

SCIENTIFIC COOPERATION AS A BRIDGE  
ACROSS THE COLD WAR DIVIDE: THE CASE  
OF THE INTERNATIONAL INSTITUTE FOR  
APPLIED SYSTEMS ANALYSIS (IIASA)

Alan McDonald  
*International Institute for Applied Systems Analysis*  
*Laxenburg, Austria*

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International Institute for Applied Systems Analysis, Laxenburg, Austria  
Tel: +43 2236 807 Fax: +43 2236 73148 E-mail: [publications@iiasa.ac.at](mailto:publications@iiasa.ac.at)

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# Scientific Cooperation as a Bridge Across the Cold War Divide

## The Case of the International Institute for Applied Systems Analysis (IIASA)<sup>1</sup>

ALAN McDONALD

*Environmentally Compatible Energy Strategies Project, International Institute for Applied Systems Analysis, A-2361 Laxenburg, Austria*

### INTRODUCTION

The idea for the International Institute for Applied Systems Analysis (IIASA) was first proposed by Lyndon Johnson in 1966 as one of several “bridge-building” initiatives between the United States and the Soviet bloc. The goal was to bring together researchers from different countries and disciplines to study problems common to advanced economies—pollution, health care delivery, traffic congestion, and the management of large enterprises in general. Formally nongovernmental, IIASA was founded in 1972 by twelve National Member Organizations (NMOs), with political and financial support from their national governments.<sup>2</sup>

The purpose of this chapter is to offer lessons from IIASA that might be useful to future efforts at scientific cooperation across political divides. To that end, only those aspects of IIASA’s history that I believe hold the most lessons for such efforts will be discussed. These include the origins of the idea in 1966, the negotiations leading to IIASA’s formal founding in 1972, start-up issues in the 1970s, the withdrawal of White House support in 1982, and three key developments in 1990—renewed White House support, the end of the Cold War, and a new research agenda for the Institute.

I purposely tell the story in some detail so that others can also draw their own lessons. The creativity needed to move a negotiation through an apparent impasse often comes from creative analogies with success stories from other negotiations. The IIASA negotiations are a success story, and the more one knows the details, the more one can draw such useful imaginative analogies down the road.

The paper provides an American perspective on IIASA’s history, primarily because U.S. source documents were simply much more available than those from other countries. A complete and balanced history is still to be written.

### THE INITIATIVE WITHIN THE UNITED STATES GOVERNMENT

IIASA’s story begins with National Security Action Memorandum 345 (NSAM 345). Issued on April 22, 1966, NSAM 345 addressed principally American nuclear planning, but it also laid out a policy that came to be called “bridge-building,” of which IIASA was to be one small part. Bridge-building began with the logic of con-

tainment, defined by George Kennan as a "long-term, patient but firm and vigilant containment of Russian expansive tendencies," which would eventually lead to "either the break-up or the gradual mellowing of Soviet power."<sup>3</sup> In the 1966 White House the argument appears to have been that bridge-building would either make the break-up safer or, what may have amounted to the same thing, speed the mellowing.

Bridge-building came to encompass many initiatives, although not all were undertaken solely to build bridges. Bridge-building included reducing export controls on East-West trade, extending Export-Import Bank credit guarantees covering Eastern Europe, upgrading legations to full ambassadorships, establishing grounds for a non-proliferation treaty, easing Polish debt burdens, financing American exports for a Soviet-Italian FIAT auto plant, negotiating a civil air agreement with the Soviet Union, liberalizing U.S. travel to Communist countries, and exchanging with the Soviet Union cloud photographs taken from weather satellites.<sup>4</sup>

In response to NSAM 345 an interagency group was convened to generate specific possibilities under the chairmanship of Dean Acheson, then a consultant to the Secretary of State. Its final report on June 3, 1966 covered the range listed above and included the following comments:

An East-West Foundation or University might be established in one of the Eastern European countries or Austria. The purpose would be to provide Western instruction in subjects of acute practical importance to the Eastern Europeans, e.g., agriculture, business administration and modern management techniques.

On June 15 President Johnson was due to address a delegation of visiting Austrian businessmen in the Rose Garden. Francis Bator, Deputy Special Assistant to the President for National Security Affairs, suggested the occasion be used to propose new bridge-building initiatives, including "an East-West Institute of Management and Administration." Johnson's reaction was positive; Secretary of State Dean Rusk's was not. Rusk was concerned that such an initiative would undercut the U.S. policy of non-recognition of East Germany. He wished to consult first with Western allies through a discussion in the NATO Council and turn the idea into an international Western proposal. Johnson chose postponement. If Rusk was deeply persuaded that proposing an East-West Institute was not wise, Johnson would do the speech without bridge-building proposals.

By July 8, there was another National Security Action Memorandum, NSAM 352, and its subject was specifically "bridge-building." It began,

The President has instructed that—in consultation with our allies—we actively develop areas of peaceful cooperation with the nations of Eastern Europe and the Soviet Union. He has asked the Secretary of State to examine and propose to him specific actions the Government might take. These actions will be designed to help create an environment in which peaceful settlement of the division of Germany and of Europe will become possible.

NSAM 352 set in motion an effort culminating in President Johnson's October 7, 1966 speech to the National Conference of Editorial Writers. In what became known as the "bridge-building speech," Johnson announced seven new initiatives and reaffirmed two already in train, but the list still did not include the East-West Institute.

On November 30 Bator sent a memo to Johnson in which he recalled the history of the East-West proposal, Johnson's favorable reaction, the decision to hold off until NATO colleagues were consulted, and the absence of action since, concluding,



... if you are still favorably disposed, I recommend that we do a quick NATO check and go ahead with an announcement, perhaps next week ... If you want him to take this on, Mac [Bundy] would be ready and willing ...

We would not want to nail down the specifics at the outset; it would offend both our friends and the Eastern Europeans. Bundy's job would be to conduct a real consultation, not a hard sell. However, those of us who have worked on the idea have in mind an institution based on the proposition that *all* advanced economies—capitalist, socialist, communist—share the problem of efficiently managing large programs and enterprises: factories and cities, subway systems and air traffic, hospitals and water pollution. There is great demand—in Russia and Yugoslavia as well as the UK and Germany—for the new techniques of management designed to cope with these problems.

Johnson approved, with instructions to clear it with Rusk, and then go ahead as proposed. Johnson himself would call McGeorge Bundy, who had earlier been Johnson's Special Assistant for International Security Affairs and was now the president of the Ford Foundation. Bundy's appointment was made public on December 15, 1966, but Ambassador Llewellyn Thompson alerted the Soviets prior to the announcement to improve the likelihood of a favorable reaction.

### EXPLORATIONS AND NEGOTIATIONS

During the next few months Bundy met with U.S. and Western academics, business leaders, Executive Branch officials, Congressmen, the Soviet Ambassador Anatoly Dobrynin, and ambassadors of various U.S. allies. By April 17, 1967 he was able to write to Bator in the White House that he believed it worth continuing the exploration. The Soviet government had extended an invitation to visit, and Bundy was prepared to go, presuming the White House approved of the direction of his explorations. His counterpart in the Soviet Union would be Jermen M. Gvishiani, Deputy Chairman of the State Committee for Science and Technology and son-in-law of Soviet Premier Aleksei Kosygin.

In May and June Bundy visited London, Moscow, Paris, Bonn, and Rome, together with Eugene Staples of the Ford Foundation and, in Moscow, Carl Kaysen, Director of the Institute for Advanced Study at Princeton University. They found interest ranging "from considerable to great" in increasing international cooperation in the study of large common problems. But the written report of the trip, which at later stages Bundy circulated widely in the United States and overseas for comment, never once mentioned bridge-building or the original White House motivations. Instead, it described solid support for continued efforts based solely on the merits of the proposed international cooperative research.

Meanwhile, major developments were taking place between the United States and the Soviet Union. The two countries managed to exercise coordinated restraint during the Six-Day War in the Middle East (June 5–10, 1967), and in late June, at Glassboro, New Jersey, the first summit meeting between the countries in six years proved a notable success. By all accounts, Premier Kosygin and President Johnson developed a personal appreciation and understanding of each other that had eluded their predecessors. Although Johnson and Kosygin were at pains to emphasize their deep continuing differences particularly over Vietnam and the Middle East, the popular reaction in the United States was strikingly positive. Kosygin likened his recep-

tion in Glassboro on the second day of the summit to a homecoming. Crowds of people lined the streets, some with signs reading "Welcome Back," "Peace, Tovarich," and "Thank you, friend." More than 2,000 people waited through a muggy afternoon and a heavy rain shower to cheer every phrase of impromptu post-meeting remarks offered by what the *New York Times* described as a "startled and obviously pleased" Kosygin. As the *New York Times* editorialized,

If in the long run the talks ... help promote a lasting improvement in Soviet-American relations, much of the credit will belong to the people of Glassboro. The spontaneity with which they took Premier Kosygin to their hearts and the manifest genuineness of their interest in peace and international cooperation obviously had an infectious effect on the Russian visitors.<sup>5</sup>

In August Bundy asked Bator for White House guidance on two issues: (1) Should it be made clear to the Soviets that the two Germanies could not be treated symmetrically? and (2) Were there White House objections to locating a center in London or Paris, rather than Vienna? Bundy's team had heard suggestions in Western capitals that Vienna and other neutral possibilities did not offer the needed range and concentration of intellectual resources. There were no White House objections, and for the next several years U.S. negotiators emphasized London and Paris as locations preferable to Vienna. The German question was more difficult, but in the end the answer was also "no." It was better to avoid the German question for the moment than delay further discussions until U.S. positions had been thoroughly hashed out. The German question was anyway a moving target. West German policy clearly opposed full and equal participation of East Germany in international institutions, but in the summer of 1967 West Germany was beginning its own policy of bridge-building.

Nor did the Soviets want to leap immediately to the German question. Kosygin had returned from Glassboro firmly impressed that Johnson was sincere in his vision for a more peaceful world and his interest in improving U.S.-Soviet relations. Johnson and he had even spoken briefly about the possible East-West center. Nonetheless, a major point of Soviet policy was the status of East Germany. If Gvishiani could negotiate a deal that would raise East Germany's international status, it would be very attractive to the upper echelon of the Soviet government. Still, he too felt it wiser not to press for too much too soon. As Ambassador Thompson described to Bundy during a January 1968 conversation with Gvishiani "... [he] made clear that he was interested in finding a way to avoid this problem rather than to press for inclusion of the East Germans."

In the fall of 1967 Bundy began a round of correspondence to convene a small international meeting of experts in the fields proposed for study at the East-West Center. Prime Minister Harold Wilson had placed responsibility for the British role in the hands of Sir Burke Trend, Secretary to the Cabinet. Bundy gently encouraged Trend to have the United Kingdom sponsor the small international meeting of experts, emphasizing to both Trend and Wilson that London might be the best place for the center to ultimately reside. The British did take the lead, and in February 1968, Sir Solly Zuckerman, Chief Scientific Adviser to the Prime Minister, wrote to Bundy, Gvishiani, Pierre Massé (President of Electricité de France), Hans von Heppé (State Secretary of the West German Ministry for Scientific Research), and Ambassador Caruso (Secretary General of the Italian Ministry of Foreign Affairs). The University of Sussex had agreed to host an informal meeting of experts. Each of the

five countries, in addition to the United Kingdom, could send four participants. Individuals would participate in their personal rather than representative capacities, and there would be no commitment by governments.

Gvishiani immediately raised the German question. His own participation in the Sussex meeting, he suggested, might hinge on whether an "acceptable solution" could be found to the fact that Sussex had invited representation from West Germany but not from East Germany. Zuckerman hinted broadly that Gvishiani could include an East German on his own team if he chose, a possibility Zuckerman had already cleared with the West German Foreign Ministry. The meeting was to start on Saturday, June 16, 1968, but at the last moment, the Soviets cabled that they, the Poles, and the East Germans would not be attending due to the flare-up of tensions in Berlin.<sup>6</sup> Nonetheless the meeting went ahead on June 16-20, 1968, with solid representation from West Germany, France, Italy, the United Kingdom, and the United States.<sup>7</sup> The Soviet absence was a clear disappointment, but the argument that a center would be valuable on its non-political substantive merits alone was by this time well developed and oft-repeated. No one with any diplomatic experience had expected completely smooth sailing given the difficult political issues to be addressed on both sides, and the possibility of creating a center without the Soviets, but leaving them the option of joining later had been previously raised. The Sussex conference concluded by forming a small planning group to be chaired by Zuckerman, which would address the following four points: (1) surveying current applications of systems analysis to civil problems; (2) considering commissioning pilot studies; (3) elaborating more specific proposals; and (4) considering a further meeting.

A few weeks later, Gvishiani was sending clear signals of continuing interest. Within days of receiving a report on the Sussex meeting from Zuckerman he wrote to Bundy emphasizing Soviet interest.<sup>8</sup> A week later he took advantage of a Paris meeting with Aurelio Peccei of Italy to reinforce the message and express specific interest in meeting with Bundy and Zuckerman in the fall, when he would next be outside the Soviet Union.<sup>9</sup> East-West tension increased in August when the Soviet Union and its allies entered Czechoslovakia, but this had no evident effect on discussions about the center. Indeed, Gvishiani met in Rome in October with Peccei and Zuckerman. His absence in Sussex, he explained, was because "The issue of East German participation, when it had become known that a West German team was turning up, had then been raised to an unnecessary level of importance ..."<sup>10</sup> Gvishiani assured Peccei and Zuckerman that Soviet interest was still considerable, and he stressed the particular Soviet interest in incorporating modern techniques of forecasting in their planning process. He emphasized the importance of focussing on methodology rather than political considerations. The less emphasis on politics, the less likely would be problems like those which kept the Soviets from Sussex.

In the United States, the Sussex report was circulated to a number of distinguished academics. Their reactions were generally supportive, and Bundy's team would turn again to these academics as discussions progressed. Throughout, the team continued to expand the list of people to be consulted, possibly entrained in the planning, and, with luck and persistence, recruited to the center when all was said and done.

Zuckerman, Bundy, Peccei, and Gvishiani met in Vienna on December 8, 1968, producing an *aide memoire* that was circulated to key Sussex participants. While fo-

curring on the substantive value of systems analysis research, it also dealt satisfactorily with Gvishiani's key concerns: "that the undertaking be non-governmental, that it be scientific in spirit, and that it should be open to others besides the initiating parties."<sup>11</sup> Peccei pushed for an early larger meeting to follow up Sussex. Zuckerman and Bundy did not want to lose momentum, but did not want to gather too big a group prematurely. Moreover, Richard Nixon was to be inaugurated in January 1969, and it would take time for the new administration to establish its position on President Johnson's initiative.

Peccei was able to write to Gvishiani on December 20 that "competent people" in the Italian government approved and supported what had been discussed in Vienna. However, Peccei's main interest on December 20 was in another project he had discussed with Gvishiani "concerning the Problems of World Future." This was an initiative of the Club of Rome. Peccei pursued both in parallel, and while he was at pains to assure that what was to become IIASA not be confused with the Club of Rome, his efforts were not always enough for Zuckerman, who was unenthusiastic about the global modeling that came to be featured in *Limits to Growth*.<sup>12</sup>

In the United States, Bundy, assisted by Howard Raiffa and Joseph Bower of the Harvard Business School, convened groups of academics to refine aspects of their thinking and engage those they would eventually want involved in the center's work. To quite a few they gave questionnaires asking directly whether they would consider working at the center, what would be important considerations in their decisions, and how they ranked different possible locations. In the responses addressing location, Vienna was ranked very low.<sup>13</sup>

In July Bundy, Bower, Peccei, and Zuckerman traveled to Moscow for meetings with Gvishiani and others. Zuckerman's resulting *aide memoire* showed increased specificity.<sup>14</sup> There would be eight founding members (unnamed) and a structure built around four elements: a Council, a Conference to advise the Council, the Management, and Scientific Advisers. The *aide memoire* did not include a key oral agreement that had been reached. The institute's Council Chairman would be from the Soviet Union, the Director from the United States, and the location in the United Kingdom.<sup>15</sup> At the suggestion of Gvishiani, the sole official language would be English.<sup>16</sup>

They hoped to organize a meeting of founding members in mid-November in London, but the timetable slipped. In October Willy Brandt had been elected West Germany's first Social Democratic Chancellor, and time was needed to obtain final assurances from the new government about its participation and consent to East German participation. In the United States, Bundy had discussed the IIASA initiative with Henry Kissinger and Lee DuBridge of the Nixon administration during the summer,<sup>17</sup> and in September Bundy and Raiffa reported on their efforts to the National Science Board (NSB), the governing board of the National Science Foundation (NSF). They proposed that the initiative should continue and that eventual U.S. participation in the institute should be managed by the National Academy of Sciences (NAS) and financed by the NSF. The NSB concurred.<sup>18</sup> In October President Nixon designated the NSF the responsible agency for providing U.S. financial and administrative support and instructed NSF Director William McElroy to "seek financial support in the Foundation's budget for the 'International Institute for Applied Systems Analysis.'"<sup>19</sup>

Under the new administration Philip Handler, President of the NAS, became the principal U.S. negotiator, and an NAS advisory committee was formed under the chairmanship of Kenneth Arrow. In May 1970 Handler visited Rome, Vienna, and Moscow. In Rome he met with Peccei and other Italians promoting Milan as a site for the center. In Vienna he met various Austrian officials advocating Viennese sites. In Moscow Gvishiani's team pressed for a Viennese site as well as for a Soviet Deputy Director to balance the American Director. The Soviets had prepared three documents including a "Confidential Annex" for Handler's attention only. It hinted that the Soviets might require the center to be exempt from an existing U.S. embargo of computer exports to the Soviet Union as a condition for Soviet participation. It was a hint the Americans chose not to treat seriously and the Soviets chose not to pursue.

At this point IIASA's founding was still more than two years away, but those involved expected it to come sooner. The principal remaining differences were location, the relative authority of the Council and Director, and the relative importance of methodological and applied research. The Soviets preferred Vienna for its proximity, neutrality, low cost of living, other international organizations, cultural amenities, infrequency of strikes, and the facilities and favorable tax treatment being offered by the Austrian government.<sup>20</sup> The Americans argued that Vienna lacked appeal in terms of intellectual and research resources for the Westerners they would want to recruit. France, Italy, West Germany, and the United Kingdom each had offers of their own on the table to host the institute. The Soviets wanted a relatively powerful Council<sup>21</sup>; the Americans wanted to assure the Director flexibility. The Western countries wanted all authority for hiring in the hands of the Director. Soviet and Eastern European proposals argued for national hiring quotas and giving national organizations a strong say in who would be recruited from their countries.<sup>22</sup> The Soviets were hesitant about research moving beyond methodology. Westerners believed applications were essential if the institute was to be worthwhile.<sup>23</sup>

There was agreement to be found in several areas. Both sides agreed on a four-fifths majority voting rule to assure an effective veto to both East and West. Additionally, there was agreement on the financial formula: both the United States and Soviet Union would pay one-third, and the last third would be divided evenly among remaining members, for a total of U.S. \$3 million.<sup>24,25</sup> Finally, there remained the key understanding between the Americans and Soviets that the latter could select the Council Chairman while the former could select the Director.<sup>26</sup>

The picture that was emerging was of a standing conference in which all participating countries could have one representative, some of whom also served on the Council. The conference was advisory, but the Council had real authority. It was important that the Council's size be limited; some seats would be permanent, and some would rotate. East-West balance was important.<sup>27</sup> Underlying the variations discussed was a Soviet objective of administrative arrangements that would keep important decisions in the hands of the Americans and Russians.<sup>28</sup> In some ways it looked like the UN, but it would retain its non-governmental label and membership, and it would be restricted, at least initially, to a small number of industrialized countries.

Zuckerman was hoping for a general conference in the fall, but that proved impossible given the pace of talks. There was also tension between Zuckerman's initiatives in his role as the formal chairman of the planning effort, and Gvishiani's

interest in the United States and Soviet Union maintaining implicit control of the process.<sup>29</sup> Zuckerman, Handler, Gvishiani, and Philippe Richer (Deputy Delegate-General, General Delegation for Scientific and Technical Research, France) met in London on December 3, 1970.<sup>30</sup> The meeting was considered "completely informal and unofficial," though all four participants confirmed for the record their explicit authority to negotiate on behalf of their governments. Gvishiani was clear on his objective—ironing out all details so there would be no points of disagreement when they convened a general conference to found the institute formally. Progress was definitely made toward finding formulations that struck the right balance first, between the Council's authority and the Director's, and second, between methodological and applied research. Agreement on a site was more problematic. They agreed only to form a small working group to collect information related to site-selection criteria.

On June 1, 1971, Handler met with Peccei and Gvishiani in Vienna, and flew to Paris to meet the next day with Pierre Aigrain and Philippe Richer. They discussed a draft charter Handler had sent Gvishiani in January, clarified terminological stumbling points, and generally reached apparent agreement on everything except the site. West Germany had now joined Gvishiani and the Easterners in backing Vienna. The group agreed that Zuckerman should convene a multinational preparatory meeting in Paris in October. Gvishiani and Handler would revise the draft charter by correspondence to assure an agreed-upon text prior to the October meeting. If they could not decide on a site then, a working group would be established to prepare for a definitive site decision at the subsequent "first meeting" of the institute itself.

The planning meeting of "founding member institutions of eight nations" was convened in Paris by Zuckerman on October 11–12, 1971.<sup>31</sup> By this stage only Austria and France remained in the site competition. The meeting included presentations by representatives of the Austrian and French governments of their contending sites. The following day a smaller group inspected the French site at Fontainebleau.

The draft charter was considered article by article. Effective agreement was reached on most issues: membership, status of member institutions, funding, and powers of the Director and the Council. On membership, Canada and Japan would be asked to become founding members. To maintain equal representation between East and West, Hungary and Bulgaria would be asked if Canada and Japan responded favorably. Only a simple majority would be required for Council decisions, but three-fourths of the founding members would be necessary, thus maintaining an effective veto for East and West. Disagreement remained first on the site—Paris or Vienna. Second, major disagreement remained concerning the control national organizations could exert on appointments. Third, despite regular diplomatic expressions of agreement, differences on the relative value of methodology and applications proved extremely hard to put to rest. Two working groups were formed—the first to forge agreement on a final charter, and the second to generate agreement on a site, or at least to develop objective appraisals if agreement proved impossible. The tentative date for launching the institute was set for February 28–29, 1972.

The working groups met in Vienna in December 1971 and visited the Laxenburg site proposed by the Austrians. They met again in Paris at the end of January and the beginning of February 1972, and visited the proposed French site at Fontainebleau.<sup>32</sup> By the end of February they had agreement on everything except the site and how to resolve Soviet reservations about the process for approving research project leaders.



The French had rescinded their offer of Fontainebleau as cost estimates for renovations kept climbing,<sup>33</sup> and it was unclear what might be put forward as a French alternative.<sup>34</sup> The founding meeting was pushed back first to March, then July, and finally October 1972. By March, however, Gvishiani and Handler were nearing agreement on Vienna as the site, although this was kept private to maintain bargaining leverage and allow the French every opportunity to table a competitive offer.<sup>35</sup> By June 1972 Howard Raiffa had agreed to be the first Director and was visiting European capitals reporting on progress, encouraging national committees, and recruiting researchers. Academician Letov would be one of two Deputy Directors, and by August, Canada and Japan were prepared to have founding members included from their countries. A majority of the Site Working Group was recommending Laxenburg, a decision that was formalized in a divided vote on September 6 in London.<sup>36</sup> First, funds from the Austrian government would make Laxenburg significantly less expensive than a French site. Second, to match Austria's offers of "special privileges and immunities" from taxes and customs the French would require a formal inter-governmental agreement. Neither West Germany<sup>37</sup> nor the United States<sup>38</sup> would sign such an agreement given that there would be a founding member organization from East Germany.<sup>39</sup> Their view was that any agreement signed by governments would violate the objective that the institute be nongovernmental.<sup>40</sup> The Soviets dropped their reservations about research leader appointments, allowing these to be the unconstrained prerogative of the Director.<sup>41</sup> The only quotas left in the Charter were provisions that two-thirds of research scholars must come from countries with member organizations and that "Each member institution shall have the right to have at least one research scholar selected from among its nominees ..."<sup>42</sup>

IIASA's formal creation finally took place October 3–4, 1972 in the offices of the Royal Society in London.<sup>43</sup> The NAS press release at the time noted briefly IIASA's genesis in the 1966 White House and subsequent support from President Nixon, but it dealt mainly with the value of joint research on systems analysis and never mentioned the original objective of building bridges.<sup>44</sup> The *New York Times* was more direct: "Although officials here [Washington, DC] were reluctant to say so openly, privately they conceded that the institute was yet another step in a bridge-building effort that the United States hopes will eventually bring about the liberalization of the Soviet and East European Communist systems."<sup>45</sup>

## OBSERVATIONS

From the U.S. perspective, the primary motivation behind the proposal for an East–West institute was bridge-building. From the very beginning the substantive focus was to be systems analysis and modern management techniques, fields where the United States led the world and where many believed great gains were to be had through improving and disseminating American methods. Bundy concluded early that the institute would have to be substantively first-class to succeed, and his team placed substantial effort into entraining top U.S. people from the outset. The Soviet Union had similar interests. Better understanding between East and West was a desirable goal that would be well served by the proposed institute, and there were high expectations for new systems methods for analyzing and managing large complex

enterprises. The institute promised an attractive mechanism for looking jointly to the future beyond the distractions and dangers of day-to-day politics.<sup>46</sup> Key individuals in both the United States and the Soviet Union believed that the United States had something to teach and the Soviet Union something to learn about systems methods applicable to large modern complex problems—and that it would be in the interests of all for the Soviets to learn from the Americans.<sup>47</sup>

In both countries, the initial steps depended greatly on support from top political levels, particularly from President Johnson and Premier Kosygin. IIASA might have been founded even without the success of the 1967 Glassboro summit—the initiative was in train by then and Bundy had already visited Moscow—but it is clear that Glassboro helped greatly in the early stages. Later, assuring a high-quality program became the focus. The enthusiasm people around the world had for systems analysis, and the quality of people from the field who were involved were essential to the success of the negotiations. Had the institute offered only a bridge between East and West, with no promise of exciting, high-quality, consequential research, it is highly unlikely it would ever have been founded. Despite historical assertions to the contrary, the converse is probably also true—that IIASA would never have been founded had it offered only good research without the appealing goal of improved East–West understanding. This point, however, appears far less often and less emphatically in the record. The conclusion is that the negotiations needed both high-level political backing and substantive research promise for their success. In the case of the IIASA negotiations, the former seemed to be especially important in the beginning, the latter in the end.<sup>48</sup>

Another feature that appears to have been critical to the success of the negotiations was the nongovernmental formulation. Both Gvishiani and Andrei Bykov (who assisted Gvishiani and became IIASA's first Secretary) report that after IIASA's founding, Chancellor Brandt mentioned to Prime Minister Wilson that he (Brandt) would have supported East Germany's participation in IIASA even if the Institute were intergovernmental rather than nongovernmental. This was an easier position to take by that time since the two Germanies were well on their way to formally recognizing each other (which they did on December 21, 1972), but during the IIASA negotiations, this was by no means certain. Indeed, the German problem was central from the beginning of the IIASA talks; it prevented the Soviets from attending the 1968 Sussex meeting, and it was handled successfully precisely through the early decision to make the institute nongovernmental. In the Soviet Union the nongovernmental formulation also kept the initiative largely clear of the Foreign Ministry, thereby increasing Gvishiani's flexibility and ultimately reducing bureaucratic constraints on participation by first-rate Soviets.<sup>49</sup> That the negotiators were always formally acting only in their personal nongovernmental capacities (although with clear channels to their governments) also allowed them flexibility that no doubt helped greatly, and may have proved decisive.

Balance between the research program's focus on methodology (the Soviet interest) and applications (the Western interest) was essential to final agreement, as was balance in the control that could be exerted by Eastern and Western members. Assurance that both blocs would retain an effective veto even as the institute expanded was critical, though nearly all Council decisions have since been made by consensus. The agreement to restrict IIASA to peaceful issues and avoid strategic topics was



reached so early that it is easy to take for granted. Nonetheless, it was undoubtedly essential.

Johnson's objective had been a bridge between the United States and the Soviet bloc, but Bundy quickly made his consultations multilateral. First, it would be easier to build a high-prestige institute if it were not restricted to only Americans and Russians. Second, it would make for a more stable institution. As evidence, IIASA managed to weather seven years in the 1980s without White House support, something that would have been much less likely had the United States and the Soviet Union been the only two members—nongovernmental or not. Multilateralism may have also added stability to the 1966–72 negotiations.

### THE FIRST DECADE

Upon IIASA's establishment, Howard Raiffa was appointed to a three-year term as Director. Three-year appointments for the director have been the standard ever since. In 1975 Raiffa was succeeded by Roger Levien, who served two terms and was succeeded in 1981 by C.S. (Buzz) Holling.

Raiffa faced the challenges of a start-up, while Levien's subsequent task was to turn a successful start-up into a sustainable institution. Raiffa had enthusiastic supporters, money, and an exciting and broad mandate. He had no building, no staff, no administrative support, limited international networks, and no history of trust and successful cooperation among the National Member Organizations (NMOs). By Levien's arrival, IIASA had proved it could exist—it had acquired buildings, researchers and support staff, a library, and computers, and was establishing both the networks and mutual understanding to continue—but it had not proved it could last. Levien's challenge was to expand IIASA's networks, mutual understanding, supporting constituencies, and its impact, while assuring the right balance between constancy of purpose and responsiveness to growing, diverse constituencies.

#### *Recruiting*

Recruiting proved the Director's most important task. The U.S. team had been working on recruitment since the early decision that the institute must be of high quality. They had engaged top Americans in the planning, incorporated their advice, and cultivated potential recruits. They had negotiated the broad strokes of a research program that played to the enthusiasm they had heard for systems analysis applied to interesting international problems. They also recognized that for some people IIASA incorporated an important appealing, noble possibility of helping save the planet. Raiffa and Levien were always alert to sabbaticals and other special opportunities, but IIASA's main selling point was the promise of interesting research possibilities. Early on Raiffa recruited high-quality Westerners such as George Dantzig, Mike Fiering, Buzz Holling, and Tjalling Koopmans, with each initial success making the next a bit easier. The Max Planck Gesellschaft recruited Wolf Häfele, who became the Western European Deputy Director and Leader of IIASA's Energy Sys-

tems Program. Capable people were recruited from the United Kingdom's strong operations research community, helped by the fact that IIASA's salary scale was higher than Britain's.<sup>50</sup>

Beyond the research opportunities, IIASA held special attraction for Eastern professionals. For internationally oriented individuals in the East, IIASA offered a window on the West. Moreover, living in Austria on a IIASA salary meant more money, more amenities, and more freedom professionally and personally.<sup>51</sup> It was appealing and successful as a place for "tunneling through ideologies," to borrow a phrase from Tibor Vasko, Czechoslovakia's signer of the original Charter.<sup>52</sup> For example, it was at a 1983 IIASA conference that Soviet scholars first began publicly discussing the economic theories of N.D. Kondratieff, which had been condemned by Josef Stalin in the 1930s.

Raiffa was convinced that recruiting good Westerners for permanent positions at IIASA would be difficult. Moreover, permanent appointments of Westerners would have to be balanced by permanent appointments of Easterners. He had no way of judging which Eastern candidates would work out, particularly in this new field of systems analysis. His solution was fixed-term contracts for all researchers. The Soviets pressed for a minimum term of two years. After disastrous results in several Soviet cases, Gvishiani eventually agreed to a shorter minimum term. Fixed-term contracts for researchers have remained the norm at IIASA ever since.

Raiffa was not given free rein to recruit from the Soviet Union, but struck the following compromise after about six months of intense debate. The Soviet NMO exercised the option allowed in the Charter of submitting lists of nominees whom IIASA could recruit; if none were acceptable to Raiffa, the Soviet NMO could choose to extend the list.<sup>53</sup> By the end of Raiffa's term, however, Soviet recruiting was no longer from a restricted list, and with experience, Raiffa and Levien began to request specific individuals. The longer IIASA's list of alumni grew, the more routes there were for identifying and evaluating possible recruits. Understanding also spread that no country had an interest in sending unqualified people—they did not last and were ineffective in bringing home substantive intellectual research benefits. However, institute directors everywhere were still reluctant to relinquish their best people. To remedy this dilemma, Levien brought institute directors to visit IIASA to identify mutually beneficial collaboration and to see how IIASA could lead to more international exposure, invitations, travel, and further connections for their institutes.

It was important to recruit younger researchers as well as established names. One early success of IIASA was the Ecology Project's work on spruce budworm infestations in Eastern and Central North America.<sup>54</sup> Buzz Holling, who led the project, emphasizes not only Raiffa's role in creating the right interdisciplinary mix and essential opportunistic setting, but also the fact that he, George Dantzig, and others brought with them some of their best young students and colleagues. Their participation and their follow-through were essential to the project's success.

In 1977 Levien started the Young Scientists Summer Program (YSSP). It has proved successful both as a mechanism for long-term recruiting and in its broader objective of exposing young researchers early in their careers to IIASA's international, interdisciplinary setting and research approaches. Its capacity has expanded from ten participants in 1977 to more than fifty today. It has received consistent praise from NMOs, outside reviewers, and participants.

### *Bureaucracy*

As might be expected in joint ventures between mutually suspicious countries, significant, and sometimes burdensome, bureaucracy was initially imposed on IIASA by both its Soviet and American parents. For example, every check Raiffa signed required Letov's counter-signature. With Letov often in Moscow, and Raiffa in Cambridge, the quick reactions needed for a start-up were difficult. With Bundy's help, Raiffa's solution was a Director's discretionary fund financed by the Ford Foundation, which could be used for all Raiffa's start-up needs. Periodically he would request that the Council, if it concurred with his expenditures, replenish the discretionary fund with transfers from regular Institute funds. They always did.

Against the recommendations of a number of his advisors, Raiffa also chose relative novices for administrative positions in the belief that they would introduce less bureaucracy than would seasoned international diplomats and administrators. He never regretted his choice. Publication policies also presented a potential pitfall, as Eastern bloc members and the Japanese initially insisted on prior approval of publications by NMOs. An elaborate—and most likely slow—approval procedure was avoided by an agreement that publications would simply carry a disclaimer describing them as the independent views of their authors.

### *Relations with Other Organizations*

Especially helpful were the consistent support Raiffa received from the Austrian government in navigating the bureaucracy, as well as assistance, temporary space, and temporary personnel provided by the International Atomic Energy Agency (IAEA). IAEA Director General Sigvard Eklund viewed IIASA as a potential attractive partner, and Raiffa was quick to explore joint appointments and other mechanisms to mutually benefit the two institutions. UNIDO, another UN agency headquartered in Vienna, was more hesitant initially, perhaps because Director General Khene, an Algerian, was suspicious of this new exclusive East–West club. However, the WHO and UNEP proved surprisingly cordial and supporting. The directors of both were concerned about the quality of research within the politicized UN system and they were interested in farming out contracts to IIASA's less politicized, higher-quality research staff.

Levien expanded IIASA's list of collaborating institutions with three objectives: One was recruiting, which has already been discussed. The second was the role of such collaboration in spreading techniques of systems analysis. And third was the goal of building a diverse and extensive constituency. The more institutions to which IIASA could make itself useful, the better it could balance the diverse interests of its NMOs and their funding sources.

In 1979 Levien, with the help of Gvishiani and T. Keith Glennan in the United States, created a program in International Cooperation in Systems Analysis Research (ICSAR). U.S. corporations contributed tax-free funds to the NAS, which awarded them to industry-oriented IIASA initiatives supplementing the core research program. The program increased awareness at IIASA of industrial interests and awareness among U.S. corporations of IIASA. ICSAR did not survive the 1982 reversal in White House Policy toward IIASA, but U.S. membership did, in part because of continuing funds and support from a number of ICSAR corporations.

### *The Research Program*

In his initial tour of NMO-country capitals, Raiffa compiled a list of the projects suggested in each. Because none enjoyed universal support, he chose a portfolio of projects with something for everyone. Two key features addressed the prevailing doubts about researchers working together successfully on important problems without government interference. First, there would be a methodological group, and, second, the applied projects would address long-range rather than short-range problems. Long-range research was believed less likely to provoke government interference, and if governments did interfere, IIASA could take at least temporary refuge in methodological work. Projects would have finite lifetimes within the Institute, although each was encouraged to plan for continued decentralized research collaboration after IIASA.

A second major programmatic concern was the desire of East Europeans that IIASA serve as something of a consulting group, addressing their particular problems. Raiffa's compromise was that some such work would be undertaken by the Institute as long as it also included a research component that advanced the state of the art. IIASA also had to deal with high expectations that global modelers had for the Institute. Peccei had been involved from the outset and had a clear interest in what IIASA might contribute along lines similar to those pursued by the Club of Rome. Solly Zuckerman had equally clear objections. The compromise reached allowed IIASA to host a series of conferences reviewing and documenting global modeling studies around the world, without working on global modeling directly. The global modelers liked the forum this provided. Their critics liked the requirement for documentation and the opportunity for skeptical review.

Initially there was real reluctance to touch topics close to existing international negotiations. In 1974 Raiffa proposed to the Council a summer exercise—not even a project—related to the Law of the Sea negotiations. It would be an opportunity for scientists and others to mix informally and explore possible models relevant to issues in the negotiations, such as the economics of mining deep-sea manganese nodules. The Council rejected the proposal, believing it to be too involved with politics. In contrast, twenty years later the Council's strong support for research addressing international negotiations on population and development, global warming, and other environmental issues was almost taken for granted.

IIASA's initial years also provide some lessons in missed opportunities. For example, many of IIASA's founders had envisioned an institute active in both research and training, and the Eastern Europeans in particular advocated that more attention be given to training. But the emphasis was clearly on research. Training got short shrift. It was a development Raiffa later regretted and listed high among things he would do differently if given a second chance. IIASA's one substantial training success from its first decade has been the YSSP.

Levien's task after 1975 was to turn the successful start-up into a sustainable institution. Levien came to IIASA from fourteen years at the RAND Corporation. On the basis of his RAND experience he established a matrix structure for the research program. There were four quasi-disciplinary research areas with two major cross-cutting programs—the Energy Systems Program and the Food and Agriculture Program. Research areas could recruit in their own fields, offer disciplinary appeal, and

have greater longevity than the cross-cutting programs. The cross-cutting programs emphasized interdisciplinary research and applications, and had shorter time frames.

### *Relations with the NMOs*

All things considered, Raiffa and Levien were pleased with progress in Laxenburg, but less pleased with progress, or the lack thereof, in the National Member Organizations (NMOs). From the perspective of the Director's office, an ideal NMO would have a strong substantive interest in IIASA's research, strong influence with its country's government and scientific community, and a stable, well-funded, and creative promotional program to extend both IIASA's impact in a country and the country's interest, awareness, and participation in IIASA. Raiffa had hoped each NMO would create a domestic mechanism through which IIASA's research could reverberate within its country. Some NMOs made more progress than others, but as a group they fell far short of Raiffa's and Levien's hopes.

New NMOs joined IIASA from Austria (1973), Hungary (1974), Sweden (1976), Finland (1976), and the Netherlands (1977). Each NMO generally had another organization that provided its funds, often a finance ministry. The result (by 1977) was 34 organizations with diverse interests that believed they had authority and responsibility for the Institute. Finance ministries were frequently less concerned with scientific progress than with domestic benefits that showed a return on their investment. Where NMOs were established organizations, their structures and interests were not always well suited to the field of applied systems analysis. For example, after Solly Zuckerman's tenure, the Royal Society offered little support for interdisciplinary, international team-building around applied problems and criticized IIASA regularly for placing too little emphasis on publications in the disciplinary journals favored by Royal Society members. New NMOs were often no better suited than established organizations for supporting systems analysis at IIASA, and they tended to carry less clout within their countries' funding organizations and scientific communities.

In retrospect, the creation of IIASA devoted little attention to the NMOs. Those negotiating IIASA's creation were each fulfilling the functions they would later leave to the NMOs. Each served as a two-way link, simultaneously doing three things: (1) promoting national interests to his IIASA colleagues; (2) negotiating compromises with mutual benefits; and (3) promoting IIASA to national constituencies back home. Finding or creating NMOs with the institutional capabilities and funding to carry on all three functions was difficult, and once the Institute's individual creators had left the scene, IIASA's Director and research leaders often had to shoulder the main burden for disseminating IIASA's results, raising additional funds, and building networks.

### *Defections and Spying*

In some cases, such as Czechoslovakia, recruiting was difficult because governments feared that good researchers might defect to the West through IIASA. Indeed several Easterners did approach Raiffa about the possibility of defection, but were consistently discouraged. Defections would have likely stopped the Institute dead in its tracks.

Two features of IIASA were designed partly to make it a less attractive site for intelligence agencies to try to place their people. First, hiring was placed in the hands of the Director. This presumably made it more difficult for a spy to get hired at IIASA than at other agencies in Vienna where appointments were more controlled by governments. Second, IIASA did no confidential research so there was nothing secret to find at IIASA. Over the years, there were nonetheless several individuals from the West and the East who were suspected by their colleagues. To the consternation of American officials, Raiffa chose to tolerate rather than confront the likely intelligence affiliations of people on his staff. Indeed he took IIASA's policy of non-confidentiality one step further, maintaining no confidential Director's files and never locking his office. The intelligence responsibilities of suspected Soviets and East Europeans most likely were related more to watching their own nationals than to collecting intelligence from the West. However, even alleged spying could have damaging results when publicized. In 1981 the final issue of the former British newsweekly *Now!* published an article that Arkady Belozarov, a Soviet then serving as IIASA's Secretary responsible for external relations, was involved in espionage related to North Sea oil exploration. Belozarov denied the charges, but after discussions with Levien and citing the potential damage that even the allegations could cause to IIASA, he immediately resigned and returned to the Soviet Union. However, the incident had reverberations across the Atlantic, where Ronald Reagan was now in the White House and policy toward the Soviet Union had shifted from bridge-building to isolation and pressure.

### POLICY CHANGES IN WASHINGTON

In 1981 the Reagan Administration submitted a fiscal year 1982 budget proposal that halved funding for NSF's Division of International Programs. The Division, with the support of NSF Director John Slaughter, chose to eliminate funding for IIASA. Three reasons were given: other funding priorities (particularly bilateral programs), lack of Soviet reciprocity, and poor-quality research.<sup>55</sup> NAS President Philip Handler protested in letters to NSF Director Slaughter, Office of Management and Budget Director David Stockman, and Secretary of State Alexander Haig, and in testimony to Congress.<sup>56</sup> Several Western European governments urged the administration to reconsider, and several hundred U.S. scientists wrote to Slaughter and members of Congress. Congress restored IIASA funds for 1982, but the Administration promptly eliminated the funds again in its fiscal year 1983 budget proposal, adding national security to the three earlier reasons. Again the debate moved to Congress, and again Congress disagreed with the administration on funding priorities, reciprocity, and quality. On national security, however, it deferred to the President to make the final judgment, while observing that "it is not clear that all the evidence has been fully evaluated or that current facts support the hypothesis of a security concern at the Institute."<sup>57</sup> In March 1982 Frank Press, the new President of the NAS wrote to the White House, noting that after reviewing classified documents, the NAS believed that it should continue in IIASA. On March 20 George Keyworth, Science Advisor to the President, wrote back.



We have ... decided to reaffirm our complete withdrawal of support for IIASA. We believe that the scientific interests of the United States are more productively served by other international scientific programs. We continue to be concerned about lack of reciprocity in IIASA's programs and about Soviet abuse of the Institute. We believe that it would be particularly inappropriate to continue our involvement in IIASA in light of other actions we have taken to show our displeasure about martial law in Poland and Soviet complicity in the oppression of the Polish people ... I would suggest the Academy transmit its notice of withdrawal to the IIASA Council at an early date.<sup>58</sup>

Because IIASA was nongovernmental, the withdrawal of U.S. government support did not result in the withdrawal of U.S. membership. In fact, to assure continuing U.S. involvement, an independent IIASA-U.S. Planning Group had been formed in December 1981. Its Chairman was Charles Maechling, Jr. of the Carnegie Endowment for International Peace, and its Executive Director was Chester Cooper of Oak Ridge Associated Universities. Maechling had been legal Counsel to the NAS and deeply involved in the original IIASA negotiations from 1969-72. The Planning Group worked closely with IIASA's new Director, Buzz Holling, and included former IIASA Directors Raiffa and Levien, several other IIASA alumni, Keith Glenan from the ICSAR Program, the Staff Director of the House Science and Technology Committee's subcommittee on Science, Research and Technology, plus a number of members relatively new to IIASA but strongly supportive of its mission.

The initial purpose of the Planning Group was to reverse the Administration's decision to terminate funding. That focus changed in early April following George Keyworth's letter quoted above. Keyworth's letter led the NAS to notify IIASA formally that it would withdraw at the end of 1982, and the Planning Group now turned to the task of finding or creating a new U.S. NMO and identifying the necessary private funds. From both the NAS and the Administration the Planning Group had a promise of neutrality. They would neither oppose nor support the Planning Group's efforts, although the NAS Council resolution on withdrawal also expressed "the hope that participation of the U.S. scientific and technical community in the program of IIASA may continue to be possible."<sup>59</sup> The IIASA Council, which in November 1981 had indicated a willingness to be flexible during the U.S. crisis, had been kept informed of the Planning Group's activities. In April the Council met in emergency session to reaffirm continuing support for IIASA. At the regularly scheduled IIASA Council meeting in June, both Maechling and Cooper participated as did Bruce Hannay, still the formal U.S. Council member from the NAS. Maechling's and Cooper's presentation on their efforts was well received, and Hannay's own comments were generally supportive. While in Vienna, Maechling also briefed Austrian Chancellor Bruno Kreisky on the American efforts.

Howard Raiffa meanwhile had approached the outgoing and incoming presidents of the American Academy of Arts and Sciences in Cambridge, Massachusetts, plus several other members of the American Academy's governing council. All had expressed significant interest. John Voss, the American Academy's Executive Officer, attended the Planning Group's June meeting, and the Academy's Council voted over the summer to take on the IIASA membership. The transfer of membership from the NAS to the American Academy was accomplished through parallel resolutions by the councils of the NAS, the American Academy, and IIASA, and became effective January 1, 1983. The Planning Group was disbanded. A new U.S. Committee for IIASA was established within the American Academy. Chaired by Harvey Brooks of Harvard University, it included most of the members of the original IIASA-U.S.

Planning Group. For 1983 the American Academy managed to raise \$1.15 million, 57 percent of its assessed dues. The Soviet NMO paid an amount equal to its 1982 assessment of \$1.92 million.<sup>60</sup>

The withdrawal of U.S. government support had an effect on several other NMOs, although only one, the Royal Society, formally withdrew. As reasons, the Royal Society gave both the U.S. government withdrawal and a "lack of intellectual merit" in the research plan.<sup>61</sup> Subsequently it recanted the latter reason, but it never resumed membership. The Fellowship of Engineering agreed to succeed the Royal Society as the U.K. NMO, provided it could secure funding, but it was unable to do so, and British membership ceased. French support began a long uneven decline, although it was not until 1993, after the U.S. government had renewed its support, that the Council voted unanimously to terminate French membership. The Soviet Union came very close to withdrawing in 1982. Maintaining support for IIASA had become more difficult since Kosygin's death in 1980, and there were strong arguments against Soviet payments in the absence of U.S. government payments. A high-level decision to withdraw was made, but Gvishiani brought together party secretaries to lobby Guri Marchuk, his new boss as Chair of the State Committee for Science and Technology. Marchuk was initially hesitant, but once persuaded, he then convinced Yuri Andropov, then head of the KGB and soon to succeed Leonid Brezhnev in November 1982 as general secretary of the Communist Party's Central Committee.

In early 1984 the American Academy formally requested a renewal of government support.<sup>62</sup> In response Secretary of State George Shultz clarified U.S. policy to allow support for IIASA projects contingent on case-by-case reviews for consistency with U.S. policies on international scientific cooperation and national security.<sup>63</sup> In 1985 the American Academy turned to IIASA's Congressional supporters to include money for IIASA projects in NSF's budget. Funding was included for fiscal year 1986. In October 1985 the American Academy submitted a voluminous research proposal to the NSF for \$500,000 for six IIASA projects. A year and a half later, in March 1987, the National Security Council rejected the proposal, but subsequent proposals were more successful.<sup>64</sup> Nevertheless, reviews took fourteen to fifteen months for each proposal because of national security clearance procedures required in addition to standard NSF peer reviews.

These steps were seen as significant progress in the United States, but they still left the U.S. NMO far short of its formal obligations to the Institute. Its payments were too little, unpredictable, and targeted to specific projects. Other NMOs were envious. They too would have liked to pay less and target their favorite projects. For 1987 the Council, prompted by Senator Michael Kirby of Canada, formally revised the contribution schedule to bring it into line with the reality that had developed. By that time, the U.S. NMO was paying about half of what it should, and most Eastern European NMOs had made proportional reductions in hard-currency payments.

Overall the IIASA Council, led by the Soviet NMO, demonstrated remarkable flexibility and patience with the U.S. NMO during the Reagan administration. However, by the time George Bush succeeded Reagan in January 1989, both the Council and the American Academy were losing patience with Washington's reluctance to fund regular annual unrestricted U.S. contributions as called for in the IIASA Charter.



## END OF THE COLD WAR

In 1989, the first year of George Bush's presidency, three developments led to renewed White House support. The first was a White House initiative to establish three international centers for cooperative research on global climate change. The second was intensified lobbying by the American Academy's U.S. Committee for IIASA and others, and the third was that security concerns in Washington diminished considerably.<sup>65</sup>

### *International Global Change Research*

On November 6–7, 1989 more than 60 countries participated in a meeting in Noordwijk, the Netherlands on global climate change. All participants save the United States and Japan (and the Soviet Union by some accounts) supported explicit timetables and targets for reducing greenhouse gas emissions. The United States argued that too little was known about how to effect the proposed cuts and what the economic consequences might be. President Bush, who had spoken of a war against global warming in his campaign a year earlier, was criticized for his apparent retreat from campaign statements.

The United States was represented by D. Allan Bromley, Assistant to the President for Science and Technology, and William Reilly, Administrator of the Environmental Protection Agency. Bromley's subsequent report to Bush noted that nothing effective existed in the international domain to provide good information on how to effect cuts and estimate economic consequences. Bush's reply was simple—Bromley should create something to fill the gap.

A proposal soon emerged within the Administration to establish three regional centers for global climate change research. Thinking along these lines had already begun prior to Noordwijk, and the three regional centers would become a centerpiece of U.S. proposals made formally in April 1990 at an 18-nation White House conference on international global change research. North and South American countries would cooperate in one center. European and African countries would cooperate in a second, and Pacific rim countries would cooperate in a third. Eventually "latitudinal" connections between the centers would complete a global network. For the European–African center, serious consideration was given from the beginning to modifying IIASA for this role rather than starting a new institution from scratch. One reason for this was that, by November 1989, IIASA's visibility had already been raised in the White House for other reasons.

### *Intensified Lobbying*

Early in 1989 the U.S. Committee requested a high-level review of U.S. policy toward IIASA. The Committee believed the status quo was no longer tenable. Project-by-project funding was slow, cumbersome, uncertain, and inconsistent with IIASA's Charter and the commitments of all other members. After seven years of keeping the IIASA option alive for the U.S. government, the American Academy was finally ready to take "no" for an answer. If the government did not decide before

the end of the year to restore full dues support, the American Academy would give IIASA formal notice of its withdrawal.

The request was sent from Harvey Brooks to Secretary of State James Baker in May. In August Deputy Secretary of State Lawrence Eagleburger wrote back that U.S. policy was unchanged so the U.S. Committee for IIASA focused on contacts within the State Department, OSTP, the National Security Council, and Congress. By the end of October the NSC had taken the lead in an inter-agency review, and in late November an initial inter-agency meeting concluded that no security reason now existed not to participate fully in IIASA.

On December 28, Bromley called Brooks to say that President Bush had made clear his determination to take part in IIASA and to try to find money for the U.S. membership. U.S. government priorities for IIASA's research would be global change and economic restructuring in former centrally planned economies. The government would not fund straight "dues," but otherwise everything was negotiable. The NSF would be the lead agency as in the 1970s, with OSTP involvement at the policy level. Because paying dues was a key part of being a member of IIASA, Brooks could not report full success to the IIASA Council, but by May 1990 a sufficient understanding had been worked out in Washington for Brooks to commit the American Academy to continuing membership. As Washington gained confidence that IIASA would develop a coherent research program centered on global change and economic restructuring, the American Academy gained confidence that the NSF would provide programmatic funding for the program as a whole.

Important to this process of confidence building were, first, international progress on the three regional institutes for global change research; second, the increasing involvement of Robert White, president of the National Academy of Engineering; and third, negotiation of a new strategic plan at IIASA. By the beginning of August, White had agreed to succeed Brooks as the Chair of the American Academy's U.S. Committee for IIASA. White was a Washingtonian in the midst of international global change research and not considered part of the "Cambridge mafia" that had come to dominate the U.S. membership since its 1982 exile from Washington. White agreed to lead the U.S. membership only after personal assurances from Bromley that funding would not be a problem. White would also succeed Peter de Janosi as the U.S. member of the IIASA Council. And de Janosi, who had coordinated much of the U.S. lobbying effort for the past year, became Director of IIASA in August 1990. He immediately started the process of negotiating a new strategic plan centered on global change and economic restructuring.

### *Diminished Security Concerns*

The extent of alleged Soviet misuse of IIASA and the threat IIASA contributed to U.S. security remain contentious to this day. Some contend that the classified record of Soviet misuse unambiguously justifies the lack of U.S. government support in the 1980s. Others describe the classified record as an embarrassment to U.S. intelligence services. It is not important to resolve the differences here. What matters are the opinions of those influencing key decisions at the time those decisions were made. In 1989 these were changing. As one government official noted early in the year, when IIASA previously had been on a meeting agenda "fifty folks from DOD would show up to argue against it." That was no longer the case.<sup>66</sup>

One reason was the overall change in the perceived Soviet threat to the United States. By 1989, significant progress had been made in arms control negotiations, Soviet "new thinking" in foreign policy promoted better diplomatic relations, Mikhail Gorbachev's long-term commitment to *perestroika* was increasingly clear, and Western capitals were increasingly supportive. Moreover, sweeping changes were occurring in Eastern Europe: in June, Solidarity won overwhelmingly in Polish parliamentary elections, and on November 7, the East German government fell and the Berlin Wall was a historical relic within days. By the end of the year, Communist governments had also fallen or been radically purged in Czechoslovakia, Romania, and Bulgaria. By 1990 Gorbachev would be awarded the Nobel Peace Prize for his contribution to ending the Cold War.

IIASA had also taken specific steps to respond to the United States security concerns. During the 1980s, the Institute had reconfigured its international computer connections, and in 1989 the American Academy arranged a site visit to IIASA by two computer security experts from AT&T Bell Laboratories. In addition, U.S. export and re-export restrictions applicable to IIASA equipment were clarified, and new procedures were instituted at IIASA in response to Washington's concerns.<sup>67</sup>

### *Reorientation at IIASA*

U.S. interests in IIASA as a global change institute matched well with thinking in other NMO countries. With the end of the Cold War the first question for the IIASA Council was whether they should declare success, disband the Institute, and go home. If not, what would be the best direction for the Institute to take? All the NMOs concluded IIASA was a unique and valuable resource. Global change proved the best rubric under which to forge agreement on the Institute's future direction. There were differences of emphasis. Japan emphasized technological change; many former centrally planned countries emphasized economic change; the United States leaned toward environmental change and strengthening links to Africa. The mechanism through which de Janosi and the Council reached agreement was the joint formulation of a new strategic plan for the Institute, *Agenda for the Third Decade*, formally adopted by the Council in June 1991.

## ASSESSMENT

### *Bridge-Building*

IIASA began as one part of a bridge-building strategy in the Johnson administration. In this role it certainly succeeded.<sup>68</sup> The principal evidence is that for 17 years during the Cold War, and for nine more since, Western and Eastern countries have worked together at IIASA, largely without government interference, producing good interdisciplinary work in areas including energy, agriculture, ecology, climate change, air pollution, population growth and aging, migration, economic change, methodology, water resources, transportation, and forestry. When IIASA was established, it was hardly self-evident to IIASA's founders that Eastern and Western scientists could work together productively on common problems. Could they get reasonable scientists with freedom to work seriously in the West? Could they create

something that would not crumble with the first political crisis between the United States and Soviet Union. The fact that the answer was "yes" was significant.

Many examples of East–West collaboration are included in IIASA's history of research teams and publications. An example that is interdisciplinary as well as international is that of James Vaupel, an American demographer, and Anatoli Yashin, a Russian mathematician. Although recruited to different projects, they met at IIASA in 1981 and began collaborating on modeling heterogeneous populations, that is, populations with diverse subpopulations. They wrote at least thirteen joint papers while at IIASA and continued to collaborate well after they left. Many other professional connections were begun at the Institute, plus quite a few true friendships (and even several marriages). Mutual understanding certainly increased between many of those from the East and West even in the midst of negative political stereotypes. Of course, there were those who, upon seeing the Soviet system in action, decided it was even worse than previously believed. Nevertheless, in terms of affecting formal policymaking, there is little evidence that the increased understanding gained by individuals at IIASA *systematically* made its way back into the policy process in any NMO-country.

### *Research Quality*

Almost from the outset it was agreed that the Institute would have to succeed scientifically if it was to succeed at all. Thus its second goal, essentially co-equal to bridge-building, has always been high-quality research. Its record includes strong successes, controversial successes, a host of good projects, and a fair share of disappointments. Many formal reviews exist for the record—commissioned both by IIASA's Council and by various government agencies in several NMO countries. The NSF commissioned outside reviews of IIASA in 1976 and 1979 that included site visits by experts, peer reviews of IIASA publications, and surveys of U.S. alumni and participants in IIASA conferences.<sup>69</sup> The NSF has peer-reviewed all proposals for U.S. contributions since 1985. In 1993 the IIASA Council instituted a system of three external evaluation committees. Each committee is responsible for one-third of the research program and visits are rotated so that each year one committee visits. All these reviews have found research projects to praise and projects that need strengthening or phasing out. The bottom line in all cases, however, has been further support for IIASA.<sup>70</sup>

### SUMMARY LESSONS

With respect to its two original objectives—bridge-building and high-quality research—IIASA was a success. Strong, high-level political support was essential, particularly in the early stages. Equally important was the involvement of high-quality researchers, first in shaping the Institute's future research agenda and then in its early research. Both the original negotiations and the eventual institute benefitted because they were nongovernmental. Multilateralism is credited with adding stability, although IIASA may also have benefitted from the bipolar dominance of the United States and the Soviet Union: there was arguably greater political stability during the bipolar Cold War than in the multipolar periods before and since, and

IIASA is currently dealing with more diverse interests among its NMOs than during the Cold War. Additional important features in 1972 were balance in the research agenda among different national interests, balance between a U.S. Director and a Soviet Council Chairman, and mutual vetoes for East and West.

Future initiatives could improve on IIASA's experience by crafting stronger national support structures. Future efforts should also consider a greater emphasis on support from industry and philanthropists, and greater outreach efforts, including training and education as well as public relations. Finally, they should not underestimate the difficulties of expansion once the original enthusiasm and excitement have passed.

#### ENDNOTES

1. This case study benefits tremendously from interviews granted me by Francis Bator, Allan Bromley, McGeorge Bundy, Andrei Bykov, Peter de Janosi, Jermen Gvishiani, C.S. Holling, Roger Levien, Charles Maechling, Jr. Arkadii Maltsev, Marek Makowski, Roman Ostrowski, Howard Raiffa, Tibor Vasko, and Robert White; from advice and information supplied by Helga Lowe and Eddie Löser; and from comments on earlier drafts by Jesse Ausubel, Francis Bator, William Blanpied, Garry Brewer, Andrei Bykov, Chester Cooper, Wolf Häfele, Thomas Lee, Charles Maechling, Tibor Vasko, and the participants in an October 21–22 workshop at the New York Academy of Sciences—Jesse Ausubel, Alexander Keynan, Rodney Nichols, Susan Raymond, John Redick, Juilian Robinson, David Speedie, John Temple Swing, Pete Suttmeier, Gregory van der Vink, Iddo Wernick, Suzanne Wood, and Paulo Wrobel. I am also grateful to Charles Maechling for sharing with me his extensive files on both the 1969–1972 negotiations led on the U.S. side by Philip Handler, and the 1981–1982 activities of the IIASA–U.S. Planning Group.
2. The twelve NMOs were from Bulgaria, Canada, Czechoslovakia, France, the Federal Republic of Germany (West Germany), the German Democratic Republic (East Germany), Italy, Japan, Poland, the Soviet Union, the United Kingdom, and the United States.
3. X, "The Sources of Soviet Conduct," *Foreign Affairs* 25, 4 (1947): 566–582.
4. Lyndon B. Johnson, "Remarks of the President at National Conference of Editorial Writers, Carnegie Endowment Building, New York," October 7, 1966; Edward Skloot, "The Decision to Send East-West Trade Legislation to Congress, 1965–1966," *Appendices: Commission on the Organization of the Government for Conduct on Foreign Policy* 3 (Washington, DC: U.S. Government Printing Office, 1975).
5. *New York Times* (26 June 1967): 32, column 1.
6. "IIASA—The Early Days," A lecture given at IIASA by the Founding Director of the Institute, Professor Howard Raiffa, on Wednesday, September 23, 1992 (by Marc Clark from tape and previous transcription, February 3, 1993).
7. West Germany (Wolfgang Fincke, Federal Ministry of Scientific Research; Karl Ganzhorn, IBM-Stuttgart; Meyer-Abich, Assistant to Prof. von Weizsäcker, Department of Philosophy, University of Hamburg; and Gerhard J. Stoeber, Federal Chancellor's Office, Planning Staff), France (Michel Crozier, Director, Centre de Solociologie des Organisations de l'Ecole pratique des Hautes Etudes, Paris; Bertrand de Jouvenel, Chairman and Managing Director, Society for Economic Study and Documentation; and Pierre Massé, Président, Electricité de France), Italy (Aurelio Peccei, Managing Director of Italconsult), the United Kingdom (Colin Buchanan, Department of Civil Engineering, Imperial College of Science and Technology; Christopher Freeman, Director, Science Policy Research Unit, University of Sussex; E.C. Williams, President, Operational Research Society; and Solly Zuckerman, Chief Scientific Adviser to Her Majesty's Government), and the United States (McGeorge Bundy, President, Ford Foundation; Carl Kaysen, Director, Institute for Advanced Study, Princeton;

- Arjay Miller, Vice-Chairman, Ford Motor Company; and Howard Raiffa, Professor of Mathematical Statistics, Harvard Business School).
8. July 12, 1968 letter from J. Gvishiani to McGeorge Bundy.
  9. July 25, 1968 letter from McGeorge Bundy to Solly Zuckerman.
  10. "Note of a Meeting with Mr. Gvishiani, Deputy Chairman of the USSR State Committee for Science and Technology, and Dr. Peccei, Managing Director of Italconsult, in Rome on Saturday, 19th October 1968 on Bundy Proposals" by Solly Zuckerman.
  11. December 30, 1968 letter from McGeorge Bundy to Pierre Massé.
  12. Donella H. Meadows, Dennis L. Meadows, Jørgen Randers, and William W. Behrens III, *The Limits to Growth* (New York: Universe Books Publishers, 1972).
  13. Answers to a May 1969 questionnaire from Russell Ackoff (5/28/69), James Coleman (5/27/69), Paul Taubman (6/2/69), and Anthony Oettinger (6/3/69).
  14. "Aide Memoire, Moscow Meeting—10th–11th July 1969, Planning for an Institute of Applied Systems Analysis," prepared by Sir Solly Zuckerman.
  15. Joseph L. Bower, Trip Notes, September 9–15, 1970.
  16. "IIASA—The Early Days," A lecture given at IIASA by the Founding Director of the Institute, Professor Howard Raiffa, on Wednesday, September 23, 1992 (by Marc Clark from tape and previous transcription, February 3, 1993).
  17. March 2, 1972 Airgram from Department of State to Athens, Ankara, Belgrade, etc., Subject: Status of the International Institute for Applied Systems Analysis (East–West Institute).
  18. 126th meeting of the National Science Board, September 4–5, 1969.
  19. March 2, 1972 U.S. Department of State Airgram; Subject: Status of International Institute for Applied Systems Analysis (East–West Institute); also October 7, 1969 confidential memorandum from Richard Nixon to William D. McElroy, Director, National Science Foundation.
  20. "International Institute of Applied Systems Analysis," Note of an unofficial meeting held in Curtis Green Building, London, S.W.1. on Thursday 3 December 1970 at 10.30 a.m. (and continued at the Hyde Park Hotel, S.W.1.), Cabinet Office, London, S.W.1., 7 December 1970.
  21. Undated copy of a confidential memo from Joe Bower to Phil Handler re: "Background for the Woods Hole Meeting [August 13, 1970]."
  22. Undated copy of a confidential memo from Joe Bower to Phil Handler re: "Background for the Woods Hole Meeting [August 13, 1970]"; "Memorandum for the Record, Subject: Institute for Applied Systems Analysis—Planning Meeting, October 11–12, 1971, Paris, France," October 22, 1971, Charles Maechling, Jr.
  23. "International Institute of Applied Systems Analysis," Note of an unofficial meeting held in Curtis Green Building, London, S.W.1. on Thursday 3 December 1970 at 10.30 a.m. (and continued at the Hyde Park Hotel, S.W.1.), Cabinet Office, London, S.W.1., 7 December 1970.
  24. "International Institute of Applied Systems Analysis," Note of an unofficial meeting held in Curtis Green Building, London, S.W.1. on Thursday 3 December 1970 at 10.30 a.m. (and continued at the Hyde Park Hotel, S.W.1.), Cabinet Office, London, S.W.1., 7 December 1970; Undated copy of a confidential memo from Joe Bower to Phil Handler re: "Background for the Woods Hole Meeting [August 13, 1970]"; August 13, 1970 meeting at Woods Hole on "Proposed Center for the Study of Problems of Advanced Societies," summary of the meeting prepared by Murray Todd and included with Phil Handler's September 8, 1970 letter to Joe Bower.
  25. Alternatives based on "ability to pay" as measured by GDP or national scientific budgets were also considered. But even expected beneficiaries of such formulas, such as East Germany and Poland, preferred the clarity, symmetry, and stability of



the chosen formula over the complexity and uncertainty of alternatives based on ability to pay. "Memorandum for the record, Subject: Institute for Applied Systems Analysis—Planning Meeting, October 11–12, 1971, Paris, France," October 22, 1971, Charles Maechling, Jr.

26. According to Charles Maechling, Jr., the one surviving member of the Handler team, the oral agreement reached in Moscow in 1969 between Bundy and Gvishiani was never made known to Handler, nor would Handler have considered himself bound by such an agreement. However, Maechling also reports that the Handler team's clear expectation was that the Director would be an American and the Council Chairman a Soviet.
27. "Memorandum for the Record, Subject: Institute for Applied Systems Analysis—Planning Meeting, October 11–12, 1971, Paris, France," October 22, 1971, Charles Maechling, Jr.
28. October 19, 1970 memo on Ford Foundation letterhead from Marshall Goldman to Bundy re: "Meeting with Gvishiani on the Center for Applied Systems Analysis, Moscow, October 12, 1970."
29. Ibid.
30. "International Institute of Applied Systems Analysis, Note of an Unofficial Meeting held in Curtis Green Building, London, S.W.1. on Thursday 3 December 1970 at 10.30 a.m. (and continued at the Hyde Park Hotel, S.W.1.), Cabinet Office, London, S.W.1., 7 December 1970.
31. "Memorandum for the Record, Subject: Institute for Applied Systems Analysis—Planning Meeting, October 11–12, 1971, Paris, France," October 22, 1971, Charles Maechling, Jr. In addition to Handler, Gvishiani, Peccei (now representing the Italian National Research Council), and Zuckerman, the planning meeting included Pierre Aigrain from France (Association Francaise pour le Developpement des Analyses Systemes), Friedrich Schneider from West Germany (Max Planck Gesellschaft), Karl Leupold from East Germany (Deutsche Akademie der Wissenschaften zu Berlin), and Adam Smolenski of Poland (Polish Academy of Sciences).
32. March 2, 1972 U.S. Department of State Airgram; Subject: Status of International Institute for Applied Systems Analysis (East–West Institute).
33. Unclassified January 17, 1972 letter to Nelson Sievering (Director, Office of General Scientific Affairs, SCI, U.S. Department of State) from John H. Buehler, Assistant Science Attaché, U.S. Embassy, Paris.
34. February 23, 1972 letter from Paul Sitton to Advisory Committee for the International Institute for Applied Systems Analysis, National Academy of Sciences.
35. March 27, 1972 letter from Thomas F. Malone to Philip Handler.
36. International Institute for Applied Systems Analysis Site Working Group, Note of a Meeting held in London on 5–6 September, 7 September 1972, ASA(S)(72) 2nd Meeting.
37. September 18, 1970 Memorandum of Conversation, Department of State, Subject: East–West Institute; Participants: Wolfgang Opfermann, Counselor (Scientific Affairs), German Embassy, Nelson F. Sievering, Jr., Director, General Scientific Affairs, SCI.
38. June 7, 1972 letter from Paul L. Sitton (NAS) to Pierre Audigier (Embassy of France, Washington, DC).
39. June 29, 1972 letter from Alan Hodgkin to Philip Handler; June 6, 1972 U.S. Department of State telegram to the American Embassy in London.
40. July 21, 1972 letter of Philip Handler to Alan Hodgkin, The Royal Society.
41. In this case I believe that personalities made a difference. As Gvishiani gained confidence that he could work cooperatively with Raiffa, he became willing to bend on this final issue.

42. Charter of the International Institute for Applied Systems Analysis," Article XI, Section 6, Laxenburg, Austria, 1972.
43. As described by Rennie Whitehead, who signed the Charter for the Canadian Committee for IIASA: "The remarkable qualities of Gvishiani have never been better demonstrated than they were on that day. He started the first IIASA Council meeting by making a short statement in excellent English. He said that, in his experience, more international initiatives had failed through linguistic arguments than from any other cause. He did not believe that the Institute could survive with more than one official language. The only feasible choice was English. So he was making the decision at the outset that English would be the official language of the Institute ... I recall no discussion of this remarkable statement. I think most of those present were momentarily stunned and, by the time they had recovered, Gvishiani was on the first item of the Agenda proper. However, on his first intervention the Soviet member started in the Russian language. Gvishiani let him get one sentence out before he interrupted him, saying 'Professor -----, you heard what I said; I know you have some difficulty with English but please try.' The Soviet member complied, albeit in bad grace. A little later the French member, Professor Levi, spoke. Gvishiani cut him off after the first couple of words by saying in a light and humorous manner 'Professor Lévy [sic]: if the Russians can speak English, surely you can.'" See J. Rennie Whitehead, *Radar to the Future: The Story of a Boffin*, unpublished manuscript.
44. "Scientists of U.S., U.S.S.R., Ten Other Nations Establish Institute to Study World Problems," news release, National Academy of Sciences, distributed October 4, 1972.
45. "U.S. and Soviet Will Lead A 12-Nation 'Think Tank,'" Richard D. Lyons, *New York Times*, Washington, DC, October 4, 1972.
46. Interview with Jermen Gvishiani, June 12, 1996, Laxenburg, Austria.
47. This is one of several examples from the IIASA negotiations where success depended upon more on dovetailing asymmetrical, complementary interests than on elaborating symmetrical interests. Other examples of differences that were successfully dovetailed include the Soviet preference for the Council Chair and the U.S. preference for the Directorship, IIASA's attractiveness to Westerners as a window on the East and its attractiveness to Easterners as an opportunity to travel and live in the West, and the Eastern emphasis on methodology and the Western emphasis on applications. In this respect, the IIASA negotiations reinforce the general lesson that *differences* in the interests and abilities of parties often provide the raw material for fashioning creative trades or synergistic arrangements that leave all parties better off and make agreement possible. Symmetry is often important in selling a potential agreement to one's constituency, but asymmetry is often what makes agreement possible.
48. I must not leave the impression that there were no critics of IIASA in Washington or Moscow. In both governments there were always those for whom increased East-West understanding was never a desirable goal or who believed it wiser to spend money on research at home. In both the United States and the Soviet Union there was a fear of spies, and in the Soviet Union there were fears of brain-washing and possible defections as well.
49. Interview with Gvishiani on June 12, 1996, and September 10, 1987 letter from McGeorge Bundy to Edward Levi, President, American Academy of Arts and Sciences.
50. Salaries had been a major issue, with agreement finally reached on a single scale applying to all staff. It would be up to individual NMOs to develop supplementary innovative procedures for their own nationals if they wished. The salary scale was



keyed to levels in France, Italy, and West Germany. This was higher than prevailing salaries in the United Kingdom and Eastern Europe, but lower than those in America. For the United States, the deficiency was solved partly by an NAS-administered fund provided by the NSF to "top up" selected American salaries. West Germany and Japan employed similar supplementary systems.

51. June 12, 1996 interview with Jermen Gvishiani, Laxenburg, Austria; June 10, 1996 interview with Andrei Bykov, Laxenburg, Austria.
52. July 23, 1996 telephone interview with Tibor Vasko: Prague, Czech Republic and Cambridge, Massachusetts.
53. "IIASA—The Early Days," A lecture given at IIASA by the Founding Director of the Institute, Professor Howard Raiffa, on Wednesday, September 23, 1992 (by Marc Clark from tape and previous transcription, February 3, 1993).
54. For more on this work, see "Qualitative Analysis of Insect Outbreak Systems: The Spruce Budworm and Forest," D. Ludwig, D.D. Jones, and C.S. Holling (Editors), *J. Anim. Ecol.*, Vol. 44:315–332, 1978; *Adaptive Environmental Assessment and Management*, C.S. Holling (Editor), John Wiley & Sons, Chichester, UK, 1978; *Pest Management: Proceedings of an International Conference, October 25–29, 1976*, G.A. Norton and C.S. Holling (Editors), Pergamon Press, Oxford, UK, 1978.
55. 1982 Report of the House of Representatives Science and Technology Committee regarding U.S. participation in IIASA, April 23, 1982.
56. Testimony of Dr. Thomas Malone, Foreign Secretary, National Academy of Sciences, before the Subcommittee on Science, Research and Technology of the Committee on Science and Technology, U.S. House of Representatives, February 23, 1982.
57. 1982 Report of the House of Representatives Science and Technology Committee regarding U.S. participation in IIASA, April 23, 1982.
58. March 20, 1982 letter from G.A. Keyworth, Science Advisor to the President, to Frank Press, President, National Academy of Sciences.
59. May 5, 1982 memorandum from Chester L. Cooper to Members of the IIASA-U.S. Planning Group, Subject: Report on Activities Since our April 13th Meeting.
60. To cover Austrian inflation the Council increased dues by 6 percent for 1983, 4.8 percent for 1984, five percent for 1985, and 5 percent for 1986. The U.S. NMO always fell well short of the formal dues levels. The Soviet NMO regularly paid its full 1982 amount, but it did not pay the annual increases.
61. May 25, 1982 telegram from Ronald Keay, Executive Secretary, Royal Society of London, addressed to the Council of IIASA.
62. For funding in the interim, the American Academy turned to major private foundations and the companies contributing to the ICSAR Program, while also negotiating for additional flexibility from the IIASA Council. The Academy was willing to be billed for full Category A dues—the level that applied to the U.S. and USSR NMOs—but also reported to the IIASA Council each year a lower U.S. target level for what it realistically might raise. The Soviet NMO continued to pay at the 1982 Category A dues level. The American Academy's eventual success in raising sufficient private money to weather a complete withdrawal of government funding is unique in IIASA's history. Critical to that success was the existence of private foundations in the United States with programs, expertise, and finances that could match the American Academy's needs.
63. September 22, 1984 letter from Secretary of State George P. Shultz to McGeorge Bundy.
64. The NSF provided \$455,000 in fiscal year 1987; \$550,000 in fiscal year 1988; and \$845,000 in fiscal year 1989, plus an additional \$39,000 for American YSSP participants.

65. The first and third of these points come from a telephone interview with D. Allan Bromley, August 19, 1996: New Haven, Connecticut and Cambridge, Massachusetts.
66. Author's notes from a February 16, 1989 conversation with Peter de Janosi.
67. Although I have learned that specific IIASA actions were important in reducing security concerns in Washington, I do not yet know which actions specifically made a difference.
68. From the interviews and documents collected for this paper, the lone dissent to this conclusion comes from Solly Zuckerman's autobiography published in 1988. "Only time will tell whether IIASA will succeed in fulfilling the main hope that brought it about—that of helping bring about East–West understanding. So far there is little to boast about." Solly Zuckerman, *Monkeys, Men and Missiles: An Autobiography 1946–88* (London: Collins, 1988). Zuckerman does not elaborate.
69. December 8, 1978 memo from Harvey Averch, Assistant Director, STIA (Scientific, Technological, and Scientific Affairs), NSF to Members of the National Science Board and Director NSF regarding "NSB requested evaluation of the International Institute for Applied Systems Analysis;" W.W. Cooper, "A Report to NSF on Policy Applications of IIASA Products with Analytical-Quantitative Content," September 10, 1978; John M. Richardson, Jr., "International Collaboration at IIASA: Survey and Appraisal," September 15, 1978; C. West Churchman, "Survey of the Contributions of the International Institute for Applied Systems Analysis to Methods Other than Applied Mathematics," 1978; A. Charnes, "New Analytical Methods at IIASA," September 5, 1978; Jurgen Schmandt, "Policy Research at the International Institute for Applied Systems Analysis: A Report to the National Science Foundation," September 1978; May 11, 1979 memo from Harvey Averch, Assistant Director, STIA (Scientific, Technological, and Scientific Affairs), NSF to Members and Consultants of the National Science Board via the Director NSF regarding "Results of a Survey of IIASA Alumni"; "Survey of IIASA Alumni," prepared for Division of International Programs, National Science Foundation, prepared by Aileen N. Sprague and J. Davidson Frame, Computer Horizons, Inc., March 1979; "The Information Dissemination Program of IIASA in the United States," prepared by Nancy K. Roderer and Candace H. Olsen, King Research, Inc. for the National Science Foundation, August 17, 1978; "Final Report: Assessment of the Scientific Quality and Utility of Reports Produced by the International Institute for Applied Systems Analysis," Kappa Systems, Inc., August 1978, NSF Contract No. C-INT 78-11783; October 29, 1980 memo (NSB-80-464) from Harvey Averch, Assistant Director, Scientific, Technological, and International Affairs, NSF to Acting Director/NSF, regarding "NSB-requested Assessment of the International Institute for Applied Systems Analysis"; Robert M. Thrall, "IIASA: What It Is and What It May Be - A Report to the National Science Foundation, Washington, D.C.," September 1980; Martin Greenberger, "IIASA From Youthful to 'Useful,'" September 1980; C. West Churchman, "IIASA How Good is IIASA? A Report to NSF on an Evaluation of the International Institute for Applied Systems Analysis," August 1980; George J. Klir, "IIASA: Expectations, Accomplishments, Current Characteristics and Prospects—A Comprehensive Review and Recommendations," August 1980; Carl Kaysen, "Report on IIASA: Summer–Fall 1980."
70. Research accomplishments that have attracted particular praise include early work by Holling's Ecology Project on spruce budworm infestations in North America in particular, and on adaptive resource management in general. IIASA's Energy Systems Program, begun in 1973 after the first oil shock, was the Institute's major program throughout the 1970s. In the mid-1980s IIASA set the standard in estimating global warming impacts on international agriculture. In the 1990s it has stayed

at the leading edge of this field, applying adaptations of IIASA's global agricultural production, trade, and consumption models. In 1989, Stanislav Shatalin, a principal economic advisor to Gorbachev, encouraged IIASA to bring eastern and western economists and officials together to assess possibilities for Soviet economic reform. The results were not adopted by Gorbachev to any significant extent. But, Boris Yeltsin later made greater use of them and, in November 1991, appointed Petr Aven from the IIASA project as Russia's minister of Foreign Economic Relations. Since 1986 the United Nations Economic Commission for Europe has used RAINS (IIASA's Regional Acidification Information and Simulation model) as the key scientific support for negotiations under the 1979 Convention on Long-Range Transboundary Air Pollution, the main international accord regarding air pollution. In the field of natural resources and the environment, essentially every international science program in the past two decades has been influenced by the research and networks begun at IIASA in 1972. IIASA fostered in this area a new international community of interest at a time when nothing comparable was underway elsewhere. Ideas and connections begun at that time have persisted and expanded, and they now thoroughly permeate international efforts such as the International Geosphere-Biosphere Programme and the Intergovernmental Panel on Climate Change. See Ludwig, D.D. Jones, and C.S. Holling, "Qualitative Analysis of Insect Outbreak Systems: The Spruce Budworm and Forest," *Journal Animal Ecology* 44 (1978): 315-332; C.S. Holling, ed., *Adaptive Environmental Assessment and Management* (Chichester, U.K.: John Wiley & Sons, 1978); Jeanne Anderer, Alan McDonald, and Nebojša Nakićenović, *Energy in a Finite World: Paths to a Sustainable Future* - Report by the Energy Systems Program Group of IIASA, volume 1 (Cambridge: Ballinger Publishing Company, 1981); Wolf Häfele, *Energy in a Finite World: A Global Systems Analysis* - Report by the Energy Systems Program Group of IIASA, volume 2 (Cambridge: Ballinger Publishing Company, 1981); Merton J. Peck and Thomas J. Richardson, eds., *What is to be Done? Proposals for the Soviet Transition to the Market* (New Haven: Yale University Press, 1991); Joseph Alcamo, Roderick Shaw, and Leen Hordijk, eds., *The RAINS Model of Acidification: Science and Strategies in Europe* (Boston, London, and Dordrecht: Kluwer Academic Publishers, 1990).

