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From Cold War to Warm Relations: Fertile Ground for Science Diplomacy in Central Asia

Alice P. Gast

ON October 27, 2011, U.S. Secretary of Energy Steven Chu presented the Department of Energy Secretary's Honor Award to researchers at Pacific Northwest National Laboratory who, from 1998 to 2010, disposed of spent nuclear fuel and weapons material from the fast breeder reactor in Aktau, Kazakhstan. These researchers, along with others, helped Kazakhstan to secure and move 11 tons of highly enriched uranium and 3.3 tons of weapons-grade plutonium, enough for 775 nuclear weapons. This award is a fitting recognition of our recovery from the high stakes and high cost of the Cold War nuclear arms race and the technical assistance needed to ensure a peaceful and safe outcome. It celebrates the transition from using scientists and engineers to develop weapons of mass destruction to employing many of these same technical experts in the effort to eliminate these very weapons. Thanks to the cooperative threat reduction program, brought about by the Nunn-Lugar Act in 1992, Kazakhstan is nuclear-free.

We are now, at last, entering an era when our scientists can work together in pursuit of common goals that address the grand challenges facing the world. While this is a story that is true for each of the countries where I have been serving as a United States Science Envoy—Azerbaijan, Kazakhstan, and Uzbekistan—in Kazakhstan in particular my efforts exemplify the potential and the limitations of science as a central part of U.S. diplomacy.

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Kazakhstan, which celebrated twenty years of independence on December 16, 2011, is a strategically important ally worthy of our attention. With the ninth-largest landmass in the world, located between Russia and China, Kazakhstan has thirty billion barrels of oil reserves—ranking it eleventh in the world—and substantial mineral resources of uranium, copper, zinc, and rare earth metals. The Atyrau-Alashankou pipeline carries oil from Kazakhstan to refineries in China. These resources, and Kazakhstan's role as a supplier of oil and gas from outside the Persian Gulf region, make it a country of significant geopolitical interest to the United States, Europe, and China and an important regional leader in Central Asia.

The Kazakh government has recognized the need to move from a commodities-based economy to an innovation-driven economy and has made some progress developing new educational and scientific initiatives. However, much remains to be done. While President Nursultan Nazarbayev has worked to make Kazakhstan an international player through his membership and leadership in international organizations and through development of collaborations, exchanges, and partnerships with U.S. and European laboratories and universities, Kazakhstan's economy remains reliant primarily on oil and minerals.

As the United States begins to search for specific ways to strengthen its partnership with Kazakhstan, both bilaterally and regionally, and Kazakhstan continues to look for ways to expand its knowledge economy, science can and should play an important role. The occasion of my visit to Kazakhstan in June 2011 provided that emphasis on science diplomacy.

What Is the Role of Science Diplomacy?

The establishment of the Science and Technology Adviser to the Secretary of State in 2000 was recognition of the increasing importance of science and technology in international diplomacy. The United States has benefited from the wisdom and leadership of four such advisers, and their role as "an advocate for science-based policy at the State Department" is a clear indication of the centrality of science and technology in foreign policy.

Science diplomacy gained additional official recognition by the U.S. government with the appointment of science envoys in 2009. The original focus was to have envoys travel to Islamic-majority countries as a follow-up to President Barack Obama's speech that same year in Cairo, Egypt. The science envoy is a voluntary role for a scientist to travel abroad as a private citizen, with the aid of the State Department and embassy staff, to look for potential links and collaborations.

To date, there have been six science envoys named to one-year positions. The envoys are described in the 2010 announcement as people who "will seek to deepen existing ties and foster new relationships with foreign counterparts and gain insights from other nations about potential areas of collaboration that will help address global challenges and realize shared goals."

My trip to Central Asia was similarly described by the U.S. State Department in a media note as a trip to "identify areas for cooperation on energy, education, public-private partnerships, and information technology in meetings with senior government officials, ministers and representatives from the scientific, education, nonprofit, students and business communities."

The science envoys' travels are thus mostly fact-finding and information collection trips made by people knowledgeable about the science and education communities in the United States. It is clear that the ultimate benefit of the work of volunteer envoys will be based on follow-up actions after the initial visits, leading to the formation of sustainable collaborations. Kazakhstan is ready for such increased collaborations and sustained partnerships.

I found the people of Kazakhstan to be welcoming, eager to engage in a dialogue about the future, and optimistic about change. Scientists greet fellow scientists with open arms, and I found the talent and spirit in the universities and institutes to be a harbinger for progress in the future. Senior scientists at research institutes proudly introduce their staff, though they are very conscious of the age distribution and the need to bring on young talent. Faculty and administrators at universities are ready to receive visiting professors and students. Science diplomacy is an excellent way to improve economic, educational, and political environments in Kazakhstan and similar countries.

Kazakhstan and the International Stage

In order to be successful, science diplomacy needs willing governments on both sides of the relationship. Since its independence, Kazakhstan has worked toward a role in the international community. It joined the United Nations on March 2, 1992, less than three months after gaining independence. Kazakhstan was a founding member of the organization promoting trust among bordering countries, known as the Shanghai Five, in 1996, which later became the Shanghai Cooperation Organisation. President Nazarbayev has also promoted Kazakhstan's leadership of the Organization for Security and Co-operation in Europe and the Organization of the Islamic Conference.

Despite these international engagements, progress is still elusive, and the influence of Russia and China is substantial. Kazakhstan has yet to realize its potential as a global innovation-based economy. Western collaboration will help, but it needs to be targeted on areas where progress can be made.

The United States and Kazakhstan have a long relationship, dating back to the latter's independence in 1991, in nonproliferation and elimination of nuclear and biological weapons and remediation of nuclear contamination. In 1992 the United States, Japan, the European Union, and Russia established the International Science and Technology Centers (ISTC) in order to provide former weapons scientists with opportunities to apply their talents to peaceful activities.

Now it is time to move those strong collaborations forward to focus on areas of science and technology promoting economic development and global competitiveness. The timing is especially good because the Kazakh leadership has made its support of international collaborations, science education, and enduring partnerships clear through new international agreements and by defining its priorities.

In 2010 the Kazakh and U.S. governments entered into the U.S.-Kazakhstan Science and Technology Cooperation Agreement, designed to strengthen educational and scientific collaborations between U.S. and Kazakh institutions. The agreement focuses on issues of interest to both countries: education, health, biotechnology, energy, seismic research, water resource management, information technology engineering, and the environment. The actions that follow the positive words in the agreement are critical and must begin immediately.

Kazakhstan and International Education

Soon after independence, President Nazarbayev recognized the need for a young cadre of professionals educated in the leading universities of the world. He launched the Bolashak program in 1994, and Kazakhstan has sent hundreds of students abroad every year since. The scholarship pays for all tuition, fees, and living expenses for attendance at many top universities in the United States and Europe. The scholars are required to return to Kazakhstan for five years, and Bolashak alumni can be found in multinational corporations, banks, embassies, startup companies, and government agencies. According to the website of the Kazakh Embassy, today there are 815 Bolashak scholars in 42 U.S. universities seeking bachelor's (73 percent), master's (26 percent), and doctoral (1 percent) degrees.

This profile of the international student from Kazakhstan will change dramatically as undergraduate students will be encouraged to attend the new and developing Nazarbayev University to be taught in English, and the Bolashak program will support graduate study abroad.

The government's foresight in understanding the power of higher education, and the need to "outsource" that education initially, has greatly served Kazakhstan. The commitment to helping young Kazakhs study abroad, while learning Western culture and practices, is admirable and sets the country apart from other former Soviet countries. The table showing the number of students studying in the United States per million residents indicates that Kazakhstan leads the countries in the Commonwealth of Independent States in sending students to the United States.

The requirement for students to return to Kazakhstan for at least five years may help prevent the "brain drain" that some countries experience when sending their talented youth abroad, although the number of scholars remaining in the country after five years is unavailable.

	2010-11 Academic Year Total # of Students	# of Students in U.S. Per Million Residents	2010-11 Academic Year % Undergraduates
Azerbaijan	440	52	44.5
Kazakhstan	1,890	121	57.9
Kyrgystan	279	50	40.5
Tajikistan	249	33	53.4
Turkmenistan	210	42	49
Ukraine	1,583	35	36.8
Uzbekistan	560	20	44.5

Source: Population figures from July 2011 CIA estimate

Kazakhstan and Science and Education

One of the most important factors making Kazakhstan a player in the international research and higher education community is the move from the huge Soviet system of scientific institutes governed by a national academy to a set of research institutes more closely connected to universities. The history outlined on the National Scientific Portal describes the development and transformation of the scientific institutes over the past century. Many of my discussions with science leaders centered on collaborations between institutes and universities, and several universities are making use of the experimental facilities available at institutes.

Independence from the Soviet Union was the beginning of many changes initially marked by a severe economic crisis. The number of science-based employees was reduced by a factor of three, and in 1992 the Ministry of Education and Science was formed to oversee science and technology policy in Kazakhstan. In October 2003 the National Academy of Sciences of the Republic of Kazakhstan was reformed by presidential decree, and it assumed the role of a modern academy with distinguished members but without the control of the central budget for science and education.

In 2009 President Nazarbayev announced the development of a new law, "On Science," that would reform the country's system of scientific research funding and create a new research university in Astana. In this law, passed in 2011, the president proposed the formation of research councils to select projects and determine grants with the advice of peer scientists. The law also holds the State Scientific Technical Commission responsible for determining the strategic direction of Kazakhstan's science and technical priorities. The Minister of Education and Science, Bakytzhan Zhumagulov, summarized the intended outcome as a "breakthrough in education, breakthrough in sciences and breakthrough in innovation development."

Achieving the goals in this rhetoric will require significant effort by the Kazakh government and may be the area where international guidance is most needed. The development of new universities, teaching in English and focusing on international collaboration, is laudable, but Kazakhstan is faced with the dilemma of how to

reform older institutions to develop the same level of quality throughout the educational system. The country needs concerted efforts from all of its universities and development of international collaborations and advisory boards to avoid the degradation of the scientific community into the "haves and have-nots."

U.S.-Kazakhstan S&T Future

Sustainable change requires willing participants and a long-term investment. The United States and Kazakhstan have built a base of political, scientific, and education relationships during the two decades since the end of the Cold War. In order to maintain and grow this base, we need collaborators sharing common interests in research, teaching, and economic development.

As the Vice-Minister of Education and Science Baktybay Kasymbekov has noted, Kazakhstan's priorities are in the areas of energy, raw materials processing, information and communication technology, and life sciences. These mirror our own as described in recent U.S. diplomatic visits, such as that of Assistant Secretary of State for the Bureau of Oceans and International Environmental and Scientific Affairs Dr. Kerri-Ann Jones to Kazakhstan in January 2011. To establish sustainable partnerships, we need three things: collaborative structures, financial support, and willing scientists and educators.

Collaborative Structures

In discussions with Kazakh leaders, they expressed the desire to have a standing bilateral committee in science and technology to facilitate cooperation. Such a committee could be added to the already existing Annual Bilateral Consultations between the two governments. Another approach would be to develop a bilateral committee bringing together academic, industrial, laboratory, and government leaders. Such a committee could promote and oversee collaborative activities, including:

- exchange of scientific delegations and individual scientists;
- exchange of students;
- sharing of research administration structures and technology transfer approaches;
- joint science and engineering programs between laboratories, universities, and institutes; and
- collaborative conferences, symposia, and exhibits.

We should build on past successes such as the 220 projects supported by the ISTC. The ISTC will move its Secretariat to Kazakhstan by 2015, and this organization can provide some of the structure needed to coordinate bilateral activity.

Financial Support

In addition to existing U.S. government funding for collaborations in energy, health care, water management, and environmental protection, private support from foundations and corporations will be essential. The Kazakh government is committing significant resources to new research universities that are building collaborations with foreign scientists. Global corporations benefit from collaborative projects where the best research and education is made available regionally. Investments in Kazakh research universities will be important for the highly skilled workforce needed to keep their businesses competitive. Now is the time for multinational corporations and the Kazakh government to choose collaborative areas and invest in them. A bilateral committee should oversee the investments.

Willing Scientists and Educators

There are talented scientists in Kazakhstan eager to collaborate. Researchers from the United States will be most attracted to work in fields of unique interest in the region such as rare minerals extraction and monitoring; avian influenza and Newcastle monitoring, treatment, and immunization; radionuclide production and radioactive waste management in sludge; and absorption and microbiotic technologies for water purification and metal extraction. Investments in these areas can build regional centers of excellence to attract international scientists.

In addressing U.S.-Kazakh relations, U.S. Ambassador John Ordway recently wrote in the *Astana Times*, "Over the last 20 years, we have developed a genuine and increasingly strategic partnership between our two nations. . . . A partnership is an on-going process. I am confident the foundation for ours is solid indeed and that it will continue far into the future." If science is to serve an important role in diplomatic efforts to build such a partnership with Kazakhstan, as signaled by the creation of the science envoy program, the U.S. government needs to look into strategic and sustainable approaches to science cooperation. A science envoy provides a beginning to make connections. Scientists and educators from both countries who want to collaborate and feel a need to spend time and energy building and maintaining a relationship are essential to longer-term progress. Sustainability will be more likely if we align our strategic objectives with science activities that might support them. Building on the ISTC collaborations with new programs aimed at an innovation economy is one such approach.

Strategically, we should be interested in Kazakhstan's transition from a commodity-based economy to an innovation-driven economy. If we do not provide the means to do it, China and Russia are likely to extend their influence in the region. Over the long run, links between the private sector, academic communities, and the governments will be essential to ensure long-term support for collaboration with this important emerging ally. SD