MICRO CHESS

A MATCH FOR BRUTE FORCE

Tony Harrington tells us why a chess computer company caused a scandal...

The German firm of Hegener and Glaser started out as an importer of electrical components. Its clients included firms such as Siemens, Braun and Telefunken.

All this might seem a long way from microcomputer chess, but as their company prospered, Manfred Hegener and his partner began looking around for new fields to develop. And here coincidence — which so often seems to be responsible for bringing entrepreneurs into the microcomputer chess market — took a hand.

One of the projects Hegener and Glaser opted for was to produce a new telephone. As part of the contract for the telephone project, the firm acquired the services of two programmers, Thomas Nitsche and Elmar Henne, whose hobby — you guessed it — was writing chess programs on mainframe computers. At this time (around the beginning of 1980) the first successful microchess programs were on the market.

After talking to Nitsche, Hegener and Glaser decided that there was a definite demand for a well designed chess computer. They found that their enthusiasm for pioneering in this market was not shared by the banks, but their electronics business provided them with sufficient investment capital.

By Autumn 1980 they had designed and produced 3000 units of the Mephisto portable chess computer. Within a month, orders had reached 18,000 and the production facilities had to be expanded.

In January 1982, about eighteen months after the production of the first Mephisto, the firm produced an updated version of the program, called the Mephisto II. By the end of last year, the firm reckons that total sales had reached 25,000, with 6% of these units being sold in the UK, through Competence, run by Terry Knight. A full-sized, well-finished wooden sensory board and wooden pieces were then produced as an add-on to the portable set.

The details that follow were provided by German amateur chess champion Ossi Weiner who has worked as a consultant for the firm since 1981.

By profession, Weiner is an architect, but he has played in the German Bundes League, the top German chess league, for a number of years. He has an estimated ELO rating of 2300 and has been champion of Munich three times. In 1980 together with two others he wrote a book about chess computers. This started him off as a chess journalist and a number of articles in magazines and newspapers followed.

He gave up his profession to become more involved with chess programs and artificial intelligence. In the first instance, this took the form of setting up his own chess shop specializing in selling microcomputer chess machines. By 1980 chess computers had become very popular in Germany and the shop did well.

He decided that Hegener and Glaser had a machine with a great future in the Mephisto. He started to buy more and more of Hegener and Glaser's stock, and in the end was buying a significant proportion of the whole stock.

'Hegener came to see me and said, you are so good at selling chess computers. Don't waste your time running this shop; come and join us — so I did,' he said modestly.

Since then he has been an integral part of the Hegener and Glaser team, along with the programmer Thomas Nitsche.

From Weiner I learned that work is now well advanced on the Mephisto III, a machine which the firm hopes will break the ELO 2000 rating barrier.

According to Weiner, the Mephisto III program will continue on the same lines as the Mephisto II. He explained that the Mephisto programs are different from the majority of other chess programs on the market, in being more selective. They don't specialise in brute force calculations.

Brute force in chess programming has a very specific meaning. It means that the program looks at every possible move, no matter how idiotic or unlikely. The Mephisto program aims for a pre-selective, intelligent search, and in-depth analysis. For example, at tournament level, the Mephisto II does a four/four balanced search. In other words, it makes four brute force moves, followed by four selective moves, in its search sequence. We are talking here about an eight ply searching sequence, or four full moves for white and black.

If there are checks or forced captures involved, of course, the selective search can go deeper, even on the Mephisto II.

According to Weiner, the Mephisto II has won a number of games by playing strategically better than other chess computers, though the other side of this coin is that it has also lost tactical games to machines whose concentration on brute force paid a better tactical dividend in positions with tactical complexities.

With the Mephisto III, the brute force component of the search will be reduced to the initial two ply. From there the selective mechanism will take over up to a depth of thirteen moves on the lines.

'This posed us a problem,' Weiner said. 'How does the machine decide which is a main line?' This, he pointed out, is the creative part about designing and writing a chess program, that is, sorting out how the chess program will find out where to search and where not to search.

The solution, Weiner said, was to have the machine distinguish between 'quiet' and 'wild' positions, and to approach the two types of position differently. Quiet positions are those where there are no immediate tactical possibilities. Wild positions, as the name suggests, are positions where a lot is going on, where pieces can be captured and attacked or checks given.

Traditionally, computers play quiet positions very badly. Machines which specialise in brute force calculation of tactical positions find themselves with no obvious move to make. What happens, as a glance at computer games listings will show, is that the machines act aimlessly. They shuffle rooks from square to square or march their castled kings from side to side. The result is like suspended animation until some human operator puts them out of their misery, or they exhaust the fifty move rule.

'What has to happen here', Weiner said, 'is that the computer attack has to have a way of recognising that this is a special type of position. It is a time not for tactics but for planning ahead. It has to devise a strategy for the game'.

Writing the algorithm which will give the machine such a capability is no easy matter. According to Weiner, the algorithm has to specify such matters as how to evaluate the relative strengths of king and queen side flanking movements, pawn structures and so forth. The result, in the Mephisto's ~~and Roman III's~~ case is that it now plays a very 'intuitive' game.

'The nice thing about it is that it can surprise you with its moves. Normally, if you understand chess computers you can lay money on the moves they will make and win every time. But this machine surprises even Thomas Nitsche,' he said.

The other side of the coin is that in playing more intuitively the machine has become more 'humanlike'. It will play brilliantly one day and have a totally wrong intuition the next day.

On the lower levels, there is no real improvement — perhaps even a slight weakening — by contrast with the Mephisto II ~~and Roman II~~. But on the higher levels, particularly tournament level, where 19 ply searches are possible, it will play a much stronger game, Weiner says.

At the moment the programme is running on a large computer and has not yet been translated into microprocessor assembler code. It has taken and is taking a long time to de-bug, mainly because of this intuitive approach. But Weiner hopes that it will be ready for the German micro-computer tournament in Hamburg in August.

Mephisto with full-sized board

In addition to its success with the Mephisto, Hegener and Glaser scored a notable victory recently in the matter of the TV World Cup put on jointly by the BBC and German television.

Those of our readers who watched that tournament, screened every Sunday on BBC2, would have seen the Mephisto legend flash up in red on the screen from time to time. A rather complicated tale lies behind this. For while it passed relatively unnoticed in the UK, in Germany that Mephisto sign popping up on the TV screens caused more than just raised eyebrows.

Der Spiegel, the German equivalent of *Time* magazine, devoted a full page to telling its readers what an outrage this was. Advertising is unheard of on German TV. Yet here in the most blatant form was the Mephisto legend advertising, albeit indirectly, a product from Hegener and Glaser.

It came about like this. Helmut Phlegner, the German grand master, belongs to the same chess club as Ossi Weiner. Phlegner was to do the commentary for the World Cup for German television. He told Weiner that the current system for moving the pieces on to the display board was unsatisfactory and far too complicated.

It took a lot of time, and needed two cameras. This made it really expensive as well as difficult. Phlegner mentioned to Weiner that Scisys had been trying to produce a system to solve this problem but that it hadn't succeeded yet.

Weiner told Hegener and Glaser about the problem and they were interested. BBC representatives came to Munich and met Hegener and Glaser to discuss a possible development. 'We told them it was an expensive business developing a project like this,' Weiner said. 'The TV people said that they didn't mind, it costs thousands of pounds to film in any case. Go ahead and develop it,' they told us.

'We intended to develop such a system in any case. And with considerable work and effort we did come up with one.' The finished system does away with the need for cameras and with long hours of studio rehearsals, since Hegener and Glaser had the logical idea of using the chess board as if it were a terminal to input information directly to the TV screen.

The TV screen displays a chess board and simply by moving a real piece on the real demonstration board it makes the same piece move on the television screen. Additional controls were built into the system to enable the demonstrator to highlight any square that he chose.

It was obvious that the system would save masses of TV time since no camera crews were needed at the demonstration session. But the system itself was not cheap to build. It was necessary to use a computer to interface with the display board and considerable processing power and storage was needed to drive the extremely high resolution graphics display.

(According to Weiner the interface system designed by Hegener and Glaser tells each of the million dots on the TV screen which colour to take on, at any particular moment.)

When the system was complete Hegener and Glaser took it to the TV people and here is where the problems began. They had taken it upon themselves to design a system without signing a contract. This might sound daft, but it was strictly a practical decision. As Weiner pointed out, nobody they spoke to had the authority to give them the go-ahead. 'Everyone we spoke to at the BBC or at German television thought that it was a wonderful idea but none of them could authorise money to fund the development.'

In the end the development work took four months and cost Hegener and Glaser between one hundred thousand and two hundred thousand Deutschmarks. During all this time they hadn't seen a penny on their investments. 'We weren't looking for a fortune, but we wanted some contract that would give us at least our demonstration costs back,' Weiner said.

The television people said that it was impossible, and suggested that they should be allowed to use the device during the broadcasting of the tournament, on spec as it were. 'They told us, if it's good, then we'll pay you,' Weiner said.

Obviously, that wasn't a particulary satisfying arrangement. In the end, being practical men and women, an amicable arrangement was worked out. It was agreed that Hegener and Glaser should be paid 25,000 Deutschmarks and to compensate them for their development costs the Mephisto sign would be flashed up on the screen now and then.

This somewhat unorthodox agreement

satisfied both the TV people and Hegener and Glaser, who were alive to the publicity value of having their name broadcast to a selected interested audience, who, by the simple act of watching the chess coverage on TV, had declared themselves potential buyers of microcomputer chess sets.

None of this was to the liking of *Der Spiegel* which felt that some underhand activity must have taken place and which devoted one full page to telling its readers what a scandal this was. Weiner was most aggrieved when he mentioned this, '*Der Spiegel* made a great thing out of it. All the facts were open to the public to know from the start. We answered all their questions, fully and frankly and the net result was written up as though it was brilliant investigative journalism.' But Weiner reckoned that even the publicity provided by *Der Spiegel's* write-up did Hegener and Glaser a reasonable amount of good. 'People said Hegener and Glaser must be pretty smart if they can beat the advertising rules like this,' he said.

Just how smart they are, we will be able to judge for ourselves when Mephisto III comes onto the market later this year.

Games section

White: Mephisto II ; Black: Fidelity Elite
Sicilian Defence: Notes by David Levy

1	e2-e4	c7-c5
2	Nb1-c3	Nb8-c6
3	f2-f4	e7-e6
4	Ng1-f3	Ng8-f6?!

(More usual is 4...g7-g6, or 4...Ng8-e7 followed by ...d7-d5.)

5	e4-e5	Nf6-d5
6	Nc3xd5	e6xd5
7	Bf1-e2	c5-c4?!

(More to the point would be 7...d7-d6, to undouble the d-pawns.)

8	d2-d3?	

(Better 8 0-0.)

8	...	c4xd3
9	Be2xd3	Bf8-c5
10	Bd3-e2	Nc6-e7
11	c2-c4?!	

(White is already embarrassed by the fact that it cannot castle K-side, because of the black bishop on c5, and now compounds this by voluntarily undoubling Black's pawns.)

11	...	d5xc4
12	Be2xc4	Qd8-b6

For travellers . . .

SOUND ADVICE

where CP/M is loaded, diagrams on how to use STAT, PIP, SUBMIT and so on, finishing up with a glossary of terms.

ICL's courses are rather formal although they are comprehensive and would probably be better suited to the training of larger numbers of employees within a big company.

A choice which may well be preferable for individual use — either in the home or small business — would be the National Computing Centre's Business Basic course. This is definitely better than ICL's courses if you want an introduction to the principles of the computer.

It consists of one computer, a book to go with it, a book of 'application studies' and their answers, and two copies of a quick reference card which can be used to tailor the course to your own system.

A computer is really essential if you want to derive the full benefit of this course, but that is a logical requirement only if you want to learn to program. It would still teach a beginner a good deal about micros and the Basic language if they had no system.

The cassette is dependent on the book although the latter would almost suffice on its own. The tape provides a sort of friendly commentary and much of its material is contained verbatim within the book. Regular example programs are set out and con-sidered as each part of Basic is dealt with.

Every so often you stop the tape — noting the counter number in a box provided — and read some of the book or do an exercise. A lot of pictures are provided — one of the first, incidentally, shows some-one inserting a disk into a drive the wrong way — which make the book look helpful and amusing to use.

Generally I would imagine this is a fun course to do and it does go into plenty of depth — slowly. It's much more designed for the confused or simply completely inno-cent computer user than the more advanced ICL courses. In actuality you could learn more from ICL's product but for some individuals it might take a little longer.

The NCC only produce the one course — that outlined above. While ICL estimates it has sold a total of approximately 3,500 copies of various courses from its series, the NCC's Jill Baker says Business Basic is 'very popular' and estimates that about 20 copies are sold per month. Many of these are apparently sold to home computer users.

Although course content, accuracy and approach are all very important, with this method it is the pupil who determines the probability of success. Self-discipline is the order of the day.

Audio courses, though, are an easier learning option than reading a book. It's a simpler matter to sit and listen to a voice telling you something than to pore over a book to find out that something yourself. In addition, although you may think most of what you've heard has gone in one ear and out through the other, it's surprising how much you can pick up without realising it.

Sound Training, ICL and the National Computing Centre are the only organisa-tions I can discover who sell audio courses relating to computers. There may be some others. If there are, they're not making very much noise about themselves. There will probably be more springing up in future as new software appears and more companies decide to jump onto the micro band-wagon.

Meanwhile if you feel this method of learning is for you (or your employees), the National Computing Centre's Micro-systems Centre supplies Business Basic — tel 01-353 0013 — and ICL courses can be discussed by contacting Andy Street on Windsor 68181 ext 179.

Prices

	exclusive of VAT
Business Basic (inc VAT)	£19.50
ICL Pascal	£105
ICL CIS Cobol	£130
ICL Microsoft Basic	£70
ICL CP/M 2.2	£50
ICL Wordstar	£50

END

MICRO CHESS

(Black has a clear advantage because of its domination of the a7-g1 diagonal, preventing White from castling.)

13	Qd1-c2	0-0
14	Nf3-g5	Ne7-g6

(Possibly more natural is 14...g7-g6, followed by ...Ne7-f5 and eventually ...Nf5-d4 or ...Nf5-e3, as appropriate.)

| 15 | a2-a4 | Bc5-e7? |

(A serious retrograde step. 15...Bc5-e3! would be very strong, for example 16 g2-g3 d7-d5!, and if 17 Bc4xd5 Qb6-a5+. Another possibility is the immediate 15...Bc5-b4+, keeping the white king stranded in the centre and saving a tempo.)

| 16 | a4-a5 | Be7-b4+ |
| 17 | Ke1-f1 | |

(The first critical position.)

| 17 | ... | Bb4xa5?! |

(Dangerous, because after White's next move Black's defence needs very accurate handling. I would have been tempted to ignore the a5 pawn, which is vulnerable in the long term in any case, and concentrate on attempting to take advantage of the exposed situation of the white king. But computer programs are terrible material-ists, and the temptation to grab a pawn is normally too much for them to resist.)

| 18 | h2-h4! | |

(The best chance. White is a pawn down and its king is precariously placed, so the only hope is to take advantage of the pressure on f7 (knight and bishop) and h7 (knight and queen). Now we have the second critical position.)

| 18 | ... | h7-h6?? |

(There seems little wrong with 18...Qb6-b4! (threatening mate on e1) 19 Bc1-e3 d7-d5! 20 e5xd6 (or 20 Bc4d5 Bc8-d7, with threats of ...Bd7-b5+ and ...Ra8-c8) 20...Bc8-f5 21 Qc2xf5 Qb4xc4+ 22 Kf1-g1 Ba5-b6 23 Be3xb6 a7xb6, when Black still stands better. Of course, not many chess programs would examine this 11-ply sequence, but I would have thought that a number would reject 18...h7-h6 as being too weakening. The text allows White to turn the tables, a chance which Mephisto grabs with alacrity.)

| 19 | h4-h5! | Qb6-b4 |
| 20 | Bc1-e3 | d7-d5 |

(Now this try is too late.)

| 21 | h5xg6 | h6xg5 |

(Everything else is inadequate, eg: (a) 21...Bc8-f5 22 Bc4-d3 Bf5xd3+ 23 Qc2xd3 h6xg5 24 g6xf7+ Rf8xf7 25 Qd3-h7+ Kg8-f8 26 Qh7-h8+ Kf8-e7 27 Qh8xa8; or (b) 21...d5xc4 22 g6xf7+ Rf8xf7 23 Ng5xf7 Kg8xf7 24 Qc2-a4, with a decisive material advantage in each case.)

22	Bc4xd5	g5xf4
23	g6xf7+	Rf8xf7
24	Be3-c5	

(Threatening 25 Qc2-h7 mate.)

24	...	Qb4-b5+
25	Kf1-g1	Qb5xc5+
26	Qc2xc5	Ba5-b6

(Now all of Black's pieces are pinned: the f7 rook against its king on g8, the a7 pawn against the rook on a8, and soon the bishop on c8 against the king.)

27	Qc5xb6	a7xb6
28	Ra1xa8	g7-g5
29	R8xc8+	Kg8-g7
30	Rh1-h8	

(Threat 31 Rc8-g8 mate.)

30	...	Rf7-f8
31	Rc8xf8	Kg7-g6
32	Bd5-e6	b6-b5
33	Rf8-g8 mate.	

END