

E-mailing from Armenia

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The development of an information technology industry in the remains of the old Soviet Union brought the discipline of a market economy to the region.

You can put your bag here because you'll be using the front room," Mark advised. "Your cell phone probably won't work, and even if it did, you'd discover that it wouldn't be able to send e-mail."

For nearly two decades, e-mail had been the link that had bound the two of us together and had sustained Mark's global social circle: family in Washington, brother in Los Angeles, fiancée in London, and friends scattered across that collection of countries that had once been known as the Soviet Union.

Mark's apartment is about a block from Moscow's glitzy central shopping street, as close to the Kremlin as an ordinary mortal can possibly live. The building has housed the Russian witnesses to the events of modern history: melancholy poets of the Czar, revolutionaries on horseback, Soviet technocrats that fought the Cold War, reformers who demanded a democratic society and free access to the West. Now the building is filled with the entrepreneurs of the New Russia. They own electronic gadgets from Silicon Valley, drive luxury cars from Germany and Japan, dress in the latest Paris fashions, and eat at ethnic

restaurants tastefully decorated with artifacts from the central Asian republics.

"The building does have high-speed Internet," Mark added, "and wireless and voice-over-IP phone service."

COMMUNICATIONS FROM ABROAD

Digital communication technology was not readily available in the early 1990s, when Mark arrived in the crumbling remains of the Soviet Union. At the time, the country was only starting to make network connections with the West. The Zelinsky Institute of Organic Chemistry had a connection through IBM mainframes. RelCom, a commercial venture that had been born following the demise of communism, had a link through Finland to the European EU-Net. As such connections were not easily accessible to a young aid worker, Mark had to communicate with me through more primitive technologies: white paper, blue ballpoint pens, and return addresses carefully spelled out in Cyrillic letters.

"Dear David," his letters would begin, "I am in Kiev" or Riga or Vladivostok. "I am working with emigrants." "I'm programming comput-

ers." "I'm being a tourist in Uzbekistan." Five or six weeks would pass between the day he posted a letter and the day I received it. The envelopes would often arrive with the marks of transit, signs that made you want to believe they contained the frozen air of the Siberian steppes or the dust of the Silk Road.

Mark found e-mail in 1995, when he was assigned to a field office in Yerevan, Armenia, a former Soviet state located on the northeast corner of Turkey. "I was an onsite specialist," he explained in a letter. "I was there to help a department of the newly independent government be effective and efficient by making sure equipment and funds went to proper use."

At the time, Armenia was a hardship post, where the services were far from effective and nowhere close to efficient. It had drained its treasury by fighting a ruinous battle with Azerbaijan on its southern border. Its industrial base, built by the old Soviet government, was collapsing. Its basic infrastructure was starting to fail. "You always had to keep a duplicate of your work," Mark recalled, "in case the power failed when you were programming."

Mark was to help with the reconstruction of the Armenian economy by creating an aid database, records of the resources that might be available to help develop the country. His organization thought it would be an innovative use of technology even though it proved to be an awkward program that resembled some of the least efficient computer applications that once had been commonplace in the Soviet Union.

THE SOVIET COMPUTER INDUSTRY

The Soviet computer industry began in 1950, when Sergei Lebedev (1902-1974) built the country's first computer in Kiev. It grew in parallel with the American industry, developing some machines that were based on Western ideas and some that were unique to the communist world. It produced the BESM computers, the Strelas, Urals, and Minsk. By the mid-1980s, it had

produced two families of computers that were widely used for data processing, the unified systems (usually abbreviated “ES” for *edinenaya sistema* or called Ryad, the Russian word for “series”), and the small systems (abbreviated “MS” for *malyha sistema*).

The larger ES family included 32 models, 200 peripheral devices, and 12 versions of an operating system. Most of the ES machines were based on the architecture of the IBM System/360 series. At its zenith, the ES series was described as being second only to the IBM 360/370 series in the number of installed mainframes. The MS series was based on the DEC PDP-11 and Vax designs.

Through the 1970s and 1980s, Soviet planners spent billions of rubles to place these two families of computers in the management offices of the country’s manufacturing and distribution enterprises. They intended that these machines would perform the basic clerical work needed to run their economy.

As a whole, these centers proved to be a mediocre investment. In part, they were hampered by the poor quality of Soviet software, poorly trained staffs, and slow communication, but they also were undermined by the nature of the communist system itself. The Soviet Union’s central-planning office wanted reports that would validate its economic goals rather than provide information it could use to manage operations or respond to the invisible hand of the market.

Under these circumstances, manufacturing organizations had no incentive to make good use of their machines. “Even computerizing simple accounting can be perceived as a threat,” observed one pair of scholars. “It is easier to hide inconsistencies when the accounting system is manual.”

The computer industry should have flourished during the period of Glasnost (1985-1991), when Mikhail Gorbachev tried to bring economic reform to the country. Computers could have provided the information that was needed to move the country toward a market economy. They

IEEE Annals of the History of Computing

The *IEEE Annals of the History of Computing* publishes stories of the development of computing institutions and computing technologies. It has regularly described the Soviet computer industry and also devoted an entire issue, available through the Computer Society Digital Library, to computing in Eastern Europe. The current issue of *Annals* (vol. 29, no. 3) has a story about computers in Malta.

could have been used to identify efficient sources of production, unused resources, and excess distribution capacity.

Instead, the Soviet computer industry collapsed with much of the rest of the old manufacturing base. The state-run computer firms lost their government support and rapidly went out of business, taking with them the ES and MS computer lines. “The engineers did a heroic deed in designing these computers,” remarked a Russian journalist, “but they still ran an inefficient industry.”

A collection of small entrepreneurial companies replaced the old state firms. These new companies were usually attempts to capitalize on the research of a university computer science department or a government laboratory. They usually had no more than 100 employees and possessed very little business skill. The economic turmoil of the period overwhelmed most of them. “Essentially nothing from before the early 1990s has survived,” observed a business manager from that period.

A BROADCASTING OPPORTUNITY

The economic turmoil of the 1990s fell heavily on the old provincial capitals such as Yerevan. Many full-time workers could not feed themselves on the salaries they earned, and some held multiple jobs.

In this environment, Mark found that he had time on his hands. He could program by day but had little to do at night. Searching the city, he discovered a new independent radio station (HAI-FM, 105.5 on your FM dial) that was financed by an American philanthropist. In spite of

the outside financing, the station had little money to offer its employees. Most spent only a few hours at the station before departing to work at a second or third job.

When he introduced himself as a former college radio announcer and a willing volunteer, Mark received a warm welcome and an offer to host four evening shows a week. Although Mark was pleased with the opportunity, he noted that the station was not only struggling with a failed economy but was also hampered by the old ideas of the Soviet system. “The announcers wrote out scripts beforehand,” Mark observed, “and read them in a monotone voice.”

Mark brought a western approach to his shows. “I did a typical pop deejay show in English,” he recalled. The music was drawn from his college collection of compact disks: Madonna, the B-52s, the Bangles, Prince. No one quite knew what to make of his program. He was informal, witty, relaxed. “The other deejays would literally come in and just watch me,” he wrote. “That was kind of creepy.”

Mark’s stories were predictable to anyone familiar with college radio stations. One day, he reported that he “stuck my head out the window with the microphone in hand and described what Mount Ararat looked like at that particular moment.” “The reaction is tremendous,” Mark wrote, “at least in the very small circles of people I talked to.”

NETWORK COMMUNICATIONS

The messages describing Mark’s shows reached me in minutes, rather than days, because he had discovered an e-mail connection.

With the Soviet economy in shambles, the Société Internationale de Télécommunications Aéronautiques (SITA) provided the connection. A cooperative society founded jointly by the European airlines in 1949, SITA supplied communications services to support air travel.

SITA operated a sophisticated private computer network that had grown out of a telegraph service. The SITA telegraph had begun operating in 1950 and used Paris as a central hub to route messages. In 1966, the human operators in Paris were replaced with Univac computers. Six years later, the whole network was converted to a packet-switched protocol.

Mark had access to the SITA network because his aid agency worked closely with the airlines. The agency used the network to arrange to move refugees, displaced persons, and victims of political persecution. As an extra benefit, the network gave agencies access to the Internet. “We dial a local number from Yerevan,” Mark wrote, “wait an age and a half for it to connect via Moscow, and then log on to some kind of bulletin board. From there we can download and upload messages.”

A MOONLIGHTING AID WORKER

International e-mail was still relatively new at this time. To jump from network to network and country to country, it was often necessary to know how to route an e-mail message through some gateway. Hence, Mark’s first e-mail communications

with me had some of the marks of novelty.

He would write lengthy descriptions of his job, his city, his world. I replied with questions that showed my amazement at having an observer on the other side of the world. Was it warm over there? Was it cold? What was his apartment like? How did he survive with sporadic electricity? How much did he see of the thugs and robbers that were allegedly found on Armenia’s roads?

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At first, I didn’t focus on Mark’s role at the radio station. I didn’t grasp that an aid worker was moonlighting as a disk jockey. The narrative unfolded slowly, as I began to understand that the shows were important to both Mark and his Armenian friends. “I am not a rogue personality with some skill at the mixing board,” Mark wrote one day, “but rather a live representative of what they want to become.” He then concluded, “They just didn’t know it until now.”

In addition to hosting his shows, Mark was starting to train the local announcers in the skills of the American college disk jockey. He showed them how to be relaxed, to improvise, to respond to the music, to feel comfortable, to express their own personality. The Armenians readily accepted these ideas, but they also believed that there was something special in Mark’s music. “The deejays recorded all of my CDs,” Mark wrote. “My music is about 40 percent of their air time.” “They sound just like you!” observed one of his friends.

For a time, even after Mark retired from his duties at the station, you could turn to 105.5 FM Yerevan and think you were in an American college

town. You heard the hits and jokes of the 1980s. You might be excused for believing that Ronald Reagan was still the US president, that the Iron Curtain still stretched across Europe from Stettin on the Baltic to Trieste in the Adriatic, that you were on one side of that curtain and that Armenia was on the other.

The radio station was Mark’s legacy to Armenia. His database, the project that had taken him to Yerevan, had suffered a fate similar to that of the old Soviet computer industry. It was delayed longer than anyone had anticipated, was more complicated than they had planned, and was rarely used for practical problems.

Such databases would be useful to a developing economy only as the region developed a new information technology industry. This new industry followed the introduction of e-mail to the region and brought the discipline of a market economy. However, it created no large manufacturing facilities in the region and established no large software firms.

The new firms did only the work that couldn’t be done for less money in other parts of the world. Parts came from Kuala Lumpur and Santa Clara to be assembled in Moscow. Software, created in Redmond and Mysore, was sold in Kiev by young men with German BMWs and Paris suits. Yerevan phone numbers, owned by companies in Virginia, provided high-speed connections to weather reports from Atlanta, news from London, and financial reports from Frankfurt.

It is one thing to think that you can rebuild an economy with a database. It is something quite different to bring e-mail to Armenia. ■

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