A brighter future for Soviet computer chess?

Tony Marsland, University of Alberta

Monty Newborn, McGill University

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 7th 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.

Insert photos ①, ②, ③

The afternoon of the tenth 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 fifty per cent 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 fifteen 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.

Insert
photo ④ ⟶

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, seventeen thousand foot 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 dis-
cussion 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 recog-
nition 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 pro-
ceeding 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.

Insert
photo ⑤ →

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 twelve 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.

Insert →
photo 6

January 23, 1981

(1) Vladimir Arlazarov resting during our discussions.
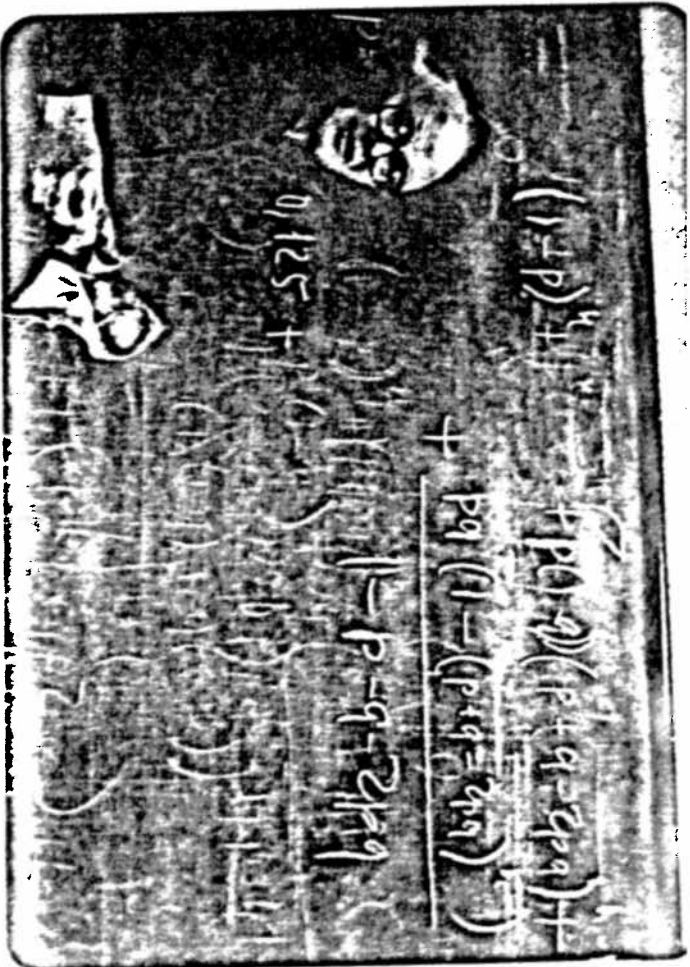
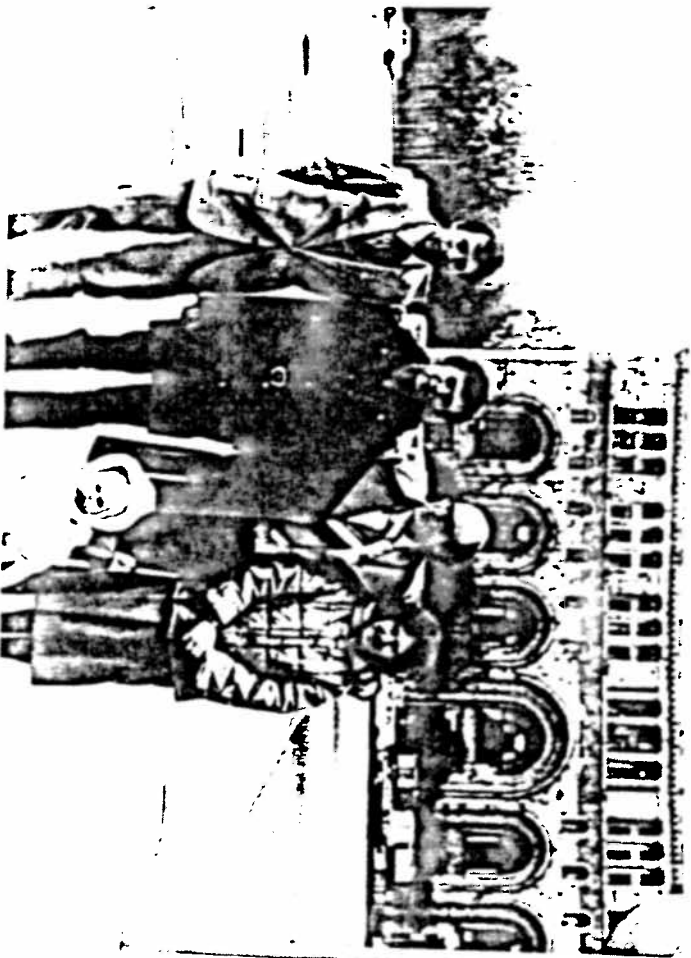(2) Georgi Adelson-Velsky explaining his work on the analysis of the minimax algorithm.

(3) Part of the KAISSA group: Vladimir Arlazarov, Alexander Ushkov,

④ Edik Pogossian talking with Misha Donskoy.

⑤ After dinner at the Sofia restaurant: Sasha Resnitsky, Boris Stilman, Misha Donskoy, Mikhail Botvinnik, Monroe Newborn, Amy Newborn.

⑥ The traveling group in Erevan: Tony Marsland, Misha Donskoy, Monroe Newborn, Amy Newborn, Barbara Newborn.