

FEATURES

Exodus from the East

Thousands of scientists—along with entire universities—have fled war-torn eastern Ukraine. Others have staked their futures on the breakaway republics *By Richard Stone, in Kyiv and Vinnytsya, Ukraine*



Refugees and a pro-Russian rebel at Donetsk National University in August; many professors and students later fled the campus.

Around 11 in the morning on 23 June, Volodymyr Semystyaga was at work in the State Archives of Luhansk, in conflict-riven eastern Ukraine, when his cellphone rang. The speaker claimed to have information and asked to meet him outside. There, two men approached. “One put a gun to my belly. The other put a gun to my back,” says Semystyaga, a 65-year-old history professor at National University of Luhansk. “Nobody on the street recognized what was happening.” They bundled him into a taxi and sped off.

His captors took Semystyaga to a building they called SMERSH, after the Soviet military counterintelligence unit created by Josef Stalin in World War II. In the basement, Semystyaga says, he was interrogated for weeks—injected with truth serum, burned with cigarettes, and beaten. “They had me put on a gas mask, then they blocked the air inlet and I felt like I was choking.”

As his enemies had learned when they ransacked his home and office, Semystyaga was a key figure in the resistance to the region’s Russian-backed separatists, who have carved out a breakaway republic. On his 55th day in detention, Semystyaga escaped with the help of a sympathetic guard and slipped out of separatist territory.

The conflict that nearly cost Semystyaga his life had flared in April, after the ouster 2 months earlier of Ukraine’s pro-Russia President Viktor Yanukovich triggered Russia’s annexation of the Crimean Peninsula. Centered in eastern Ukraine’s Donets Basin, or Donbas, the turmoil has taken more than 4600 lives. It has also opened a bitter rift among academics and scientists. Some see a union with Russia as a chance to recover the prestige and resources that research and scholarship in the region enjoyed in Soviet days. Others, like Semystyaga, fear persecution and believe that westward-leaning Ukraine offers a brighter future.

A key concentration of Ukraine’s scientific infrastructure—southeastern Ukraine hosts scores of universities and research facilities—is dissolving. In recent weeks, about 1500 scientists and professors and 100,000 students have fled rebel-held parts of the Luhansk and Donetsk regions in Donbas (see map, p. 16). In early autumn, the Ministry of Education and Science of Ukraine hurriedly began moving 11 universities out of rebel territory. Most relocated

to other parts of Donbas that Ukraine still controls, in some cases leaving the original campuses in the hands of separatists. Donetsk National University (DonNU), one of Ukraine’s leading universities, has set up shop 800 kilometers west in Vinnytsya.

Some of the displaced researchers have managed to spirit out valuable specimens and other research materials. But others have had to abandon their labs and life’s work. A multitude of scholars remain in the war zone because they will not forsake elderly family members, students, or research projects—or because they are loyal to the separatist regimes, the so-called Donetsk People’s Republic (DPR) and the Luhansk People’s Republic.

The National Academy of Sciences of Ukraine (NASU), which manages a couple of dozen institutes, field stations, and other facilities in Donbas, has come under fire for its slow response to the crisis. “There was a period in which it would have been possible

porary,” he says. “But in reality, it was the beginning of the end.”

DONBAS HAS TILTED TOWARD RUSSIA for decades, ever since Soviet authorities built it up as a hub for industry and mining, especially for coal. Not surprisingly, much of the research that took root there was yoked to industry. Naumovets, whose uncle served in a tank battalion that liberated Donetsk from the Nazis during World War II, says that Donbas scientists have done pioneering work in nanotechnology to strengthen metals and create ceramic powders. But while applied science dominated the region, oases of basic research also formed, notably in mathematics and environmental sciences. By the late 1960s, Donetsk had become one of six designated scientific centers of Ukraine.

Many elderly residents there are nostalgic for Soviet times, when workers had stable salaries and a predictable rhythm of life. After Ukraine became independent, Donbas’s subsidized economy lagged and its infrastructure decayed. Ukraine’s yearning for closer ties with Europe also unsettled many people, scientists among them. “They were afraid that meant competing at a European level. They knew they would have to produce scientific articles and work hard. But allied to Russia, they could be equals,” says a pro-Ukrainian geologist at the Ukrainian State R&D Institute of Mining Geology, Rock Mechanics and Mine Surveying in Donetsk who requested anonymity.

After Russia annexed Crimea, many in eastern and southern Ukraine hoped those regions would follow. Separatists in the Donetsk and Luhansk regions declared independence from Ukraine in April and held referendums on 11 May to lend the takeovers an aura of legitimacy. (The two rebel republics are recog-

nized only by the shadow state of South Ossetia.) In short order, two major science institutes cast their lot with the breakaway republics. Alexander Kovalev, the director of the Institute of Applied Mathematics and Mechanics (IAMM) in Donetsk, declared his fealty to DPR. “He handed the institute to the terrorists on a silver platter,” says one mathematician in Kyiv familiar with the situation. Kovalev’s defection prompted 35 IAMM mathematicians to decamp to Kyiv, where they have formed a new division of the Institute of Mathematics. (Asked by e-mail whether he thinks IAMM is better off under DPR rule, Kovalev wrote back: “Come to Donetsk without weapons. See



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Volodymyr Semystyaga, National University of Luhansk

to get equipment out, and I urged them to do so,” says physicist Maksym Strikha, Ukraine’s deputy education and science minister. “But they were too conservative-minded and tried to avoid any decisions.” When the insurrection in Donbas flared, “people assumed it was a fleeting problem,” explains physicist Anton Naumovets, a NASU vice president who chairs a committee of the academy’s leadership, or presidium, formed to tackle the problem.

Zoologist Igor Zagorodnyuk of the National University of Luhansk, who fled death threats from separatists in July, agrees. “Until the end of May, all of us believed the situation in Luhansk was absurd and tem-

for yourself.” He ignored other questions.) At the mining geology institute in Donetsk, Director Andrii Antsyferov also pledged his support, and the institute’s array of costly equipment and instrumentation, to the breakaway republic.

Other directors and their staff fled the rebel-controlled regions, out of loyalty to Ukraine or fear of the separatists. At the Luhansk Nature Reserve, where ecologists study the steppe, forests, and wetlands of the Donets Basin, armed groups arrived in June and proceeded to camp near the Russian border. Director Vitaly Bondarev summoned the police. When they showed up in cars marked DPR, “it was clear it was all over,” says Bondarev, who is a Ukrainian loyalist. The insurgents vacated the preserve, he says, but not before riddling it with land mines. He and his family left for Kyiv and he is now pursuing a doctoral degree in acarology—the study of mites and ticks—at the Institute of Zoology.

Roman Grynyuk had to evacuate an entire university. On Friday, the 20th of June, a group of armed men descended on the

Fraying at the edges

Kyiv authorities have moved 11 universities out of rebel-held territory in Donetsk and Luhansk. Science assets in Crimea are beyond their grasp.



administration building of the DonNU campus in Donetsk and demanded to see Grynyuk, the rector. “I was afraid we would be shot,” he says. The separatists evicted the administrators and commandeered the campus. “I tried to negotiate,” Grynyuk says.

“But there were many factions, and I wasn’t sure who the leader was.” He ordered most faculty and staff to take an extended vacation in July and August.

Even as fighting raged in August, Grynyuk held out hope that DonNU would be able to delay the fall term by only 1 month and resume classes on 1 October. But his hopes faded in early September, when DPR’s education and science minister, Igor Kostenok, ordered Donetsk universities to cease teaching Ukrainian history, literature, language, and law. “It was apparent to me that the university wouldn’t be able to continue to function,” Grynyuk says.

The coup de grâce came on 17 September, when armed men escorted into Grynyuk’s office a new acting rector: a former DonNU lecturer on Russian history named Sergey Baryshnikov. “Of course, my reaction was not positive,” Grynyuk says. He got on the phone to the education ministry in Kyiv, and they began hashing out plans for relocating the university.

Casting around for affordable options, the cash-strapped ministry learned that

Ukraine mourns a lost science jewel

By Richard Stone

Months before Ukraine began losing facilities and scientists in breakaway regions of eastern Ukraine (see main text, p. 14), another of its key scientific centers slipped away: Crimea. The peninsula’s mountains, Black Sea coast, and balmy



Ukraine had recently upgraded the 70-meter radio telescope in Yevpatoria.

climate had made it a magnet for science during and after the Soviet era. When Russia annexed it in March, “Ukraine lost some very precious assets,” says Serhiy Komisarenko, director of the Palladin Institute of Biochemistry in Kyiv.

Ukraine’s astronomy community took the biggest losses, Komisarenko says.

- The Crimean Astrophysical Observatory in Nauchny has a 22-meter radio telescope that pools data with other radio telescopes around the world to form a virtual instrument thousands of kilometers wide. Other telescopes on the 550-meter ridge map sunspots and identify orbital debris.
- The Crimean Laser Observatory, a sister facility in Katsiveli, did pioneering work in the early 1960s to measure the distance between Earth and the moon. In recent years, it has studied geodynamics—probing irregularities in Earth’s rotation, for example—by pinging satellites with laser pulses.
- The 70-meter radio telescope at the Center for Deep Space Communications in Yevpatoria has been used to communicate with Russian space missions and beam messages to other galaxies in hopes of making alien contact. Ukraine had recently spent millions of dollars upgrading the center, says Yaroslav Yatskiv, director of the Main Astronomical Observatory in Kyiv.

Ukraine’s marine scientists are keenly feeling the loss of two facilities devoted to studying the unique biology and physical conditions in the Black Sea: the Marine Hydrophysical Institute (MHI) and the Institute of Biology of the Southern Seas, both in Sevastopol. Other losses include the Karadag Nature Reserve and the Crimean branch of Ukraine’s Institute of Archaeology.

A handful of Ukrainian loyalists among the scientific personnel in Crimea have left the peninsula. Many other researchers there welcomed a reunion with Russia. Vladimir Fortov, the president of the Russian Academy of Sciences, said in July that the academy would form a department in Crimea and that institutes would be eligible to apply for Russian grants in 2015. Research will benefit, says Sergey Stanichny of MHI. “Corruption in Russian science is smaller than in Ukraine, and all procedures are more transparent,” he claims.

In response, Ukraine’s science ministry has proposed making Fortov persona non grata, says Maksym Strikha, a deputy science minister. “No official bilateral programs with Russia are possible now,” he says. “I did my Ph.D. in Leningrad,” Strikha adds. “Now I have no friends there.” ■

Crystal, a jewelry manufacturer in Vinnytsya, was struggling in the economic downturn, and DonNU could lease two derelict factory buildings for a pittance. Many DonNU faculty members had qualms about fleeing. DPR apparatchiks had warned of reprisals against anyone who tried. “They were told that there are very many cellars in Donetsk where they could end up and never be found,” Grynyuk says. Nevertheless, by early October the hegira from DonNU had begun. On 3 November, Ukraine’s science minister presided over the opening ceremony of DonNU-in-exile.

About 200 professors and lecturers (out of 700 before the split) are now nesting in spartan rooms almost devoid of furniture in the former jewelry factory. DonNU’s budget barely covers salaries, and it now must fritter away modest student enrollment fees on temporary lodging for relocated faculty.

Baryshnikov has dismissed the exodus’s impact, boasting that the rump DonNU he rules is a “powerful institution that cannot be transplanted like a ficus from one pot to another.” The truth is quite different, says Liliya Hrynevych, a legislator in the Verkhovna Rada—Ukraine’s parliament—and chair of its science and education committee. “It’s clear the quality of education in the shadow universities in Donbas will be so dubious,” she says, “that no one will want to employ their graduates.”

Grynyuk has appealed for overseas help to outfit DonNU-in-exile, including funds to renovate a pair of ramshackle dormitories donated by a local college. Classes for the 7000-odd registered students (60% of last year’s total), including about 500 residing in Vinnytsya, are online-only for the foreseeable future. “I hope in 3 or 4 years we’ll be able to return to Donetsk and reclaim our campus,” he says.

Other universities in occupied Donbas have shifted operations to cramped satellite campuses in regional cities under Ukrainian army control. “We thought moving them nearby would be less traumatic,” says Strikha, the deputy education and science minister. For example, the National University of Luhansk is now headquartered in nearby Starobilsk, but only about 20 professors have taken up residence there, says the university’s Zagorodnyuk. It, like DonNU, is now a virtual university. The education and science ministry

will do its best to keep a scientific pilot light burning at the embattled universities by funding “weak” research proposals, Strikha says. “We need to give them a chance.”

ABRUPTLY TRANSPLANTING a research career can be wrenching. DonNU-in-exile’s chemistry dean, Alexander Shendrik, opens his laptop to show photos of the teaching and research labs he abandoned back in Donetsk, equipped with spectrometers, x-ray crystallography machines, and other pricey instruments. He slaps his hand on his desk. “The losses are catastrophic,” he says. “For any chemist, his laboratory is his life.”

Others have managed to smuggle out key specimens and data. In his cramped new office—just a gap between exhibits at Ukraine’s National Museum of Natural History in Kyiv—Zagorodnyuk picks up a 200-gigabyte hard drive, wrapped in bubble sheet, containing all of his data and publications. “Guess how I got this out of Luhansk?” asks the zoologist. He passed through several checkpoints, where separatists rifled through his belongings, with the hard drive taped to his leg under his left sock.

Other contraband has arrived just hours earlier. Zagorodnyuk picks up a brick of several matchboxes glued together and slides one open. Inside is the delicate chestnut-brown skull of a Strand’s birch mouse. In another box nestle test tubes holding tiny skeletons. He opens one and plucks out a scrap of yellowing paper describing the specimen in ornate Cyrillic: It’s a northern mole vole collected in 1912 in southern Ukraine. A few dozen more boxes of bones are stacked on a shelf. Three days earlier, one of Zagorodnyuk’s graduate students who is riding things out in Luhansk had slipped into his mentor’s apartment and retrieved the collections. The student paid a train conductor to deliver the specimens to Kyiv.

Maksym Netsvetov’s research subjects—plants—are less portable. He’s head of phytocology at Donetsk Botanical Garden (DBG), one of Europe’s largest botanical gardens. Established in 1964, DBG is known for pioneering work in “industrial botany”—ecological restoration for a region scarred by factories and mines—and for its world-class herbarium, where taxonomists have identified more than 200 species of medicinal plants. Netsvetov and others spirited out irreplaceable specimens to Kyiv. But he worries about how the remaining plants will fare in Donetsk.

DBG staff members can’t get near the arboretum, and winter cold—fatal to the tropical plants if the greenhouse is not heated—is closing in. “Terrorists set trip wires in the arboretum connected to bombs,” Netsvetov says. “Before long, the tree collection will be lost,” he says, putting his hand to his forehead and wincing. “It’s hard not to get emotional.”

Back in Donbas, the atmosphere is only growing more poisonous. In November, at Donetsk State Medical University, the DPR-appointed rector gathered remaining staff and challenged them to openly declare their loyalties. Of the 800-odd people in the room, 11 had the courage to pipe up that they are pro-Ukrainian. “Others were just scared,” Netsvetov says. And at NASU’s mining geology institute, DPR officials showed up recently with sacks of money, “as if they’d robbed a bank,” says the pro-Ukrainian institute geologist. They doled out cash—but only to staff who support the separatists. ■



Among the prize specimens spirited out of Luhansk is this northern mole vole collected in 1912 in southern Ukraine.