

A Conversation with Vlad Sokhan

This is the transcript of a recorded conversation between Vlad Sokhan (VS, pictured right) and me, Paul Durham (PJD), which took place at Daresbury on 8th October 2019. The context is that Bill Smith, Martyn Guest, Ilian Todorov and I were writing an article on “Molecular Simulation in the CCPs”, to be ready by the 40th anniversary of CCP5 in 2020. In the summer of 2019, I had given an informal talk on this subject to colleagues in the Scientific Computing Department, after which VS had made some very interesting brief comments on the impact of the CCP5 Newsletter on his early days as a researcher in Kiev, Ukraine. It seemed worthwhile to ask VS more about this – hence this “interview”. I recorded it on my iPhone, and then found a free app that claimed to produce transcripts. This worked reasonably well¹ – certainly good enough to use as a basis for editing – and from it Vlad and I produced as close to a verbatim text as we could. After the transcript itself, I attach an email Vlad sent me later on the day of our conversation. This gives more details on his interactions with CCP5 and other points mentioned in our talk.



Paul Durham, Daresbury, 17 October 2019

PJD

Okay, we're recording now. So this is me and Vlad, on the eighth of October 2019. Talking about CCP5 and the Ukraine and all of that. Okay, Vlad?

VS

Yes.

I had a couple of questions just to kick this off, you may want to start somewhere else. But just to orient this whole discussion those early days for you in the Ukraine, when and where? What time are we talking about? Where were you working, and so on?

Of course, mid 80s, so it is just the beginning of perestroika. And there was a first swallow from the West coming. That was Keith Gubbins from Cornell University.

Where were you based?

I, actually I graduated from Kiev State University, in theoretical physics, and then I, I was conscripted into Soviet Army. So I spent as a platoon commander in radio-location troops (part of the Air Defence forces) for two years. And after that, I joined staff and Institute for Theoretical Physics. Now it is Bogoliubov Institute for Theoretical Physics in Kiev. He created this Institute in 1966. And during my time Davydov² was the head of the Institute, but Bogoliubov frequently visited from Moscow. And that was mid 80s. I was working on my PhD thesis. And then there was a strange letter. Well, I should probably say a couple of sentences that I wanted to say before. In Soviet Union, there were very few selected institutions that have contact

¹ Given Vlad's delightful accent and Russian terms and names, it's no surprise that my transcript app struggled sometimes. "Pavel Nikolaevich Vorontsov-Velyaminov" was rendered as "final nickel Irish fans of Philomena"!

² https://en.wikipedia.org/wiki/Alexander_Davydov

with Western world directly. So we got special 'request cards' that we could fill and ask for reprints from Western world, because usually a communication with Western world should come through KGB. And this was a very ...

Really?

Yes, really. And that was very convenient. So this was some printed, typographically printed cards, we just fill in, type, and there was couple of lines where you can put something personal, because it was very impolite just to send a request to famous scientists and asking this, but it was very difficult to explain that you're really very grateful because you know that it is perlustrated³ by KGB.

Oh boy!

Very strange methods of promoting your science, preprints. It is not very popular now, because we have arXiv, and this type of thing, but before internet it was the only, it was typographically printed, probably 300 to 400 copies, and then distributed between institutions. So that was the way how to communicate, how to promote, how to get fresh ideas.

I used to like that. When I was younger, you'd write a paper or preprint, send it out. People would always send you these little postcards asking for reprints. It was nice to receive that. It's all gone now.

Yeah. And the CCP newsletter came, somehow, in this way. So I consider this as a continuation of preprints or whatever. And it was just a normal way of communicating science. But back in 1987, I believe, Keith Gubbins went to Soviet Union, and he wanted to visit Kiev - he knew about us, somehow. But KGB for one didn't let him. So he couldn't get clearance to visit Kiev. And he sent a letter asking if anyone could come from our group to talk to him. And I was sent to do this. I went to Kharkiv, where he met scientists, there was Liudmila Pozhar⁴ who later worked with Keith in the United States. And I visited him.

I mean, Krakow at that time, Poland at that time, must have been under the same kind of restrictions, no?

Kharkiv used to be a capital of socialist Ukraine after the revolution after the Soviet started, they made Kharkiv capital. And that's city where Landau worked when he was expelled from Moscow and therefore, there was a very good school of Landau there.

Okay, so, earlier on, I think I misheard you actually, because you talked about Kiev and I thought you said Krakow, but you meant Kharkiv. So, Ukrainian. Yeah. That's why I made that inexplicably remark about Poland!

Good, good. Okay. And for some reason, Keith was admitted to Kharkiv, he visited Moscow, he visited Lviv, but not Kiev. I know that KGB archives in Ukraine are made open now, so everyone could come and for a nominal fee, get access to the documents in principle and can go and ask to see file of Keith Gubbins. But it would be possible only with Keith's consent, of course⁵. I saw him last year at the conference in Czech Republic.

I don't know him personally, but I know the name after writing our article because he is involved in many meetings and activities of CCP5.

He is British educated, from King's College London. He worked all his life in USA. He did his PhD you know, with John Rowlinson, yeah. I believe that Gubbins was either PhD student or postdoc of John Rowlinson.

³ This great word "perlustrate", used by Vlad, was new to me. It means to scrutinise, to inspect thoroughly.

⁴ https://www.researchgate.net/profile/Liudmila_Pozhar

⁵ Later: Vlad recalls that the request for the visit was made shortly after the Chernobyl accident, which might explain the refusal.

And then everything in liquid state of confined liquids and simulation passed through John Rowlinson and Keith Gubbins.

Dominic Tildesley was a PhD⁶ student of Rowlinson.

Yes, to return it back to 1987, I was given a book of my supervisor to show and I gave information about soviet research groups that I remembered at that point. And that was it. But Keith Gubbins promised me to send [the CCP5 Newsletter]. He mentioned, I believe, that he was on CCP5 visit programme, incoming visitors and outgoing visitors. And he was one of these outgoing [visitors] who was paid by CCP5 to visit Soviet Union. So he mentioned this [CCP5 Newsletter] and I was extremely interested to get this and after that, I don't remember how long it took, but we start receiving regularly CCP5 newsletters.

You didn't have to ask for them.

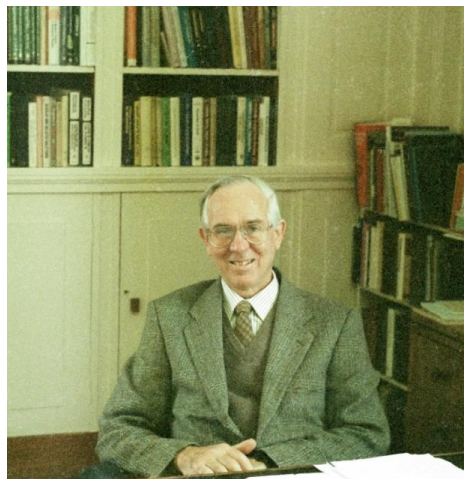
It just came.

You didn't have to smuggle them in or anything like that?

No, no, no, everything came through mail. It was delivered. It was not Stalinist time!

No, no, indeed!

And then, supposedly, next year, I was about to complete, to finish my (PhD) exams. My supervisor called me and said, there is a person from United Kingdom coming, Professor Rowlinson, and he wants to talk to you, probably because you were last year in Kharkiv. He was admitted to Kiev, visited Moscow, Leningrad (at the time it was Leningrad). I'm not sure about Lviv and Odessa but he visited Kiev. So I was given director's black limousine, to rail station and meet him. And I know that he's coming from Moscow, but I was given only the number of train and this sleeper train had probably about 300-400 people. And I don't know which one is John Rowlinson. Yeah. So I went to the platform, and then waited and waited and people were pouring from train. And I was really panicking. Because I was given a big responsibility by the director of my Institute. And I couldn't fulfil it. And suddenly, I saw a person who was like, from different world, in tweed jacket, and he was absolutely straight, not bending. And I come to him and ask whether he is Professor Rowlinson, and he said yes, and I was relieved because it was him, and then we travelled to the Institute and he visited. I don't know whether he wrote a CCP5 report on this or not. But years after I was always asking him for any opportunity to come to work. Here's VS's photograph of John Rowlinson in his office in the Physical Chemistry Laboratory, Oxford:



And then in 1990, I got an option to go to Germany, there is a German academic exchange service, DAAD (Deutscher Akademischer Austauschdienst). So I went to Konstanz, on Lake Konstanz near the Swiss border, with this idea I had and working with Professor Weyrich⁷. And then that was a start. Quite honestly, when I saw lifestyle in the West, that was completely different from what we were told by our propaganda, and I just felt completely relaxed and that nobody's watching me, no KGB walking around you asking. That's what I saw when I was there.

⁶ DPhil in Oxford, of course!

⁷ https://de.wikipedia.org/wiki/Wolf_Weyrich

Now we have Google and Facebook watching us

And it was so, so different that I actually went to foreign secretary in the university and asked whether I could bring my family there. Yeah. She said, Yes, of course. And that was absolutely normal for her.

So, when we're talking about this general question of scientific contact between West and East, yeah, if that's the right way to put it, were there any kind of more structured contacts? Everything you've told me is, is to do with your personal network, and that's normally how science operates, isn't it? But I remember from those times, in my field, band theory, electronic structure of solids, and all of that, there was a meeting in Gaussig, outside Dresden, in East Germany, every year, there was a guy, I can't remember his name, but he used to organise this meeting. It was explicitly scientists from the communist bloc, and from the west, including America. What was his name? I can see his face! Old age it'll come back to me⁸ This is the thing, he was famous for organising this meeting. And he would go around, he had a certain amount of freedom to travel in the West, and presumably must have been a party member, but he did a good job with his meeting. And he used to come around, came here trying to invite people to this meeting. And every year, he would say, oh, Abrikosov is coming from Russia, all these famous Russian scientists, Gorkov And sometimes they did. It was a sort of established regular event every year. Was there anything like that in molecular simulation?

Well, at least I couldn't travel to the west. Until 1990.

Right, nobody was allowed to travel to the west. People were allowed to travel from the west to this place [Gaussig].

Yes. We've got meetings, there was a huge conference, probably more than 1000 participants called "nonlinear world". That was in 1989, if I'm not wrong in our institute, and people, if I'm not wrong, Stephen Hawking, was there.

But for molecular simulation, molecular dynamics and so forth, statistical mechanics?

We had only our network, but the network detached from Western network, there were centres in Leningrad (now St Petersburg), in Moscow, and we communicated with them. So there were meetings, either Mendeleev meetings, so called. This was general chemistry, but there was a section on molecular simulation and in St Petersburg there were people like Rusanov⁹, he was in thermodynamics and more continuum approach. And then there was Fedor Maximilianovich Kuni¹⁰, he was from statistical physics, but he was involved in molecular simulation. And then there was Pavel Nikolaevich Vorontsov-Velyaminov¹¹, who was mockingly called double count of Soviet Union, because he's from two noble families from the Votontsov¹² and Velyaminov (referenced on Vorontsov wiki page). That was a joke, by the way. He was one of the first to use path integrals in statistical physics in USSR [apparently, he was a CCP5 visitor, see CCP5 Quarterly 41, p.15].

Were you actually, in your PhD and shortly after that, were you actually doing molecular dynamics? Computing molecular dynamics?

In a sense it's my personal, if you like, observation that if you're in physics department, you are doing Monte Carlo or if you're in chemistry you did molecular dynamics. So I did Monte Carlo, okay. We did molecular systems and part of my PhD was Monte Carlo simulation of water, confined water. And we put

⁸ Later, Dzigka Szotek reminded me – his name was Ziesche, Paul Ziesche I think.

⁹ <https://doi.org/10.1016%2FS0001-8686%2803%2900102-7>

¹⁰ <http://stat.phys.spbu.ru/En/Personal/kuni.html>

¹¹ https://www.researchgate.net/scientific-contributions/2053330721_Pavel_N_Vorontsov-Velyaminov

¹² <https://en.wikipedia.org/wiki/Vorontsov>

certain inert impurities like noble gases and could see, solvation and orientational ordering at interfaces. So that was ...

And what were your computing resources like? Ours were not great, well I suppose they were OK for that time. We had the Cray [Cray 1S] ... Yeah, okay, they weren't bad¹³. But nothing compared with today.

I was working on a legendary computer BESM6. This is in Russian “Bolshaya Elektronno-Schetnaya Mashina”¹⁴ a “Large Electronic Computing Machine” that was a transistor-based, not microchip-based computer that occupied 250 square metres room with water cooling system, drums and yeah. And with massive (!) 32 kwords memory, kwords, where you have to put all your program and data.

Everybody had small amounts of memory in those days. And that's why, you know, in Fortran of that vintage, you have all these clever tricks, overlays and things going out, coming back in again, things I never understood. I wasn't clever enough to programme that. And it was impossible to read the code and understand what the hell was going on.

My PhD was written on punch cards.

Mine too.

Usually, we were not admitted to put, input cards. But there were ladies, computer operators. Depending on their mood, they might shuffle the cards, and something happens. So I always put a line or stripe over the card deck.

That was very important. Everybody learned that! Yeah, that was a nightmare that you'd have to print off your programme on these cards in a tray with a stripe going across, and then you have to take them maybe across the road, certainly in Oxford, across the road to the computer, yes, where you could load them. And then you thought, well, maybe I'll drop them or it'll be raining ... It was a nightmare! Absolute nightmare.

And also I used the type of editing that people now, people don't understand at all ...

What, move the cards around?

Even more tricky. I used ballpoint because I know punching code, I've been punching code by heart. And if I need to edit program I have to go to Institute for cybernetics, it was mathematical Institute of Glushkov¹⁵. And I was “external user” and given time on this computer, mainly during nights with evenings. Where the punch machines were, the hall with punch machine, was closed. But there was a re-punching machine when you have an option to use old worn card replaced with a new one, they reproduce perfect copy. So I picked out these bits, square bits, and fill the holes you did not need, and punch, heal and repair, very good way of editing, that was. But this computer was about 1 million flops. And it was built before IBM invented byte division. So the word was 50 bit length, 48 bits for data and two bits were used for system purposes. One bit was actually telling whether it is a code or data and you couldn't change the code. So hacking and spoiling programme was extremely difficult. But 48 for number was reasonable. So we've got very long mantissa and then exponent to represent numbers. Yeah, quite decent stuff could be done because we got very fast magnetic drums that were speeding it. 750 watt engines were attached to them to speed them.

Do you have any idea how fast your particular Monte Carlo calculations ran on this BESM6? Is that the correct title?

¹³ Pretty good, to be honest, world-class in fact at the time – just not much compared with today.

¹⁴ <https://en.wikipedia.org/wiki/BESM>

¹⁵ https://en.wikipedia.org/wiki/Victor_Glushkov

BESM6. Okay. Yeah, you can Google for this. There is a nostalgia site for this. There is an emulator. Yes. Pictures of this. Because that was one of the greatest machines. There were 355 computers built over the world. Over the 20 years. Yes, it was without major changes, produced from 1968 to 1987¹⁶.

Wow. That's incredible, really incredible.

Yes. But when it was first designed, the first examples, they were practically all working for military purposes.

You said it was a 1 mflop machine. So that's the peak speed, right. Any idea what speed you actually achieved?

Well, I have to remember that was about 150 molecules. Something like that. [Later: I looked in my notes, for system of 250 water molecules, grand canonical ensemble, 1 million steps required two hours of wall time].

I mean, when we got the Cray 1S, here in this laboratory about 1980 I think, it was a fantastic change compared with the IBM systems. So you know, 147 mflops.

Wow, 147 mflops,

But nobody ever got that, except one guy. Most of the codes ran at, maybe 3 mflops¹⁷. But that was it itself, way better than anything we had before, because it was a fast scalar machine. And to get the 147, you had to do all the vectorisation, which was not a trivial thing. But one of our colleagues, Vick Saunders, who was a quantum chemist, he's dead now, unfortunately, he wrote, in machine code, a matrix multiply. And that did actually run at 147 mflops. So all the quantum chemists re-wrote all their codes around matrix multiplies. Just do matrix multiplies, whatever you do, just make it a matrix multiply, and they did well.

But the thing is that there were problems with BESM6 that people don't face now. For example, because it was transistor-based, the currents were so strong, that designers of computer designed specially that consequent addresses in memory, were going through different wires. And I remember one time, a chap told me that from Fortran I can burn your fire with this. And people who come from Institute of Applied Mathematics to do servicing on machine, they said, No, that's not possible. He said, let's do it now. And he typed short programme and then suddenly it started to burn and they said stop, stop, stop, it's burning!

That's brilliant!

And they asked how he did that. "I know the algorithm", he said - he just assigned a huge array in Fortran and then read elements according to the wire allocation. So it was always on this one wire.

You see, this is typical of physicists, you have to do naughty things. Yeah. But I, when I was doing my PhD at Bristol, they had a, I didn't use this machine, but they had a little machine. And you had to run your programme overnight, because it took that long. And you needed to keep the humidity of the room above a certain point. So you had to stay there all night, and every hour or so you boiled the kettle in the room then go away for another hour and come back and do it again, and so on through the night! Those were the days. Those were the days. So, coming back to the CCP5 newsletter and general contact with CCP5, and its people, could you say something about the impact that it had or its value for you and your work and maybe your colleagues at the time?

I probably could find something at home from issues of the Newsletter, because I brought them, some of them. But as soon as we received a new issue we have a group probably six, seven people working on

¹⁶ <https://en.wikipedia.org/wiki/BESM-6>

¹⁷ No doubt I exaggerate for effect here.

simulation, and it was immediately taken for reading. So someone asked, okay, could they have this issue for overnight and then they will bring it tomorrow, and then next one is reading it. And we use programmes published there, there were sometimes examples of programmes used, we couldn't access in we didn't know about FTP site. It was in 1980s or so. But the programmes and the papers were carefully read and passed from one to another, we couldn't reproduce or photocopy [the Newsletter] because there was no facility of this type. But the Newsletter was actually was literally read until it had holes in it, because it was used by so many.

Wow. So why was that? I mean, you did have access to the Western journals?

Well, our library got privileges. We had subscription to Physical Review. We had Physics Today. We had Journal of Physics, and few more. But that was it. We couldn't ask or communicate when we publish ...

So in a sense that CCP5 newsletter was a surrogate journal of molecular simulation for you guys. It wasn't just that it was sort of ... I mean, I don't remember what was in the Newsletter in those days, typically it was things before publication? So you got quick access to, to new ideas. Okay.

Well, in 1990, everything changed for me because I moved to Western world. And then of course, things got much better, if you know it, in Konstanz. Absolutely stunning libraries, 10 million units, physical units over five storey, and you could find any possible book you can dream of in the library. And library was open 24 hours, seven days a week. So you can go during the weekend, and you cannot borrow from the spot but you can enter and read inside. Yeah, that was amazing.

Let me just check on this recording, see if it's still running. OK.

In 1991 I got an invitation from John Rowlinson to visit him in physical chemistry in Oxford. So I went, that was a first ...

I'm sorry but you don't look old enough for all this, Vlad.

Okay. I'm 64 ...

Well, I'm 68. But I feel a little bit intimidated, you looking so young! You've obviously led a very good, blameless, honourable life, it's written on your face!

So when I visited, for me it was a complete discovery, the intellectual atmosphere in Oxford. And I wanted to go to Britain. I asked John, whether I could join him as a postdoc or whatever. He said, it is very unlikely, he was about to retire. And then in 1993, I remember there was in Nature, there was a small note that the Royal Society was opening a scheme for former Soviet Union scientists, "East to West" scheme, so called. So I immediately sent him a letter. And John replied that I couldn't come to him because he's retiring. But he could furnish a letter of recommendation for me. So I asked, Neville Parsonage. You don't know probably him. He was at Imperial College, very decent and very honourable scientist. He was a Reader, but he was definitely a very senior Professor scale scientist. So I asked him, and that was just a nightmarish day. I visited in 1993 London, I visited him. And he said, Well, the topic you're proposing that was on definition or calculation of chemical potential at high liquid densities, problem due to sampling, so I thought I could find the good solution for this. And Neville was captured by the idea of doing a joint project. So he telephoned the Royal Society and then his face became sad and he put receiver down and said, it's not possible. Tomorrow is the last day of application. And we need to fill two forms, one from me on my side, one from you on your side. And then it needs to be approved by your supervisor in Kiev and so forth. I said call them [the Royal Society] and say that there will be a chap calling for the forms. So I ran from Imperial College in South Kensington to the Royal Society [in Carlton House Terrace, near St James's Park] to pick up the packet left for me. When back, we completely separated and filled the forms. And then I tried to fax it to Kiev to get signatures and my supervisor was vice-Director of Institute, so he was very administratively

busy person. I telephoned, and I was ashamed to ask so I went outside, they were still coin operated phone. So ...

Oh my God, you are putting money into the phone ...

from London to Kiev I was asking them to keep this fax machine alive for and then run and I fed it coins, it went, then 1 hour passing, second hour passing, only two hours left until it closes. And that's the deadline for applications. And I called Kiev again and secretary said, well the supervisor waited for you but the fax got jammed and nothing could happen, and you didn't call. Well, I called this already from Neville's telephone. He said, Okay, do it now because you don't have any more money to do this. So I faxed again, and quite honestly, my supervisor went home. So it was secretary who signed and then faxed again. And at two minutes before 5pm I rushed into Royal Society and the officer, security officer, he just jumped to press button because I was looking probably like a terrorist! And I asked him, could you please stamp with today's date and time? And then it was Britain for me, it was completely different, when he smiled at me, and then pushed the stamp and then pushed it again and asked if I needed third one! I said No, two is enough. So I eventually got this Royal Society fellowship and then applied to Dominic Tildesley and spent two years in Southampton and then he moved to Imperial College. That's how I started. And of course, in Dominic's office, I was surrounded by a CCP5 family.

Yeah, very good. That's a great story Vlad. Let's stop this recording now, and I'll listened back to it later. I made a few notes here as well. I already mentioned in the article [Molecular Simulation in the CCPs] somewhere that in a private communication you described the importance of the CCP5 Newsletter to you and your colleagues in Ukraine, so I can put a little bit more in that now. But depending on how I can hear this recording, I might try and make a sort of an informal transcript for you and me, because I'm trying to make an archive for our Department going back over the almost 50 years it's been in existence really, as I was saying the other the other day, and this would be this would be a nice thing for that. But I won't make anything public without you seeing it. So for the recording: Thanks very much Vlad, it was fascinating to hear about the influence CCP5 had in your life. Over and out.

Email from Vlad Sokhan (after our interview 8/10/19 at Daresbury)

Dear Paul,

It was very good to talk to you today, I was a bit emotional when talking about long-passed days. In fact, I am indebted to CCP5 for changing my life – it was due to visits first of Keith Gubbins in 1987 and later, in 1988 by John Rowlinson that broke a window (I could not say open – the effect was dramatic) in the post-cold-war wall encasing us and initiated the contacts that eventually led me to the UK.

One thought: Keith Gubbins apparently applied for a visit to Kiev long in advance (getting Soviet clearance could be lengthy), presumably late 1986, i.e., just months after the Chernobyl accident – this might explain why he was refused.

Keith's report, published in CCP5 Newsletter, inspired John Rowlinson to visit Soviet Union the following year. I thought that he was also on CCP5 visit, but apparently I was mistaken, since he never published his report (a requirement for CCP5-sponsored visits). However, if memory doesn't fail me, we received CCP5 Newsletters from John Rowlinson's office, with Oxford stamp (at our Institute there was even a 'black market' of mail envelopes, especially signed ones, and I remember that an envelope from Paul Dirac with his signature was traded for a Western book: such were the times;).

A curious thing: in Kiev, John Rowlinson met the President of the Academy of Sciences of the USSR, Boris Paton (https://en.wikipedia.org/wiki/Borys_Paton), both keen mountain hikers and I remember a rumour that that they together climbed mount Elbrus in Caucasus (https://en.wikipedia.org/wiki/Mount_Elbrus), but could not confirm this. The only reference to John's visit (apart from KGB archives, not explored yet;) I found in the CCP5's report of George Malenkov (<ftp://ftp.dl.ac.uk/ccp5.newsletter/34/pdf/malenkov1.pdf>).

Some other CCP5-relevant sources on the web that I come across:

1. WTEC Panel Report on Applications of Molecular Materials Modelling (archived https://archive.org/details/DTIC_ADA467500 - you can select a PDF or see all formats, where a OCR'ed text is also available: https://archive.org/stream/DTIC_ADA467500/DTIC_ADA467500_djvu.txt - search for CCP5 (close to the end of the document).

There is also a memorial site of Konrad Singer (<http://www.pnsinger.com/konradsinger3.php/index.php>), where there is some info on the early days of CCP5, but you probably know about this.

2. The Soviet computer, which I mentioned in our chat, BESM-6 (<https://en.wikipedia.org/wiki/BESM-6>): there is an interesting publication in Sept. 1975 issue of Datamation by Andrei Ershov (https://en.wikipedia.org/wiki/Andrey_Ershov, <https://history.computer.org/pioneers/ershov.html>), a scan is available at <https://stacks.stanford.edu/file/druid:cn961cy4629/cn961cy4629.pdf> - let me know if you cannot get it, I have a copy (6.5MB). Another thing is that about a twenty years ago a copy of BESM-6 was acquired by the Science Museum in London (<https://collection.sciencemuseumgroup.org.uk/objects/co8400208/besm-6-supercomputer-1968-1987-mainframe>) and when I learned about this (still at Imperial College) I wrote a letter to the Head of Section offering my help in revitalising it (during my PhD I did the same once in Kiev, when I was kicked off the Institute for Cybernetics for breaking into this "secret" machine and using the system privileges to print my final copy of MC results, but luckily I found another institution in Kiev with BESM-6, where lazy sysops could not install the new at that time dialogue system 'Krab' – basically multiuser dumb terminal service. So I had a gentleman's agreement with them that if I manage to install the system (they were at severe press from the Institute administration) I could have all nights on BESM for myself. That's how I completed my thesis, but that's another story).

As I promised, I will find John Rowlinson's photo of 1991 and send you, and see if I have anything from the early days left in my home computer brains.

With kind regards,

Vlad