expensive model, earned a 2176 rating in an incomplete C.R.A. test which was called off near the end in a rules dispute (players were allowed to adjourn, unlike the case with the Par). Because of these disputes, C.R.A. tests were then transferred to major tournaments, with the result that these tests have been free of serious criticism. Since players have the right to refuse to play computers in tournaments,

opponents tend to be those who feel they know how to beat machines, and since they are triply motivated (rating, tournament standing, extra win/draw money) these events have been rather strict tests of the computers.

The next two tests were by Fidelity with experimental versions of their 68000 program ("Excel 68000" and "Mach II") in the 1986 and 1987 U.S. Opens. In both cases the ratings were too low for Fidelity to accept them for advertising. The Excel got about a 2040 rating, perhaps close to its true strength but well below the exaggerated expectations of Fidelity. The Mach II had a bug (corrected for the commercial version) which may have been responsible for its horrible rating in the low 1900s at the half way mark, at which point Fidelity withdrew.

The next three tests by three different companies all took place at one tournament, the Software Toolworks Open in 1987. Mephisto earned a 2154 rating for the "Mondial 68000 xl", a bit below expectations but good enough to make it a best seller. Novag entered the "Super Expert 6 MHz" with its selective search on, but did so poorly (around 2010) that it withdrew after 30 games and re-entered with the full-width mode set, playing 18 games there and another 30 in a New England event soon after, earning an unexpectedly high 2166 rating which made the model a success in the U.S. I don't believe the real difference in strength between the two modes was all that big--this may just show that there is a lot of luck in a 48 game rating (there is supposed to be about a forty point standard deviation for 48 games, so there is one chance in three that a C.R.A. rating is off by over forty points and one chance in twenty of an 80 point error or more). As for Fidelity, it got the highest rating ever (2188) but was still the loser, because its model, using the Mach II c program, used the expensive hardware later found in the Mach IV (68020 at 20 MHz, 512k RAM), which was unsalable at a four digit price without a master rating. Some distributors, notably in England, managed to fool the public into thinking that it was the Mach II c (running three times slower than the C.R.A. model) that had earned this rating, but in the U.S. the Mach II c, without a C.R.A. rating, had a tough time competing with the Mondial and Super Forte 6 Mhz.

The next round of tests was at the 1988 World Open in Philadelphia, where there were three standard tests and one Action Chess test. The Mephisto Mega IV Turbo (an inexpensive unit with an expensive "Turbo Kit" that boosted it from 5 to 18 MHz) got a fabulous 2361 Action rating for its 48 games, although I suspect that it benefited from the fact that the players in that Action Chess tournament had to play 11 rounds in two days. In the main event, though, it only got 2209 -- a master rating to be sure, but too low to market the model at the four digit price required for the Turbo version. This rating still appears in supplements under the name "Mega IV" -- the word "Turbo" should be added lest someone think the inexpensive basic unit got the master rating. Fidelity, on the other hand, had two great successes, with the Mach III earning an astonishing 2265 rating and the Mach IV 2325. The only difference between the models was speed, with the 32 bit processor, higher MHz (20 vs 16), and much larger

RAM (512k vs 64k) of the Mach IV giving it about a 7:3 speed advantage, which should mean about a 90 point spread. Although the Mach III program was considerably improved over the Mach II c, it is very unlikely that the improvement was as great as the 7:3 hardware ratio between the unit tested previously in Los Angeles (rated 2188) and the Mach III, which just points out again the statistical margin of error in the tests. The truth is that both the 32 bit Los Angeles unit and the 16 bit Mach III were really of low master (2200-2225) strength, and luck went against Fidelity the first time and for them the second. Because of the high rating, Fidelity was able to sell the Mach III in great numbers for more money than the Mach II c, although production cost was probably a bit less due to reduced RAM (Mach II had 128k, but ran at only 12 MHz). The 2265 rating was also applied to other models using the same program and equal or better hardware, namely the Designer 2265 and Elite version 2 (with 128k RAM and a different book). The 2325 rating is similarly used in Designer 2325 and Elite version 6.

With the Master barrier having been decisively broken, no one had any interest in the C.R.A. for over a year, until Mephisto had a model that was thought to have a good chance at a Senior Master rating. The Mephisto Portorose 68030 (36 MHz) was entered in the 1989 Software Toolworks Open and earned 2376, not bad but in view of the astronomical price of the unit (around ten grand) not good enough. Subsequent events showed that a rating over 2400 USCF would indeed have been justified - it was just unlucky. Due to the high cost of a CRA test (usually around five grand) and the high cost of the top models (which limits sales severely), Mephisto abandoned further attempts to obtain a Senior Master rating, although the Lyon or Vancouver 68030 would probably obtain such a rating.

The next set of tests, by Saitek at the 1990 U.S. Open, were a welcome change. Instead of entering unaffordable models, Saitek entered two units that were within the budget of the average person. The Corona II, a nice affordable wooden model, earned an Expert (2045) rating, less than expected but only slightly below the "Ply" rating adjusted to US level. The "Prisma" was estimated by Saitek to be only 1900 and got 1963, a bit above most other estimates. Saitek has not yet chosen to advertise these ratings, and may have been motivated to participate primarily to learn just how well their models played.

The trend towards testing affordable models accelerated with the Action Chess test during the 1991 U.S. Open of the Fidelity Travel Master, by far the cheapest model ever tested. It got a somewhat disappointing 2062, about a hundred below expectations, but still quite ample for a cheap pocket model. One conclusion I drew from these tests is that a good, large opening book helps a lot more in human tournaments than in computer-computer tests.

The latest C.R.A. Action Chess test took place during the U.S. Amateur Team Championship South in Orlando, FL from Feb. 15- 17, 1992. The Fidelity Elite Premiere, using the Mephisto Vancouver program, played 48 games of 30' chess against opponents ranging from just under 2000 to nearly 2400. The result was a score of 38

1/2 - 9 1/2 (33 wins, 4 losses, 11 draws) for an estimated rating of 2430! This may vary by a few points either way when the up to the minute ratings of opponents are used for the calculation. Considering that the Premiere is only a 16 bit model, this was a remarkable result. This is about a hundred points over its estimated rating at 40/2. How much of this is due to the fast time limit and how much to random factors is hard to say, but the result was more than anyone expected. Against masters the Premiere made an amazing score of 14 1/2 - 4 1/2 (including a 4-2 score against masters in the 2300s), while against Experts and near-Experts it went 24-5. It lost one drawn game on time when both sides moved about aimlessly in a blocked position for a hundred moves or so, but otherwise the test went smoothly and the rating reflected the excellent play of Richard Lang's program in all phases of the game.

As for the future, there is talk of organizing special man vs. machine tournaments to obtain C.R.A. ratings for multiple models at one shot. Unless or until this happens, we can expect to see more Action Chess events held concurrently with major tournaments. Both Fidelity and Saitek have indicated an interest in C.R.A. rating most or all new models of Expert or master strength.

## Rating the Commercial Chess Computers

Continuing the policy begun recently, I list four ratings per model, together with their mean (average). The "CCR test" is a set of 33 problems (mostly tactical) which I have chosen because they closely predict ratings calculated from actual computer vs. computer games. "SelSr+" are the ratings in Eric Hallsworth's mag "Selective Search" based on computer-computer (and some computer-human) games at 1' per move and up, with 100 added to adjust British ratings to USCF levels. "CSS+" are the ratings from the German magazine "Computer Schach und Spiele", based on nearly thirty thousand computer-computer games, mostly at 40/2, plus nearly five thousand computer vs human tournament games (mostly in Germany and Austria) with 150 points added to adjust for the average difference between C.R.A. ratings and the German list. Both of these lists include the thousands of games played between computers at 40/2 in Sweden by "Ply" magazine's testers. "CCR 30" are ratings based on thousands of Action chess games between computers played by myself and a few other CCR testers (especially Max Harrell in Mobile, AL). These Action ratings are contracted by 25% to offset the tendency of fast games to favor the more powerful model. The level of the Action list is set by the requirement that the average CCR rating of all models with (40/2) C.R.A. ratings equal the average of the C.R.A. ratings. The processor and/or MHz are listed to insure that models with similar names but different hardware are not confused. Ratings in parenthesis are calculated by adjusting for the difference in processor speed from another model with the same program. Number of games must be at least 30 for CCR 30'. Mean ratings based on only one column entry are bracketed as unreliable.

## CCR RATINGS CHART - Dedicated Models

Computer	MHz	Mean	CCR Test	SelSr	"CSS" +	CCR30'
Meph Vanc 68030	36	2476	2462	2490	2504	(2449)
Meph Lyon 68030	36	2470	2470	2479	2456	(2473)
Meph Port 68030	36	2432	****	2458	2437	(2400)
Fid Elite 10 68040	25	2409	2419	2379	2415	(2421)
Meph Vanc 32 bit	12	2377	2356	2407	2406	(2340)
Fid Elite 9 68030	32	2369	2363	2348	2395	(2371)
Meph Lyon 32 bit	12	2366	2364	2382	2354	2364
Meph Port 32 bit	12	2326	****	2342	2344	2291
Fid Premiere 68000	16	2320	2319	(2334)	(2335)	2290
Meph Vanc 16 bit	12	2308	2304	2324	2325	2277
Meph Lyon 16 bit	12	2308	2312	2338	2278	2303
Fid Des 2325 68020	20	2307	2302	2287	2324	2314
Meph Almeria 32 bit	12	2299	****	2312	2295	2289
Fid Elite 5 (2 proc)	16	2263	****	2252	2273	****
Meph Port 16 bit	12	2258	****	2290	2248	2235
Meph Polgar 10	10	2241	2237	2235	****	2252
Nov Diablo/Scorpio	16	2240	2254	2255	2227	2225
Fid Elite 2	16	2221	2216	(2198)	2258	(2210)
Meph Almeria 16 bit	12	2217	****	2221	2212	2219
Fid Mach 3, Des2265	16	2207	2210	2192	2223	2204
Meph Milano	5	2188	2215	2240	2175	2123
MephMondial 68000xl	12	2177	****	2159	(2176)	2195
Meph Polgar	5	2174	2159	2178	2165	2193
Meph MM5	5	2167	2193	2184	2161	2149
Nov Super Ex/Forte C	6	2167	2154	2162	2168	(2184)
Meph Roma 68000	12	2153	2129	2152	2170	2161
Nov Super Ex/Forte B	6	2148	****	2126	2116	(2201)
Meph Academy	5	2141	****	2147	2131	2146
Fid Mach II L.A.	12	2138	2129	2119	2143	2160
Meph Amsterdam	12	2127	****	2129	2124	****
Meph Mega IV	5	2122	2127	2124	2114	****
Fid TravelMaster h8	10	2121	2134	2118	****	2110
Saitek Maestro D	10	2116	****	2118	2118	2113
CXG Sphinx Dominator	4	2107	****	2068	2110	2144
Meph MM4	5	2103	2081	2100	2100	2132
Nov Super Ex/Forte A	6	2100	****	2089	2068	2143
Fid Des 2100 Display	6	2069	2066	****	2072	****
Saitek TurboKing II	5	2051	2064	2065	2066	2007
Fid Par Ex/Des 2100/ Phantom/Chesster	5	2034	2044	2013	2044	****
Saitek Simul/Corona	5	2027	2039	1998	1991	2080
Saitek Stratos	5.6	2001	****	2010	1991	****
Saitek TurboKing	5	1996	****	1990	****	2001
Nov Super Nova 6301	16	1931	****	1922	1940	****
Saitek Prisma/Blitz	10	1927	1943	1932	1910	1923
Nov Super VIP 6301	10	1880	1811	1888	1892	1929
Meph Europa/Marco Polo/ USCF Academy 6301	8	1875	****	1864	1886	****
Nov Primo/VIP 6301	8	1854	****	1840	1853	1870
Saitek Astral/Conquistador/ Cavalier 6301		1752	****	1711	1792	****
CXG Sup Ent/Adv Star		1750	****	1765	1735	****
Nov Mentor 16/Amigo		1742	****	1684	1800	****

## PC Program Ratings

PC Programs on 486/33 MHz (except ChessMachine and Chesscard, which have their own processors and so run the same on any pc regardless of its speed.) Those tested only on 386/33 are given with 60 points added to estimate performance on 486/33.

Computer	MHz	Mean	CCR Test	SelSr	"CSS" +
ChessMachine 512k--					
Schroeder v.2.1	15	2437	2405	2464	2441
Konig "TheKing"	15	2432	2396	2460	2439
MChess (many vers.)		2401	2393	2405	2406
Fritz = KnightStalker		2334	2346	2321	****
Rexchess 2.30		2319	2338	2299	2320
Psion 2		[2278]	****	2278	****
Zarkov 2.50		2276	2348	2254	2226
[Chessmaster 3000]		[Low 2200s-insufficient testing]			
Psion 1		[2141]	****	2141	****
Colossus x		[2091]	****	2091	****
ChessMaster 2100		[2076]	****	2076	****
Final Chesscard		1873	****	1862	1883

It is interesting to compare the above mean ratings with C.R.A. (40/2) ratings for those models which have both. I list the C.R.A. ratings first: Meph Portorose 68030 2376 - 2432, Mach IV (Des 2325) 2325 - 2307, Mach III 2265 - 2207, Novag Super Expert 6 MHz 2164 - 2100, Meph Mondial 68000xl 2154 - 2177, Par Excellence 2100 (about 2065 including prelims) - 2034, Saitek TurboKing II (or Corona II) 2045 - 2051, Saitek Prisma 1965 - 1927. Two other models were tested at much higher speed in the C.R.A. tests than in the standard models: Mega IV got 2209 at 18 MHz in C.R.A., and its above 2122 rating at 5 MHz would be around 2260 at 18 MHz. Fid Mach II L.A. got 2188 C.R.A. at three times the commercial speed, and its above 2138 mean rating would be about 2258 at the C.R.A. speed. So the greatest spread observed to date is 70 points, not much more than might be expected to occur once in ten C.R.A. tests just due to sampling error in 48 games. Conclusion: the above mean ratings are a good estimator of how machines should do in serious competition with humans at 40/2. For the three Action chess tests held to date, the machines have averaged about 50 points above the "mean" ratings, so I recommend adding 50 points to the "mean" ratings if you wish to estimate a machine's rating against humans at game/30.

### Rating Comparison

For the purpose of comparing older units (which you may own) to the new ratings, we present here an abridged listing from CSS (the same as the fourth column on the previous rating lists).

Meph Almeria 68020	2295
Meph Roma 68020	2222
Meph Dallas 68020	2216
Meph Almeria 68000	2212

Meph Roma 68000		2170
Nov Super Exp./Forte C	6	2168
Meph Dallas 68000		2164
Meph MMV	5	2161
Meph Roma II 68000		2150
Meph Academy	5	2131
Meph Amsterdam 68000		2124
Nov Super Exp./Forte B	6	2116
Meph Mega IV	5	2114
Fid Prestige AG	8	2105
Meph MMIV	5	2100
Sphinx Galaxy	4	2090
Fide Excel 68000		2077
Nov Super Exp/Forte A	5	2048
Fid Par Excellence	5	2044
Conchess Plymate Vict	5.5	2035
Nov Exp/Forte B	5	2030
Nov Exp/Forte A	5	2022
Meph College	5	2018
Fid Excellence	4	2014
Meph Monte Carlo	4	2010
Meph Supermondial	4	2010
Meph Rebell	5	2001
Nov Exp	4	1994
Sait Stratos	6	1991
Conchess Plymate	5.5	1985
Sait Simultano	5	1982
Meph MMII	3.7	1969
Sait Renaissance	4	1966
Conchess Plymate	4	1956
Sait Turbostar	4	1953
Nov Superconstellation	4	1950
Fid Elite Glasgow	4	1947
Nov Super Nova		1940
Meph Glasgow 6800		1935
Chessplayer 2150 (Atari/Amiga)		1934
Fid Elite Budapest	3.6	1922

Sait Blitz/Prisma		1910
Sphinx Dominator	4	1905
ChessMaster 2100 (Amiga)		1901
Fid Elite A/S	3.2	1900
Nov Constellation Quattro	4	1894
Fid Prestige	4	1893
Meph Europa	3	1886
Conchess Glasgow	4	1885
Final Chesscard	5	1883
Nov Constellation	3.6	1882
Sait Superstar	2	1872
ChessChamp 2175 (Atari/Amiga)		1862
Fid Elite	4	1860
Nov Primo		1853
ChessMaster 2000 (Atari)		1852
Conchess Glasgow	2	1835
Nov Constellation	2	1827
Meph Mondial	2	1825
Fid Sensory 12	2.5	1810
Nov Amigo		1800
Fid Sensory 9	2	1798
Sait Cavalier		1792
Super Enterprise		1735
Steinitz (MGSIII)	2.5	1734
Morphy (MGSIII)	2.5	1711
Fid Champion	2	1700
Sait MarkV	2.5	1680
Sait Turbo S	3	1664
Sargon ARB 2.0 (MGSII)	2	1645
Meph III		1614
Nov Savant Robot	2	1612
Enterprise		1573
Fid Senory Voice		1544
Sci MarkIII Super System		1525
Nov Solo		1520
Nov Savant		1516
Fid Voice		1509
Meph II		1485
Fid CC7		1461
Fid CC10		1450
Meph Junior		1444
Meph Mini		1418
Boris		1417
Meph I		1402
Sci Mark II		1240
Sci Mark I		1135

### Bits & Pieces

(Readers' Letters and Replies)

Joe Stella, Marlboro, Massachusetts

I wrote to you some time ago about some puzzling match results between my Novag Super C and M-Chess [on 486/33]. Well, I have taken your advice and re-played the match setting M-Chess in optimal mode. This made an incredible 215 point difference in M-Chess's playing

strength [based on 30 game matches-ed.]. In this mode, the dubious openings and unsound piece sacrifices I observed before were absent from M-Chess's play, which was very impressive indeed. Sometimes it made very nice piece maneuvers in the endgame, while in other games it just blew the C off the board with a strong attack. After seeing this, I am almost ready to agree with the programmers who think Marty Hirsch must have sold his soul to the devil; if Richard Lang's program is better than this, it must really be something. The results for both matches, time limit 60 moves in 30', are [M-Chess in Random Mode beat Novag in Best Move Mode by 17-13, while M-Chess in Optimal Mode beat same Novag by 24.5-5.5].

Of course, the difference in hardware is a major factor in these results. If we could run the Novag program on a processor that had equal MIPs with the 486/33 it would probably be a very close and interesting match. I think M-Chess has greater chess knowledge, but this might only net an advantage of 50-80 points over the "C".

[It is interesting to observe that Random Mode degrades the play so much in M-Chess. Testers take note! Probably some of the gap was just due to luck. Even the decisive result in optimal mode was no more than I would expect from the enormous hardware difference given equal programs. If you want to learn whether Novag or M-Chess has a better program, you'll have to test them on comparable hardware.--ed.]

William McKinney, Corvallis, Oregon

...Certainly conducting the test [Mephisto Lyon 16 bit vs Radio Shack "Chess Champion 2150", score 49 1/2 - 1/2] was at least personally valuable, for in the process I was able to learn much about the Mephisto's playing style: information I have been able to use since then to improve my own play. And my play has improved dramatically since I bought the Mephisto; I now have reached the point where I am able to beat it about as often as it beats me (at the "action chess" and '1' per move levels). Considering my previous playing abilities, that is frankly a surprising gain in skill, especially over such a short period of time.

[I always believed that chess computers were a valuable aid to improving one's play. It's nice to hear testimonials like yours that this is indeed the case.--ed.]

Peter T. B. Runk, Escondido, Ca

First let me say how much I like this tiny chess player [Travel Master]. It is a marvel in compact programming. Here I want to make a few remarks about pawn promotion and vanishing pieces. [He gives some examples of pawn underpromotion to bishop]...As I see it, if the promoted pawn can be immediately taken, what difference does it make? In every case I have tested, the promoted pawn will be Queened if it can do so without being captured on the next move. [Correct--ed.]...No problem. Maybe it



saves a bit of memory. Important for TM, but not really a flaw. [The problem is that it will sometimes promote to bishop when it can be captured, scoring the position as won, when any promotion is a blunder. This is a true bug and does lose games every once in a while.--ed.]

In regard to vanishing pieces etc., I have not detected that yet. But I am inclined to think that if the owner replaces the batteries after about 15 long games this problem won't occur. [Wrong--the problem occurs every 20 games or so even when using adaptor. It is a program bug, not an electrical problem.--ed.] I do not believe that you can get 150 hours out of them. Perhaps 50 hours. That's the way it goes and I have no objection.

A wonderful little chess player. For the price and power and portable, unbeatable.

Richard Morris, San Francisco, Ca

Once I switched from an "anti-computer" mode to a "normal" mode of play, the Travel Master seemed much stronger, easily in the high expert class. [He had previously written to say that he felt it was only low Class A strength due to its poor positional play against him.]

What appears to be the case here is that "anti-computer" tactics (get the little bugger out of book, provoke it to engage in positional contortions to chase pawns, and so on) work more effectively than they do against machines with more sophisticated programs. [I agree--ed.] In other words, the Travel Master can be made to play weakly in certain circumstances.

On finding mates; it seems to have no true "mate-finder" level...It announced mate in two when it had mate on the move (it does find that mate on the move in positions where there is no similar mate in two--so it's not really a bug, as you say). [As you saw, even in mate solve mode it plays the first mate it finds regardless of depth. Perhaps memory was too limited to allow a proper mate solve mode.--ed.]

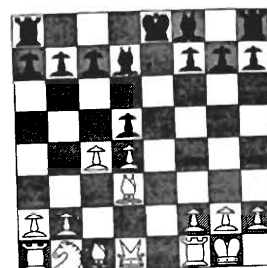
## GAMES

ACM Tournament, Albuquerque, Nov. 1991 -- 40/2

White: MChess on 486/33

Black: Hitech

1 e4 e5 2 Nf3 Nf6 3 d4 Nxe4 4 Bd3 d5 5 Nxe5 Nd7 6 Nxd7 Bxd7 7 o-o Qh4 8 c4 Bc6? [diagram] (The book move is 8...o-o-o with a fairly even game. The move played loses, but without extensions it



would take a 13 ply search to see this. Even with recapture extensions it would take 11, and Hitech usually can only do 9.) 9 g3 Qf6 10 cxd5 Bxd5 11 Bxe4 Bxe4 12 Re1 Qg6 13 Nc3 f5 14 f3 o-o-o 15 fxe4 a6 16 Bf4 fxe4 17 Nxe4 Bb4 18 Rc1 c6 19 Re3 Rd5 20 Qa4 Bf8 21 Rec3 Kd8 22 Qb3 Rb5 23 Qc2 Bb4 24 Rb3 Re8 25 Be5 Qh6 26 a4 Rb6 27 Rf1 Qg6 28 Rbf3 a5 29 Rf5 Qh6 30 Rf7 Be7 31 Rxxg7 Qe3+ 32 Kg2 and black resigned.

ACM Tournament, Albuquerque, Nov. 1991 -- 40/2

White: Socrates on 486/33

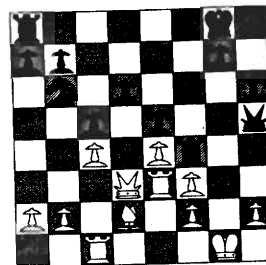
Black: Mephisto Vancouver on 68030 at 50 MHz

1 e4 c5 2 Nf3 d6 3 Bb5+ Bd7 4 Bxd7+ Qxd7 5 c4 Nc6 6 o-o Nf6 7 Nc3 e5 8 d3 Be7 (IM Mike Valvo commenting on the game around this point predicted a boring draw. Boy was he wrong!) 9 Nd5 (I would play 9 Bg5 and later take the knight to play with knight vs.

bad bishop.) o-o 10 Nxe7+ (Socrates did not yet have knowledge of good and bad bishops; this trade helps black.)

Qxe7 11 Bd2 Nd7 12 Re1 f5 13 Qb3?! (misplacing the queen) fxe4 14 dxe4 Nb6 15 Ng5? h6 16 Nh3 Qe6 17 Rac1 Nd4 (black's edge is obvious) 18 Qd3 Nf3+ 19 gxf3 Qxh3 20 Re3

(White's situation looks critical, but actually it's not so easy for black to win against precise defense, as we shall see.) Rf4 21 Qf1 Qh5 22 Qd3 Rh4? (This looks deadly, but actually black must not allow white to capture the d pawn, since it gives white too much counterplay.) 23 Qxd6 Rxh2 24 Kf1 Qh4 25 Be1 Rd8 26 Qe6+ Kh7 27 Ke2 Qg5 28 Bc3 Qg2 29 Rf1 Rd1 30 Qf5+ Kg8 31 Be1! (Although the black rook could not be profitably taken either way, this move makes it clear that black's attack has failed and he must soon lose a pawn or more.) Rd6 32 Rb3 a6 (This seems rather silly, but there are no good moves.) 33 Qxe5 Nxc4 34 Qxc5 b5 35 a4 Re6 36 Qc8+ Kf7 37 Qd7+ Re7 38 Qd5+ Re6 39 axb5 axb5 40 Qf5+ Rf6 41 Qxb5 (Now white must win.) Nd6 42 Qd7+ Kg6 43 e5 Rh5 44 exf6 Re5+ 45 Re3 Rxe3+ 46 Kxe3 Qxf1 47 Qxg7+ Kf5 48 Bc3 Qc1+ 49 Ke2 Qc2+ 50 Kf1 Qc1+ 51 Kg2 Qg5+ 52 Kh3 Qh5+ 53 Kg3 Qg5+ 54 Qxg5+ Kxg5 55 Be5 Nf7 56 f4+ Kf5 57 b4 Kg6 58 b5 Nd8 59 f5+! (if it's taken 60 Bc7 and whichever way the knight moves one of the passers will soon queen) Kf7 60 b6 Kf8 61 Kh4 and Black resigned. The game illustrates that general rules that computers (and even humans) rely on, such as that the king is safest in the corner and exposed on the center files, are at times quite wrong.



Private Match -- Alabama, Dec. 1991 -- Game/30'

(Thanks to Jim Babcus for sponsoring the match and providing the game scores.)

White: Mephisto Vancouver 16 bit

Black: Stuart Rachels (IM and 1989 U.S. co-champion)

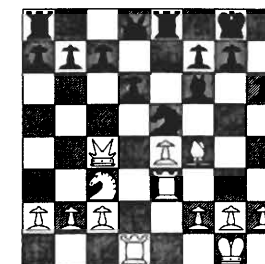
1 e4 c5 2 Nf3 Nc6 3 d4 cxd4 4 Nxd4 Nf6 5 Nc3 d6 6 Bg5 e6 7 Qd2 Be7 8 o-o-o Nxd4 9 Qxd4 o-o 10 f4 Qa5 11 Bc4 Bd7 12 Bxf6 (ECO gives 12 e5 as best and doesn't even mention this.) Bxf6 13 e5 Be7 14 exd6 Bf6 15 Qd3 g6 (maybe black should give up the bishop pair to wreck white's pawn structure by 15...Bxc3) 16 Ne4 Bg7 17 c3 Bc6 18 g4 Rac8 19 a3 Rfd8 20 Rhe1 Ba4 21 Rd2 b5 22 Ba2 b4 23 axb4 Qxb4 24 Kb1 Qb7 25 Bc4 Rc6 26 f5 Bb3 27 Bxb3 Qxb3 28 fxe6 Qxe6 29 Rf1 Qd7 30 Qd5 Rb6 31 Nc5 Qe8 32 d7 Qe7 33 Nb7 Rxd7 34 Qxd7 Qe4+ 35 Qd3 Qxb7 (With a clear exchange up, white should win, and does. It is difficult for me to say just where Rachels lost the game.) 36 Qd8+ Bf8 37 Qe8 Re6 38 Qd7 Qe4+ 39 Kc1 Re7 40 Qc8 Re8 41 Qc7 Re7 42 Qg3 Qa4 43 Qg2 Qa1+ 44 Kc2 Qa4+ 45 Kb1 Qa5 46 Qd5 Qb6 47 h3 Qe3 48 Rdf2 Qe4+ (hopeless, but there was no other defense to Rxf7) 49 Qxe4 Rxe4 50 Rxf7 Re1+ 51 Kc2 Rxf1 52 Rxf1 Kg7 (black could resign here) 53 b4 h5 54 gxh5 gxh5 55 Ra1 h4 56 Rxa7+ Kf6 (It would be rude to play on against a human opponent here, but it's difficult to offend a computer.) 57 Kb3 Ke6 58 c4 Kd6 59 Rf7 Be7 60 c5+ Ke6 61 c6! Kxf7 62 c7 and black finally resigned. While Mephisto computers have beaten other top players before at game in 30 (and even at 40/2), I believe Rachels is the strongest player to lose to a 16 bit computer at a rateable time limit.

[another game from the same match]

White: Mephisto Vancouver 16 bit

Black: Stuart Rachels IM

1 e4 e5 (by prior agreement, so as to avoid another Sicilian, which would probably have been Rachels' choice otherwise) 2 Nf3 d6 3 Bc4 Be7 4 d4 exd4 5 Qxd4 (I prefer 5 Nxd4) Nf6 6 Bg5 o-o 7 Nc3 Nc6 8 Qe3 h6 9 Bf4 Be6 10 Qe2 Bxc4 11 Qxc4 Nd7 12 o-o Bf6 13 Rad1 Re8 14 Rfe1 Rb8 15 Re3 N(d7)e5 16 Nxe5 Nxe5 17 Bxe5?! (This concedes superiority to black. In open positions like this bishops are more valuable than knights.) Bxe5 18 h3 c6 19 Rf3 Qe7 20 Qb3 b5 21 Ne2 g6 22 Ng3 Bg7 23 Qa3 Rbd8 24 Qa6 Rc8 25 b3 Be5 26 c4 b4 27 Rdd3 h5 28 Nf1 Bg7 29 Qa5 Rb8 30 a3 bxa3 31 Qxa3 Be5 32 Qa6 Rb6 33 Qa5



Qb7 34 Qa3 Ra6 35 Qc1 Ra1 36 Qe3 Qb4 37 Rd2 a5 38 Qa7 Rf8 39 Re2 a4 40 Qe3 a3 (Now it's clear that black is winning.) 41 Qa7 Qc5 42 Qa6 Qd4 43 Rfe3 Qd1 44 Re1 Qxe1 45 Rxe1 Rxe1 46 Qxa3 Rxe4 47 Qa7 Re1 48 Qb7 c5 49 Qa7 Re8 50 h4 Bd4 51 Qa4 R8e2 52 Qa8+ Kg7 53 Qf3 Rxf2 54 Qxf2 Bxf2+ and Black soon won. This was a very well played positional

## Chess Software for the Macintosh

by Steve DeRyke

In terms of chess playing software for the Macintosh there are actually only seven worth considering. Sargon III written in 1984 and now out of production, and later replaced by Sargon IV written in 1988 which is still available. Psion written in 1985 and now out of production. ChessMaster 2000 (which does not run on the Mac II line) and ChessMaster 2100 written in 1990, also still available. Finally there is CheckMate and Battle Chess newly arrived from the Amiga world. Of these Psion is clearly the strongest and to be recommended if you can find a legitimate copy. Sargon IV is next, being only slightly weaker in all regards, except in the area of features where it excels. ChessMaster 2100 has a checkered past offering much hope, but little satisfaction. CheckMate though the newest and based on a participant in the Lyon Championship was a complete disappointment. Sargon III is mentioned only for completeness and was tested to provide a historical comparison. Battle Chess was not tested as its main purpose is to entertain the novice rather than provide a serious challenge to a tournament player.

To test these programs I chose to run them on a Mac II with 2 Megabytes (Megs) of Random Access Memory (RAM) against a Mephisto Mondial XL. The CPUs involved are a 32 bit 68020 running at 16 Megahertz (MHz) and a 16 bit 68000 running at 12 MHz respectively. From a strict comparison of processor speed this should give the software on the Mac II a 3 to 1 [more like 2 1/4 to 1 -- ed.] speed advantage, however the Macintosh must busy itself with screen handling and input that the dedicated micro is not concerned with. For those of you not familiar with the Mac, this is no small chore, being fully equivalent to the windows environment on a PC clone. In reality the speed advantage is slightly under 2 to 1 [about 3 to 2 -- ed.]. For those in the PC world the Mac II compares to a slow 80386 machine running DOS or a fast 386 running Windows 3.0.

Sargon III offers a stark but sufficient display. There is no 3-D display but anyone comfortable with chess books should never miss it. Its options and features eventually established the norm for other programs. The only major option that it lacks is the ability to print a move list directly from the application, though with the Macintosh's superior cut and paste abilities this is hardly a concern. On a Mac II this program produced excellent results in the Bratko-Kopec Experiment out scoring the Mondial XL, Sargon IV, CM 2100, CheckMate and Psion, as well as

numerous other dedicated micros (see chart below). This was due primarily to its emphasis on tactics, though its knowledge base does not appear to be drastically inferior to software currently available. However due to its poor head-to-head showing against the Mondial, I would evaluate its rating only near 2000 on a Mac II. Considering its age this is an excellent result, one that makes it difficult to encourage a user to upgrade their software to something newer when they will eventually upgrade their hardware anyway.

Sargon IV offers both a 2-D and an excellent 3-D display with several sets of men from which to choose, plus the ability to design your own, though this is really an unnecessary frill. The one feature I truly disliked during the entire move, rather than clicking to select and clicking to release as the other programs had you do. The chance of slipping off the mouse button and releasing on the wrong square is annoying. One nice feature is Fixed Depth which restricts the search to a certain number of ply and is great for forcing you to develop tactics and strengthen your ability to look ahead. I would evaluate its rating near 2100 on a Mac II. [I would say over 2150 based on comparison with the similar program in the dedicated model Fidelity Mach II -- ed.]

Psion offers a choice between 2-D and 3-D and most of the same options as the other programs. In addition it offers a hint and next best feature. But the nicest extra is a clock setting called equal, where it will force the computer to respond within a time limit that is determined by the opponents play, so as your mood or interest changes during the game it accommodates you. I would evaluate its rating near 2150 on a Mac II. Psion is an early version of the software that now makes up the Mephisto line, though it dates back to the Amsterdam units.

ChessMaster 2000 does not run on the Mac II series of computers due to a non-standard use of the Macintosh toolbox calls. This is typical of many computer games in which speed is of the essence. Unfortunately when newer operating systems or more complicated ROM becomes available they often turn out to be incompatible. For that reason I would recommend that you ask the supplier about this whenever possible. It is interesting to contrast this program with Sargon III. Although Sargon III was written prior to ChessMaster 2000 it actually has a longer useful life span. Whereas the increases in hardware have been a boon to Sargon III they have actually been the death knoll for CM 2000. It just goes to show that quality programming will prove out in the long run.

ChessMaster 2100 does work with the 32 bit Macintoshes, but be sure to get version 1.1 which is intended to fix many fatal bugs in the original release. However, even this release is still a bit flaky at times. It does not allow you to use alternative sets of men in the display and often corrupts the letters in the pull down menus. It also defaults unpredictably to auto-play mode when first started. But the most troublesome problem was its refusal, at times, to allow you to add pieces to the problem set up mode. None of these problems were impossible

to work around, but that shouldn't be necessary at this point in the development of these types of software. The features available that worked were on a par with anything else available, the display was especially nice, however you do have to hold the mouse button down while moving the pieces as in Sargon IV. I would rate its play near 2000 on a Mac II, not the 2100 claimed in its name.

CheckMate is a polished piece of software with only a few minor annoyances. First the manual still has not been upgraded to describe the Macintosh. Instead you are asked to go back and forth between a manual discussing Amigas and Ataris to a paper insert that explains the differences for the Mac. Another quirk is that the pieces are in blue and red. The outside of the package says only black and white displays are supported, but that is luckily not the case. Still, blue and red? Couldn't they just have easily programmed it for more appropriate shades? It is a feature laden application containing almost all of the best features of those above plus many more. One of the best features is a 300,000 move opening book, though it does tend to play rather bizarre lines at times. This software offers several options on pieces movement, including an intuitive interface. In this mode clicking on a square is all that is needed if there is only one piece that can move there or make that capture. I thought when reading the manual that this would be more confusing than it is worth, but it turned out to be quite convenient. CheckMate did quite well on the Bratko-Kopec test, in fact it includes the positions in its software so that testing the computer or yourself is quite easy. This did make me wonder though that possibly the code has been optimized to do well on these problems. This seems all the more reasonable based on its abysmal play. The authors claim this to be the 1990 World Personal Computer Blitz Chess Champion, whatever that means since there is no such tournament, and to have defeated most major software in their testing. If this last is true they have severely bungled moving the code to the Macintosh. It didn't simply get beat by the Mondial it played terribly, sometimes hanging pieces. Unfortunately, I would rate its play well below 1800.

The head to head testing I performed was at speed chess (5 seconds/move), as others have tested these products in other ways and at other time controls, with it turns out, corresponding results. This, in my opinion is how chess playing software is most frequently used anyway. It's hard enough to sit down to a long game against a dedicated micro, with a real set of men in front of you, let alone sit for hours staring at a screen representation of men, no matter how good the 3-D graphics are. In any case, I believe the results would only improve for the Mac II based software, as increased time would give increased emphasis to the speed advantage it has [I disagree with this-- ed.]. The Mondial did quite well defeating CheckMate 9 to 1, Sargon III 7 to 3, ChessMaster 2100 6.5 to 3.5, Sargon IV 6 to 4 and tying with Psion 5 to 5.

It is difficult to draw any conclusions from this test in regards to the status of computer chess in general. Clear-

ly the top software packages are not up to the standards of even the older dedicated machines [since Sargon IV on the Mac is essentially the Fidelity Mach II program, I can't agree with this -- ed.]. The profit margin for dedicated units costing 1000's of dollars is much greater than that for a \$50 piece of software so one cannot blame the manufactures for holding back the algorithms until they have made back their research investment. However, as upgrades to personal computer hardware become more and more common the need for these minor improvements in software is lessened. It is estimated that by the year 2000 personal computers will offer 100 MIPs of processing power [The 80586 may reach this figure in '93; by 2000 we should be nearing 1 BIP -- ed.]. At that rate even Sargon III will play Senior Master level.

#### Summary of Bratko-Kopec results:

	Total	Tactical	Lever
Sargon III (Mac II)	14.66	10.00	4.66
TurboStar 432	13.5	8.5	5.0
CheckMate (Mac II)	13.	1.6	4.5
Par Excellence	13.08	7.58	5.50
Psion 1.6 (Mac II)	13.00	9.00	4.00
Mondial XL	12.00	9.00	3.00
SC-12	11.66	6.50	5.16
Sargon IV (Mac II)	11.55	7.25	4.30
CM 2100 (Mac II)	11.10	6.80	4.30
Super Constellation	11.00	4.50	6.50
Sargon III (IBM PCjr)	10.00	6.00	4.00
Mephisto Blitz	8.00	8.00	0.00

It should be kept in mind that the problems included in the Bratko-Kopec set test only two of the many concepts in good chess and so it is not a definitive examination of strength.

## An Insiders Guide to Chess Computer Pricing

By Phillip Klett

Those of you who closely follow the computer chess field are probably often puzzled by what appears to be some very unusual pricing policies.

I, myself, have walked along Fifth Avenue in New York noting electronics store after electronics store proudly proclaiming "Outrageous Low Prices", but when I go inside to price chess computers, I am greeted by prices, in many cases, which are way above list and usually on units that are years outdated.

On the other hand, publications dedicated to the professional chess player, always promote the latest products at what appear to truly be "outrageous low prices" because this customer base has been educated by publications such as Computer Chess Reports.

However, sometimes there are claims or aberrations in the professional publications which appear to be unintelligible. For instance, those of you used to seeing Diablos

priced at below \$700 will now be stunned by pricing on the VERY SAME machines of OVER \$1100. "How can this be?" you ask. Well, it all began in 1989 when Fidelity convinced Novag that it was in Novag's best interests to have Fidelity distribute its products in the U.S. market. In effect, Fidelity was going to open up a market which Novag could not crack into in exchange for Fidelity's pricing the higher end units out of the market (presumably to allow Fidelity to sell its own product instead). The thought process seems to have been that Novag would more than make up for their losses on the high-end (Super Forte/Super Expert) with the new found (by Fidelity) market on the low end (Solo/Toys/Games).

The project was a dismal failure. Fidelity was not terribly successful in promoting Novag's mass market items, and the artificially high prices on the other end would seem to have made Novag no profit (overall) through Fidelity. So, on January 1, 1991, Fidelity either quit (or was dismissed from) marketing Novag product, and Novag went back to attempt to market directly to dealers such as I.C.D. and the U.S.C.F. Not only didn't Novag lower the prices, but the introduction of the Scorpio and Diablo brought HIGHER PRICES, not because dealers were making more but simply because Novag was charging more.

At about this same time, Novag struck up a deal with a U.S. distributor named British Boston to promote the low end while still maintaining their separate high end companies because it is pretty much understood that chess computers selling for more than \$100 to \$150 are incapable of being sold through mass marketers. However, it appears that sales of Diablo and Scorpio were below expectations (probably because of inflated prices) and Novag chose to keep it simple and give the entire market to British Boston. This extra middleman served to raise prices by about 200%. It would not take much imagination to determine how poorly Scorpions and Diablos will sell at TWICE their former prices.

Another really puzzling event is a recent ad campaign by two different retailers - let's call them Retailer A and Retailer B. Retailer A proclaims to be the exclusive seller of the Mach III Designers at a price of \$199.95; Retailer B promotes what appears to be the same machine at \$188. These two offers appear to directly conflict with each other and from what we can determine, there is a conflict. The company claiming exclusivity does, indeed, have exclusivity and has had same since October 1991. This agreement is in writing and signed by the National Sales Manager of Fidelity and the President of Retailer A. Apparently there was a void at the \$199 price point for Christmas, and Retailer A offered to buy them all from Fidelity if Fidelity would allow a price that would permit the units to be sold for just under \$200 to the end-user.

An explanation of the other ad is much more difficult since Retailer B was aware of the exclusive agreement and really had no reason to believe that Mach III units would be forthcoming. In addition, the \$188 price, although enticingly low, could not be very realistic since Retailer A had to buy ALL of the production in order to sneak just below the \$200 threshold. Therefore, one can

only guess as to the motivation of Retailer B... questionable at best. Perhaps the old idiom applies, "If an offer is too good to be true, it probably is!"

Incidentally, the questionable ad also has a box in which it states, "Call For A Free Chess News written by Larry Kaufman, I.M. Get the Latest information on new chess computers, chess programs and everything on chess as it happens without waiting for a quarterly chess reports. Get it today!!!" According to Larry, he was commissioned to write two or three assorted articles for that company, but he was never informed that those articles were going to be used as an attempt to take away customers who are subscribing to the Reports.

## Computer Go Reports

by Milton N. Bradley, 1 Dan

For this report, I had confidently expected to provide you with the results of my head-to-head tests of the three major computer Go software packages, the **Many Faces Of Go**, **Nemesis** and **Star Of Poland**. Unfortunately, only **Nemesis** and **Many Faces Of Go** have released the promised updates of their DOS program versions to date. Under those circumstances, I can see no point in analyzing the relative merits of programs when that result might be obsolete by the time that you read this, so all of that will just have to wait until the next issue.

The only real computer Go news of significance at this moment is the issuance by Ishi Press International of the **FREE** shareware program called **IGO**, which is available from **ICD** for \$2.00 (to cover the cost of the diskette plus shipping and handling) [*ICD tells us this is below their credit card minimum, so please mail check or money order made out to ICD to: IGO Offer, c/o ICD, 21 Walt Whitman Rd, Huntington Station, NY 11746 - the Eds.*] Please specify 5 1/4 or 3 1/2 when ordering.

**IGO** is intended as an introduction to Go for complete beginners, and is really **Many Faces Of Go** with its playing algorithm restricted to the lowest 4 levels. It features the same stunningly beautiful VGA graphics, and the identical improved tutorial that now appears in the **MFGO** update. But despite its many very real assets, Go beginners who attempt to learn from **IGO** must be aware of its equally very real deficiencies, lest they be misled into learning things "that ain't so" and which will therefore later have to be unlearned.

In my opinion, these deficiencies are so serious that I have just finished the monumental task of completely reediting and enhancing the tutorial and "Example Game" as well as replacing the entire "Advanced Game" to overcome them. As of this writing, I am awaiting approval from the program's copyright owner to issue my improved version of **IGO** in place of the original. If the approval is received, those ordering **IGO** from **ICD** will receive the improved version, and the comments that follow will be moot. If that approval doesn't materialize, then you should keep the following detailed concordance of the original **IGO**'s deficiencies before you as you go

through it. Then **IGO** can provide a really excellent **FREE** introduction to the world's premiere strategic board game. (However, I must in good conscience add here that even my improved version of **IGO** necessarily only provides the rudiments, with a modest amount of embellishment and necessarily scant detail. For much fuller exposition, including a complete introduction to the major tactics and strategic ideas of Go, please refer to my book "**THE BEGINNER'S GUIDE TO THE GAME OF GO**", also available from **ICD**.)

The most important of the needed modifications of **IGO** (which I have already passed on to its creator) are:

1) In the section "Life and Death", the key statement (a quote of the author of **THE WAY TO GO**) "**The power of stones is always measured by the number of liberties they keep**" (emphasis mine) is inaccurate and misleading. A better statement would be: "*The fighting power of stones lacking two secure eyes is directly proportional to their liberty count*". [Even this improved version is not totally accurate/complete, since it doesn't consider virtual liberty count, that enclosed stones have no fighting power at all unless engaged in a semeai (life-and-death fight) with a similar enemy group, and that the presence of a single eye may be worth many liberties. But including all of those refinements would only be confusing at this early point in the beginner's learning, so it is best that they wait until later.]

2) The statement that **Ko captures constitute "...an endless series of meaningless plays..."** (emphasis mine) is just plain wrong! Quite the contrary, **Ko** fights (except for one point endgame **Kos**) only occur when they are of critical importance. Otherwise one side will simply ignore the **Ko** to take **Sente** (the initiative) [*similar to tempo to you chess players - eds.*] twice elsewhere.

A further significant omission here is insufficient explanation of the significance of **Ko**, as the determinant of the consolidation/killing of a needed eye or connection for one or another group, or (in rare cases) an extra liberty in a semeai. Without explanation or much motivation, **Ko** does indeed seem trivial (and therefore incomprehensible to the beginner) when in fact it is almost always anything but!

3) The statement that "**Stones that can form only one eye.... will eventually .... die**" completely ignores the significant exception of **Seki** (a local stalemate), in which even eyeless groups can live.

4) The level of play in the "Example Game" is both almost completely passive and very weak, so it is far, far from representative of how Go incorporates the most incredibly incisive tactics and profound strategy of any strategic board games. Even worse is the fact that the commentary actually misses many obvious strategic and tactical errors/omissions (not the least of which is the possibility for a successful White invasion on the 3-3 point in Black's lower right corner from **B23** on.)

5) The statement "**ATARI is to Go as CHECK is to Chess**" is **DEAD WRONG!!!**, and will throw off any chessplayer who reads it. **Check requires a mandatory response, while response to an atari is always entirely optional.**

6) The comment for **W2** "At the very beginning it is usually better to start an area of your own rather than play close to your opponent" is **WRONG!** Generically, these are in fact equal valued alternatives. What is true in this specific case is that, given play on a small 9x9 board and **B1** on the 3-3 point, **W2** is better played in an open corner.

7) The comment for **B17** "Next will come close fighting for corner territory" is **DEAD WRONG!!** What follows isn't "fighting" at all, but yose (endgame plays).

If you keep these corrections in mind, **IGO** is an excellent way to give Go a try if you don't already play. I guarantee that it will add a new dimension to your thinking which will almost certainly improve your Chess as well!

**LATE FLASH** - Ishi has just issued and updated version of **IGO** which may or may not correct all the deficiencies noted above, since we have not seen it. If you choose to order it, you will get the best version available.

## Dear CCR,

(This is an actual letter received at the CCR offices, printed in its entirety)

I am writing in response to comments given by Steven Schwartz in "Common Computer Chess Misconceptions" published by CCR in Vol. 2, No. 2 Reports.

On the fourth misconception listed, wherein chess software for PC's is going to make the stand-alone chess computer obsolete, he answers that no matter how great computer graphics are, there is nothing like playing on a three dimensional chess board. Well, Steven, couldn't you place a chess board by your PC, and play along? But then you would still be exposed to all of that radiation emitted from the computer monitor. Right? Utter nonsense and really surprised you published his remarks on monitor radiation.

The U.S. Government has legislated strict standards for ionizing radiation from televisions and monitors. The June 1991 issue of Computer Shopper contains an article on "Radiation Dangers" that states "at one time, the amount of radiation given off by a particular tube-type television model was so high that a TV set could have doubled as an X-ray machine. But thanks to tighter federal regulations, today's monitors are well-shielded against X-rays. Although the fear of overexposure is real, monitor emissions don't come close to approaching the danger level. Someone would need to be subjected to high concentrations of hundreds of watts per square inch of electromagnetic radiation before there'd be a health risk."

Steven's readers will die of old age first, or they might die first from radiation fear. Fear instilled in them with his careless remarks.

I agree with him that the stand-alones will continue to survive despite the price advantage enjoyed by PC software, but not for the reason he mentioned. Anyone who loves chess would love a Travel Master, or inexpensive stand-alone that plays master level chess. You can take either anywhere, and play anytime. A laptop computer could do the same, but their prices are still too high.

For senior master level chess, it makes more financial sense to purchase a 386/33MHz clone and a copy of M-Chess than to purchase the top of the line Mephisto model for 5 or more times the money! They both pay top level chess, but that will be the only thing the stand-alone will do! For that 3D feel Steven mentions, I have several nice chess sets to place next to my PC, but I find it bothersome when my PC sets up the pieces so much faster. I also feel it makes no difference whether you learn and play using a physical chess board or not. I calculate chess positions in my head, and not on a board or screen (there is rule against that). Smart chess playing consumers are quick to realize that as long as you have the likes of a Marty Hirsch or Larry Kaufman writing PC chess programs, they will have a number one chess program running on their PC'S. Stand-alones are nice, but do they: Print-out chess moves, link to chess databases, play over modem, show the clocks and analysis at the same time, or allow you to word-process a letter to CCR? The list is almost endless with a personal computer. Also I might add, common sense dictates that unless you have a chess title before your name, you are not going to consistently defeat these computers anyway without first handicapping them to a large extent. To the average Joe, it makes little difference if the computer opponent plays at 2400 or 2200 strength, he is in for a long afternoon.

Steven also mentioned Applied Concepts in his article. A fine company that I bought Boris, Sargon, and the Great Game Machine from in the late 70's and early 80's. Over a decade ago, I toured their facilities and was shown a chess unit that had a robotic arm (which moved the chess pieces for you). Consumers today have more choices to choose from, and I doubt a contraption like that, or a sensor board attached to your PC, would sell. Why a sensor board if you own a PC? To escape radiation? To quote Steven, "we will see sensor boards that attach to your computer thereby allowing you to play in the third dimension and away from the radiation." I hope- for CCR sake, no one takes his remarks about radiation too seriously. I liked his other remarks.

When choosing a computer opponent it becomes a matter of personal taste, and the folks at ICD have given me honest candid recommendations over the past ten years. Also CCR is the best source available for those interested in computers and chess (besides I know and really like Larry Kaufman).

Sincerely,  
John Tenery

Please publish this letter, and/or a statement to the readers of CCR explaining Mr. Schwartz's baseless remarks about monitor radiation. Scare tactics to sell chess computers? No doubt some CCR reader will believe Mr. Schwartz's ignorance on this subject, and react by selling his PC, or convincing his pregnant wife to quit her job where

she sits in front of a computer monitor all day. Such a mishap could come back to your publication.

By the way, The New England Journal of Medicine, March 1991 (from article mentioned in letter) "reported the results of a study which found that pregnant women working long hours in front of VDTs did not increase their risk of miscarriage"

(Note - Steve's response to this letter follows)

## Dear John

by Steve Schwartz

Thank you for your letter, John. Frankly I was surprised by your response because I was not attempting to intimate that sitting in front of monitors was going to cause people to grow a third arm (or second genital, for that matter). I suppose it is a function of where I live and work. Suffolk County (the county in which I.C.D.'s retail store Your Move is located) was the first locale in the U.S. that legislated limited time for workers in front of their video terminals. Not being a legislator (thank heavens), I do not know what scientific evidence they used as the basis of their decision, but it probably had some merit. One of my cohorts here at ICD has informed me that the law was passed because of studies showing that radiation emitted from monitors was known to cause glaucoma (a serious eye disease). In fact, Paul tells me that he had his glasses radiation treated based upon the recommendation of his optometrist because he spends substantial periods of time at the computer (when he is not in his normal catatonic state).

I do have a tendency to be sarcastic and facetious when I write; it's a great way to project humor. You will recall the misconception that Larry Kaufman was really a mainframe computer with 300,000,000 gigabits of memory, and I responded with the "Truth" that Larry was a "bonafide member of the human race." Perhaps that statement will instigate a damning letter from HAL (of 2001 fame) protesting that he does not want to be classified in the same breath as a mere Larry Kaufman.

There is a chance that you were taking my approach to radiation too seriously. The recommendation of the dentist's lead apron when playing chess for long periods of time in front of a computer monitor was meant to garner a chuckle not strike fear into the hearts of PC users. Just think, if I were looking to scare people, I could have mentioned that viruses were lurking in every chess program and their personal computers would self-destruct the very first time they loaded the chess software into their machines. Luckily that's not true either, but it's a great example of black humor.

I think it is safe to say the jury is not in on the negative effects (if any) of monitor radiation. Perhaps your classification of my remarks as "baseless" was a bit on the harsh side, and the phrase "scare tactics to sell chess computers" is indeed baseless. Our

philosophy here at I.C.D. has always been to give the potential customers all of the available data and allow him/her to make an educated decision. If that decision is to purchase software instead of a stand-alone unit, then that is perfectly acceptable to us because we will have a happy customer for life. Maybe that is what has kept us in business for 14 years.

So, there you go. I apologize for any panic that I may have created by my last article and your comments are well taken. However, no matter how popular Computer Chess Reports gets, I do not think that my articles will affect I.B.M. or the world economy very much. Boy, do I wish I could!!

## Public Chess Reports

By The Staff

There is one glaring similarity between Computer Chess Reports and Public Television. Every once in a while we need to interrupt our programming to ask for money. Like your local not-for-profit T.V. station, CCR makes no profit and, in fact, consistently shows a loss. Breaking even is sort of, as stated in The Man of La Mancha, the "Impossible Dream".

It is here where you, our readers, can help us to continue to bring to you the latest information from around the world as it pertains to computer chess. Of course, the obvious method of achieving this goal is to convince as many of you as possible to re-subscribe to the Reports. We kind of chuckle every time we tell someone that the last issue of the 1991 Reports is coming out in March of 1992, but as our faithful readers know, our intentions are good, but sometimes the lack of available information or the desire to include the very latest news pushes deadline back by months. However, please note that we have never shorted our readers; every issue promised has been delivered, albeit sometimes in a tardy fashion (but we are working on that).

The other method of assisting us in keeping this magazine afloat is to ask for donations. We do this because the yearly subscription rate does not pay the bills. The reason the subscription rate is so low is because we want to attract the largest possible readership and we are succeeding in that goal but, ironically, the more readers we have, the more money we lose. It's like the proverbial shop owner who is asked how he can stay in business with prices so low that he loses money on every sale, and he answers, "Don't be silly, I make it up in volume!"

If the choice is between donating money to CCR or giving it to Cancer, AIDS, Heart Disease, or the Homeless, please open your hearts to those worthwhile charities and we will be more than happy to accept your subscription. But if you give to all of these causes and have some room left over in your heart and wallet for a quality enthusiast's magazine, we welcome your donations - small or big. If you choose, you may mail in a check or money order to CCD c/o ICD, 21 Walt Whitman Road, Huntington Station, NY 11746 or, when you re-new your subscription by

phone, please indicate if you choose to donate and how much.

Nevertheless, whether you choose to re-subscribe or not, and whether you choose to donate to our goal of making this a bigger and better magazine, we hope that you have enjoyed reading the Computer Chess Reports.

## Remember When

Those of us who have followed the chess computer industry since the beginning have been privy to some truly strange product. How many of you recall the Novag Robot Adversary, a huge computer that looked more like a high priced stereo than a chess machine. The control buttons were hidden behind a brushed chrome door, and standing high above the machine was a robotic arm.

You see, the unit would move its pieces by having this Terminator 2-type mechanical arm swoop down upon the piece and move it to the proper brushed silver or black square. What an attention-getter. It never failed to draw a crowd, and the response when it was put into the "Emotions" function was just incredible.

Should the Robot lose a game, it would start making all sorts of electrical noises, and would then proceed to swing the arm wildly around knocking all the pieces over. One always suspected that if frustrated too many times by losing the arm would go after the human opponent instead of the pieces. However, we never received any police reports of customers being killed by their chess computer!

About the same time, Novag introduced the Savant. Once again a beautifully designed machine which had the most unique input/output. The pieces were actually LCD displays (not bad representations at that) and quite large. The movement of the pieces were accomplished by the human's simply pressing on the picture of the piece and then pressing on the square to which the piece was being moved. How delightful! Unfortunately the defect rate for both of these machines was far above what it should have been, and there did not seem to be anyone around who knew how to fix them.

It was Boris from Applied Concepts that was the first chess computer to exhibit a personality. It had a screen which not only flashed the moves being made but also

### Credits and stuff:

Send us your letters, writing, comments, notes and ideas to: CCR Bits & Pieces, c/o ICD, 21 Walt Whitman Rd., Huntington Station, NY 11746  
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made comments such as, "Please don't blow smoke in my face" and "Please keep the talking down; I can't concentrate!" Perhaps the comments distracted the human so that he did not realize just how terrible Boris' chess was.

Fidelity, not be undone, introduced Voice Challenger. It didn't have much of a personality (just the opposite of their new Chesster), but it sure caused a commotion. Imagine, a machine that could talk to you - remember that was back in the late 1970's. Naturally, it was only a matter of time before the consumer realized that he didn't really want or need a chess opponent which spoke. After all, if that's what he wanted, he could play a bonafide human!

The industry has seen its share of glorious and disastrous computer chess playing machines many of which cannot be covered in the allotted space, but future issues shall perhaps delve further into them and we request that you write in to us if you have your own story about chess computers. We welcome your letters.

## Bargain Basement

ICD's retail store, Your Move Computers, has a basement full of old goodies that they would like to get rid of. Here's a list of what we came across, and please note these are all sold AS IS 1 week return (credit only) privilege, and no credit card orders will be accepted - check or Money Orders only. Obviously, **supplies are limited** - first come, first served. AC and shipping not included in prices. Call ICD 1(800)645-4710 for Shipping costs and availability.

**Fidelity Mach III Designers** \$175.00 each  
ICD store demo units. Complete. Full warranty.

**Fidelity Travel Masters** \$59.00 each  
Demo units/evaluation units. Complete w/warranty.

**Novag Quattro** \$45.00  
Works fine, no dress box

**Morphy Encore** \$40.00  
No box, no manual, no AC

**Fidelity Gambit** \$45.00  
Complete.

**Broken Elite A/S Boards** \$50.00 each  
Several broken boards. They're full sized wooden units, and possibly fixable.

**Fidelity Elite PC Interfaces** \$30.00 each  
Works with any Elite with interface capability

**SciSys Sea Battle** \$15.00 each  
Electronic battleship. Complete. Not chess, but a great toy.

**Mephisto 68030 Vancouver 36MHz** \$6500.00  
Demo unit. Perfect condition.

If you have some old computers you would like to sell, send a forty word ad and check for \$5.00 made out to CCD inc and send it to CCR Pawn Shop, 21 Walt Whitman Rd., Huntington Station, NY 11746.

# THE END.

That's right, this is the LAST ISSUE of the 1991 subscription block. No more, it's all over, all done, finished, completed, terminated, discontinued, closed, concluded, finalized. If you wish to receive Computer Chess Reports in 1992, you'll have to resubscribe. If you would like to receive the 1992 issues, please fill out this form or order through ICD at 1(800)645-4710 with major credit card.

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Computer Chess Reports generates no profit for any of those involved; it is a labor of love. The minimal price you pay to receive an issue often barely covers the costs of printing and mailing, not to mention the few hundred man-hours required to assemble each issue. Donations to improve the magazine are always welcome in our office, as they help make ends meet. If you would like to see Computer Chess Reports continue and improve in quantity and quality, please include a donation of any size. We are not a large organization, and the Reports is a secondary job for every one of us - this is truly a reader supported project. We thank you for your collective support.

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