

A brighter future for Soviet computer chess?

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For two weeks in December, Misha Donskoy, principal author of the former world champion chess program KAISSA, hosted us during a visit to several artificial intelligence research centers in the USSR. Suspecting that many ICCA members may be interested in our observations, we present this report. Although technical discussions were the main purpose of our visit, we had many opportunities to see places of historical, social, religious and scientific interest. Several very delightful evenings were spent with our Soviet colleagues and their families.

We arrived in Moscow on December 7 and spent several days in technical talks at the Institute for System Studies with the KAISSA group - Donskoy, Vladimir Arlazarov, Georgi Adelson-Velsky, Alexander Bitman, and Alexander Ushkov. Bitman, a master level chess player, easily outplayed the Chess Sensory Challenger which we brought along with us for demonstration purposes. Adelson-Velsky, an extremely capable and animated scientist and a real pleasure to meet, generally led our technical discussions. His eyes seemed to glisten with enthusiasm when he spoke. Discussions centered around probabilistic analyses of various aspects of the minimax algorithm and parallel search of chess trees. Our first joint seminar on alpha-beta analysis and the impact of computer technology was attended by about thirty people, including Leonid Kantorovich, winner of the 1975 Nobel Prize in Economics for his work on linear programming.

(continued on page 5)



Part of the KAISSA group:
Vladimir Arlazarov
Alexander Ushkov
Misha Donskoy



George Adelson-Velsky explaining
his work on the analysis of the
minimax algorithm.

A brighter future for Soviet computer chess? (continued from page 4)

The afternoon of the 10th was spent with Mikhail Botvinnik and his assistants, Boris Stilman and Sasha Resnitsky. Botvinnik appeared in excellent health and he looked not one day older than he did three years ago when he was in Canada. He told us of Resnitsky's recent work which involves applying heuristic search techniques, similar to those in PIONEER, to a maintenance scheduling problem. Botvinnik indicated that the new algorithm performs 50% better than the old one which is based on conventional mathematical programming methods.

On Thursday, December 11, we (Tony, Monty, Misha, as well as Monty's wife, Barbara, and 15-month old daughter, Amy, who were accompanying us as tourists) flew to Erevan, capital of Soviet Armenia, on a flight that was delayed six hours for reasons that remain unexplained. We spent three days in Erevan as guests of the Computing Center of the Armenian Academy of Science, where our host was Edik Pogossian. He is interested in adaptive systems and is involved in extending his ideas to chess, a most difficult project. Our second seminar on the 12th attracted an enthusiastic audience, and our display of the CSC was a big hit. We saw no evidence of any commercial products based on microcomputers while we were in the USSR.

(continued on page 6)



Edik Pogossian talking with Misha Donskoy.



The traveling group in Erevan: Tony Marsland, Misha Donskoy, Monroe Newborn, Barbara Newborn, Amy Newborn (in front)

A brighter future for Soviet computer chess? (continued from page 5)

After spending Saturday catching up on Armenian history through visits to ancient monuments, we flew to Kiev on a flight which took us high over the Caucasus mountains. When we left Erevan, 17,000 ft. high Mt. Ararat in neighboring Turkey dominated the horizon - legend has it that Noah's ark came to rest somewhere high on its sides. Our visit to the Institute of Cybernetics in Kiev, in contrast to the informality we encountered in Erevan and Moscow, followed a more customary "strictly business" pattern, possibly because computer chess is not of primary interest to the staff there.

On the 17th, the day after our return to Moscow, we gave our third seminar at the Institute of Control Science where the KAISSA team used to work. This talk was the highlight of our technical visit. About 150 people from the Moscow artificial intelligence community attended. Monty's talk was first and covered recent activities in computer chess in North America; Tony followed with a survey of parallel minimax search. Misha Donskoy provided simultaneous translation, doing an outstanding job as he had done twice before. Much discussion followed both talks, including comments by Botvinnik and Adelson-Velsky. Near the end of the session, it was announced that Botvinnik was being invited to serve on a national committee which oversees the direction of research in artificial intelligence. This seems to be a move that gives increased recognition to the importance of computer chess and that may result in greater support for the KAISSA and PIONEER programming efforts. Work on KAISSA has been proceeding slowly, in part because of the group's involvement in the design of a database system, and in part because of the difficulty in obtaining sufficient computer time. The PIONEER group cannot make progress, chiefly because no computers are currently available, as has been the case for several months. If increased support is forthcoming, the friendly rivalry that exists between these two groups with such different philosophies may have very positive effects. We have seen benefits from such competition in North America where great advances have been made during the last decade. Following our seminar, Botvinnik hosted us to a memorable dinner at the well-known Sofia Restaurant.

(continued on page 7)



After dinner at the Sofia restaurant: Sasha Resnitsky, Boris Stilman, Misha Donskoy, Mikhail Botvinnik, Monroe Newborn, Amy Newborn.

A brighter future for Soviet computer chess? (continued from page 6)

For that evening we invited Arik Futer to our hotel for tea, and later he took us for a stroll along Gorky Street to Red Square, along with all the other visitors. It was Futer's KRP vs KR endgame program which relieved David Levy of 12 bottles of Scotch a few years ago when Soviet Grandmaster Yuri Averbakh confirmed that the program played perfectly on a set of positions chosen by David. Just before we left Moscow, Futer heard that his dissertation had finally been accepted, and he was delighted. Discussions on the 18th and 19th at Donskoy's Institute and a brief visit to the University of Moscow concluded our technical agenda.

Those of you who read Russian may be interested in three books produced during the last few years. Botvinnik surveys his career since 1967 both as player and creator of PIONEER in From Chessplayer to Computer (Physical Culture and Sport Publishing House, 1979), while On Solutions of Inexact Search Problems (Soviet Radio Publishing House, 1979) contains his most recent computer chess work as well as articles by his co-workers. In Programming of Games (Science Publishing House, 1978), Adelson-Velsky, Arlazarov, and Donskoy present ideas that went into KAISSA, including Donskoy's method of analogies and Adelson-Velsky's work on probability theory. One hopes that all three books will eventually appear in English.

Thanks to Misha's graciousness as our host, guide, interpreter, and at times, even baby carrier, everything went smoothly. We were always warmly received, offered a wide variety of delicious Russian dishes, and given many opportunities to become connoisseurs of vodka and smooth Armenian cognac. It was particularly good to meet Soviet scientists with interests so near ours. We hope that opportunities arise before very long for us to be their hosts.

January 23, 1981