5 Knowledge for Free?

Why Two US American "Mobile Radioisotope Training Laboratories" Embarked on a World Tour in 1958

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Introduction

In 1958, the US government donated two bus-like vehicles to the International Atomic Energy Agency (IAEA), which were packed with equipment and materials to train scientists and technicians in the detection, measurement, and handling of radioisotopes.[1] A charity from philanthropic foundations had helped promote scientific research in the United States in the first half of the 20th century, and after the Second World War, federal agencies were established to increase funding for national science. Certainly, the donation of mobile radioisotope training laboratories to the IAEA was part of an expansion of funding strategies motivated by the belief that nuclear technoscience was fundamental to advancing modernization all over the world, but it also played another role. The gift represented an effort to generalize Western values and must be understood as part of the non-military Cold War struggle against the Soviet Union.

The extension of Cold War strategies from the domain of nuclear weaponry to civilian sectors originated with the "Atoms for Peace" initiative launched by US President Eisenhower at a plenary session of the United Nations (UN) in December 1953. "Atoms for Peace" was chosen as the motto of a conference held in Geneva in August 1955, which gave the opposing Cold War camps the opportunity to present and compare their progress in developing applications for the future atomic market. "Atoms for Peace" also became the leitmotif of the IAEA. It was established in 1957 to monitor nuclear weapons programs, set safety standards, and promote scientific and technical exchange as a basis for developing the civilian nuclear energy sector worldwide (Fischer 1997; Brown 2015; Röhrlich 2017, 2022; Adamson 2021). Representatives of the nuclear superpowers, the industrialized countries, and the developing countries were involved in this agency's foundation.[2] The United States and the Soviet Union were engaged in a tug-of-war for influence over certain developing country members of the IAEA – in particular those rich in uranium and other raw materials relevant to nuclear energy uses, such as India, Brazil, and South Africa – and these countries, in turn, sought to influence the agenda of the IAEA (Hecht 2006; Röhrlich 2016).

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Given this geopolitical constellation, the donation of the two busses by the US government constituted a move to counter Soviet propaganda and action in the non-aligned territories. The intention was to use the mobile laboratories in what became collectively known as the "Third World", a group of countries in Africa, Asia, the Middle East, and the Americas, which had been experiencing forces of decolonization, struggles for independence, and nationalist movements. The two busses constituted veritable vehicles for the spread of knowledge about radioisotopes around the globe. The program offered on board was characteristic of a Cold War-driven "educational internationalism", with the mobile laboratories universalizing scientific norms, embodying the geopolitical visions of the US government, and justifying and enacting a developmentalist imaginary around the globe.

By tracing the world tours of the two mobile laboratories, this chapter describes the nature and scope of a particular form of the educational aid program in support of the contested territory of the "Third World". It aims to contribute to an understanding of the Cold War's global dimensions and the knowledge dissemination strategies associated with this conflict. Earlier historical studies have focused on the transnational movement of knowledge spurred by the mobile laboratory in Latin America, as well as on the manufacture of the busses and the act of handing them over to the IAEA (Mateos and Suárez-Díaz 2019; Rentetzi 2021). However, the symbolic power of the mobile laboratories has not yet been adequately recognized. To achieve this, this chapter elaborates on the origins of radioisotope training and the donor's perspective, traces the diplomatic negotiations involved in the tours, and reveals how the donated bus-like vehicles contributed to the dissemination of knowledge through the training offered on board. Drawing on archival sources and digitized newspaper reports, it follows both busses on their tours from 1958 until 1965, when the IAEA ended this training program.

Pinning Hopes on Radioisotopes

In the 1950s, radioisotopes became a symbol of the humanitarian application of atomic energy. There was a widespread belief that radioisotopes would improve agriculture by increasing crop yields and reducing insect populations, as well as lead to progress in human health by providing a basis for the development of many new medical treatments. Investment in research was also accompanied by optimism about the biological uses of radioisotopes, for instance, in the analysis of vitamins. Studies were believed to lead to discoveries that would be of great value to society. As a consequence, biophysics and radiochemistry experienced an upswing (Keller 1990; Rasmussen 1997; Kraft 2006; Radar 2006; Santesmases 2006; Creager 2013).

However, there was a clear international imbalance of power. After the Second World War, the United States gained a monopoly on radioisotope production, as it had the technical means, licenses, know-how, and experience to

artificially produce a large variety of these substances. Much of the radioisotope production was carried out at the Oak Ridge facilities in Tennessee, managed by the Atomic Energy Commission (US AEC). Oak Ridge – or "America's atomic apothecary"[3] – began supplying radioisotopes to domestic universities and hospitals in 1946. A year later, when the Marshall Plan for European economic recovery was announced, the US government allowed the export of material to Western Europe, and later to non-communist countries around the world, where radioisotopes were used in cancer treatment and enabled studies of nucleic acids, proteins, or viruses (Creager 2002, p. 368). However, it was not until an international scientific elite was convinced that the future of peaceful applications of atomic energy lay in radioisotopes that significant demand was established in the world market (Creager 2013, p. 86). Consequently, the number of shipments increased sharply in the 1950s, putting heavy strain on the Oak Ridge Isotope Division. It was only after 1960 that other facilities had developed the infrastructure to start competing with Oak Ridge in terms of radioisotope production.[4]

In the 1950s, Oak Ridge not only supplied products to domestic and foreign research centers, medical schools, and hospitals but also offered courses in radioisotope handling and, after the launch of the "Atoms for Peace" program, invited citizens of "friendly nations" to participate in these courses (Hof 2021). In 1957, the US AEC approved the establishment of a nuclear training center in Puerto Rico. This institute's curriculum included a radioisotope handling course identical to that established in Oak Ridge, but which was specifically targeted at Spanish-speaking participants from Latin American countries. The US International Cooperation Administration (ICA) provided information and paid for the training of participants from economic aid recipient countries.[5] The donation of two mobile laboratories to the IAEA in 1958 must therefore be considered as an extension of US policy to offer training opportunities to foreign citizens.

The monopoly on the production of radioisotopes, and on the know-how in handling them, gave the United States a competitive advantage over other nations. But during the Eisenhower administration, there was a discursive strategy of US representatives to create a sense of equality. The endowment of two mobile laboratories to the IAEA was a demonstration of good intentions and of the will to support other nations. Indeed, at a plenary session to prepare the IAEA's founding, the chair of the US AEC, Lewis Strauss, stated that science was

> without boundaries […] and a common knowledge of the peaceful application of this new science can help us all to a better understanding of each other. […] the United States does not seek for domination or control or profit. Nor shall we as a government ever do so.[6]

In the summer of 1958, in the aftermath of the Sputnik mission, which had marked a clear triumph for the Soviets, Brussels hosted Expo 58, which was to

become an important Cold War battleground. The exhibition juxtaposed the "Third World" abundance of raw materials and Western technological development, which itself was grounded in the use of those same resources. Expo 58 thus conveyed the message of the "necessity" of development aid (Pohl 2021). At the second "Atoms for Peace" conference in Geneva that same summer, the US government, in a propagandistic gesture of global support for nuclear technoscience, gifted the two mobile laboratories to the IAEA and brought one of them to the exhibition grounds. The mobile laboratory program was established with the assistance of experts from the Oak Ridge Institute of Nuclear Studies (ORINS), who designed the two vehicles. In addition, Ralph Overman, chair of the ORINS Special Training Division, offered his team to assist the IAEA in setting the training targets. He was convinced that radioisotope training should be made available in many countries.[7] The bus-like vehicle's presence in Geneva was intended to attract attention and encourage sympathy for American philanthropy.[8]

Assistance and Anti-communism

In 1956, the Australian representative to the IAEA, Sir Percy Spender, argued that atomic energy was of little value if the "less developed" countries were not given information and special materials, as well as the opportunity to train their people, including "wise advice as to how this new knowledge can be applied to their problems".[9] The technical assistance program, incorporated into IAEA policy and embodied by the two vehicles, was intended to help developing countries in their science-based industrialization development. This understanding of foreign aid was based on the teleological view that nations go through progressive stages of economic achievement (Mateos and Suárez-Díaz 2020, p. 419). In line with the IAEA's mandate to provide technical assistance to its member states as they established their civilian nuclear energy sector,[10] the mobile laboratories were to help developing countries increase their expertise so that they could make better use of their resources.[11]

However, the gift of the mobile laboratories to the IAEA was not only motivated by economic concerns. It was embedded in a larger propaganda effort to win the global battle for "hearts and minds" – a strategy that eventually served to prevent the spread of communism in postcolonial countries. New states were emerging in the mid-1950s, and there were signs that yet more would gain independence. The "Third World" was seen as in need of help, and the United States and the Soviet Union competed for their favor. Nikita Khrushchev, head of the Soviets, launched a massive offensive to assist developing countries, recognizing the strategic importance of foreign aid in the struggle with the West (Donaldson 1982; Pach 2006; Heurlin 2020). US President Eisenhower likewise anticipated that assistance programs would be helpful in gaining the allegiance of those nations that had not yet committed to a side. Interest in foreign aid grew, as did fear of enemy expansion (Easterly 2006).

In its early years, the IAEA was a contested arena rather than a place of reconciliation where Cold War tensions could be eased. The mobile laboratories emphasized the scientific capability and leadership of the United States as part of an effort to "exclude the USSR from entirely dominating the Agency training program".[12] Issues of national security provided an important impetus for the donation of the mobile laboratories. This is evident from the fact that the construction costs were financed from the ICA's Mutual Security Funds. The radioisotope training program was promoted not only by the IAEA but also by the US Information Service (USIS), which had been established in 1953 to influence public opinion in non-communist countries.[13] By giving people in foreign nations a sense of partnership with the West, US-led "educational internationalism" also served to counter communist influences abroad.

Furthermore, the attempt to weaken Soviet Union footholds in the nonaligned territories coincided with a shortage of militarily relevant raw materials, which suggests that the offer of radioisotope training also served to strengthen international relations. Popular movements for sovereignty and independence emerging in the decolonizing countries threatened access to scarce minerals and impacted US attempts to increase its stockpiles. As early as 1950, the US Munitions Board had warned that foreign countries were beginning to protect their industries by either placing raw materials under strict export controls or preparing plans to do so. Possible shortages of uranium and thorium – the latter is used to produce the fissile isotope ^{233}U – were considered problematic in the event of a national emergency. The Munitions Board thus advised the US AEC to strengthen relationships with India, Portugal, Belgium, Britain, France, and Brazil, all of which had access to key raw materials and rare-earth elements either through their own natural resources or via those they obtained through their colonies. This board suggested increasing technical and financial assistance abroad to counter nationalization processes.[14] A year later, in 1951, the US AEC handed out Geiger counters to foreign service posts and embassies in many areas in Latin America and Africa – but not those in countries under communist influence, notably Guatemala. After their collection, radioactive samples were sent to Washington for analysis, with the results forming the basis of possible trade agreements.[15]

The US government sought to dominate uranium's circulation and secretly prospected abroad for this important resource (Adamson, 2016). It is difficult to conclude from the accessible archival source material whether the world tours of the two mobile laboratories and their accompaniment of US experts were seen in similar strategic terms. Officially, representatives from the USIS and the US AEC argued that the mobile nature of the laboratories would make it possible for them to move quickly from town to town and provide access to training for many.[16] However, their expectations exceeded the actual interest on the ground in visits from these vehicles. Costs were high, and the program was hampered by international tensions and independence movements, as evidenced by the two mobile laboratories' journeys.

Foreign Aid in a Time of Political Instability: The Tour in Europe, Asia, and Africa

The two busses had a 10-kW generator on board and an air-conditioned interior. Each unit had a radiation counting room and a chemical laboratory. Dual sessions alternating with lectures allowed twelve students to participate in each course.[17] These courses were identical to those given at the home institute in Oak Ridge, but also allowed the subject matter to be adapted to the presumed interests of the participants.[18] The laboratories (see Figure 5.1)

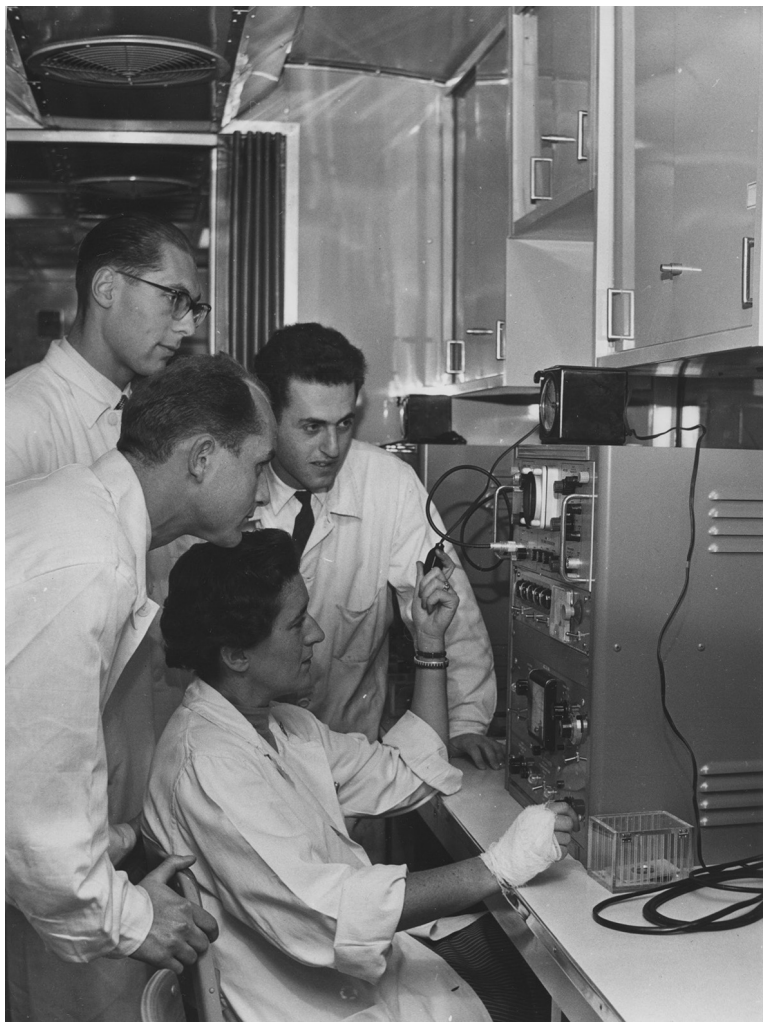

Figure 5.1 The interior of the mobile radioisotope training laboratory. Dr. Traude Bernet, Head of the Austrian Isotope Distribution Centre, is explaining the handling of an oscilloscope (picture: IAEA Archives, E0033_11. 1959). Credit: IAEA.

were designed to provide appropriate basic training in radioisotope handling. They facilitated lectures on radiation, radiochemistry, instrumentation, the principles of health physics, nuclear structures, modes of decay, and on general problems of radioisotopes. The practical experiments provided knowledge of counting techniques, measurements, chemical manipulations, and separation methods.[19]

The first vehicle left the exhibition grounds in Geneva after the "Atoms for Peace" conference and was driven to the IAEA headquarters in Vienna, where it was received in an official ceremony in September 1958.[20] The IAEA had to divert funds from its annual budget to make use of the gifted radioisotope training program. Operating and maintenance costs increased because a driver had to be hired and the vehicle had to be modified to comply with European traffic regulations. The estimated costs for the first two years of operation totaled almost 100,000 US dollars. Consequently, knowledge was *not* provided free of charge: the IAEA decided that the visited countries had to cover a proportion of the costs, which included transport, paperwork, and fifty percent of the drivers' salaries. The drivers were Austrian mechanics who were also trained to help teach part of the radioisotope handling courses.[21]

The first vehicle was stationed in Vienna in the winter of 1958 and was used in the training of medical officers, while plans were under way to transfer the bus to other countries. The chair of the IAEA, the US lawyer William Sterling Cole, sent a circular to member states explaining the content and scope of the training opportunities on offer. Cole suggested that governments cooperate with each other to reduce the cost of transporting the vehicle to their country.[22] However, his letter went unanswered by many representatives. Most IAEA member states were already able to offer radioisotope training to their citizens, since they had benefited from the invitation for training at Oak Ridge after the launch of the "Atoms for Peace" program in 1955. The Japanese Atomic Energy Research Institute, for example, began inviting students from Southeast Asian countries to its training facility in 1958.[23] Ceylon built its own facility with support from the IAEA, which further reduced the need for a mobile laboratory in the Far East.[24]

In fact, the number of countries reporting a need for a visit was low. Moreover, there was an unspoken expectation regarding the infrastructure and expertise required. While the representative of Haiti requested further information on the program, the local UN technical assistance office considered this country "too underdeveloped", because no studies on nuclear energy problems had been carried out in Haiti to that date.[25] The Belgium government, in turn, had no interest, arguing that the mobile laboratories should serve the "underdeveloped countries".[26]

Although the first mobile laboratory was originally intended to be used mainly in Europe, only three countries besides Austria received visits. In April 1959, the vehicle departed Vienna for Athens.[27] From the Greek capital, the journey continued to Yugoslavia. Here, the nation's President Tito was engaged in an attempt to decouple the country from Soviet paternalism and control and

transform it into a modern knowledge society. From Yugoslavia, the journey continued to the Federal Republic of Germany, the last European country visited.[28]

In autumn 1959, the US government rejected the IAEA's request to send a unit directly to Korea on the grounds that the first mobile laboratory had met with little interest.[29] Instead, the third and fourth vehicles built at Oak Ridge were to be used for training in small communities and rural areas in the United States. This decision was based on the assumption that radioisotope use was experiencing limited growth because there were not enough US scientists and engineers trained in the field.[30]

Therefore, after its tour of Europe, the first mobile laboratory was loaded onto a ship in Italy in 1960 and transported to South Korea.[31] After five months of service there, it was driven to China, triggering heated discussions among railway employees about whether, considering the many tunnels along its route, the vehicle might have been mounted a little too high.[32] Although representatives of the Soviet Union had arranged for China's admission to the IAEA in 1956,[33] a serious ideological conflict had developed between the governments of the two communist regimes in the meantime, which may explain why China approved a visit by a US-sponsored mobile laboratory. After five months in China, the vehicle set out for the Philippines in 1961, where the US radioisotope specialist Ralph Overman joined the project for eighty days, giving talks and interviews, thereby promoting the training content and assisting in its organization and day-to-day running.[34]

After the Philippines, the mobile laboratory was stationed in Indonesia for four months, from where the journey continued to South Vietnam. At the time, with the conflict with North Vietnam having already erupted, the Eisenhower administration sought to transform the South into a model of successful decolonization (Statler 2006). The US projection of science-based social progress also provided the framework for the visit to Singapore, where the training program was offered in 1963. At that time, Singapore not only received development aid under the Colombo Plan, whose aim was to strengthen the economy of Southeast Asia, but the US government had also supported the establishment of an Asian regional nuclear center there in 1955, based on the "Atoms for Peace" initiative and under the responsibility of the ICA. This project was supported by the US AEC, which provided technical advice. The mobile laboratory visit thus contributed to continued aid from the West.[35]

For unforeseen reasons, Singapore was the last country in Asia to be visited. After initially considering it unnecessary because of the many training opportunities already available, the Pakistan Atomic Energy Commission invited the mobile laboratory in March 1964 to both West Pakistan and East Pakistan (which became the independent nation of Bangladesh in 1971).[36] In preparation for the program, spectrometers were delivered from the United States. However, the Pakistan government canceled the visit in December 1964 because of the administrative burden involved. It had originally been intended

to transport the laboratory from East to West by rail, as this would be much more economical than shipping it along the coast. However, the train journey involved crossing the territory of India. This was undesirable, as tensions between India and Pakistan were high. Indeed, they were soon to erupt into outright conflict over the Kashmir region in September 1965.[37]

Thus, instead of being sent to Pakistan, the IAEA decided to ship the mobile laboratory to Ghana, which by that time had been independent for eight years. Ghana was the only country on the African continent to receive a visit. This was a period in which many African states were going through (post-)colonial conflicts and political unrest. The IAEA discontinued the mobile laboratory program, having concluded that there was not sufficient interest for this kind of technical assistance. The first unit was brought back to Austria in 1965 and parked in the IAEA's new laboratory in Seibersdorf to expand the limited space there.[38]

Raw Materials in Exchange for Economic Aid: The Tour on the American Continent

South American countries, especially Brazil and Argentina, became important trading partners for the US government in the late 1940s, as North American soil contained too few of the minerals needed for bomb fuel (Hamblin 2021, p. 21). This partnership was characterized by an asymmetry of power, however: in 1954 US officials took advantage of a famine in Brazil to trade valuable minerals for wheat (Adamson and Turchetti 2021, p. 52). The US assistance program to Latin America expanded in the wake of "Atoms for Peace", and reactors and the training of experts subsequently became important bargaining chips in the US pursuit of access to uranium and thorium deposits. Brazil benefited the most from US financial support to expand nuclear technoscience, allowing exploration for rare materials in return.[39]

While the decision had been taken to keep the third and fourth units in the United States, in March 1960 the US government gave the IAEA the second mobile laboratory in order to provide the "American Republics" with a training program similar to the radioisotope courses offered at Oak Ridge.[40] The second mobile laboratory was driven to Mexico, accompanied by US experts, to offer radioisotope training.[41] The vehicle was then shipped to Argentina, where, for once, not US American experts but local organizers were responsible for the course content.[42] From Argentina, the journey continued to Uruguay. Uruguay was not actually a member of the IAEA in 1961, but its government had agreed to the Revised Standard Agreement on Technical Assistance in 1955, and the provision of the mobile laboratory could be financed through the UN's Expanded Program of Technical Assistance for Economic Development. Therefore, the chief of the Exchange Section of the IAEA's Division of Exchange and Training, Arturo Cairo, had no objection to the deployment of the mobile laboratory in Uruguay.[43]

Brazil was next. The Brazilian government had been the second in the world (after Turkey) to sign a bilateral agreement with the United States in 1955 on cooperation in the peaceful uses of atomic energy. This agreement allowed the leasing of enriched uranium for reactors and the exchange of unclassified information. As a result, US companies built reactors in Brazil for research, education, and radioisotope production. The media subsequently reported that Brazil had entered the nuclear age and that radioisotopes would fundamentally change medicine.[44] The mobile laboratory toured seven Brazilian cities for nine months in 1962 for demonstration and training purposes and, according to a media report, was met with great interest.[45]

However, similar to the first unit's tour (see Figure 5.2), the second mobile laboratory came too late to tout radioisotope training as a novelty and create a large demand for it in Latin America. After a visit to Bolivia in 1963, the mobile laboratory was housed in a garage in Brazil until 1966, when the IAEA donated the vehicle to Costa Rica to support a "special fund" project to eradicate fruit flies. Thus, after seven years, in which 1500 course participants were trained in one African, four European, five Latin American, and six Asian countries, both units were withdrawn from service.[46]

Figure 5.2 The first mobile radioisotope laboratory being shipped in Italy for the Far East. Both vehicles were painted light green, were over 10 meters long, 3 meters high, and 2 meters wide, and had an unladen weight of 13 tons (picture: IAEA Archives, E0033_13. 1960). Credit: IAEA.

Conclusion

This chapter has explored a tangible manifestation of knowledge circulation in the Cold War, illustrating how the United States nurtured its image of a blessed and generous nation giving gifts to others. The two self-contained laboratories were to bring expertise training to remote places in the world in order to disseminate knowledge about radioisotopes. Their donation to the IAEA was a clever propaganda move to make national representatives aware of the positive attitude of the United States and to outdo the Soviet Union in providing assistance. However, the knowledge offered was not entirely free: not only did those visited have to pay for transport, paperwork, and salaries, but also, due to concerns about the stability of international relations, the radioisotope training program had to be seen as a soft power intervention abroad and a means to establish contacts that would help to build the Western-led nuclear world market the US government aspired to.

The mobile laboratories had symbolic power, as they embodied geopolitical visions, but they also enacted a technoscientific developmentalist imaginary. In the 1950s, radioisotopes were considered vital for the economic growth of developing countries and were seen as highly beneficial to the prosperity of young nations. The lending of the mobile laboratories to interested parties was meant to facilitate practical experience in radioisotope handling and to expand access to know-how. The intention was to bring knowledge to people who would otherwise not have the opportunity.

However, the original vision whereby education about nuclear energy would reach all sections of the population changed when the program was deployed. Both units were usually stationed at university campuses to offer advanced training for specialization to only a small number of qualified academics. Apart from the Geneva exhibition in 1958, the vehicles were only used to conduct public outreach in South Vietnam and Mexico. The training program was not as successful as expected: for several periods of time, the two mobile laboratories were neither on the road nor being used for training purposes. In all, they accounted for only 0.8 percent of the IAEA's expenditure on technical assistance during their world tour period. Nevertheless, the IAEA signage on the busses helped build public awareness about this new global player shortly after its founding. Several times, the drivers had to disperse curious crowds along their routes.[47]

The roads, ships, and rail used, as well as the motorized laboratories themselves, make apparent the way in which the circulation of knowledge was dependent on infrastructure. The vehicles' journeys over land and sea could be arduous and were often hindered by bureaucratic obstacles. The mobility of the two laboratories also depended on political will. The radioisotope training program became entangled in myriad national interests and faced diverse local needs. Countries with sufficient training opportunities turned down the offer, while others had their own priorities for development. Furthermore,

international tensions and decolonization struggles added to these difficulties, meaning that negotiations for visits failed with many governments. On top of this, an increasing number of sites worldwide already had the technical capabilities and know-how to produce and use radioisotopes in the 1960s, while the promising discourse that had characterized their promotion in the previous decade was beginning to fade.

Notes

1 Radioisotopes – or radioactive isotopes, today more often called radionuclides – are unstable and decay. In the 1950s, they could be produced artificially by reactors, chemical processes, or cyclotron bombardment (Seaborg 1994).

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