

A DONKEY HOOF

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To Irene

It is a November day in Karst; we are standing in a company of donkeys watching a blacksmith at work. Donkey's hooves are self-repairing, made to wear themselves on the rough terrain of a desert; here the soil is soft, and the hooves must be trimmed periodically. From the outside the hoof is black, but, when the blacksmith's knife cuts off the sole, the inside is pure white tinged with lilac.

I was born in 1957; my family lived then in an old house on Yakimanka street in Moscow. After a year we moved to an apartment by the Aeroport metro station; my parents still live there. All around were small wooden houses. Under our windows was a little market covered with snow where one could pet a horse, at its end a small store selling Christmas tree decorations, and further, beyond railway tracks, an immense dark park.¹ In summer we lived in a dacha near Moscow; there was a pond with frogs and crested newts, rose chafers on sweet briar and lilac, small lizards basking on fence boards, and even hedgehogs.

We children were cruel towards animals. Tying up a chafer to fly in circles around you was the usual fun.

Even then my eyesight was getting worse; each time that I got stronger glasses, I would lie supine under an old birch tree: seeing every leaf was like falling up into the crown.

Tethered to school routine, the childhood, its golden green shimmer, faded away. My mama's mother died of cancer. In a year my papa's father, who lived with us and loved me so much, died, and I was afraid to come to his bed.

A couple of kilometers from our dacha, beyond pine copses, was a fur farm. A high fence separated it from the outer world; the pines beyond were all dead. Frenzied yapping and a horrible stench brought by the wind. Was I aware of a cusp of cruelty there? I have no memory. When all great poplars in the Moscow streets were tortured into dreadful stumps, I asked the biology teacher how this could be, and got no reply.

One day I happened to come to evening mathematical classes. Led by students from the University, they met once a week in the building of the mathematical school no. 2; it was a delight. At the end of the year, after a small informal exam, I was accepted to the 8th grade of the 2nd school.

At the exam a boy next to me was asked to write the word "intelligentsia"; he made a mistake, and ran away in tears. I stayed put and felt bad taste in my mouth, like a copper door handle.

The school was wonderful. There were mathematical courses given by professors from the University (thus I learned the basics of functions of complex variable prior to calculus). But the best were classes of literature. Our teacher Victor Isakovich Kamyarov, a small wiry man who looked like the magical little horse of a Russian tale, had an impeccable sense of humor. He valued peculiar details over grand ideas and, like Pushkin or a dragonfly, could see things from

¹ Deep within is a grotto where Nechaev and his henchmen murdered student Ivanov (the event that brought about Dostoevsky's novel "The Possessed").

different points of view at once. I owe to him a belief that poetry lies at the heart of the human capacity for understanding.

An episode: Chernyshevsky's novel "What is to be done?" was included in the curriculum not for its literary quality, but because of the revolutionary stand of the author. Victor Isakovich said: "I want you to read the book. Each class will start with a quiz on its contents. I'll move along the list; you get the top or the bottom mark depending on aptness of your answer." The rest of the time had little to do with the book: Victor Isakovich was telling us the story of Chernyshevsky's life. It was an artistic marvel; we were speechless. We were too shy to ask our teacher about his sources. A year later I read "The Gift"² and saw that Victor Isakovich followed its fourth chapter relishing all the piquant details. (The authorities did not appreciate the names of Nabokov and other émigré writers; it might have been the only class on his work in the Soviet Union at that time.)³

The authorities did not appreciate the 2nd school, its flamboyance and independence, either. At the end of my first year there, its head V. F. Ovchinnikov, who had led the school for fifteen years, was fired. Our teachers stayed with us for another year (the classes were as good as before); many, Victor Isakovich among them, then left and were replaced by newcomers. One of those, a pink-haired lady teaching the history of the Communist Party, promised me a bad final grade (deemed to be an obstacle to entering the University). I left the 2nd school before the last semester; this was plain wrong. Much later I heard that at the end of the year some old teachers falsified official documents changing students' bad final grades to good ones.

In 9th grade I started to learn new math by myself (which was exceptionally ineffective). Our dacha neighbor was Alyosha Parshin; my mother took me to him, and he became my informal advisor. On Alyosha's table at his dacha, a small wooden cabin on an overgrown lot, sat a heap of books — and how many of them I read in the following years! — Heisenberg's "Physics and Beyond", St. Augustine's "Confessions", Propp's "Roots of the Fairy Tale" to name a few. He had a keen interest in animism, the shaman trance in particular. Not far from our dacha was a huge forest guarded at its edge by an immense pine tree with several contorted trunks resembling a dragon. We rode bicycles through birch and pine forest, to Poltevo's empty white stone church, and further on beyond the Vladimir railway. In the beginning of my 10th grade Alyosha brought me to Israel Moiseevich Gelfand's seminar.⁴ I made friends with Borya Feigin; his mother Marina Borisovna was soon sharing with me many books, a xerox copy of "The Gift" and handwritten sermons of Anthony Bloom were among the first ones.

² Nabokov's last Russian novel; from the first page I was entranced by the unbelievable magic of its language.

³ The irony of it is that prudent Nabokov himself agreed to censor off this very chapter in the first 1937 Paris edition of the book (for reasons clear from its chapter 5).

⁴ See my essay "I. M. Gelfand and his seminar - a presence" in the Notices of the AMS, vol. 63, 2016, no. 3, <https://arxiv.org/pdf/1505.00710.pdf>

I failed the entrance exams to Moscow University,⁵⁶ and was then admitted to the Pedagogical College. This was, in fact, Fate's gift. In the morning I went to classes, in the evening to lectures or seminars at the University,⁷ and in between I mostly roamed the city or the woods beyond it. There were true friends and a great flow of books. On the first day of classes I met Olya Gerasimenko, we chatted about the summer, and she told me that she has learned all Mandelstam's poetry by heart.

The land was not privately owned, and one could hike wherever one wished. Moscow was so much smaller than today, its environs were mostly forests criss-crossed by thin trails, small villages of log cabins with little orchards and wells in unpaved streets, bits of field, and little towns. In the first year in college, I saw the woods nearly every day.

Attendance in college (as opposed to school) was not strictly enforced, and I enjoyed playing truant. After the first year I was skipping ideological classes in their entirety. Later on, when I was at the University, they summoned me to the headquarters to declare that I was the champion of truancy and to inform me how many hours I had fiendishly managed to save.

An episode: I. R. Shafarevich's book "Socialism" was published in the West, and Parshin gave me a copy to read. (At the time Igor Rostislavovich was greatly respected for his open stand against the authorities.) The idea of the book was that socialism is the death drive of humanity; the author illustrated it with many historical examples. The book was fat, and I read only the more curious chapters, such as the story of Albigensians (*vile* people whose socialism-mongering was frustrated by the Pope ordering a crusade against them). I gave the book to Romik Dimenstein; upon returning it, he wondered if Shafarevich is a Roman Catholic. I asked how he came to the conclusion. Romik replied "These Albigensians, they were all killed. All that we know about them comes from the murderers: How can a sane person take such stories at face value unless he is a Roman Catholic?" I learned that the veracity of a narrative can be often checked simply by looking at it from a detached point of view.⁸

In 1977 I managed to be transferred to the math department of the University and became a student of Yuri Ivanovich Manin. He remained to me ever after what le Hyéneux was to Le Chien of "Cabot-Caboche".

Back in 1968 Manin signed a letter in support of Esenin-Volpin, a logician-cum-dissident who had then an enforced short stint at a psychiatric hospital (they say the authorities wished to spoil for him the celebration of the 15th anniversary of Stalin's death). To those who did not express regret about the signing, punishments were meted out. To Manin they forbade teaching the curriculum and going abroad, thus throwing him into the briar patch of his own

⁵ At that time the bosses of a few élite Moscow colleges (the math department of the University, two physics institutes, the Higher School of KGB) were keen on not accepting Jewish students; to that end, the entrance exams (to the first three colleges) were specially tailored for them to make extremely difficult to pass. The bosses' criteria of Jewishness differed from Halakha's ones: a mongrel that I am is a Jew by the former, and a Gentile by the latter.

⁶ In truth events of that kind were a vaccine against possibility of racial prejudices in you. It is a pity that this vaccine happened to be ineffective for many to whom it was administered.

⁷ There were both official and student seminars. The first that we ran with Volodya Drinfeld was on N. Katz's article on nilpotent connections and S. Bloch's preprint on curves in K-theory and crystalline cohomology.

⁸ Parshin himself once told me that to recognize a devil it is enough to look at him from behind for he has no back.

special courses, seminars, and students. I belonged to this sun-dappled world until it ceased to exist in the beginning of the 90s.

Manin's way of teaching students was to immerse them into the living flow of mathematics. In his courses Yuri Ivanovich explained subjects he was learning at the time and found most fascinating. He did not offer problems to solve; instead you were surrounded by a cloud of budding ideas. Feeling affinity with one of them, you let it play freely with things you knew; with luck, it would start then to open.

My first paper came at the end of 1977 in the wake of the work of Drinfeld and Manin on the construction of instantons. At its core is Barth's classification of some vector bundles, and I noticed that it readily extends to a simple description of the whole derived category of coherent sheaves on a projective space. One morning I went to Manin's apartment to tell the story. Yuri Ivanovich ordered "Sasha, go home, write a note, type it, and bring to the FAA⁹ office: full gallop." It happened that Israel Moiseevich with his son Seryozha and Olya Bernstein found at the same time a similar, yet somewhat different, result, but their writing was hampered by Olya's trip to Caucasus. In the next issue of FAA both notes appeared under the same date, BGG's one placed first regardless of the alphabetical order; I felt what it means "avoir l'oreille tirée par l'Empereur."¹⁰

Olya and his wife Lena introduced me to a delightful informal life. With a wonderful singer Marina Romanova we became friends;¹¹ her husband taught me French. There were many trips to Leningrad. We attended a great course of Nathan Eidelman on Russian history that took place at a private apartment with barely enough place on the floor for the many listeners. Eidelman was then writing a book about Paul I, a chivalrous monarch who offered to end all wars by replacing them with single combats of the sovereigns, and was murdered soon after this.¹² The talks were colorful: when Eidelman, a huge man with a stentorian voice, was twisting Emperor's neck, we almost heard the scrunch and the last wheezing. The lectures themselves did not survive poor Paul for too long: one of the listeners¹³ was arrested, and the prudent host of the apartment decided to be on the safe side.

Traveling abroad was not for commoners, but this did not bring any isolation. Many foreign mathematicians visited Moscow and shared our life. Pierre Deligne was a frequent guest, Bob MacPherson stayed for a year at the end of the '70s and continued to visit us very often, and, a bit later, Don Zagier, and others. I learned from them a lot, and we remained friends for life. Carol MacPherson divorced Bob and later married John Tate; I did not see her since that yearlong stay with Bob until we met at a conference in John's honor at Minneapolis in December 2010 — and we talked as if the thirty-year gap did not exist.

Olya Bernstein and Bob MacPherson at about the same time gave courses at Manin's seminar on holonomic D-modules and intersection cohomology, respectively. Nobody saw that they were talking about the same subject viewed from different perspectives. It took another year or two and a push from the Kazhdan-Lusztig conjectures to notice it.

⁹ Functional Analysis and its Applications was I. M. Gelfand's journal.

¹⁰ L. Tolstoy "War and Peace", vol. III, part I, chapter VII

¹¹ When I read silently Zabolotsky's poem "The blind man", I hear her voice.

¹² A sample of the coterie involved in the plot: https://en.wikipedia.org/w/index.php?title=Olga_Zherebtsova&oldid=1152433313.

¹³ Borya Kanevsky.

One spring day we went with Dima Leshchiner to the village of Ostrov. A most beautiful white stone church of the Boris Godunov period stands there high on a hill over a turn of the Moscow river.¹⁴ It was empty; we climbed stairs inside the wall, then cast iron brackets up the tented roof to the burned-out cupola at the top. Deep down below a couple was riding a motorcycle with side car; it reared, shook off the riders, and went on tumbling down the green slope of the hill. I pocketed an immense nail from the cupola as a souvenir, and we started our descent.

On another day Oleg Ogievetsky's family and I took a bus ride to an abandoned village three hundred kilometers from Moscow where Mitya and Ljuba Lebedev lived in a log cabin. We walked from a bus stop on a trail among a waist-deep grass, and myriads of insects hopped and sang out their fullness of joy. A transparent stream meandered, fish at the bottom, through the village; you drank from it lying on your stomach. The world as it should be.

The PhD program at the University was not accessible. Graduating students who did not go on to a PhD were sent to various organizations in need of mathematicians (many of those were of military kind)¹⁵. The process was finalized sometime in spring in a big room at the math department. Vladimir Mikhailovich Alexeev came there after a major cancer surgery to bring me to his computer lab at the Moscow Cardiology Center. I became a friend of his family.

The paper of Kazhdan and Lusztig with their conjectures appeared; it gave traction to our discussions with Olya Bernstein, and we found a simple proof. In the autumn Pierre Deligne came to Moscow to marry Lena Alexeeva, the daughter of Vladimir Mikhailovich. Pierre brought a preprint of "Weil II". Before Pierre's next visit, he and Gabber, and Olya and I found perverse sheaves. Our happy playing with math continued into January; then Olya's family was allowed to emigrate, and they flew away. There was little hope to ever meet again.

Vladimir Mikhailovich died in December. The new head of the lab saw me running away while other young engineers had their Komsomol meeting, and inquired why I was not there. I replied that I was not a member of the organization. The boss asked then if I had ever been one; I said "no". This was a lie: I entered Komsomol at the end of high school (this was deemed to be necessary to get to the University). After graduation, a membership registration card was given to you to bring to the place of a new job or, if you were so inclined, to get rid of it. Together with Dima Leshchiner, I burned mine in a Petri dish on the windowsill of my room using the Ostrov church nail as a poker.¹⁶ On my way home I felt bad about the lying; I called the boss by phone and apologized. He decided to fire me, and began to count my late arrivals to the workplace. Someone told Gelfand about the incident; by a fillip of his phone call to the head of the biological division of Cardiocenter, I was moved there and left to my own devices to enjoy the same freedom I had had as a student.

Back in mid-50s Khrushchev announced that his predecessor was a criminal. This momentous event was unique: alas, no other country victorious in the war followed suit. In truth, it was a Manifesto that granted the subjects a right not to take the authorities seriously. At that it was

¹⁴ https://ru.wikipedia.org/wiki/Церковь_Спаса_Преображения_в_селе_Остров#/media/Файл:Ostrov_TransfigurationChurch_0638.jpg

¹⁵ Avoiding them was a matter of art. Dima Leshchiner's solution to the problem came to include a barefoot visit to the new job (not unlike Jōshū's one in cat's koan, <https://www.rzc.org/news/nansen-kills-the-cat/>).

¹⁶ The same has happened, on the same windowsill, with Dima's card upon his graduation two years earlier.

common to reserve this attitude exclusively for the Soviet bosses,¹⁷ and to maintain that the powers to be on the other side of the Iron Curtain were of different, radically better stock.¹⁸ This mental block still has hold over many former denizens of Soviet Union regardless of where they live: mass beliefs that we share are truth to us.

The time of my youth was benevolent towards those who had no urge for climbing the social ladder and to hold sway over others. Big issues — education, medicine, housing, social care, etc. — were free,¹⁹ and a small salary was enough for the rest of the needs. Having a position aligned with one's interests was best, otherwise one would opt for a job giving maximum of free time.²⁰ Toss the coin with "Soviet" and "anti-Soviet" sides back to whatever Caesar it belongs to. A free and gentle culture of those who took to heart Pushkin's poem "From Pindemonti"²¹ emerged. It shines through the animated movies of Yuri Norstein²² and the books of Yuri Koval; Manin's courses and seminars were also a part of its "deeper Liberty". The senseless din of lawn mowers and leaf blowers, as well as canned laughter, did not exist; there was silence, "the best of what I've ever heard."²³ Bob MacPherson later called our nook of that world "a mathematical paradise".²⁴

During the years at Cardiocenter my immediate supervisor was Ilya Novikov, and I became a good friend of his and of his wife Marina Alexeevskaya. Kindness was their innate quality. There was an attitude that a service to the good, such as the work of physician, is incompatible with profit, and some physicians never took money from their patients. Marina acquainted me with two brilliant physicians of that kind, Lina Kozzerovskaya and Sasha Nedostup, a pediatrician and a cardiologist.

Lina had a wonderful gift of treating the neurological problems of newborn babies, such as cerebral palsy, with special massages. After her day at the hospital she visited all those who needed her help. In the beginning of the 90s Lina had major cancer surgery. The general situation in Moscow was bad, a doomed attempt to get treatment in Boston brought only more suffering to her, she flew then with her husband Borya and son Serezha to Israel, but it was too late. Ilya and Marina emigrated to Israel just a bit later, and Marina soon died of cancer too. I've lost contacts with Borya and Serezha; not long ago I saw in my papers the last letter from Lina, she asked me to care about Serezha, and I felt myself a full-blown scoundrel.

¹⁷ In my time they were seen mostly as objects of countless anecdotes.

¹⁸ Incidentally, this was a mass belief of criminals (блатные) in Stalin's Kolyma camps, see Georgy Demidov's story "The painter Bacillus and his chef-d'œuvre".

¹⁹ We had no doubt that this is so, only better, in every civilized country.

²⁰ Say, it could be building sheds during summer at a rural place in a nice company; my friend Vitya Khanin was doing this for years.

²¹ Here is Nabokov's translation: <https://ireaddeadpeople.wordpress.com/2014/11/06/alexander-pushkin-to-stroll-in-ones-own-wake/>

²² See <https://www.youtube.com/watch?v=6gS1Bp4LZLc>, <https://www.youtube.com/watch?v=CzHIY--oWGI>

²³ B. Pasternak "Звезды летом".

²⁴ <https://www.simonsfoundation.org/2012/05/30/robert-d-macpherson/>, part 16.

In later years I saw Sasha Nedostup almost every time I was back in Moscow. In his apartment there were perhaps ten dogs and fifteen cats that he and his wife had taken from the street. Cats sat Egyptian on every table and shelf, dogs smiled, their eyes shined: all were happy. Sasha was a very good poet, and he loved telling stories from his life. Like this one: Sasha was in a subway car. A shabbily dressed man next to him was reading. Sasha looked over man's shoulder: these were poems of Georgy Ivanov.²⁵ The man looked up, saw Sasha's eyes, read a line aloud, and Sasha continued — he knew so much poetry by heart. Then Sasha recited a line of another poet, and the man continued it. This went for a while. Then the man stood up, smiled, bowed, and left the car. Here is another story:

An episode: Sasha's father was the head of a watch factory in Moscow; when the war started, it was not evacuated, so the family stayed there. The factory was a two hour walk from the home. To get a bit of extra money, Sasha's father repaired watches. Once he walked home with an expensive watch in the pocket; when he arrived, he found a hole there and no watch. All they had was not enough to pay for the loss. Sasha's mother prayed all night. In the wee hours Sasha's father went to the factory trying to trace his steps back and hoping beyond hope to find the loss. Stepping into a puddle (it was spring) he felt something like a small stone under the boot; he bent down: it was the watch.

Sasha was a faithful Russian Orthodox Christian. And he loved Leo Tolstoy and Nikolai Leskov. Once he told me that the only sense he could see in persecutions of 1920s-1930s in Russia is that they returned Christianity there to the state it properly belongs to, that of the first centuries AD prior to turning into a State religion.

Around 1986, after an unlucky diving-board jump, my field of vision was punctured with black holes. The father of my friend Misha Rozenblum worked at the Helmholtz eye clinic; he took me to Elena Olimpievna Saxonova. She resembled a crow goddess, but infinitely benevolent, a fantastic eye surgeon who treated everyone who came to her²⁶ and never took any money. Elena Olimpievna sewed my retina back to life. Ten years later, in Princeton, I had an unpleasant feeling in my eyes (this time due, perhaps, to horse jumping). The best retina doctor around studied, with the help of many contraptions, my eyes and found nothing wrong; he could not find the laser stitches either. Back in Moscow we joined a line of patients outside Elena Olimpievna's bare reception room. She remembered me as she remembered every patient. Looking into my eyes through a lens she dictated to a student the radii to be repaired, then asked if I could come next morning to her hospital for another laser treatment. After the surgery I asked if I could pay her or the hospital (this was the time of dark poverty in Russia); she looked at me with her crow-goddess eyes, and I was ashamed to my core.

An episode:²⁷ The only son of Elena Olimpievna had grave psychiatric problems; he killed himself. She was totally stricken, her life was over. At this very time her friend, an eye doctor too, got an eye illness which required immediate surgery, otherwise blindness was inevitable. She called Elena Olimpievna, explained the situation, and informed that Elena Olimpievna will do the surgery. Elena Olimpievna refused: her hands were trembling; she could not hold the scalpel. The friend replied that if she would not operate then nobody would. This was a person

²⁵ A Russian white émigré poet, see https://en.wikipedia.org/wiki/Georgy_Ivanov

²⁶ Among them was Manin's mother, and later Manin himself too. The Helmholtz clinic treated patients from outside Moscow only; no Muscovite could be admitted to it. After a short exam at her office Elena Olimpievna took me to the reception desk, looked at the lady there, said shortly "This is my patient", and the lady started doing the paperwork.

²⁷ I heard it from the author of a beautiful memoir http://damian.ru/dr_statii/ne_opozdai.html about Elena Olimpievna (in Russian).

who never broke her word. Elena Olimpievna did the surgery;²⁸ it was successful, and Elena Olimpievna came back to life.

About that time Sasha Belavin started to teach me quantum physics and string theory. I took bus rides to snowy Chernogolovka early in the morning, and Sasha taught me all day in Polyakov's empty apartment with breaks for strongest sweet Turkish coffee that Sasha masterfully prepared in a cezve. Sasha was working then with Vadik Knizhnik on an algebro-geometric description of Polyakov's measure. Tragically Vadik soon died. His heart stopped beating and no one knows why.

In a while Sasha brought me as a young researcher (докторант) to the Landau Institute.

The beginning of Gorbachev's reign, despite the tragedies of Chernobyl and the Armenian earthquake, was a very optimistic time. The Afghan war ended, censorship receded, Mathias Rust's Cessna landed near the Kremlin. Manin was inviting his students and their friends for evenings at his apartment. At one of them we celebrated Brodsky's Nobel Prize; at another Yuri Ivanovich and Alyosha Rudakov danced sirtaki among a bevy of young lady guests. Little did we know that this was a wake for our "tall starling house."²⁹

The country started to open, and I came to Paris. The hotel at Denfert-Rochereau, née place d'Enfer, had a single shower on each floor and no soap, and I decided to get some. In Moscow they sell soap in hardware stores. I walked the moving feast of the streets looking around; finally, in le Marais, I spotted something of the kind. The store was small, dark, and distinctly medieval; there were two Orthodox Jews inside. The sounds I made were foreign to them, and I resorted to mime. The men were dumbstruck. After a while one of them caught an idea, opened a huge ancient chest, and extracted from its depths a morsel that still smelled awfully despite its undoubted antiquity. I had just enough money to acquire the artifact. Back in the daylight I saw a soap advertisement in a pharmacy window across the street.

Besides the soap, I bought, in the YMCA Press store at rue de la Montagne-Sainte-Genève, a small-format thin-paper collected edition of Solzhenitsyn. At the Moscow airport it was duly confiscated, but returned back in a week. Reading it I was startled how much the quality of his writings,³⁰ their undertones, and the way they affected the public, were akin to those of Chernyshevsky. Soon the ban on Solzhenitsyn was lifted, his voluminous opuses were being published first in the most prominent literary periodicals using up nearly all the printed space.

Bob MacPherson invited me to Boston, so fresh and green under its glass tower. I was happy to see Olya Bernstein again and lived at his house. I saw homeless people for the first time in my life; I asked how could it be, and the reply was "that is the way they want to live." Due to Bob, I started to come to M.I.T. for the Fall, and I saw the glory of the Indian summer. Once he and Mark Goreski took me and my wife Irene for a boat ride in the Boston harbor. A small island was fully covered by a flock of monarch butterflies. I felt like Bilbo at the top of a tree in Mirkwood.

In Boston I enjoyed the company of Dima Kazhdan and Barry Mazur, the weekly book readings in Barry's office. The speed of time there and in Moscow was totally different: each year it was exactly the same Boston, but Moscow would change palpably in even a few months' absence.

²⁸ As a precaution she hid another eye surgeon in the next room.

²⁹ O. Mandelstam "За то, что я руки твои не сумел удержать..."

³⁰ The samizdat versions I read long before were much better due, perhaps, to the excellent work of the editors; in the US the author returned the texts to their original versions.

What struck me most in America was the abundance of animals — a skunk, a raccoon, or even a deer crossing a street, — and a great variety of species of trees, many times more than in Europe. Later I saw a reason: the Catastrophe here came in one fell swoop — forests clear cut, prairies destroyed, buffaloes, Indians, whales, myriads of other animals and birds killed,³¹ — it all took place in a few decades, then those who got through had a chance to survive in the remnants of their world. And in Europe man has strangled nature for millennia.³²

With Irene we were taking riding lessons at a stable near Rastorguevo. Once we left carrots at home, and Irene gave the good horse a sandwich forgetting that there were sausages inside. He took a big bite, and suddenly I saw the horror of our unbelievable betrayal on his face. After ten years I turned vegetarian, and his understanding became mine.

Time in the Soviet Union moved faster and faster. In Moscow immense demonstrations demanded changes. A public lecture of Alexander Men, a priest well-known among Moscow intelligentsia, on Christianity, brought huge crowds. Soon afterwards, Father Alexander was axed down near his home at Semkhos station. Sasha Belavin, who was close to him, brought me to the place the following day; I remember Sasha kneeling down and touching the blood-soaked patch of earth with the edge of his Gospels.

At some moment a critical mass of men at the top saw that discarding socialism meant they would have a thousand times more money than commoners, not merely 2-3 times more as before, and the country's fate was sealed. Some retrogrades among the authorities made in August '91 a last-ditch attempt to arrest the collapse, and brought tanks to Moscow. They had no desire to shoot at people, and when the crowds did not dissolve, they cancelled the "coup" (as it was conveniently called later); two of them committed suicide.

In the evening of the second day of the "coup" Irene and I went to the parliament building held by the progressive authorities. A tight ring of people, arm in arm, surrounded it; our friend Alyosha Korotaev was there. They were grim and concentrated. We joined a much larger crowd hanging around. Drizzle fell. Every window of the huge building shone brightly in the darkness. Activists explained that a gas attack was imminent; to survive must pee on a handkerchief and tighten it around the nose and mouth; the public hesitated to follow the instructions. Loudspeakers announced that tanks were moving towards the building; the assault would start in mere minutes. At that moment all the lights in the building were switched off. After a quarter of an hour of suspense in the total darkness the building shone up, and everyone caught a breath: the attack was delayed. This repeated perhaps five times during the night. In the early morning, when the subway opened, we went home to sleep. The loudspeakers blared out the beginning of another tank attack; people ran from the subway station towards the building.

We were all so happy about the fall of l'Ancien Régime.

To dispatch Gorbachev the new bosses quickly split the country (his title "the president of the USSR" thus becoming a phantom). The huge demonstrations went to naught (the last I saw was several dozen of people demanding to fire the top boss' chamberlain). Another row, this time with the parliament, was ended by tanks shooting at the parliament building, all in all hundreds were killed; then the Chechen war was started. The country was fleeced and pillaged, pensions

³¹ Of 60 million buffaloes only 541 made it to 1889, one in 100 thousand; of 2 to 4 billions of passenger pigeons all were killed.

³² Say, already in 1281 Edward I ordered all wolves in England to be killed (a bit later he expelled from England all Jews). The last aurochs died in 1627 in Poland.

and salaries were halted. So many people died then from the absence of livelihood and despair, far more than had perished from Stalin's persecutions.³³

On Moscow streets now were homeless people, old ladies stood trying to sell their meager possessions. Banks and bordellos popped up, armed gangs exchanged shots. The Temple of Christ the Savior was being rebuilt, and all posts were covered with offers of affordable black magic services.

Like other commoners, mathematicians who did not earn money abroad were in dire straits. Bob MacPherson initiated, through the American Mathematical Society, the collection of money to help; he smuggled the cash and dealt with direct distribution of it.³⁴ Ten years ago, when I was giving lectures in Yaroslavl, a man thanked me for survival of his family; I was utterly ashamed.

I began to work with Volodya Drinfeld on his approach to geometric Langlands theory via the quantization of Hitchin's integrable system. Once, on the way to Kirillov's place where Volodya then lived, I bought a beautiful grass snake as a birthday present to Irene. While we talked, the snake managed to escape. The next morning Volodya found her relaxing on a heap of drying plates; thereafter she disappeared again.

In mid '90s Irene became a graduate student in biology in Princeton, and we switched to living in America for most of the time. I finished a flying school at Princeton's airport. The best were the night flights: the flickering of villages far below, flakes of snow turned into sparks piercing horizontally the beam of headlight. When, following Spencer Bloch's suggestion, we moved to Chicago, my Cessna days were over. After all, flying in a dream is a superior experience with no noise of the aircraft engine at that.

What stayed with me is the awareness that we, as humans, essentially do not perceive the element of Air. Poetry at best gives a hint, a suggestion of seeing: *Da geht der Sturm, ein Umgestalter, geht durch den Wald und durch die Zeit, und alles ist wie ohne Alter: die Landschaft, wie ein Vers im Psalter, ist Ernst und Wucht und Ewigkeit.*³⁵ But birds are part of the Air: Jacob and the Angel in the poem *are* a bird and the wind. For us observing a bird's flight is like watching the play of a piano virtuoso for a deaf person, and we don't realize that.³⁶

Back in '99 I first took NATO's assault on Serbia the way newspapers told me, failing to look at them from a detached perspective. Manin saw it on the spot as an unraveling of the international law where unprovoked war of aggression is the top crime. He was horrified and full of bad premonitions. Not long after, on the 9/11, the authorities solved their conundrum of

³³ The number of excessive deaths in 1993-95 in fSU is about 2 million, 1.3 million for Russia, see <https://worldtable.info/gosudarstvo/smertnost-v-rossii-po-godam-tablica.html>; that of repression deaths in 1937-38 is about 1.2 million (a quarter of them were plain criminals), see p. 1155 in https://sovietinfo.tripod.com/ELM-Repression_Statistics.pdf. For details, see A. Roginsky <https://acround.livejournal.com/58592.html>, <https://istpamyat.ru/2018/04/10/2749/> and V. Zemskov <https://www.politpros.com/journal/read/?ID=783> (in Russian).

³⁴ See <https://www.simonsfoundation.org/2012/05/30/robert-d-macpherson/>, part 17.

³⁵ R. M. Rilke "Der Schauende".

³⁶ Our best attempts at bird's flight — paraplane gliding and downhill skiing — despite the delight they bring, are utterly inadequate. Indeed, bird's vision is many times keener than ours, and flying a paraplane we imitate an almost blind vulture. A flight of a Cooper's hawk through branches of a tree is beyond the dreams of any slalom champion.

the 90s — how to keep an enormous army when the country has no enemies — and started to war in earnest. Brueghel's Dulle Griet came to life.³⁷

We rode an expressway in London, rushing flows of cars separated by a concrete barrier. Suddenly I saw on the right a fox pressing himself into the barrier, utter horror in his eyes.

Mathematics is a world perceived only through efforts of human brain, but mathematicians do not doubt its reality. In quantum physics the key object representing reality — the psi-function — is not real in any mundane sense, for it changes irreversibly whenever observed. These are small facets of the fact that we are fundamentally unaware of what reality is. Perhaps, for us “contact with reality” amounts to “realization” or “understanding”.³⁸ It is not a stable state, but always a process, a living thought, where one cannot know what awaits around the corner.

Most of the rest of what we take for reality is rather the product of our disjointedness from it, a goo of mass beliefs and wrong assumptions cooked into a semblance of sense. A false concept or idea (say, “profit” or “progress”, or that nature is human's property) that starts to be taken seriously by many is akin to an artificial growth hormone taking power over flesh: it forces society into an ever-expanding activity that churns up ugliness and blindness, never understanding. It's man's effort to build a new world in the image of his madness, by destroying the real one whose living magic we are all a part of. And it is everywhere.

In his Dachau diaries Edgar Kupfer-Koberwitz³⁹ says that the worst of what humans do to themselves is a direct consequence of what they do to animals. Perhaps the death spiral cannot be stopped unless a phase transition in our attitude to ourselves and to Nature happens, and we realize that animal lives matter no less than human ones.

The central panel of Bosch's⁴⁰ triptych “The Garden of Earthly Delights”⁴¹ is full of animals, humans, mushrooms, and plants — magical and usual ones — which play, converse, and transform one into another. This is the same world as in the Paradise panel — they meet seamlessly, filled by the same golden light and magic, only here there are far more denizens — except that God is not seen, but you find a painter. Not a single man-made thing, all is alive. We never saw such a world but felt it: it comes when you are on the verge of seeing something you don't know yet what — images flowing one into another, the beginning of understanding. Between it and the Hell panel is a gap, they have nothing in common. Hell's blackness is stuffed with devices produced by humans, all turned to be instruments of ugliness and torture. I'd call the painting “Creativity”.

³⁷ [https://en.wikipedia.org/wiki/Dulle_Griet#/media/File:Dulle_Griet,_by_Pieter_Brueghel_\(I\).jpg](https://en.wikipedia.org/wiki/Dulle_Griet#/media/File:Dulle_Griet,_by_Pieter_Brueghel_(I).jpg)

³⁸ And understanding in every sense possible at that: the modern scientific one is as sufficient as the knowledge of chemical contents of pigments is enough to comprehend a painting. Say, that one <https://www.icon-art.info/hires.php?lng=ru&type=1&id=203>.

³⁹ See https://en.wikipedia.org/wiki/Edgar_Kupfer-Koberwitz.

⁴⁰ What a pseudonym: “Bosch” means “Forest”.

⁴¹ https://en.wikipedia.org/wiki/The_Garden_of_Earthly_Delights#/media/File:The_Garden_of_earthly_delights.jpg

Around 2012, after reading Ryōkan's⁴² poems, I was enchanted by the old Japanese culture, so gentle and peculiar (say, horses were not shod but wore rice straw sandals "umugatsu", and there is a word "komorebi" for the sunlight shining through leaves); then came Zen meditation and suizen — playing bamboo flute shakuhachi. I was fortunate to befriend Jesse Ball and Eric Shutt. With Jesse we read books and play shakuhachi on skype almost every morning, such a joy.

Sometime in 2010s Don Zagier brought me to ICTP in Trieste, to the Adriatic. Not far away, in Karst, is an old hill town of Štanjel; there we met Stan Sušnik. In his younger years Stan was a film producer. Once he looked at a donkey and saw him — then Stan and his wife Mojca sold their apartment in Ljubljana, and went to live in a village in Karst. They are keeping two herds of donkeys — just for happiness, theirs and of those around.

An episode: A jenny gave birth to a baby foal, and then rejected him. The baby tried to suck, she kicked him. Stan brought him home, bought a sack of dried horse milk. A baby should be fed every two hours, and in a couple of days Mojca began to go crazy. Stan had a friend, a poor peasant, who loved and understood horses; Stan asked him for help. The friend came and talked to the jenny very quietly for several hours. She was convinced, and allowed the baby to come back.

Parshin, Nedostup, and Manin went away within the past year. I bow deeply to their memory.

2023

⁴² See <https://en.wikipedia.org/wiki/Ryōkan>.