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Building a Lasting Cuba-U.S. Bridge through Science

Sergio Jorge Pastrana

ON December 17, 2014, the presidents of Cuba and the United States, Raúl Castro and Barack Obama, made unexpected simultaneous announcements that marked a departure from a policy that has been in place for more than half a century. The declaration that both countries will reestablish full diplomatic relations, though already a historical landmark, is yet to be fulfilled. Both administrations have said this process has just begun and may take time. This is an exceptional opportunity, but only if a bold new vision on both sides allows it to succeed.

While this is the first time in all those years that both governments have announced the intent to renew full diplomatic relations, there were previous attempts on both sides to establish constructive relations. Unfortunately, those attempts were always derailed. Despite poor diplomatic relations, long-standing scientific institutions in the United States and Cuba have found ways to work together. The work of researchers contributes to the advance of knowledge by small increments. Although the scientific process is constrained by societal, economic, and political elements, basic research has a pace and time scale of its own.

Collaboration between U.S. and Cuban scientific institutions started in earnest in the mid-nineteenth century, mainly between the Smithsonian Institution (founded in 1846), in Washington, DC, and the science section of the Economic Society of Friends of the Country (founded in 1793), as well as the Royal Academy of Medical,

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Physical, and Natural Sciences (founded in 1861), both in Havana. Several other institutions, from both countries, became involved in this collaboration during the following decades.

A regular exchange of letters, documents, scientific literature, and specimens occurred between some of the founders of U.S. and Cuban scientific institutions, notably between Felipe Poey in Havana and Joseph Henry and—especially—the naturalist Spencer Baird, the second secretary of the Smithsonian Institute in Washington, DC. Their correspondence, which covers several decades, is kept in the archives of the Smithsonian and the Academy of Sciences of Cuba, together with that of other naturalists who followed in their footsteps. Poey, Henry, and Baird are the forefathers of a tradition that continues to this day, according to which scientists from both countries strive to further knowledge by sharing ideas, experiments, and results. Thus, when both the U.S. National Academy of Science and the Cuban Academy were created in the early 1860s, bonds between some of their founding members were already in place.¹

This tradition continued into the first half of the twentieth century. Nevertheless, U.S. investments in Cuba since the nineteenth century were practically limited to large plantations and sugar mills. Scientific institutions, among them the Cuban Academy, had little support and a low social profile. Cuba also became a trial ground for many U.S. industrial products, so technologies and innovations found their way quite early to the Cuban market, but none of the research involved took place with Cuban participation. Havana became in many ways the second most sophisticated city of the Northern Hemisphere after New York, but all that progress had almost no local background or organic link to the rest of the country's economy or society.

Despite the limitations for creative scientific research, some distinguished Cuban scientists continued their cooperation with outstanding American naturalists by collaborating on publications and participating in joint explorations.² Natural history studies and geographical explorations were carried out mainly by individual scientists, with little government support, and with no guaranteed possibility of continuing such labors. Laboratory research in Cuba was restricted mainly to a small number of agricultural experimental stations and very few medical institutions. Research facilities were so scarce and so badly funded that a commission sent in 1950 by the International Bank for Reconstruction and Development (a branch of the World Bank) to evaluate the possible concession of loans to the Cuban government stated that "Cuba's economic development demands effective laboratory and field research facilities. But the Mission could not find any suitable applied research laboratory."³

After 1959, as Cuba and the United States grew apart, Cuban authorities chose an independent route toward development, based on an extraordinary effort in education, as well as a sustained drive to build a strong scientific establishment. Since 1962, the Cuban Academy has acquired functions similar to those of the science and technology councils established in several Latin American countries,

and the three existing public universities were reorganized that same year. New schools of engineering, medicine, and agriculture were established, and many scientific research institutes in several disciplines were organized.

Almost twenty years later, in the late 1970s, Cuba already was in a position to benefit from the studies generated by its pioneering researchers and the state-of-the-art facilities that had been built to promote research. Cuba began to produce scientific results that yielded several sophisticated products, mostly in the fields of pharmaceuticals and technical medical equipment. The science-technology-innovation-production cycle was completed locally for the first time.

During those initial efforts to develop a national Cuban scientific establishment, Cuba sent many students abroad to the Eastern European socialist countries for university studies, and for doctoral and postdoctoral training, and received hundreds of their technical and scientific advisors in return, but Cuba also welcomed scientists and scholars from many other countries, and maintained scientific exchanges with institutions from all over the world. Cuban leaders in science were getting their master's and PhD degrees in multiple other countries, including even a few in the United States. Several U.S. scientists contributed to developing the Cuban scientific establishment, with visits, cooperative research, and new ideas.⁴

However, in the mid-1970s, in order to build a more lasting scientific bridge between Cuba and the United States, Abelardo Moreno, a student and follower of Carlos de la Torre y Huerta⁵—who was a member of the Cuban Academy, director of the Cuban National Zoo, and a distinguished member of many national and international zoological organizations—established initial contacts with Theodore Reed, the director of the U.S. National Zoo in Washington. They both began to discuss the possibility for a continued exchange program between the Smithsonian and the Cuban Academy. Moreno had been an assiduous correspondent and distinguished visitor to the Smithsonian for many years, and he was a friend and colleague of its former secretary, Alexander Wetmore, until about 1973, when the correspondence dissipated given Wetmore's growing difficulty in surmounting the ever increasing political divide.

Early evidence of U.S. efforts in bridge-building comes in a November 29, 1977, memorandum—now located in the Smithsonian archives—in which Ross Simons, of the Office of the Deputy Secretary for Science, reports a meeting with National Science Foundation (NSF) representatives at which a planned first visit by a Smithsonian delegation to Cuba was discussed. This memo shows that at some point during the early years of the Carter administration, even the NSF had contemplated establishing links with some Cuban national organizations in order to finance joint programs of research, and that the NSF wanted to ensure that this new move toward an understanding with the Cuban Academy would not make the Smithsonian the exclusive U.S. partner.⁶

In late 1977, Moreno stressed to Cuban officials the importance of renewing contacts between the Cuban Academy and the Smithsonian.⁷ It was under the leadership of the deputy secretary for science, David Challinor, and through the good offices of Simons, and with a very diplomatic treatment of all the alternatives, that a proposed early 1978 Smithsonian delegation visit to Cuba was defended on the grounds of being a nongovernmental engagement. Indeed, the trip would be funded entirely from private sources.

At that time, the Cuban Academy had responsibilities that made it the equivalent partner of several U.S. institutions. In its advisory role, and as the representative of the national scientific community, it was an equivalent of the U.S. National Academy of Sciences. Regarding its role as the coordinator and facilitator of the integrated network of national scientific societies, it was the natural partner of the American Association for the Advancement of Science (AAAS, publisher of *Science & Diplomacy*). As the national governmental body in charge of coordinating the activities associated with the national system for science and technology, it had some responsibilities similar to those of the NSF. Finally, as the main organizer and administrator of science museums, zoos, and aquariums, the Cuban Academy in many ways had equivalent functions to those of the Smithsonian. This last mandate had then just been given, and it was only natural that Cubans should look for related expertise from the most developed institutions available. Besides, ambitious projects were under way to develop a new national zoological park and a national botanical garden. Any experienced institution in those fields was a most desirable partner for scientific exchange.

The Cuban Academy agreed to a schedule and undertook the necessary national coordination to invite a delegation of Smithsonian scientists, and Reed involved the participation of the U.S. National Museum of Natural History. By late 1977, almost everything was ready to make it happen. As planned, this first visit took place in early 1978.

It is important to note here the personal contact between the researchers and the extraordinary productivity of that first visit. The delegation of Smithsonian scientists arrived in Havana on February 26, 1978, and stayed for a week. Prior to the visit, the Cuban Academy had received the list of researchers and their fields of expertise and had begun identifying counterparts to attend to them.⁸ While the time constraint prevented field trips—except to locations that were very close to Havana and a short trip to the Boca at Zapata Swamp, the biggest swamp in the Caribbean—most of the Cuban hosts took their counterparts to view collections while also discussing possible long-term projects. Indeed, most of the hosts and counterparts continued to have productive and collaborative relationships over the years that followed.⁹

The first printed result of the visit came from the pen of Porter Kier, then director of the U.S. National Museum of Natural History. He was granted access to the Sanchez Roig collection of Cuban fossil echinoids through Amelia Brito, the

deputy director of the Institute of Geology and Paleontology. This unique historical collection—which was first publicized in the early 1950s in the Cuban Academy’s journal *Anales de la Academia de Ciencias*—was in need of a curator who could carry out a specialized revision. Roig himself had been a distinguished member of the Cuban Academy. Through a lending agreement, Kier studied the Sanchez Roig collection, compared it to equivalent collections of the Caribbean, and published a definitive revision of the *Fossil Spatangoid Echinoids of Cuba* in 1985.¹⁰ This serves as an excellent example of the importance of the kind of relationships scientific institutions foster.

Hosting the visit also involved informing the U.S. guests as thoroughly as possible about the development of a Cuban scientific community and the realities of Cuban society in the 1970s. The Cuban participants were intent on not turning this visit into a showcase, and instead they wanted to allow the visiting researchers as much time as possible at the collections and with their partners. However, there was so much lack of information and propaganda as a result of the political conflict (as there still is), that at least some insight on the history of Cuba and its institutions was required. As a result, the American visitors spent time at the central offices of the academy, the Museum of Natural History, the University of Havana, and the Museum of the City of Havana.

That this first visit was considered a success by Smithsonian authorities can be gathered from reports in their archives. S. Dillon Ripley, an ornithologist who was then secretary of the Smithsonian, expressed to members of Congress after the visit that it “was very successful from the Smithsonian point of view, and provided important opportunities for our staff to look into the scientific progress and status of collections there...”¹¹ An interesting detail arose from memos exchanged at the Office of the Deputy Secretary for Science right after the visit: the final cost allotted by the Smithsonian for a group of U.S. researchers to spend one week in Cuba was a mere \$9,388.¹²

This visit gave way to an invitation for a Cuban delegation of the academy to visit Washington the following year. The academy’s president, the hematologist Wilfredo Torres, led the Cuban delegation; he had been at the forefront of establishing Cuban scientific research institutions. Under the Cuban National Center for Scientific Research (CENIC), a facility founded in 1964 as a multidisciplinary lab and institute for postgraduate studies in several branches of science, Torres had been involved in starting research groups that would eventually mature into whole new centers. In close connection with universities, as a well-endowed laboratory facility, CENIC was the nucleus out of which came the six or seven most developed Cuban centers of advanced biomedical research during the late 1970s and early 1980s, as well as research in several other fields, such as animal and plant health.

The Cuban delegation comprised several of the counterparts from the previous visit.¹³ If the emphasis of the first visit was in finding counterparts for researchers interested in cooperation on both sides, and as such had succeeded, this second

delegation, on the Cuban side, was intent on building stronger institutional links that could provide common ground for longer-term activities.

This is when Ripley became directly involved in the exchange. He had been acquainted with Moreno, also an ornithologist, for many years. Every time they came across each other, they would immediately get lost in conversation. Likewise, during the visit, Ripley spent most of his time involved in discussions with Moreno.

The meeting was a success and had cultivated the ground for yet another encounter. As soon as the Cuban delegation arrived back in Havana, preparations were started toward Ripley's visit to Cuba and the possibility to sign some sort of long-term agreement outlining a continued relationship that relied on something more permanent than an occasional exchange of letters.

Early the following year, Simons went to Havana to prepare for Ripley's visit, and Simons and this author drafted the memorandum of understanding (MoU). This document was reviewed by legal advisors on both sides and was determined to be nonbinding for both governments. A very simple document, it is still in place and provides a common ground for a trusted and continuous scientific relationship for two institutions that have been sharing scientific links for more than a century and a half.

In April 1980, Ripley and his wife, Mary, a horticulturist, visited the Cuban Academy. Tirso W. Sáenz, acting president of the academy, Moreno, and the author hosted him. During a week in Cuba, he got acquainted with the academy and its research activity, attended the event establishing the Cuban Section of the International Council for Bird Preservation, and met with Cuban Vice President José Ramón Fernández and Council of State member Guillermo García Frías.

A bird-watching expedition was organized to Zapata Swamp, a haven for bird colonies. There he went to the Bay of Pigs and Playa Larga, grim reminders of how hard the conflict with the United States had recently been on Cuba. Finally, accompanied by the author, he visited the Museum of the City of Havana, where he met Eusebio Leal, who had just then begun a huge endeavor to recover and restore the splendor of Old Havana's historic buildings. Leal, now a member of the Academy of the History of Cuba, the Academy of Sciences of Cuba, and the Cuban Academy of Language, showed him what had been already accomplished, along with his plans and ideas. At the exhibits, Ripley paused to watch the collection of original vintage Cuban flags and remnants of the *Maine* battleship, sunk at Havana Harbor in 1898. He also read a facsimile of the Platt Amendment under the glass cover of the desk of the last U.S. military official to preside over the country, in 1902. As a parting gift, Leal handed out portraits of José Martí, with a facsimile inscription in Martí's handwriting that reads in Spanish, "And Cuba should be free, from Spain, and from the United States...."

Ripley signed the memorandum together with Sáenz, and commented on the need for scientists to increase that understanding of each other. Unfortunately, during his stay, the aura of cooperation was disturbed when several people

assaulted the Peruvian embassy in Havana, to gain access to diplomatic grounds, and, in the process, killed a guard. The Mariel boatlift followed, during which many Cubans tried to migrate to the United States. The next year, a Republican government would come to power in Washington, and for more than a decade the relationship that had been so assiduously built first dwindled and eventually came to standstill.

In 1985, Smithsonian Vice President Challinor, who had helped locate the necessary private funds to sustain initial exchanges with Cuba, visited the academy, and a plan to continue exchanges was discussed and signed. Both Challinor and the new secretary, Robert McCormick Adams Jr., who had replaced Ripley after his retirement the previous year, struggled for some time with the U.S. Department of State to uphold the Smithsonian's right to maintain a scientific exchange with Cuban researchers, but the Reagan administration's rhetoric grew increasingly harsh until the Smithsonian had no choice but to stay put. In the 1985 report on the Smithsonian's international activities, only one page is devoted to Cuba, and it only briefly mentions a policy meeting. The text simply lists those in attendance, including Oliver North of Iran-Contra fame representing the U.S. National Security Council.

The situation did not improve under the George H.W. Bush administration, and it was not until 1992 that contacts were resumed. In January, on the invitation of Wayne Smith, a professor of Latin American studies who was then with Johns Hopkins University, a delegation of Cuban scientists visited the Smithsonian for a roundtable on biodiversity. Hosted by the U.S. National Museum of Natural History, under its biodiversity program, and with the support of Don Wilson, the director for biodiversity at the National Museum of Natural History, and Simons, the Cuban group included Maria Elena Ibarra, director of the Institute of Marine Sciences at the University of Havana; Ángela Leyva, director of the National Botanical Gardens; Hiram González, ornithologist for the Cuban Zoo Society; Gilberto Silva, of the Cuban National Museum of Natural History; Miguel Vales, director of the Cuban Center for Biodiversity at the Institute of Ecology and Systematics; Jorge Foyos, then deputy director of the Institute of Oceanology; Pedro Rosabal, from the National Commission on the Environment; and the author. This group discussed alternatives to continue activities in support of natural history collections, joint expeditions, and joint research.

During the 1980s and 1990s, many other activities were started with the Smithsonian through different channels, such as collaboration on the history of science led by Pedro M. Pruna, José B. Altshuler, and Bernard Finn. Links with art museums, promoted by James Early at the Smithsonian, and links between the National Museum of the American Indian and the Antonio Núñez Jiménez Foundation for Nature and Humankind, were also fostered.

From this new start, many other activities have emerged, often promoted by the same experts on either side of the Florida Straits who have been involved over

decades. Much U.S. knowledge about Cuba has ensued. In 1998, the author had the opportunity to accompany the Cuban Academy president to the U.S. National Museum of Natural History, where they attended a panel of several American and Cuban scientists who discussed the full spectrum of joint research between the countries.

In addition to the still-effective MoU signed by the Smithsonian and the Cuban Academy in 1980, the academy signed MoUs with the New York Botanical Garden in 1994 and, a few years later, with the Social Science Research Council; the latter allowed for continued research exchanges in not just social and economic sciences but also natural and environmental sciences. Finally, in 2013, a new MoU was signed between the Cuban Academy and AAAS to continue this path of scientific contacts and exchanges.

Throughout all these years, the Cuban Academy and the U.S. National Academy of Sciences have had a common understanding, and shared actions, to advance the impact of science on world affairs through activities based in multilateral international organizations such as the International Council for Science, the InterAcademy Partnership, the InterAmerican Network of Academies of Sciences, and their respective networks of centers of excellence and specialized scientific societies. All these instruments favor the continuity of links that provide the necessary base for joint research so that scientists and scholars can engage on long-term projects that in turn will give basic and fundamental research the possibility to achieve results that provide new knowledge. However, as all those exchanges have to be supported exclusively by private funds, they can only advance very slowly and in small steps.

In recent decades, the scientific communities of Cuba and the United States have found several ways to come together and agree on what is essential to advance joint research in the best interests of both countries, peoples, and societies. They have made this point explicit in a number of papers and articles, but little can be accomplished under the present embargo, a limitation that cannot be ignored.¹⁴

By working together, the two scientific communities can create a formidable force to bring about capacity building elsewhere. Both strengths combined can bring a synergy that will provide new ground for extraordinary impacts. An example of that comes from the recent achievements in containing the Ebola epidemic in West Africa. Cuban doctors and nurses who were well trained to deal with catastrophes and epidemics, supported by U.S. personnel as well as those of other countries and nongovernmental organizations, seem to have curtailed the exponential spread of the disease. Although it is still too early to derive definitive conclusions, the outcome might have been much worse if not for Cuban doctors and nurses, along with U.S. hospital facilities.

Through the years, numerous Cuba-U.S. scientific links have produced results whenever cooperation has been allowed to proceed in good faith. Nevertheless, for

the two countries' scientific exchanges to be really productive in the long run, new efforts require a blank slate and guided by a new vision of bilateral relations.

No doubt, after more than half a century without diplomatic relations, various pending issues will need to be resolved between the two countries. And many would argue against a warmer relationship unless such-and-such steps are taken first. But science deserves a chance. Joint research in almost any field can only work for the best aims and needs of both countries and should be favored without any prerequisites. The evidence strongly suggests that Cuba-U.S. joint scientific research can provide opportunities for progress and capacity building in both countries and elsewhere.

Such progress, however, will require general licenses overruling many aspects of the embargo, the easing of various limitations (e.g., on banking, fiscal matters, customs, travel, movement) in both countries for scientific research activities, and, most important of all, a fundamentally changed vision. At least in the realm of science, we should be able to find creative ways to engage in continued cooperation that can bring us much needed solutions for urgent global problems that impact both countries. This joint scientific endeavor can help build a solid bridge of understanding across the existing political divide. **SD**

Endnotes

1. A good narrative of these exchanges can be found in Pedro Marino Pruna Goodgall's inaugural lecture for the exhibition *El naturalista cubano Felipe Poey y el descubrimiento de la biodiversidad en el siglo XIX*, at the Smithsonian Tropical Research Institute in Panama, September 5, 2005.
2. One example is Carlos de la Torre y Huerta, Felipe Poey's main disciple and also a member of the Academy of Sciences of Cuba. His counterparts for many years were William Morton Wheeler and Thomas Barbour, from Harvard's Museum of Comparative Zoology, as well as John B. Henderson and Paul Bartsch, from the U.S. National Museum of Natural History. Several volumes on Cuban mollusks, coauthored by Torre and Bartsch, were published by the Smithsonian. Additionally, Henderson and Torre organized an expedition in 1914 to Los Colorados Keys, on Cuba's northwest coast. See John B. Henderson, "Handbook of Cuban Land and Freshwater Shells," typewritten MS, Smithsonian Archives; see also "Log Book of the 'Tomas Barrera,'" Smithsonian Archives. Years later, Bartsch also explored several islands and keys on the southern coast of Camagüey province, in eastern Cuba. See Paul Bartsch et al., "The Avifauna of the Cayeries of Southern Cuba with the Ornithological Results of the Paul Bartsch Expedition of 1930," *Smithsonian Contributions to Zoology* (1989).
3. *Report on Cuba: Findings and Recommendations of an Economic and Technical Mission Organized by the International Bank of Reconstruction and Development in Collaboration with the Government of Cuba in 1950* (Baltimore: Johns Hopkins University Press, 1951), 223.
4. While the list of researchers is very long, some notable American scientists who visited Cuba during the later twentieth century include William Golden, Lynn Margulis, Harlyn Halvorson, Leon Lederman, George Wald, Murray Gell-Mann, S. Dillon Ripley, David Challinor, and Brian M. Boom.
5. Moreno continued a tradition of cooperation started from the earlier-described links begun by Poey and followed by Torre; all were members of the Academy of Sciences of Cuba. See note 2.
6. Ross Simons to Theodore Reed and Porter Kier, November 23, 1977. Internal memo on a meeting with Eduardo Feller of the National Science Foundation, Smithsonian Archives.
7. The discussion participants included the academy president, Wilfredo Torres, a hematologist who graduated from the University of Havana; its vice president, Tirso W. Sáenz, a chemical engineer who graduated from Rensselaer Polytechnic Institute; its general scientific secretary, Ismael Clark, a biochemist who is today president of the Cuban Academy and who graduated from the University of Havana and also studied at the University of Jena in Germany;

and the author, who had recently graduated from the University of Havana. At the time, the author was in charge of cooperative programs with international scientific organizations and was already becoming interested in science policy studies.

8. This group included five scientists from the National Zoo: Theodore Reed, its director and a veterinary scientist; John Eisenberg, an expert on mammals; Eugene Morton, an ornithologist; Dale Marcellini, a herpetologist; and Jaren Horsley, an expert on invertebrates. Participants from the National Museum of Natural History were as follows: Porter Kier, its director and a paleontologist; Robert Read, a botanist and specialist on palms; Douglas Ubelaker, an anthropologist; Meredith L. Jones, a specialist on sea worms; Raymond B. Manning, an expert on marine invertebrates; C.W. "Bill" Hart, a specialist on invertebrates interested in cave shrimps; and Storrs Olson, a fossil ornithologist. The group was completed by Ross Simons, who represented the Office of the Secretary.
9. Cuban counterparts included Abelardo Moreno, director of the zoo and an ornithologist, who accompanied Theodore Reed during most of his visit and discussed plans for the new zoo. Hiram González, a young Cuban ornithologist, not only hosted Eugene Morton and Storrs Olson and showed them the collections in Havana but also maintained a productive relationship with them through the years dedicated mainly to the study of shared migratory bird species. González much later served for many years as director of the Cuban National Museum of Natural History and was eventually elected president of the Cuban National Zoological Society, a position he held until very recently. Dale Marcellini was hosted by a very young researcher named Lourdes Rodríguez Schettino, who at the turn of the century published a seminal monograph on Cuban anole lizards that was, in many ways, a result of continued cooperation between Cuban and U.S. partners. See Lourdes Rodríguez Schettino, ed., *The Iguanid Lizards of Cuba* (Gainesville, Florida: University Press of Florida, 1999). The three marine biologists were hosted by Rodolfo Claro, who was then director of the Institute of Oceanology. Both he and his institute colleagues maintained ties with their U.S. partners; with two of them, he published an updated edition of his book *Ecology of the Marine Fishes of Cuba*, now a definitive reference: Rodolfo Claro Madruga, Kenyon C. Lindeman, and Lynne R. Parenti, eds, *Ecology of the Marine Fishes of Cuba* (Washington, DC: Smithsonian Institution Press, 2001). Robert Read was hosted by Onaney Muñiz, also a specialist in tropical palms (see previous note for Read). Both developed close ties with colleagues in their respective countries before passing away. Ubelaker was the most obvious mismatch in the delegation, since there was no equivalent anthropologist active during his visit to the academy (his most obvious partners were abroad at the time). All the same, he was able to visit the Montane Anthropological Museum collections at the University of Havana.
10. Porter M. Kier, "Fossil Spatangoid Echinoids of Cuba," *Smithsonian Contributions to Paleontology*, No. 55, (March 1985).
11. Letter sent by S. Dillon Ripley to members of Congress before the Cuban delegation's visit in May 1979, Smithsonian Archives.
12. T. Ames Wheeler to David Challinor, May 9, 1978, internal memorandum, Smithsonian Archives.
13. This group included Rodolfo Claro and Onaney Muñiz. Two women researchers were also included, with none having joined the first visit. Amelia Brito, now retired, had been instrumental in helping Kier, and Nuria Gregory, now director of the academy's Institute of Literature and Linguistics, was then interested in gaining access to Library of Congress contacts, given that she led (and still leads) Cuba's second most important library. Gustavo Kouri, director of the Cuban Institute of Tropical Medicine, which was then being created, and the author, representing the international office of the Cuban Academy, completed the delegation. Kouri eventually became a vice president of the Cuban Academy, a post he held until his death in 2011. The author became foreign secretary of the Cuban Academy in 1996.
14. See Sergio Jorge Pastrana (Cuban Academy) and Michael T. Clegg (U.S. National Academy of Sciences), "U.S.-Cuban Scientific Relations," *Science* 322, no. 5900 (October 17, 2008): 345; Brian M. Boom, "Biodiversity without Borders" *Science & Diplomacy* 1, no. 3 (September 2012); Stephen Johnson, Nicholas R. Lombardo, and Sadie May Davis, *U.S.-Cuba Academic and Science-Based Exchanges* (Washington, DC: Center for Strategic and International Studies, August 2012); Kathy Wren, "Science Diplomacy Visit to Cuba Produces Historic Agreement," *American Association for the Advancement of Science*, April 30, 2014; and Gerald R. Fink, Alan I. Leshner, and Vaughan C. Turekian, "Science Diplomacy with Cuba," *Science* 344, no. 6188 (June 6, 2014): 1065.