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Uranium exposed at Expo 58: the colonial agenda behind the peaceful atom

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ABSTRACT

This research focuses on the staged contrast between atomic modernity and colonial backwardness at Expo 58 in Brussels, as a strategic promise of the peaceful nuclear, powered by Congolese uranium. I analyze the management of nuclear power – ranging from household technologies to European (post)colonial infrastructures of uranium resources and nuclear power plants – to reveal architecture as a geopolitical technology. The article argues that the 'domestication of the atom' goes hand in hand with the domestication of power, exercised through architecture on various levels, affecting the politics of visibility, knowledge, and imagination. The article examines Expo 58 as a case study, where global uranium agents such as the Union Minière du Haut-Katanga (UMHK), the US Atomic Energy Commission (USAEC), the Belgian Centre d'Études pour les applications de l'Energie Nucléaire (SKC-CEN), and the European Atomic Energy Community (Euratom) met in a setting that constructed both a Western scientific gaze and colonial backwardness.

KEYWORDS

Nuclear; transnational; postcolonial; technopolitics; Congo; architecture; atoms for peace; uranium; Expo 58

'The atomic age is going to have its first world's fair'.[1]

The peaceful use of nuclear power was the primary theme at Expo 58 in Brussels, promoted through symbolic modern architecture, household appliances, and scientific endeavors, not least by the exposition's dramatic main pavilion, the Atomium. But the fact that this peaceful nuclear energy was steeped in a history of colonial trade networks and racist exploitation was entirely obscured in the architectural aesthetics of the World's Fair. Only one evident disjuncture hinted at an encoded conflict that would erupt several years later, generating decades of proxy wars over radioactive ores. At the fair, the Congo and Congolese people were 'displayed' in a 'primitive' indigenous village that was juxtaposed to the high-tech world powered by Congolese uranium. Unpacking this disjuncture of nuclear power gives insight into how global ore and capital networks during the era of the Cold War embedded architecture within the technopolitics of nuclear energy, serving postcolonial control.

From a domestic to a geopolitical level, architecture played a significant role in promoting and securing the peaceful use of nuclear energy, to which the European Atomic Energy Community (henceforth, Euratom) was also dedicated. First, within a broader geopolitical spectrum, Euratom can be regarded as a 'cornerstone of [President

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Eisenhower's] grand design for a United States of Europe', his beloved Atoms-for-Peace program.[2] The extent of the pragmatism of this 'peaceful' use is demonstrated by a 1957 Euratom promotional film: 'the proof for the atom's domestication is the steak grilled with nuclear-generated electricity'; this 'peaceful use' also implies underlying colonial networks because it necessitates the geopolitical management of uranium resources.[3] This type of management can be generally described as the governance of (nuclear) power in a double sense[4]: First, as a political power that is exercised along classical lines of sovereign, disciplinary, and governmental power regimes through the bodies, habits, and souls of a population – biopolitics, in Foucault's sense[5]; and second, as the infrastructural management of resources, knowledge, and science that develop around power as an energy system. The governance of nuclear power therefore has to deal, on the one hand, with the application of nuclear power and its cultural and political consequences and, on the other, with a wider strategic implementation of infrastructure that ensures the flow of atoms into applications. In sum, this means that management ranges from the architectural scale of household technologies to that of uranium resources and nuclear power plants – revealing architecture as a governmental apparatus of geopolitical technology. This paper argues that the Euratom's 'domestication of the atom' goes hand in hand with the domestication of political power that is exercised through architecture on various levels and affects the politics of visibility, knowledge, and imagination on a global scale.

World's Fairs are moments in which international diplomacy, science, and technology converge on a global stage. While this has been widely acknowledged as a field of research by a growing body of literature, only very recently has the 'role of the World's Fairs in the Cold War', to cite the terms of Arthur Molella and Scott Gabriel Knowles, became an object of investigation.[6] Expo 58, as the first World's Fair after World War II, has subsequently been considered by several scholars as an ideological battlefield between the Soviet Union and the United States, especially if one bears in mind that just one year prior to Expo 58, the launch of the Sputnik space capsule intensified these political tensions between the Soviet Eastern Bloc and the West. Notably, the Soviet pavilion emphasized this scientific and technological triumph by hanging replicas of Sputnik I and Sputnik II from the ceiling. This has led scholars such as Susan Reid and Lewis Siegelbaum to focus, from respectively different perspectives, on the tensions and similarities between Western and Soviet modes of power and display in the beginning of the Cold War period.[7]

Although other scholars have addressed the relevance of displaying the peaceful use of nuclear technologies among the global superpowers at Expo 58, these perspectives have tended to lead us away from the fact that the Cold War was more than just a bipolar ideological battle fought out in exhibition displays.[8] The Cold War caused numerous violent proxy wars and conflicts elsewhere that also left encoded residues at Expo 58. This is not to speak of 'the West' or 'the East' as unproblematic monolithic cultural and political categories with univocal aims, and it is also not to trivialize the political effects that the promotion of the 'peaceful atom' had on global politics as a symbol for reconstruction. Because nuclear energy would play a key role in European postwar reconstruction, Expo 58 served larger goals beyond fascinating the public with technological innovations in order to promote the establishment of Euratom and to accommodate the European institutions in Brussels, as has been demonstrated by Stuart Leslie and Joris Mercelis.[9] Moreover, as Morrison Low has explored, the World's Fairs of Expo

58 and Expo 70 in Osaka played a significant part in selling the message of 'atoms for peace' to Japan.[10] But the 'peaceful atom' also found its encoded colonial conditions represented at Expo 58 in a way that brought together issues of colonial power, the technopolitics of nuclear energy, and the embodiment of futures that can be told through symbolic World's Fair architecture.[11]

This paper aims to analyze how the displayed disjuncture between the 'primitive' Congolese village and the high-tech world powered by Congolese uranium performed and gave physical expression to an encoded conflict around the Cold War technopolitics of nuclear energy. Unraveling the relations between actors, science, and technologies showcased at Expo 58, it sheds light upon the ways in which late-stage European colonialism in Africa paved the way for decades of proxy wars, genocides, and postcolonial control carried out under the umbrella of an allegedly bipolar Cold War. This period inscribed obscure colonial trade patterns into logistic chains of rare metals that are evidence of the problematic inability of postwar Europe to deal with postcolonial ore and labor exploitation, which has persisted into the present day. Such an analysis provides an understanding of the contested past of mining companies such as Umicore that are still operating in the Congo, and of their efforts to cover the tracks of their own colonial history and the role they themselves played in bloody conflicts.

This paper will first explore how the Congo and Congolese people were strategically displayed as 'backward' and 'primitive' in stark contrast to a high-tech modern domesticity powered by Congolese uranium. Second, it will unpack how this strategic display served global uranium networks in legitimizing colonial exploitation in order to demonstrate the allegedly peaceful use of nuclear power inside the Atomium. Third, it will analyze how the actors who organized the Atomium exhibitions were intrinsically involved in the Congo conflict that followed Expo 58 and have continued to operate in the Congo until the present day. This leads conclusively to the question of whether the World's Fair as a practice of visioning could have offered different techno- and geopolitical narratives for nuclear power. If we follow the path of the atoms, then we see that the consumer products presented at Expo 58 lead to the conditions of large scale energy operations, industrial production for diverse actors, and the role of architecture – all of which contributed to stabilizing the colonial order.[12] Therefore, architecture will be considered as the medium and the message for nuclear power.

A final remark on the use of terminologies: when I speak of architecture and nuclear technologies, I am not only referring to artifacts in themselves, but always to a strategic arrangement of multiple resources (capital, labor, industrial capacity, discourse, etc.) that brings an entire technopolitical system into being. This technopolitical system has always manifest a discontinuous history, full of contradictions, twists, and turns. It cannot be regarded as a distinct object, but rather as a network or interconnected array of interdependent subsystems, crucially situated in the environment in which they operate.[13] However, this technopolitical system always has an aesthetic dimension, which is rendered through an ideological insistence on representation. Determining whether this ideology is unintended or a deliberate choice made by the creators of the artifacts is not the main aim of this investigation. Rather, this paper aims to connect the built artifacts of building interiors and kitchen equipment, World's Fair pavilions, nuclear research laboratories, powerplants, power grids, and uranium mines, that is, architecture in a broader sense, to the ideological notions and formations of the power that determines them. In sum, this is a question of the relation between ideological representation and the technopolitical formation of power.

Prologue – Expo 58

From 17 April to 19 October 1958, Brussels hosted Expo 58 on the 200-hectare Heysel Plateau, located northwest of the city center. Situated along a grand central axis (Avenue Belge and Avenue Congo), starting right behind the Grand Palace's entrance, the futuristic structure of the Atomium served as the centerpiece of the exhibition grounds. Immediately next to the Atomium, what was called the Colonial Section was laid out on a triangular plot attached to the Tropical Garden.[14]

Along the central axis, a threefold relationship can be identified among the Electric and Hydraulic Energy Pavilion in the Belgian Section, the Atomium in the center, and the Colonial Section in the background. While the Electric and Hydraulic Energy Pavilion was meant to promote the use of electricity and electrical household equipment, the

Figure 1. Expo 58 exhibition ground with the Atomium in the center next to the Colonial Section. Source: National Archives of Belgium (NAB), Expo 58, F 1760, no. 10564. Reproduced with permission.

Atomium contained exhibits on the peaceful use of nuclear energy, with the Euratom and the Union Minière du Haut-Katanga (UMHK) among the contributors, both of which were source agencies for electricity. The Colonial Section covering the countries of Congo and Ruanda-Urundi was meant to represent the development of those territories during Belgian colonialism, with thematic pavilions on agriculture, mining, and metallurgy, along with the reenacted depiction of everyday life in a Tropical Garden, where a group of Congolese people were supposed to simulate life in a mock 'indigenous village'. However, the relation between the promotion of a new Western domesticity in the Electric and Hydraulic Energy pavilion, highlighting new electrical household equipment and assuming infinite energy resources on the one hand, and the staged backwardness and primitiveness of the Colonial Section on the other, can be described as a gap that calls into question the geopolitics of nuclear power. How does this gap relate to the view of nuclear energy in 1954 as being 'too cheap to meter', expressed by Lewis L. Strauss, chairman of the U.S. Atomic Energy Commission?[15] Or, to follow on the often-discussed myth concerning the future of a new energy conversion, one could ask: who actually paid the price for this new Western domesticity being promoted at Expo 58?[16] Moreover, how might the path of the atoms from the Electric and Hydraulic Energy Pavilion, with its domestic equipment, to the Atomium, with its agencies of nuclear power, and thence to the Colonial Section of the Belgian Congo, reveal insight into a geopolitical situation that historian and STS scholar Gabrielle Hecht calls nuclearity?[17]

What was omitted from Expo 58 displays on the applications of peaceful use of nuclear energy were the social, political, economic, and labor conditions under which the resources were extracted in the mines of the Congo. Within the visual apparatus of Expo 58, the peaceful use of nuclear energy is constituted by the exclusion of the discourse on the source conditions of uranium and the invisibility of both the uranium workers and their exposure to radiation. What is included instead within the visual apparatus is the promotion of a new domesticity in the 'new' atomic era, which differentiates itself in opposition to a staged Africanized, exoticized, indigenous life in the Colonial Section, perpetuated through the Western gaze.

Colonial 'disorder' at Expo 58

In this period of decolonization, Belgium was internationally criticized for holding on to its colonial ambitions, especially since the exposition's initiators explicitly dedicated the Colonial Section to the celebration of the fiftieth anniversary of the annexation of the Congo.[18] Although the Expo 58 organizers discussed this criticism during their preparations, this had no consequences for the pavilion designs.[19] On the contrary, the organizers decided to strategically display colonial backwardness, highlighting African dependence to justify Belgian rule, as Matthew Stanard had demonstrated.[20] But this bizarre inversion of the situation in which the high-tech world was dependent for its power on Congolese uranium shows that a encoded conflict underlay this strategic display. This conflict also marks an important passage towards a postcolonial world – less than two years after the exhibition the Congo would gain its independence.[21]

Even in the design phase of the Colonial Section, we find significant differences in relation to the glossy Atomium, which was the centerpiece of the exhibition and placed in immediate proximity. The Atomium was abstract, polished, clean, with clear edges and

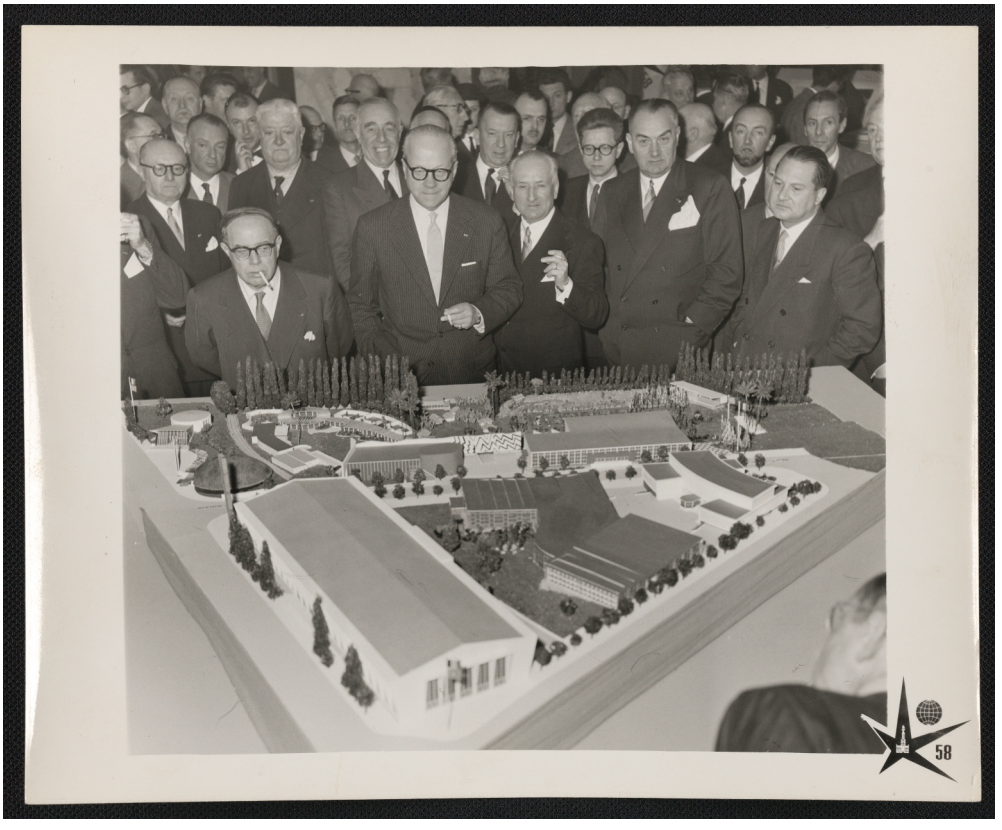

Figure 2. Presentation of the Congo Section on 15 April 1957, to the Cercle Royal Africain. Source: Brussels Royal Library, Expo 58, FS XCIII 65 B. Reproduced with permission.

details, while the Colonial Section was artificially naturalized, mimicking unprocessed tropical materials and uneven clay walls. Seen in this light, the architectural setting reflects a gap between technologically advanced parts of the World that represent 'the image of the future'[22] and the Colonial Section marked by tropical wood materials, Africanizing motives, and 'indigenous' basketwork.[23] This gap was explicitly demanded by the Exhibition Commissariat via the design guidelines, which required the Congo Section to have a specific Congolese characteristic, avoiding any monumentality or modernist architectural style.[24] To make this gap more explicit, a Tropical Garden was introduced containing exotic plants and an indigenous village, where a group of twenty Congolese people would eventually be exposed to the Western gaze in humiliating conditions for at least the first three months of the World's Fair.[25] In order to reinforce the 'colonial touch' in the architecture that was intended by the administration, Congolese workers arriving to Belgium were asked to supplement the decoration of their huts on the exhibition grounds with their own additional decorations.[26] 'Colonial backwardness' was much more thoroughly implemented by the chief architect, Maurice Houyoux-Diongre. For the designs, he hired only architects that had, like himself, already realized works in the colony. In a letter to the technical service he stated, 'the architects of this team are well known to me … they will help me in my mission to achieve a very

interesting and well maintained "Congo Section"'.[27] This exoticized colonialist image was first implemented through the planning of the seven-acre Colonial Tropical Gardens.[28] For this occasion, unique species of tropical plants and flowers were imported directly from the Katanga region in the Congo, where the Belgian UMHK would extract uranium for decades.[29] According to the landscape architect Rene Pechère, who was in charge of the Tropical Gardens, these plants should have a 'typical negro style', which he studied during an ethnographic and botanic research trip in the Congo.[30]

As argued by the historian Guy Vanthemsche, the Belgian empire frequently used World's Fairs to present Congolese people in mock 'indigenous villages', celebrating Belgian colonialism from the late nineteenth century onward. This depiction would be an essential element and a strategic choice in the political, diplomatic, and psychological mechanisms of the Belgian colonial enterprise that facilitated the building of a *new* Congo, which would continue to be subject to Belgian colonial activities for many decades.[31] In this way, previous Belgian World's Fairs were exploited to exhibit an exotic and romanticized colonialist image of the Congo, such as in Ghent (1913) and Brussels (in 1910, 1935, and 1958).[32] Expo 58 articulated, as had other fairs before it, the precise nature of contemporary technoscientific achievement – now a nuclear one – against which 'backward' peoples could be understood as such: colonial backwardness that had to be enacted and performed by Congolese people, juxtaposed to Western nuclear technology that depended on Congolese uranium.

A few of the workers from the *village indigène* were sent home after the first week because they wouldn't display the required 'enthusiasm'.[33] Without giving any particular reason in the official correspondence documents, apart from noting that their service was no longer required, the Congolese workers were sent home around mid-July.[34] However, as many protests during that period show, the humiliation of the people must have been

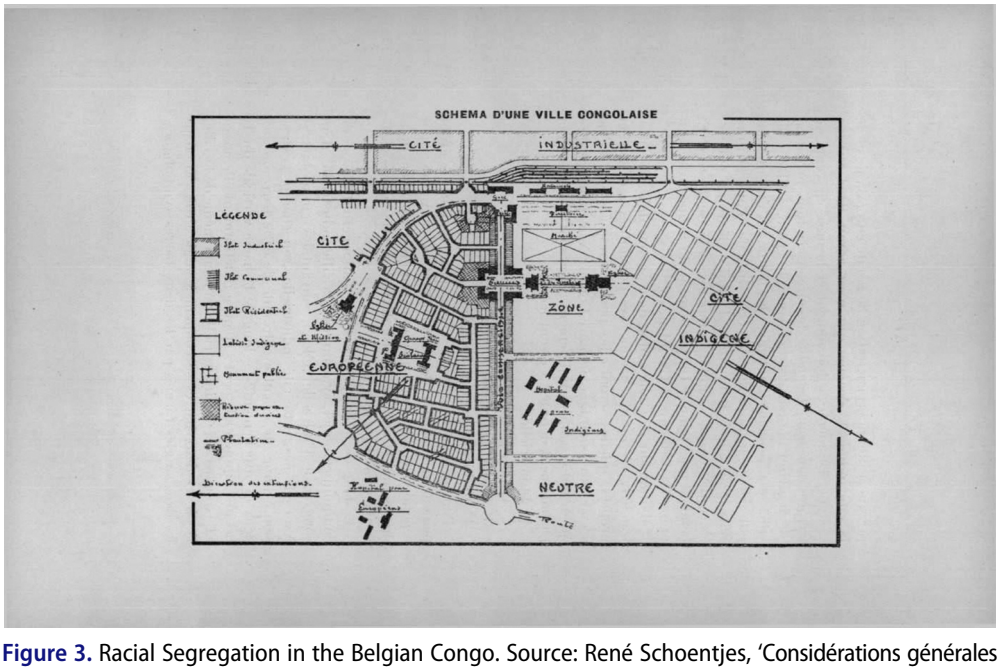

Figure 3. Racial Segregation in the Belgian Congo. Source: René Schoentjes, 'Considérations générales sur l'urbanisme au Congo belge', *Bulletin des Séances* 4, no. 2, (1933): 531–572, here 550, Académie Royale des Sciences d'Outre-Mer. Reproduced with permission.

unbearable, both for the workers, as well as for some of the spectators. Only a few sources acknowledged this inhumane side of the promoted 'new humanism': 'Congolese parked there like livestock and exhibited as curious beasts'.[35] Additionally the *village indigène* was fenced off, and the Africans were separated from fair-goers so that they could not be approached, but only studied by the Western gaze from a distance. King Baudouin reinforced this by greeting the Africans from a distance with a royal 'geste de la main', passing the *village indigène* during one of his visits to the Congo Section.[36]

Aside from that, the organizers were concerned about where the Congolese people could be housed, and in response they created a completely separate space for them, the Centre d'Acculeil pour Personnel Africain (CAPA), in a part of the unfinished colonial museum of Tervuren, fifteen kilometers outside the city center – conforming to a racial segregation practiced by Belgian colonial urbanism for decades.[37] According to the general commissioner of Expo 58, Baron Moens de Ferning, it was 'evidently out of the question to host them in city hotels or in motels near the exhibition ground. Due to their rudimentary education, other guests might perceive their behavior as awkward. On the other hand, it is certain that some Americans, for example, would not agree to be hosted in a hotel or motel with indigenous people'.[38] The CAPA was meant to host around 400 Expo workers together with Congolese tourists visiting Belgium, all people of color.[39] By excluding the black population from everyday city life during Expo 58, the organization practiced a form of urban segregation in Brussels that had already been established in the

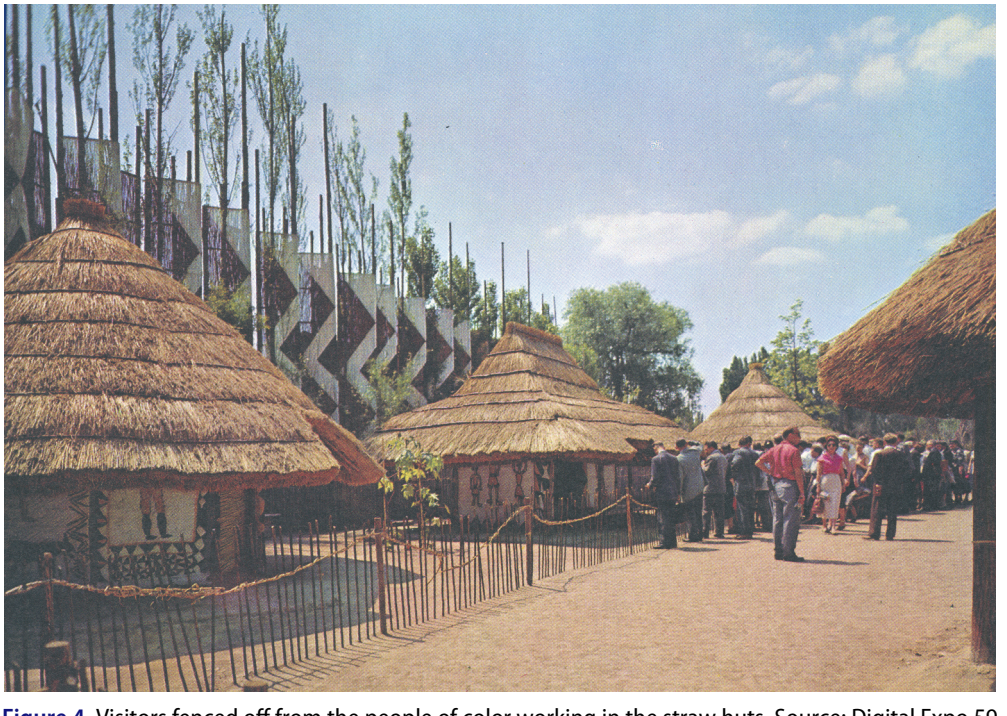

Figure 4. Visitors fenced off from the people of color working in the straw huts. Source: Digital Expo 59 Archive, Collection of the Department of Architecture & Urban Planning, Ghent University. Reproduced with permission.

Congo, strictly dividing the Cité européenne and the CAPA as a temporary Cité indigènes.[40]

While the other pavilions showed progress and technological advancements, the Congo Section with its *village indigène*, straw huts, and dirt floor[41] intentionally represented backwardness, primitiveness, and otherness, or what Timothy Mitchell would call colonial 'disorder'.[42]

Nuclear domesticity

Against the backdrop of the Colonial Section, the Western technologically advanced lifestyle appeared more modern than ever before, and what could demonstrate the peaceful use of radioactivity better than nuclear-powered architecture and household equipment. To speak in the words of John Krige, 'technological achievements, from warheads and missiles to RCA's Whirlpool kitchen became markers of the superiority of one system over the other in the "technological Cold War"'.[43] Peaceful nuclear energy can therefore be regarded as an entire machinery and practice of visioning in which the application of nuclear power is promoted for the greater good, but which excludes associations with the conditions for its production – and which therefore continues colonial legacies.

In this display of new domesticity in the atomic era, not only new electrical devices were promoted that render modern life comfortably manageable, but also an entirely new notion of the home, based on infinite nuclear energy resources that were 'too cheap to meter'. This article will now examine how these nuclear-powered household technologies contributed to the constitution of the historical category of 'user'[44] in more detail, by turning to the case study of the 'Electric House' at Expo 58. This will allow us to grasp how Western domesticity can be understood as a scalable governing technique, through its placement of bodies in a new technopolitical relationship with the availability of nuclear power.

The Electric House, designed by the Belgian architect Jacques Dupuis and the artist Lou Bertot, was exhibited in the Electric and Hydraulic Energy Pavilion to promote the use of electricity and electrical household equipment. A circular platform with a diameter of sixteen meters positioned in the center of the pavilion contained an organically shaped kitchen, a living room, two bedrooms, a bathroom, and a laundry room, all with the newest electrical equipment, flowing into one another around a central patio. Electricity was applied to the most sophisticated functions, such as the water supply in the bathroom, a surveillance camera in the children's bedroom, door-closing devices, etc. The kitchen, the centerpiece of the Electric House that occupied a quarter of its floor area, was a semi-automated domestic device in itself. Meals could be programmed through interfaces in the electric prototype and served directly to the living room. One could prepare and eat breakfast without even getting out of bed.[45] In short, Western domestic comfort resulted from transforming leisure and labor into sociotechnical relations between bodies and machines to such an extent that work and home became indistinguishable categories.[46] By connecting bodies and machines, the idea of the digital 'smart home', where its inhabitants are understood as data sets, finds here its analog predecessors.

The proposition of peaceful uses of nuclear energy that rendered the Electric House possible was not unique in its futurism; it actually had architectural precedents that had

Figure 5. The Electric House in the Electric and Hydraulic Pavilion. Source: Digital Expo 58 archive, collection of the department of architecture & urban planning, Ghent University, Reproduced with permission.

proposed how nuclear power would change the way architects would design in the future, such as Alison and Peter Smithson's House of the Future, exhibited at the 1956 *Daily Mail* Ideal Home Exhibition in Olympia Hall in London. Excluding the architectural details, their design is a testimony to the assumptions of infinite nuclear energy. According to the Smithsons, their house emerged out of the increasing influence of advertising on a consumer-oriented form of architecture, where the products of industry dominate large areas of domesticity, over which the architect has no control.[47] Although the House of the Future was designed to look twenty-five years ahead of its time by implementing the newest available audiovisual and domestic technologies, this futuristic approach was criticized by Reyner Banham, who argued that this imagined future was in fact already present; for example, the ovens exhibited were already standard equipment in the United States by that time.[48] Moreover, as Sabine von Fischer has pointed out, the architecture incorporated a whole multimedia apparatus of speaking and listening devices by creating a soundproof space for acoustic purposes, up to the last details of the exterior walls.[49] Consequently, the triple-layered composite walls of the House of the Future were designed for acoustic purposes, not as thermal insulation.

Although assumptions about the infinite availability of energy resources in the Smithsons' House of the Future project are clearly evident, most scholars have ignored these, along with

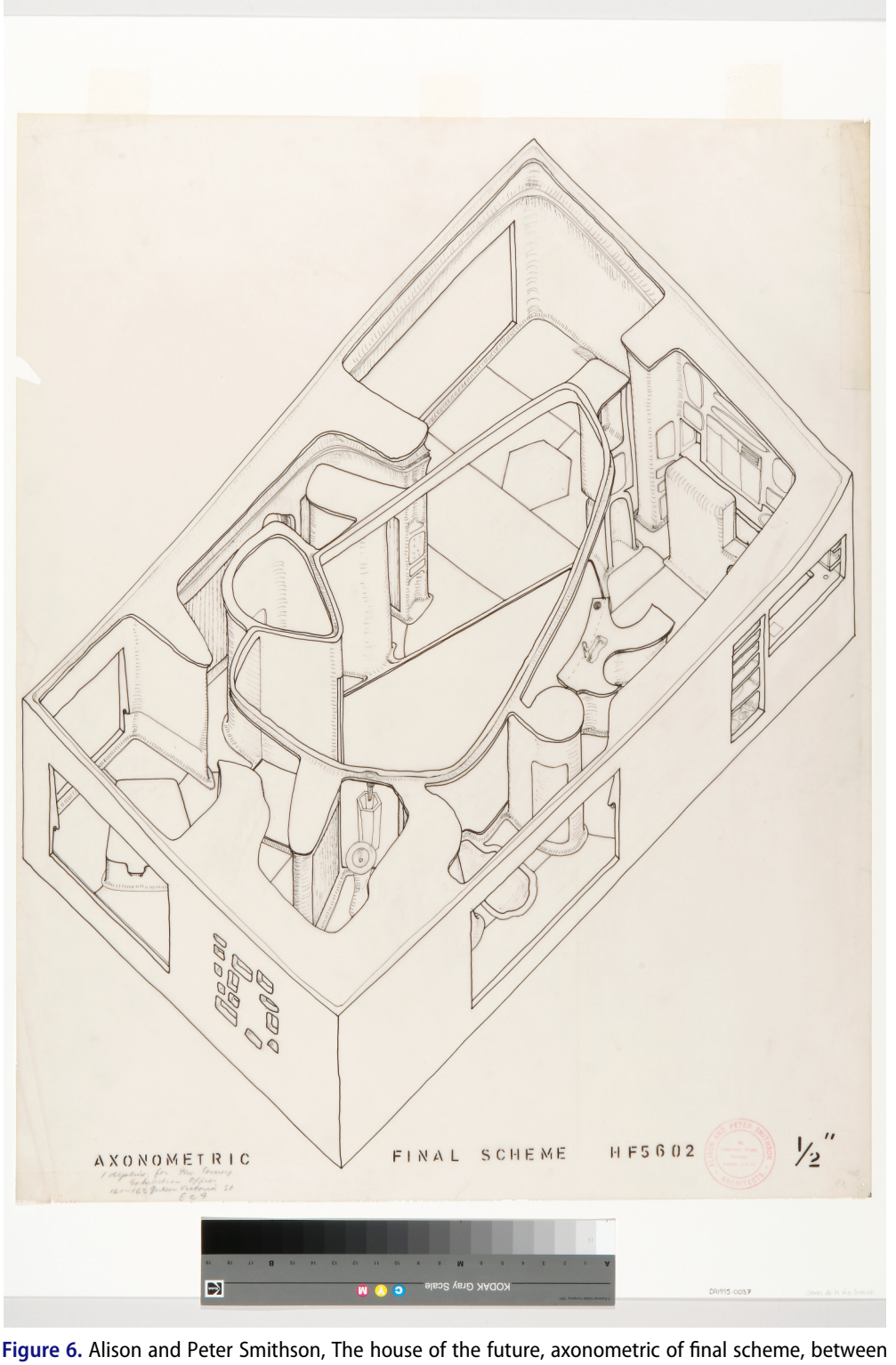

Figure 6. Alison and Peter Smithson, The house of the future, axonometric of final scheme, between 1955 and 6 March 1956. Source: DR1995:0037, Canadian Centre for Architecture (CCA). Reproduced with permission.

the role of nuclear power in the Smithsons' architecture.[50] The peaceful use of nuclear energy is present in the Smithsons' own descriptions, for example, when they claim that the conservation of food in the house is guaranteed, because 'all the food is bombarded with gamma rays – an atomic byproduct to kill all bacteria'.[51] In particular, as they continue, 'electric power, drawn from the nearest atomic power station, is used for heating, lighting, air-conditioning, water-heating, cooking, house laundry and refrigeration. Heated floors provide whatever warmth is required in any area of the house. Air conditioning sees to the mechanical extraction of all smells and ensures that dust infiltration is practically non-existent'.[52] These statements clearly emphasize that in addition to the nonexistence of dust infiltration, a subtle awareness of the energy consumption of heated floors without a basement is also 'practically non-existent', affirming the assumption that energy from nuclear power is available at an infinite level.

Consequently, the House of the Future, including its assured comfort and domesticity, was entirely based on the assumption that nuclear power would be the driving energy resource of the future. Despite the difference in the nature of the scholarly attention that the House of the Future has received in comparison to the Electric House, both projects assumed that architecture would need to facilitate the whole electrodomestic and audiovisual apparatus of Western industrial production in order to promote a new lifestyle. Neither the designers, nor the scholars or critics reviewing these two projects, were concerned about the proposed energy resources, not to mention the conditions under which these resources were to be made available. Nuclear energy was not only 'too cheap to meter' for proponents, but also in its idealized, imagined future conducive to the silencing of all but the most immediate priorities of ease and convenience. In keeping with broader majority cultural commitments of the time, the colonial and aesthetic implications of the move towards nuclearity in building remained remote from these concerns.

The framing of change and modernity among these advocates of architectural nuclearity itself encouraged such remoteness: Both projects imagine the future as linear projections. As Banham noted of most of the products in the House of the Future, the future is nothing less than an extrapolation of circumstances dominating the present condition.[53] At Expo 58, such extrapolation involved expressing through conceptual and physical means the nuclear home's distance from the indigenous village in the Colonial Section, by rendering the essential conditions of nuclear production, and of other resources involved, and technopolitical diplomacy invisible. Following the path of the atoms in order to gain an understanding of where assumptions about infinite resources originate, the activities of agencies such as Euratom and the UMHK that were exhibited in the Atomium may shed light on the strategic manner in which nuclearity was made symbolically visible, while hiding its operative origins in the background. An analysis of this exhibition can therefore reveal how assumptions about nuclear energy were based on geopolitical constellations, along with strategic visibilities within a larger historical framework of nuclearity.

The Atomium

All major Belgian nuclear agencies at the time were represented in the Atomium. The central symbol of Expo 58 was meant to be not only the architectonic embodiment of the peaceful use of atomic energy in the atomic age, but also the monumental model of the unit cell of iron crystal magnified 150 billion times. According to its engineer André

Waterkeyn, the form of the Atomium was a fundamental contribution to the achievements in nuclear, electronic sciences.[54] But determining the shape of an α-iron (ferrite) with nine atoms as a body-centered cubic crystalline structure required X-ray crystallography – a scientific discovery that would not have been possible without radioactive ores from the Congolese mines in Katanga. Yet even though tribute was paid in the symbolism of the Atomium to the scientific achievements of radiography, the sources of this technology remained neglected.

The Atomium as a model of the unit cell of iron crystal was meant to give form to something that escapes visibility: radiation. As Waterkeyn wrote, this symbolism referred, first, to a narrative of nuclear power, 'to mark the nuclear age on planet earth and promote nuclear energy for the progress of humanity', and second, to a planetary scale: 'Even if Belgium currently doesn't possess any great geopolitical importance, the Congo is producing and will produce a major part of uranium, as well as the choice by the US to situate the construction of a very important reactor (BR3) in Belgium'.[55] The Atomium can therefore be regarded, on the one hand, as the symbolic architectural embodiment over the peaceful use of nuclear energy and, on the other, as a geopolitical intervention where geopolitical strategies meet visualization techniques.

Contemporary architecture critics, such as Sybil Moholy-Nagy, criticized the Atomium as 'meaningless as a giant child's rattle – clumsy, hollow, and pathetically unrelated to the

Figure 7. André Waterkeyn with the model of the Atomium. Source: National Archives of Belgium (NAB), Expo 58, F 1760, no. 9040. Reproduced with permission.

visible forces that might well be the end of all of us'.[56] Although she blamed the Atomium's rendering of peaceful nuclear energy as being interchangeable with its catastrophic military past, Moholy-Nagy's account remained on the level of aesthetics. Using crystallography as a leitmotiv for the architecture had also an epistemic significance in postulating a metaphoric regularity and stability of scientific endeavors. In this sense it can be argued that the crystalline structure of the Atomium not only referred to the previous achievements in the science of crystallography, but also to the aim of establishing a stable geopolitical system based upon the infinite availability of uranium resources. Inside the Atomium, an exhibition was dedicated to securing stable geopolitical conditions for the continuous flow of uranium. It included space in four of its nine spheres for nuclear exhibits with contributions from Belgium, Britain, France, Italy, and Germany.

Uranium in the Atomium

The exhibition on the peaceful application of atomic energy hosted inside the Atomium was organized by Herman Robiliart, deputy administrator of the UMHK. It consisted of displays from the main Belgium uranium agencies at that time: the Association Belge pour le Développement Pacifique de l'Energie Atomique, Bell Telephone Manufacturing Company, Centre d'Études pour les applications de l'Energie Nucléaire (SCK-CEN),[57] Electronucléaire, Société Générale Metallurgique de Hoboken, Syndicat d'Étude des Centrales Atomiques (SYCA), and the UMHK, among others.[58] But Robiliart not only organized the exhibitors; due to the UMHK, long-term relations in uranium deals between the Belgian-Congo and the United States during World War II, Robiliart was a key figure in mediating the negotiations about the first nuclear power reactor that Belgium received as a manifestation of Eisenhower's Atoms for Peace program. Upon his endorsement, the Expo administration initially considered building the Belgian Nuclear Reactor 3 (BR3) on the exhibition grounds in order to allow site visits and to power the Expo. Even though the plant was eventually realized at the SCK-CEN in the Belgian Mol in 1962 for reasons of security, the exhibition inside the Atomium allows us to understand how the display of nuclear power related to the wider technopolitical agenda in controlling the flow of uranium from the Congo.

Inside the Atomium, what did remain as part of the exhibition was two nuclear reactor models, BR3 and BR2, which became operative in 1961, as a laboratory facility shared with Euratom in the Atomic Village between Mol and Geel.

When Robiliart was announced as an organizer of the Groupe Nucleaire exhibition section, he considered that it would be ideal to represent the technopolitical values of the World's Fair through a nuclear power plant that could provide the exhibition ground with the necessary electric energy of 40,000 KW, while at the same time irrigating the Tropical Gardens in the Colonial Section with its leftover cooling water, which was warm – symbolically this irrigation seems like a bizarre inversion of the global Western dependency on Congolese uranium.[59] Apart from that, the plant would be able to serve as a full-scale exhibition object for off-site visits.[60] The organizers of the fair had opted for a nuclear power plant, suitably to celebrate the latest scientific developments, so that the planning for the first Belgian nuclear power station started in early 1955, to be based at the Van Praet bridge near the Brussels Willebroeck Canal, close to the exhibition site.[61] Europe's first pressurized water reactor BR3, with a power supply of 11.5 MW, was

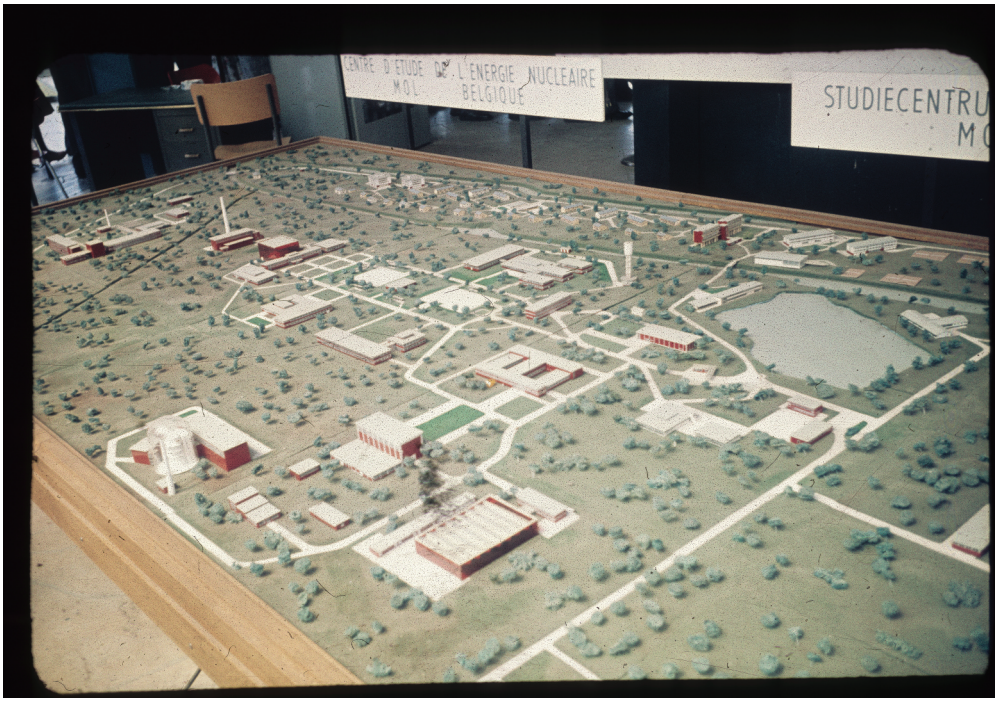

Figure 8. Model of the nuclear research center SCK-CEN in the Atomium. Source: Digital Expo 58 archive, collection of the department of architecture & urban planning, Ghent University. Reproduced with permission.

supposed to be delivered by the American firm Westinghouse, supported by the U.S. government and the SCK-CEN.[62] During a visit made by Lewis Strauss, as chairman of USAEC in Belgium, Herman Robiliart presented the project to Strauss, arguing that,

> [i]t could be the first achievement of President Eisenhower's plan for peaceful uses of atomic energy. This gesture could be of very great political importance and would show to Europeans that President Eisenhower's statement is now a reality. … Regarding Belgian public opinion, it would show that Belgium had finally received effective help from the USAEC according to the present agreement for uranium supply. … This would be a wonderful attraction for the Fair, since it would be the first industrial reactor on the continent. It could even make money if people were allowed to visit it.[63]

Even though the Eisenhower administration was not fully convinced that nuclear power technologies were ready for export, when Eisenhower announced his Atoms for Peace proposal in 1953, the Cold War confrontation left little other choice, as Mara Drogan has demonstrated.[64] Drogan has shown that Belgium was given priority in 1954 by the National Security Council to receive the first nuclear power reactor, in order to secure the contentious flow of Belgian uranium to the United States.[65] What occasion could serve that purpose, of promoting such international exchange, better than Expo 58? Robiliart ensured not only the construction of the plant for Expo 58, but also the provision of the necessary quantity of uranium from UMHK mines in the Belgian Congo.[66]

But apparently nuclear energy was 'too cheap to meter' only in theory; in practice the Expo 58 administration was 'ready to pay more per kWh out of atomic energy'.

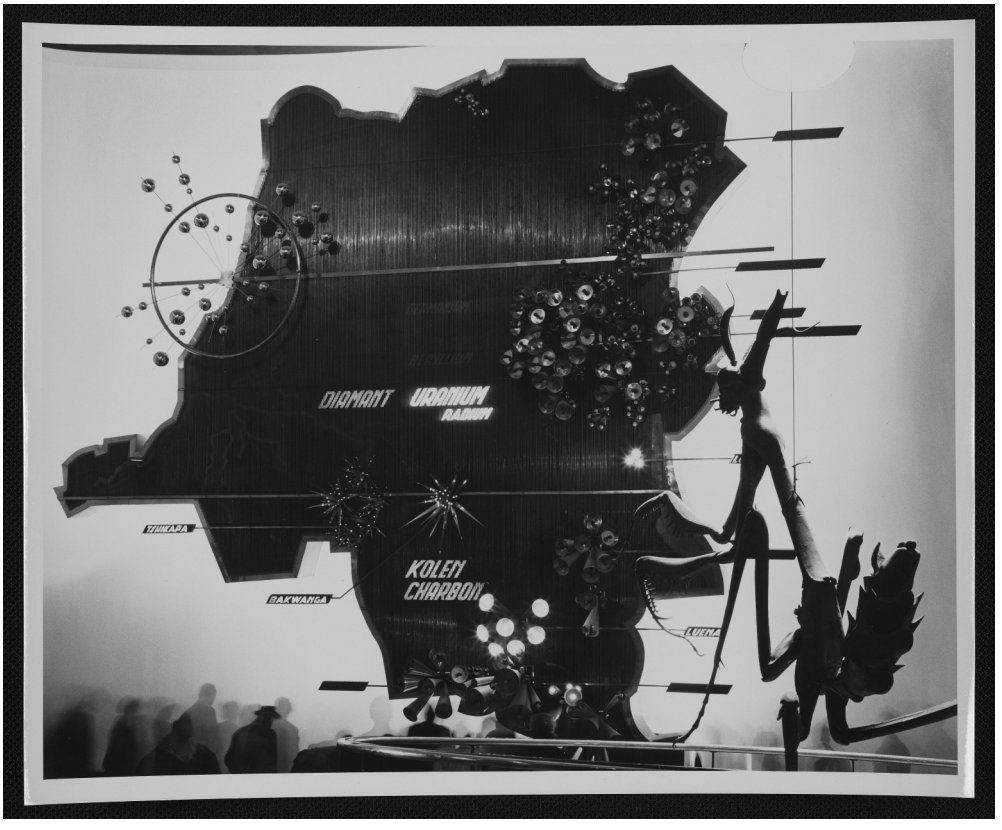

Figure 9. Resources from the Congo presented in the pavilion for mining. Source: Brussels Royal Library, Expo 58, FS XCIII 60 B. Reproduced with permission.

Nevertheless, it turned out to be too expensive to decentralize the exhibition for off-site visits in the nearby nuclear power reactor.[67] Beyond that, doubts were raised concerning the safety of the neighborhood, which hosted the Belgian royal castle that was located next to the exhibition site. As an alternative, Expo 58 was powered by the Centrale Interbrabant, located five kilometers away from the fair.[68]

Eisenhower's Atoms for Peace program aimed at greater goals, as he confirmed in an interview:

> I consider it very wise that the first atomic plant built abroad with our collaboration is being realized in Belgium, with whom we have been connected in a deep friendship for years. . . . The Belgian aid to our atomic program during and after the war [is] a unique contribution to the defense of the free world and to our power as a nation, which is devoted to the protection of peace and freedom.[69]

In particular, the collaboration between the USAEC, the UMHK, and Belgian authorities sheds light on the strategic mission behind Eisenhower's Atoms for Peace program. The mission goes beyond what the science historian John Krige outlined, namely to disseminate scientific knowledge, on the one hand, and establish U.S. companies such as Westinghouse, General Electric, etc., on the other, as the only supply instances for constructing nuclear power plants on the European market and thus instituting a new form of Western 'soft

power' during the emergence of the Cold War.[70] First and foremost, the mission had a geopolitical agenda to secure the supply of uranium and therefore the control of colonial territories.

This was catalyzed by Robiliart's own company, the UMHK, which participated in the exhibition inside the Atomium by contributing a piece of uranium ore covered by a transparent sphere.

The UMHK was a crucial agent in this constellation, considering the political impact this company had on science and nuclear power in the twentieth century. First, the company had access to the virtually unlimited funds of the Banque de la Société Générale de Belgique. Founded in 1906 under the rule of Leopold II, and granted a territory of almost twenty square kilometers in the Katanga region of Congo, the mining company was in charge of the extraction of uranium and other minerals. By the early 1920s, the company held a quasi-monopoly over the uranium market.[71] Twenty years later, the UMHK became the main supplier of uranium for the Manhattan project and therefore provided the source material for the atomic bombs dropped on Hiroshima and Nagasaki.[72] This uranium was mostly refined at Oolen (Société Générale Metallurgique de Hoboken – also present in the Atomium exhibition) in Belgium, and from there sold on further, as uranium trioxide (UO_3) in uranium deals between Belgium, Canada, Great Britain, and the United States.[73]

Figure 10. UMHK radioactive pitchblende exhibited in the Atomium. Source: Brussels Royal Library, Expo 58, FS XCIII 57 B. Reproduced with permission.

As a prime example of the economic impact that the presence of the UMHK had on the Congo: by the end of the 1950s the private electric rail network of UMHK was bigger than the Metro network of Paris.[74] Beginning in the early 1920s, the company was involved in the construction of mines, factories, railroads, and hydroelectric dams, as well as towns for the indigenous communities of laboring people (*cités indigènes*) serving the production sites. In order to ensure disciplinary control, cost efficiency, and good hygiene, the UMHK constructed workers' camps, which employed doctors, psychologists, and engineers.[75] Apart from the optimization and rationalization of their working camps in the Katanga region, UMHK invested heavily in the construction of research facilities, such as the creation of a research center in 1923 at Brussels' Brugmann Hospital, as well as in the provision of radium for scientific research.[76] Moreover, in regards to the dissemination of scientific research, in the mid-1920s the UMHK was already publishing scientific work on the use of radiation in medical care, which included new scientific discoveries over the half-life period of isotopes and new medical applications of what was called 'télécurie-thérapie'.[77] At this time, the UMHK had already established close ties to Jean Frédéric and Irene Joliot-Curie, in order to apply their expertise on radium.[78] Because Marie Curie's laboratories in Paris were supplied with radium by the UMHK, radium by the UMHK, in the 1920s she herself had been invited to the Union Minière Factory in Oolen, Belgium, where the uranium from Katanga was refined.[79] In this respect, her scientific discoveries depended to a certain extent on the politics of the UMHK and their uranium resources – even she mentions nothing of this in her own writings.[80]

In conclusion, although one can assume that the UMHK was aware of the effects of radioactivity in their mines in the Katanga area, nothing concerning uranium resources in relation to radiation and labor conditions was exposed at Expo 58. In the UMHK yearbook published in 1956, only a short paragraph mentions that 'special precautions were especially studied and strictly applied to protect workers against all [radioactive] effects. Thanks to these measures, any effects due to radiations were observed, even if the mine had been in operation for several years'.[81] This statement should be taken with some doubts, as Gabrielle Hecht notes in her book *Being Nuclear* (on the global uranium trade and Africa) that workers of the Shinkolobwe mine in the Congo were omitted from the scientific studies on radiation exposure in mining. She adds: 'not that they'd been terribly visible in the first place. The invisibility of their exposure cannot be corrected through archival diligence, because the records – assuming they were even kept – do not appear in the inventory of the [UMHK] Brussels archives'.[82]

These workers also disappear from international legislation in the Euratom Treaty dated 25 March 1957, according to which member states should report within three months on 'legislative and administrative provisions for protecting the health of workers and of the general public in the territories of Member States from the dangers resulting from ionizing radiation'.[83] Nothing about the Belgian Congo is mentioned in the proceeding meetings and discussions, or in the report that the Belgian state provided to the European Commission, although the text meticulously details safety provisions in Belgium mines.[84]

Making a geopolitical conflict manageable

It can be argued that this conceptual gap between the conditions operating in the Congo as the major resource of uranium for Western nuclear power programs; and the Western

international community with its strategic intervention programs to ensure energy flows for its 'atomic' architectures, would lead to decades of genocide, transforming the Congo into a battlefield of the Cold War and beyond. It is thus also fruitful to examine the postcolonial interdependence between the Euratom agreements with the USAEC in relation to major uranium mining and selling actors, such as the UMHK. All of these agencies were represented at Expo 58, turning the exhibition not only into a geopolitical display, but also a site of intervention and conflict, since major uranium deals and international agreements were reached against the backdrop of the visit to the exhibition by Patrice Lumumba – who founded the Congolese National Movement (MNC) in 1958 – and the ultimate cost to him of the activities generated by Expo 58.

Rendering the Congo as a backward colony at Expo 58 ultimately served the transition from colonial occupation to postcolonial control, in which the UMHK gained an even more strategic role. In the following years of war, caused by the independence of Congo, protecting the uranium mines involved the UMHK in international secret missions and Lumumba's murder. Shortly after the closing of Expo 58, Lumumba represented the MNC at the All-African Peoples' Conference in October 1958. Less than two years later, on 30 June 1960, the independence of Congo was announced in the presence of Belgian and Congolese politicians. Elections were held, which resulted in Lumumba becoming the prime minister and Kasa-Vabu the president. Only eleven days after independence, however, Belgian troops intervened in Elisabethville and Luluabourg, leading to the secession of the Katanga region under Moïse Tshombe on 11 July 1960, and bringing diplomatic relations between Belgium and the Lumumba government three days later to a halt. Tshombe was indirectly supported by the Belgian government through the UMHK, which facilitated direct control over the territory of Katanga through their privatized infrastructure of railways and bridges.[85] This support also became evident in a meeting between Belgian Foreign Minister, Pierre Wigny, and U.S. Secretary of State, Christian Herter, in which Wigny argued that Belgium had signed a treaty of technical assistance for the Katanga area. Wigny mentioned how certain forms of this technical assistance could 'surely bypass the treaty', even though the Belgian government could not openly support Tshombe, who appeared to be a quisling in favor of the Belgian interests.[86] Lumumba instead was regarded by Wigny as irrational, and thus as a threat to the international community. However, the position of the United States would turn out to be decisive in resolving this crisis.[87] In Wigny's words: 'Even if the Eastern states would support Lumumba, we would need to find official modes to speak with serious interlocutors like Iléo, Bomboko or Mobutu. Lumumba might not be a communist, but surely a genius in destruction, who serves communist ideas. Therefore it would be necessary to give a solid external support in their struggle against Lumumba'. Wigny added: 'Everybody is against Lumumba, but we do not see any way of eliminating him'.[88]

Even before the Congo declared independence, Lumumba had actively tried to obtain support from the United States, in order to set a path for another future for the Congo, in which the country could have control over its own resources. In 1959, Lumumba met with a group of New York businessmen, to whom he declared that 'the exploitation of the mineral riches of the Congo should be primarily for the profit of our own people and other Africans', by being open 'to any foreign investors prepared to help us get the fullest and most immediate value from mineral resources and energy, so that we may achieve full employment, an improved standard of living for our people, and a stable currency for our young country. Belgium will no longer have a monopoly in the country'. Denying the

legitimacy of the legal agreements between the United States and Belgium, Lumumba continued: 'From now on we are an independent and sovereign state. Belgium doesn't produce any uranium; it would be to the advantage of both our countries if the Congo and the US worked out their own agreements in the future'.[89]

After being in power for less than six months, Lumumba was assassinated in Katanga on 17 January 1961, in an international undercover operation backed by Belgium and the United States.[90] CIA field officer Lawrence Raymond Devlin was appointed ten days after the independence of Congo as chief of station. Devlin explained in his memoir, *Chief of Station, Congo*, published in 2007, that the Congo had been 'on the front line of the struggle between the Soviet Union and the United States'.[91] After Lumumba had invited Soviet representatives along with those of other nations to assist in the Congo, Devlin received an urgent telegram from Allan Dulles, head of the CIA, arguing that 'the removal [of Lumumba] must be an urgent and prime objective . . . this should be a high priority of our covert action'.[92] Towards the end of 1960, Devlin received instructions from a code-named agent 'Joe from Paris', who handed him, 'several poisons . . . one was concealed in a tube of toothpaste. If Lumumba used it, he would appear to die from polio'.[93]

A Belgian parliamentary committee of inquiry in charge of determining the exact circumstances of the assassination of Patrice Lumumba and the possible involvement of Belgian politicians came to the conclusion in their 2001 report that Lumumba was assassinated on 7 January 1961, in Katanga,

> in the presence of Katangan ministers, carried out by Katangan gendarmes or police officers, in the presence, though, of a Belgian police commissioner and three Belgian officers who were under the authority, leadership and supervision of the Katangan authorities. At no time, did the Belgian government protest to the Katangan government against the unlawful execution of Lumumba, [as well as the Mobuto opponents] M'polo and Okito, nor did they express regret or disapproval in relation to it.[94]

One of the first persons informed about the death of Lumumba was Arthur Gilson, Belgian defense minister under the Eyskens government, later charged with invading the Congo on 9 July 1960, resulting in the Congo crisis. Many questions about the intentions were left unsolved, even after the inquiry of the parliamentary committee.[95]

The strategic role of UMHK in this conflict paved the way for its contemporary successor not only to continue mining operations in the Congo, but also to control its own history. UMHK became a Congolese state company in 1967 under president Mobutu under the name Gécomin and changed its name to Umicore in 2001.[96] Umicore has contractual agreements with the Belgian state archives stating that certain documents from the UMHK inventory dating from the period between 1951 to 1961 will be only made publicly accessible after 2050.[97] After the recent Black Lives Matter struggles forced the Belgian government to reconsider its intrinsic relations with colonial history, a special parliamentary commission of ten historians and scientists was tasked with examining colonial roots of contemporary operating agencies. In the first press statement the team published, in October 2020, the commission urged the declassification of four kilometers of colonial archives, including those of companies like Société Générale or the UMHK.[98]

Nuclear power and counterimaginaries

If Expo 58 can be considered a practice of visioning that mainly served the futures of Western supremacy, it raises the question of whether alternative counterimaginaries existed at that time that included a different arrangement of architecture, science, and nuclear technologies. While Cold War science fiction commonly depicted a binary narrative about the use of nuclear material, either through superheroes who have been exposed to radiation and rescue humanity from evil antagonists, such as *Captain Atom* (1960) or *Spider-Man* (1962), or with dystopic, catastrophic, and monstrous mutations posing a sinister threat to humanity, such as *Godzilla* (1954), and *Radioactive Man* (1963), the only story that overcame this dichotomy is the Marvel comic *Black Panther* (1966). Contrary to the other stories mentioned above that extrapolated from the Cold War nuclear condition, either in the guise of a biotechnological construction that serves humanity for the greater good, or by threatening mankind with the evil use of nuclear matter, *Black Panther* speculated on an alternative future. The story took a what-if scenario as a starting point, overcoming the binary condition of friend vs. foe, and utopia vs. dystopia, by depicting the African Kingdom of Wakanda. Hidden from the Western world, Wakanda was never subject to colonial rule, because it had the possibility to develop its own technological advancements on the basis of a rare metal resource, vibranium. Wakanda protects its civilization from the harmful effects of vibranium and only sells minimal quantities 'to research laboratories for astronomical prices'.[99] In this depiction of a nuclear fantasy, an African society profits technologically and financially from its own resources.

To acknowledge the critique of A.K. Kaiza, *Black Panther* is not an African story, and there are several theories about the origin of this narrative. It could nonetheless be said that the story is a commentary on the historical condition of the Congo articulated through imagination: what if the Congo had had access to what Lumumba had demanded, namely power over the disposal of its own resources?[100] If this had been the case, as we might ask here, how might the Congo have been represented differently at Expo 58?

Such a counterimagination of the Congo was in fact articulated by some figures of the time. We find one example, for instance, in a speech that Malcolm X delivered on 14 February 1965, in which he argued that under the government of Lumumba, the Congo could have been a predecessor for the rule of a pan-African society through access to its own resources. Referring to the strategic positioning of Tshombe, Malcolm X claimed that 'this is all a cold-blooded act on the part of your Western powers, namely the Western powers here in the United States – interests in the United States, in England, and France, and Belgium and so forth. They want the wealth of the Congo, plus its strategic geographic position'.[101] But Malcolm X was assassinated one week after this speech was delivered and his voice remained an isolated one in imagining an alternate future to the colonial imagination presented at Expo 58.

Conclusion

Returning today to Expo 58 means considering the household technologies it exhibited, its architectural setting, the Atomium, the nuclear power plants of BR2 and BR3, the UMHK, the Euratom Treaty, and the indigenous village not as separate entities, but rather as interdependent modes of constructing and imagining Western supremacy that

had long-lasting violent political implications. This constellation reveals that governing nuclear power was exercised on two interconnected levels: first on the level of power via biopolitics over bodies and souls in a population; and second, on an infrastructural level via the management of energy systems connected to uranium resources, power plants, and nuclear research facilities.

On the biopolitical level, it becomes evident that governing techniques are scalable from bodies to geopolitics. Nuclear domesticity is realized through household appliances at Expo 58, and as an arrangement of materialities on multiple political and administrative registers, implies a series of operations that govern bodies. These performed operations foster the belief in the peaceful use of nuclear power, on the one hand, and distract from questioning the conditions under which nuclear material is produced on the other – that is, from interrogating how radiation is rendered insignificant, not merely invisible in a sensory way. Apart from that, these household appliances revealed a new form of living that differentiated itself from the staged technological backwardness of the Colonial Section at Expo 58, setting up a cultural gap between a Western modern world and a remote primitive one. Ultimately, this constructed, discriminating gap, which was used at an urban scale to segregate between the *Cité européenne* and the *ville indigènes*, legitimated Western interventions in colonial territories at a geopolitical scale. Especially at the latter scale, the peaceful use of nuclear power had simply switched to other forms of violence, proxy wars, encoded conflicts and postcolonial control that were less visible to the Western gaze.

On an infrastructural level, the management of resources started at the mines in Katanga in the Congo, where the UMHK had created a colonial empire over uranium. In the first instance through the construction of mines, factories, railroads, hydroelectric dams, and *cités indigènes* serving the production sites, the company ensured disciplinary control and efficient methods in uranium mining. Secondly, through the construction of medical and nuclear research facilities, the company ensured that Western scientists could develop their knowledge on nuclear science and radiology treatments without encountering any juridical problems. A company-owned publishing house contributed to the distribution of this knowledge. Thirdly, after the independence of the Congo, this infrastructural apparatus served the secession of Katanga, in order to facilitate an intervention of Western forces through Moïse Tshombe, and to ensure secure control over the uranium resources. This is one of the reasons why the UMHK could be transformed under Mobutu into a Congolese state company and continue operating today at least in part as Gécomin and Umicore.

On an infrastructural level in Europe, the management of resources continued with similar principles. First, the UMHK owned a refinery at Oolen (Société Générale Metallurgique de Hoboken), where uranium from the Congo continues to be refined many decades after having supplied the Manhattan project. Second, Euratom profited from the construction of the Belgian research center for nuclear energy SCK-CEN (Centre d'Études pour les applications de l'Energie Nucléaire), where it shared laboratory facilities in the nuclear research reactor (BR2), in Geel and Mol from 1960 onward. Third, on the basis of this and other research facilities subsequently constructed in Ispra (Italy), Karlsruhe (Germany), and Petten (the Netherlands), Euratom and the European Joint Research Center (JRC) developed and distributed knowledge on the security and efficiency of nuclear power plants among Euratom member states, published in the Euratom bulletin from 1962 onward. Fourth, although Euratom was involved with

legislation concerning radiation protection even before the independence of the Belgian Congo, no discussion can be found in the institutional archives about radiation in the uranium mines of Katanga.

Architecture played a key role in the formation of these two layers, both as the medium and the message of nuclear power. It was used to construct the facilities and to set material evidences for the discourse under which nuclear power is distributed among the population, under the assumption that nuclear resources are infinite and peaceful. It served a situation of postwar reconstruction in western Europe that was architecturally and urbanistically accelerated. It ensured the flow of uranium resources on various historical levels and geographical locations. Moreover, as architecture is a planning practice that always envisions certain futures, it served the Western gaze, through the extrapolation of scientific and geopolitical conditions of the present into a future based on Western supremacy.[102] Both the House of the Future by the Smithsons and the Electric House by Dupuis and Bertot were examples of a Western understanding of technology in which the imagination of other possible futures or conceptions of technology do not have their place. Consequently, the politics of imagining other futures, as for instance in the case of *Black Panther*, remained simply unconsidered at Expo 58.

Notes

1. Franklin C. Smith,"World's First Atom Fair Scheduled for Brussels," *Navy Times* (26 January 1957), in "Short Term Press Campaign Introducing Brussels World's Fair 1958," National Archives of Belgium (NAB), Expo 58, USA, Hill &. Knowlton, Representations a l'étranger, 4.11.00/D.21, 26, as cited in Kint, *Expo 58*, 124.
2. Hewlett and Holl, *Atom for Peace and War*, 324; Krige, "The Peaceful Atom as Political Weapon," 5–44, as well as Helmreich, "The United States and the Formation of EURATOM," 387–410; Winand, *Eisenhower, Kennedy, and the United States of Europe*, 83–108; Skogmar, *The United States and the Nuclear Dimension of European Integration*, 114–252.
3. Euratom (Pathé Journal, 5 July 1957), *L'Europe et l'énergie atomique – L'Euratom*- Pathé [Prod.], 5 July 1957, Pathé Archives, Saint-Ouen (02:46, black and white, original sound). https://www.cvce.eu/obj/euratom_pathe_journal_5_juillet_1957-fr-1cf1969c-4d5c-4296-9ef7-e87cd67dfdec.html (last accessed 12 November 2018). On colonial networks and uranium see: Hecht, *Being Nuclear*.
4. For this distinction of power, as well as for numerous side notes and methodological approaches, I am deeply thankful to Reinhold Martin and the PhD students in the seminar *Power: Aesthetics, Politics, and Energy*, at the Graduate School for Architecture, Planning and Preservation, Columbia University, New York, Spring 2018.
5. Foucault, *The Birth of Biopolitics*.
6. Molella and Knowles, *World's Fairs in the Cold War*.
7. Reid, "The Soviet Pavilion," 1–62; and Siegelbaum, "Sputnik Goes to Brussels," 120–136.
8. See, for instance, van Lente, "Peaceful Atom," 286–289; and Swift, "Soviet-American Rivalry," 27–45.
9. Leslie and Mercelis, "Expo '58," 11–26.
10. Low, "Atoms for Peace," 46–56.
11. In regards to Expo 58, this paper relies to a large extent on the remarkable work of Devos, *Modern at Expo 58*. This work was the basis of my archival research in the National Archives of Belgium (NAB) and the Historical Archives of the European Commission (HAEC).
12. The proposed methodological approach comes close to what Lewis Mumford offers in *The Myth of the Machine*. Contrary to Giedion, Mumford follows a genealogy of electricity,

arguing that power is involved wherever there is technology. See Mumford, *The Myth of the Machine*. For a European transnational history of consumer technology see: Oldenziel and Hård, *Consumers, Tinkerers, Rebels*.

13. Krige, *Sharing Knowledge, Shaping Europe*, 13.
14. For an extensive description of the whole exhibition ground, see Devos, *Modern at Expo 58*, 62–124.
15. Lewis L. Strauss, "Speech to the National Association of Science Writers," New York City, 16 September 1954. Cited in *New York Times* (17 September 1954), 5.
16. For the discursive history of the quote, see Cohn, *Too Cheap to Meter*.
17. Gabrielle Hecht uses the term "nuclearity" to describe a historically and geopolitically situated property that is distributed through science and technology, bodies and politics, radiation and race, and states and capitalism. It is therefore not meant as a property of things, but rather of technopolitical relations. Hecht, *Being Nuclear*; Hecht, "Africa and the Nuclear World," 896–926.
18. From 1885 to 1908, the Congo Free State was the private property of King Leopold II, as recognized by the Berlin Conference. In 1908, this was followed by the end of Leopold II's rule and the annexation of the Congo Free State by the Belgian state. As a colony it became known as the Belgian Congo. On the intentions to celebrate the fiftieth anniversary, see Devos, *Modern at Expo 58*, 269.
19. See, for instance, section IV, "Discrimination das la présentation du Congo belge et du Ruanda-Urundi en tant qu'exposants," in the protocols of the meeting on 12 July 1956, NAB, Expo 58, F 1760, no. 7542.
20. Stanard, "Bilan du monde pour un monde plus déshumanisé," 267–298.
21. Ndaywel è Nziem, *Histoire générale du Congo*, 531–532.
22. Van Goethem, "De gegevens van het probleem," 48.
23. Discussion of the section administration: NAB, Expo 58, F 1760, no. 4177.
24. NAB, Expo 58, F 1760, no. 4177.
25. Artisans were requested to bring traditional costumes and not allowed to be accompanied by their family if these were not artisans as well. Letter from L. Bruneel to the governor of the Kasai Province, Luluabourg, Brussels, 18 March 1959. NAB, Expo 58, F 1760, no. 7341. Some of the artisans left the exhibition around 20 July 1958, without any indication of the reason. See the letter from L. Bruneel to J. Wertz, Brussels, 18 July 1958. Ibid., no. 7342.
26. In a letter, J. Vanden Bossche asks L. Bruneel that the Congolese workers being hosted at the Centre d'Acculeil pour Personnel Africain (CAPA) collaborate in decorating the huts. "Ces [sic] Congolais seront appelés à collaborer à la construction et à la décoration des huttes." 1 April 1958. NAB, Expo 58, F 1760, no. 7622. In another letter, he thanks Floribert Mwembia for his collaboration: "Grâce à cette collaboration nous avons pu donner à ces travaux le cachet colonial [sic] que nous espérions lui donner." Letter from Vanden Bossche to Mwembia, 16 April 1958. NAB, Expo 58, F 1760, no. 7622.
27. Letter from Houyoux-Diongre to the Technical Service (Uccle, October 1955). NAB, Expo 58, F 1760, no. 4058.
28. Findling, *Historical Dictionary of World's Fairs and Expositions*, 315.
29. Plant seeds were brought by plane and in special thermos bottles. See "Semences de plantes tropicales pour l'Exposition de Bruxelles 1958." NAB, Fonds du groupe de l'Union Minière (1906–1986)/René BRION & Jean-Louis MOREAU, I 259, no. 468.
30. NAB, Expo 58, F 1760, no. 4058. For a preparatory botanical study travel by René Pechère see NAB, Expo 58, F 1760, no. 1398.
31. Vanthemsche, *Belgium and the Congo*, 69–70.
32. Wynants, *Van hertogen en Congolezen*; Lüsebrink, « Images de l'Afrique, » 75–88. Guldentops, « Congo als clou van het moderne België, » 81–93. For Expo 58, see especially Van Beurden, « Un panorama de nos valeurs africaines, » 299–311. Stanard, *Selling the Congo*, 66–76.
33. Letter from Bruneel to Copette, Président du Centre d'Acculeil pour Personnel Africain (CAPA), 9 May 1958. NAB, Expo 58, F 1760, no. 7622.

34. Letter from Bruneel to De Ridder, Président CAPA, 9 July 1958. NAB, Expo 58, F 1760, no. 7622.
35. Jacquemyns, « L'Exposition de 1958, » 43. See also « Les artisans du village Congolais sont retournés chez eux, » *La Cité*, July 271958 (Brussels): 5, both passages as cited in Stanard, *Selling the Congo*, 73.
36. *La Meuse* (Liège), no. 111 (13 May 1958): 5.
37. The urban planning of Elisabethville, now Lubumbashi, as of many other cities, strictly distinguished zones between a *Cité européenne* and a *Cité indigènes*; see Lagae, "Rewriting Congo's Colonial Past"; Georges Brausch, *Belgian Administration in the Congo*, 43.
38. Letter from Baron Moens de Fernig to A Haulot, Président de l'a.s.b.l. LOGEXPO, Brussels, 22 January 1957, NAB, Expo 58, F 1760, no. 4169.
39. *Le Soir* (Brussels), 15 April 1958, NAB, Expo 58, F 1760, no. 7640.
40. Lagae, "Rewriting Congo's Colonial Past."
41. One ton of dirt ground with a price of 650 francs was ordered additionally for the Colonial Section on Mai 5, 1958. NAB, Expo 58, F 1760, no. 7622.
42. Mitchell, *Colonising Egypt*, 80–82. This is also highlighted in Stanard, *Selling the Congo*, 70–71.
43. Krige, *Sharing Knowledge, Shaping Europe*, 9.
44. Henderson, "A Revolution in the Woman's Sphere," 221–247. On the geopolitical role of postwar kitchen designs, see McDougall, *The Heavens and the Earth*; Roland, *The Military-Industrial Complex*; and Oldenziel and Zachmann, *Cold War Kitchen*.
45. Floré and de Kooning, "The Representation of Modern Domesticity," 333–336.
46. Harwood, "The Interface," 70–92.
47. Smithson, "But Today We Collect Ads," 194.
48. Banham, "Things to Come," 24–28.
49. von Fischer, "Von der Konstruktion der Stille zur Konstruktion der Intimität," 249–268.
50. See, for instance, Colomina, "Unbreathed Air 1956," 28–59; or van der Heuvel and Risselada, "House of the Future," 80.
51. Smithson, "The House of the Future," 99, as cited in Colomina, "Unbreathed Air 1956," 43.
52. Ibid., 43.
53. Banham, *Things to Come*, 28.
54. André Waterkeyn, « le projet de palais de la science a l'exposition universelle de Bruxelles en 1958, » 9 January 1955, NAB, Expo 58, F 1760, no. 2240.
55. Letter from André Waterkeyn to the Belgian Department of Economy, 4 December 1954, NAB, Expo 58, F 1760, no. 4047.
56. Moholy-Nagy, "Brussels for the Dilettante," 24, as cited in Devos, "Let Us Now Invest in Peace," 140.
57. The *Centre d'Études pour les applications de l'Energie Nucléaire* (SCK-CEN) was founded in April 1952 and financed by the United States after the Uranium Export Tax agreement from 1951. This was a renegotiation of the 1946 Atomic Energy Act, better known as the McMahon Act, which prohibited the distribution of scientific knowledge and technology relating to nuclear energy to other countries. The compromise from 1951 finally settled on a tax of twelve million dollars, levied on the export of uranium, which would be paid to the Congolese treasury. The Congo in turn would transfer the money to Belgium for nuclear research. Around 350 million BEF (ca. 8.5 million euros) went to the new institution, *Centre d'Études pour les applications de l'Energie Nucléaire* (SCK-CEN – Research Center for the Applications of Nuclear Energy).
58. Acte Syndical (Brussels, January 221957), NAB, Fonds du groupe de l'Union Minière (1906–1986)/René BRION & Jean-Louis MOREAU, I 259, no. 579.
59. The suggestion was made by Lawrence Hafstad, director of reactor development with the U. S. Atomic Energy Commission and director at the Atomic Energy Division of Chase National Bank, during his visit to Brussels in 1955. See the letter by Robiliart to Hafstad, 5 April 1955, NAB, Expo 58, F 1760, no. 2238. For the discussion concerning the reuse of the

cooling water, see Procès-Verbal nos. 37 (55) and 38 (55), technical reunion on 7 September 1955 and 14 September 1955. NAB, Expo 58, F 1760, no. 4058.

60. Procès-Verbal no. 39 (55), Technical reunion on 21 September 1955. NAB, Expo 58, F 1760, no. 4058. BR1 (4MW) was active in May 1956. The research reactor BR2 was activated in 1961, as a Joint Research Center (JRC) between SKC/CEN and Euratom. See Verledens and Verwimp, *BR2*.
61. The history on BR3 in this and the next few paragraphs is pieced together from documents contained in the work of Devos, *Modern at Expo 58*, 44–46; Kint, *Expo 58 als belichnaming van het humanistisch modernisme*, 142–145.
62. The firm of Westinghouse was preferred by Robiliart in this first letter to Hafstad. See the letter by Robiliart to Hafstad, 5 April 1955, NAB, Expo 58, F 1760, no. 2238. See also "Reactors for Export: A Thriving New Industry," 6; and Verwimp and Verledens, eds., *1952–2002 SCK/CEN*, 17.
63. Letter by Herman Robiliart to Lewis Strauss, chairman of the U.S. Atomic Energy Commission, 16 May 1955. NAB, Expo 58, F 1760, no. 2238.
64. Drogan, "The Nuclear Imperative," 948–974.
65. Ibid., 964–965.
66. Letter by Baron Moens de Fernig to Hafstad, 18 April 1955. NAB, Expo 58, F 1760, no. 2238.
67. Moens de Fernig to the service of Commissariat (Brussels, 19 September 1955). Brussels, NAB, Expo 58, file 4.08.02.
68. Boereboom, "Electricity, Light and Water," 142.
69. *De Volksgazet* cited in "Persstemmen," *achtenvijftig* 9 (November 1955): 17, as cited in Devos, "Let Us Now Invest in Peace," 140.
70. Krige, *Sharing Knowledge, Shaping Europe,* 20–26.
71. Vanderlinden, *A propos de l'uranium congolais*, 32–51.
72. Buch and Vanderlinden, *L'uranium, la Belgique et les Puissances*; and Helmreich, *Gathering Rare Ores*.
73. The Brussels UMHK archives contain an incomplete folder entitled "*Vente d'uranium, 1956–1970*," in which uranium deals with the United States are detailed between 1956 and 1960. A first sample of UO3 submitted to the laboratories of the U.S. Atomic Energy Commission contained an inferior quality of uranium. In a letter, Thomas B. Upchurch., assistant director for foreign procurement, Division for Raw Materials, argues: 'The samples previously supplied were not the orange oxide (UO3), but some mixture of UO3 and UO2, and the bulk density of the samples was roughly about half of that which is given in the specifications." See letter from Thomas B. Upchurch to Jean van der Spek, 9 June 1958, NAB, Fonds du groupe de l'Union Minière (1906–1986)/René BRION & Jean-Louis MOREAU, I 259, no. 2614.
74. Bacquelaine, Willems, and Coenen, *Enquête Parlementaire visant à déterminer les circonstances eactes de l'assassinat de Patrice Lumumba*, 517.
75. De Meulder, *De kampen van Kongo*.
76. The center was directed by Dr. Depage, Prof. Danis, and Prof. John Murdoch, see Henry and Van Houtte, "L'institut Bordet," 271.
77. Union Minière du Haut-Katanga, *Radium*; UMHK, *Le radium*; and Murdoch and Stahel, *Appareil universel de télécuriethérapie*.
78. Correspondence with I. Joliot-Curie et F. Joliot, 1924–1956. NAB, Fonds du groupe de l'Union Minière (1906–1986)/René BRION & Jean-Louis MOREAU, I 259, no. 1072; Dossier concernant le brevet pris par le couple Joliot-Curie pour la production d'énergie nucléaire, la cession éventuelle de la licence d'exploitation de ce brevet par le C.N.R.S. (Centre National de la Recherche Scientifique) et l'exploitation d'uranium comme source d'énergie. December 1944–September 1945. NAB, Fonds du groupe Union Minière, 2e versement, Fic069, no. 358.
79. Eggermont and Stiévenart-Godeau, "The Belgian Itinerary," 186.
80. Vanderlinden, « "Marie Curie et le radium 'belge'", » 91–108; and Roqué, « "Marie Curie and the Radium Industry, "» 267–291.

81. UMHK, *Union Minière du Haut-Katanga 1906–1956*, 209–210.
82. Hecht, *Being Nuclear*, 184.
83. European Communities, *Treaty Establishing the European Atomic Energy Community (EURATOM)*, 53.
84. Dispositions législatives en matière de protection sanitaire contre les radiations (Traité Euratom, articles 33 et 219) en Belgique, HAEC, BAC 118/1986 2345–2356.
85. This was also proven by a parliamentary investigation into the murder of Patrice Lumumba. See Bacquelaine, Willems, Coenen, *Enquête Parlementaire visant à déterminer les circonstances eactes de l'assassinat de Patrice Lumumba*, 517–525.
86. 29 September 1960, "Compte Rendu entre l'entretien de M. Christian Herter Secrétât d'État et M. Pierre Wigny, Ministre des Affaires Étrangères," HAEU, Fonds Paul Henri Spaak, PHS-330.
87. Herter assured, that the United States had transferred five million dollars to Hammerskjöld, with the option to issue other payments, in order to secure the involvement of the UN. What preoccupied the US was that certain governments such as Ghana and Guinea supported Lumumba. In regards to the situation in Katanga, it would have entailed the highest risk if the UN forces that were maintaining the order in Katanga at the time would eventually have retreated. Herter argued that, even if Khrushchev were to attack Hammerskjöld, the latter would not abandon his position. 29 September 1960, "Compte Rendu entre l'entretien de M. Christian Herter," HAEU, Fonds Paul Henri Spaak, PHS-330.
88. « Compte Rendu entre l'entretien de M. Christian Herter, » HAEU, Fonds Paul Henri Spaak, PHS-330.
89. Kanza, *Conflict in the Congo*, 241.
90. For a thorough analysis of Lumumba's murder and the involvement of the CIA and the Belgian government, see Williams, *Spies in the Congo*, 253–267; see also Bacquelaine, Willems, and Coenen, *Enquête Parlementaire visant à déterminer les circonstances eactes de l'assassinat de Patrice Lumumba*.
91. Devlin, *Chief of Station, Congo*, 271.
92. Ibid., 63.
93. Ibid., 95.
94. "The Conclusions of the Inquiry Committee," 16 November 2001, http://www.lachambre.be/kvvcr/pdf_sections/comm/lmb/conclusions.pdf, (last accessed 29 June 2018); as well as Bacquelaine, Willems, and Coenen, *Enquête Parlementaire visant à déterminer les circonstances eactes de l'assassinat de Patrice Lumumba*, vol. I & II.
95. For the testimony of Arthur Gilson, see Bacquelaine, Willems, and Coenen, *Enquête Parlementaire visant à déterminer les circonstances eactes de l'assassinat de Patrice Lumumba*, vols. II, 805–807.
96. Concerning the nationalization of the UMHK, see Kovar, « "La 'congolisation' de l'Union Minière du Haut Katanga," » 742–781; « "L'affaire de l'union minière du Haut-Katanga, » "1–31. For an elaboration on Umicore, see Brion and Moreau, *De la mine à Mars*.
97. A special request by the author placed in July 2018 via the head archivist of the Belgian State Archives to access the documents entitled "sur les contacts avec les autorités belges, Janvier 1951–Septembre 1961" resulted in a negative response from Umicore. The documents contain correspondence with Belgian authorities such as Paul-Henri Spaak, Pierre Wigny, and Paul van Zeeland, among others, about the protection of the Shinkolobwe mine and uranium deals with the United States.
98. The multidisciplinary team consisted of Zana Mathieu Etambala (KU Leuven), Gillian Mathys (Ghent University), Elikia M'Bokolo (Université Kinshasa), Anne Wetsi Mpoma (Bamko), Jean-Louis Nahimana (Burundi Commission), Pierre-Luc Plasman (UCL Louvain), Valérie Rosoux (UCL Louvain), Martien Schotsmans (independent scholar and historian), Laure Uwase (Rwandian lawyer), and Sarah Van Beurden (Ohio State University). On the first press statement, see "Belgium's Colonial Past: Commission Urged to Declassify Archives," *The Brussels Times*, 24 October 2020, https://www.brusselstimes.com/news/art-culture/137,917/belgian-publisher-destroys-7000-zwarte-piet-books-clavis-black-pete-bol-com-sinterklaas/ (last accessed 28 October 2020).

99. Kirby, *Black Panther*.
100. A.K. Kaiza argues in discussion about the movie *Black Panther* (2018) that the story is largely mash-up of motifs, locally and temporarily situated African communities. He meticulously retraces the various origins to these motifs; see Kaiza, "An Annotated History of Wakanda."
101. "Malcolm X: 'You Can't Hate the Roots of a Tree and Not Hate the Tree', After the Bombing – 1965,' 14 February 1965," Ford Auditorium, Detroit, USA, https://speakola.com/ideas/malcolm-x-after-the-bombing-1965 (last accessed 18 November 2018).
102. The conceptual frameworks of such analysis had been framed by Sheila Jasanoff as "socio-technical imaginaries" that use science fiction to relocate the social, material, and moral implications of technologies. See: Jasanoff, "Future Imperfect," 1–33.

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Bibliography

Bacquelaine, D., F. Willems, and M.-T. Coenen. *Enquête Parlementaire visant à déterminer les circonstances eactes de l'assassinat de Patrice Lumumba et l'implications éventuelle des responsables politiques belges dans celui-ci, vols. I & II*. Brussels: Chambre des Représentants de Belgique, 2001.

Banham, R. "Things to Come: Architecture and Industry Look into the Future." *Design* 90 (1956): 24–28.

Boereboom, A. "Electricity, Light and Water at the 1958 Brussels World Exhibition." *International Lighting Review* 23, no. 3 (1958): 142.

Brausch, G. *Belgian Administration in the Congo*. London: Oxford University Press, 1961.

Brion, R., and J.-L. Moreau. *De la mine à Mars, la genèse d'Umicore*. Tielt: Lannoo, 2006.

Buch, P., and J. Vanderlinden. *L'uranium, la Belgique et les Puissances*. Brussels: De Boeck Université, 1995.

Cohn, S. M. *Too Cheap to Meter: An Economic and Philosophical Analysis of the Nuclear Dream*. Albany, N.Y.: State University of New York Press, 1997.

Colomina, B. "Unbreathed Air 1956." *Grey Room* 15 (2004): 28–59. doi:10.1162/1526381041165458.

De Meulder, B. *De Kampen Van Kongo: Arbeid, Kapitaal en Rasveredeling in de Koloniale Planning*. Amsterdam: Meulenhoff, 1996.

De Meulder, B. *Kuvuande Mbote. Een Eeuw Koloniale Architectuur En Stedenouw in Kongo*. Antwerp: De Singel/ Houtekiet, 2006.

Devlin, L. *Chief of Station, Congo*. New York: Public Affairs, 2007.

Devos, R. *"'Let Us Now Invest in Peace': Architecture at Expo 58 in Resonance of War."In Architecture of Great Expositions 1937-1959:* Messages of Peace, Images of War, edited by R. Devos, A. Ortenberg, and V. Zinov'evič, 133-160. Ashgate: Farnham Surrey, 2015.

Devos, R. "Modern at Expo 58: Discussions on Post-War Architectural Representation." Unpublished PhD Dissertation, University of Ghent, 2008.
Devos, R., M. De Kooning, and G. Bekaert, eds. *L'architecture Moderne á l'Expo 58: Pour Un Monde plus Humain*. Brussels, Dexia: Fonds Mercator, 2006.
R. Devos, A. Ortenberg, and V. Zinov'evič Paperny, eds. *Architecture of Great Expositions 1937-1959: Messages of Peace, Images of War*. Ashgate: Farnham Surrey, 2015.
Drogan, M. "The Nuclear Imperative: Atoms for Peace and the Development of U.S. Policy on Exporting Nuclear Power, 1953–1955." *Diplomatic History* 40, no. 5 (2016): 948–974. doi:10.1093/dh/dhv049.
Eggermont, G., and S.-G. Claire. "The Belgian Iternary in the History of Radiation Protection: Lessons and Perspectives." *Annales De l'Association Belge De Radioprotection* 41, no. 4 (2016): 183–219.
European Communities. *Treaty Establishing the European Atomic Energy Community (EURATOM) and Connected Documents*. Luxembourg: Publishing Services of the European Communities, 1957.
Findling, J., ed. *Historical Dictionary of World's Fairs and Expositions, 1851–1988*. New York: Greenwood, 1990.
Floré, F., and M. de Kooning. "The Representation of Modern Domesticity in the Belgian Section of the Brussels World's Fair of 1958." *Journal of Design History* 16, no. 4 (2003): 333–336. doi:10.1093/jdh/16.4.319.
Foucault, M. *The Birth of Biopolitics: Lectures at the Collège De France, 1978-79*. 1st ed., Edited by Michel Senellart, François Ewald, and Alessandro Fontana. Translated by Graham Burchel. New York: Picador, Lectures at the Collège de France, 2010.
Guldentops, K. "Congo als clou van het moderne België. De kolonie op de Belgische Wereldtentoonstellingen (1910–1935)." In *Congo in België: koloniale cultuur in de metropool*, edited by V. Viaene and D. G. Van Reybrouck, 81–93. Leuven: University of Leuven Press, 2007.
Harwood, J. "The Interface: Ergonomics and the Aesthetics of Survival." In *Governing by Design: Architecture, Economy, and Politics in the Twentieth Century*, edited by Aggregate (Group), 70–92. Pittsburgh: University of Pittsburgh Press, 2012.
Hecht, G. "Africa and the Nuclear World: Labor, Occupational Health, and the Transnational Production of Uranium." *Comparative Studies in Society and History* 51, no. 4 (2009): 896–926. doi:10.1017/S001041750999017X.
Hecht, G. *Being Nuclear: Africans and the Global Uranium Trade*. Cambridge, MA: MIT Press, 2012.
Helmreich, J. E. *Gathering Rare Ores: The Diplomacy of Uranium Acquisition, 1943–1954*. Princeton: Legacy Library, 1986.
Helmreich, J. E. "The United States and the Formation of EURATOM." *Diplomatic History* 15, no. 3 (Summer) (1991): 387–410. doi:10.1111/j.1467-7709.1991.tb00137.x.
Henderson, S. "A Revolution in the Woman's Sphere: Grete Lihotzky and the Frankfurt Kitchen." In *Architecture and Feminism*, edited by E. Danze, C. Henderson, and D. Coleman, 221–247. New York: Princeton Architectural Press, 1996.
Henry, J., and P. Van Houtte. "L'institut Bordet, Centre des tumeurs de l'Université Libre de Bruxelles." In *1895–1995 Cent ans de Rayons X en Belgique*, edited by R. Van Tiggelen and J. Pringot, 271. Brussels: Belgian Museum of Radiology, 1995.
Hewlett, R. G., and J. M. Holl. *Atoms for Peace and War, 1953-1961: Eisenhower and the Atomic Energy Commission*. Berkeley: University of California Press, 1989.
Jacquemyns, G., and Eliane. "L'Exposition de 1958: Son succès auprès des Belges, opinions et voeux des visteurs." In *Institut Universitaire d'Information Social et Économique "INSOC no. 1–2*, 43. Brussels: Parc Léopold, 1959.
Jasanoff, S. "Future Imperfect: Science, Technology, and the Imaginations of Modernity". In *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*, edited by S. Jasanoff and S.-H. Kim, 1–33. Chicago: University of Chicago Press, 2015.
Kaiza, A. K. "An Annotated History of Wakanda." *Diaphanes*, April 9, 2018. Accessed 2018 November 18. https://www.diaphanes.de/titel/an-annotated-history-of-wakanda-5554
Kanza, T. *Conflict in the Congo*. Harmondsworth, UK: Penguin, 1972.

Kint, J. "Expo 58 als belichaming van het humanistisch modernisme." Unpublished PhD Dissertation, TU Delft, 2001.
Kirby, J. *Black Panther* 8. Marvel Comics, 1977–1978.
Kovar, R. "La 'congolisation' de l'Union Minière du Haut Katanga." In *Annuaire français de droit international*, no. 13, 742–781. 1967.
Krige, J. "The Peaceful Atom as Political Weapon: Euratom and American Foreign Policy in the Late 1950s." *Historical Studies in the Natural Sciences* 38, no. 1 (2008): 5–44. doi:10.1525/hsns.2008.38.1.5.
Krige, J. *Sharing Knowledge, Shaping Europe: U.S. Technological Collaboration and Nonproliferation*. Transformations: Studies in the History of Science and Technology. Cambridge, MA: MIT Press, 2016.
Lagae, J. "Rewriting Congo's Colonial Past: History, Memory, and Colonial Built Heritage in Lubumbashi, Democratic Republic of the Congo." In *Repenser les limites: L'architecture à travers l'espace, le temps et les disciplines*, edited by A. Thomine-Berrada and B. Bergdol. Collections électroniques de l'INHA, 2005.
Leslie, S. W., and J. Mercelis. "Expo '58: Nucleus for a New Europe." In *World's Fairs in the Cold War: Science, Technology, and the Culture of Progress*, edited by P. M. Arthur and S. G. Knowles, 11–26. Pittsburgh: University of Pittsburgh Press, 2019.
Low, M. "Atoms for Peace in Brussels and Osaka: World's Fairs and the Shaping of Japanese Attitudes to Nuclear Power." In *World's Fairs in the Cold War: Science, Technology, and the Culture of Progress*, edited by edited by A.P. Molella and S. G. Knowles, 46–56. Pittsburgh: University of Pittsburgh Press, 2019.
Lüsebrink, H.-J. "Images de l'Afrique et mise en scène du Congo belge dans les expositions coloniales françaises et belges (1889-1939)." In *Images de l'Afrique et du Congo-Zaïre dans les lettres françaises de Belgique et alentour*, edited by P. Halen, J. Riesz, and G. Jacques, 75–88. Brussels: Textyles-Éditions, 1993.
McDougall, W. A. *The Heavens and the Earth: A Political History of the Space Age*. Baltimore: Johns Hopkins University Press, 1997.
Mitchell, T. *Colonising Egypt*. Berkeley: University of California Press, 1991.
Moholy-Nagy, S. "Brussels for the Dilettante." *Progressive Architecture* 39 (1958): 24–29.
Molella, A. P., and S. G. Knowles. *World's Fairs in the Cold War: Science, Technology, and the Culture of Progress*. Pittsburgh: University of Pittsburgh Press, 2019.
Mumford, L. *The Myth of the Machine: The Pentagon of Power*. Vol. 2. New York: Harcourt Brace Jovanovich, 1970.
Murdoch, J., and E. Stahel. *Appareil universel de télécuriethérapie*. Brussels: Union Minière du Haut-Katanga, 1937.
Ndaywel è Nziem, I. *Histoire générale du Congo. De l'héritage ancien à la République Démocratique*. Brussels: De Beock & Larcier, 1998.
Oldenziel, R., and H. Mikael. *Consumers, Tinkerers, Rebels: The People Who Shaped Europe*. Basingstoke: Palgrave Macmillan, 2013.
Oldenziel, R., and K. Zachmann, eds. *Cold War Kitchen: Americanization, Technology, and European Users*. Cambridge, MA: MIT Press, 2011.
Reid, S. E. "The Soviet Pavilion at Brussels '58: Convergence, Conversion, Critical Assimilation, or Transculturation." *CWIHP Working Paper* 62 (2010): 1–62.
Roland, A. *The Military-Industrial Complex*. Washington, DC: AHA-SHOT Publications, 2001.
Roqué, X. "Marie Curie and the Radium Industry: A Preliminary Sketch." *History and Technology* 13, no. 4 (1997): 267–291. doi:10.1080/07341519708581911.
Siegelbaum, L. "Sputnik Goes to Brussels: The Exhibition of a Soviet Technological Wonder." *Journal of Contemporary History* 47, no. 1 (2012): 120–136. Special Issue: Sites of Convergence — The USSR and Communist Eastern Europe at International Fairs Abroad and at Home. doi:10.1177/0022009411422372.
Skogmar, G. *The United States and the Nuclear Dimension of European Integration*. New York: Palgrave Macmillan, 2004.

Smithson, A., and P. Smithson. ""But Today We Collect Ads", in A Smithsons File." In *Special Issue on Alison and Peter Smithson, Arena, Architectural Association Journal*, edited by J. Baker, 194. Vol. 81. 1966.
Stanard, M. *Selling the Congo: A History of European Pro-Empire Propaganda and the Making of Belgian Imperialism*. Lincoln: University of Nebraska Press, 2001.
Stanard, M. "Bilan Du Monde Pour Un Monde Plus Déshumanisé: The 1958 Brussels World's Fair and Belgian Perceptions of the Congo." *European History Quarterly* 35, no. 2 (2005): 267–298. doi:10.1177/0265691405051467.
Swift, A. "Soviet-American Rivalry at Expo '58." In *World's Fairs in the Cold War: Science, Technology, and the Culture of Progress*, edited by A.P. Molella and S. G. Knowles, 27–45. Pittsburgh: University of Pittsburgh Press, 2019.
Union Minière du Haut-Katanga. *Radium: Production, propriétés générales, son application en thérapeutique, appareils*. Tournai: Etablissements Casterman, 1925.
Union Minière du Haut-Katanga. *Le radium: Production, propriétés générales, applications thérapeutiques, appareils*. Brussels: Union Minière du Haut-Katanga, 1931.
Union Minière du Haut-Katanga. *Union Minière du Haut-Katanga 1906–1956*. Brussels: Éditions L. Cuypers, 1956.
Van Beurden, S. "Un Panorama De Nos Valeurs Africaines: Belgisch Congo Op Expo 58." In *Congo in België: Koloniale Cultuur in De Metropool*, edited by V. Viaene and D. G. Van Reybrouck, 299–311. Leuven: University of Leuven Press, 2009.
van der Heuvel, D., and M. Risselada, eds. *Alison and Peter Smithson: From the House of the Future to a House of Today*. Rotterdam: 010 Publishers, 2004.
Van Goethem, M. "De Gegevens Van Het Probleem." In *Het Bestek 1. De Algemene Wereldtentoonstelling Te Brussel 1958 Maakt Het Besteck Op*. Vol. 48. Brussels: Directie Public Relations van de Algemene Wereldtentoonstelling te Brussel 1958, 1955.
van Lente, D. "Peaceful Atom: The Brief Career of a Symbol of Co-operation and Prosperity." In *Materializing Europe: Transnational Infrastructures and the Project of Europe*, edited by A. Badenoch and A. Fickers, 286–289. Basingstoke: Palgrave MacMillan, 2010.
Vanderlinden, J. "Marie Curie et le radium 'belge'." In *Marie Curie et la Belgique*, edited by Univ. Libre de Bruxelles, 91–108. Brussels: Université libre de Bruxelles, 1990.
Vanderlinden, J. "A propos de l'uranium congolais." Classe des Sciences Morales et Politiques Mémoires in-8°, Nouvelle Série, Tome 51, fasc. 1, Brussels: Académie Royale des Sciences d'outre-mer, 1991.
Vanthemsche, G. *Belgium and the Congo, 1885-1980*. trans. by Alice Cameron and Steven Windross. Cambridge: Cambridge University Press, 2012.
Verledens, A., and L. Verwimp, eds. *BR2: Research Reactor with Multiple Applications*. Mol: SCK/CEN, 2011.
Verwimp, L., and A. Verledens, eds. *1952–2002 Sck/cen*. Mol: SCK/CEN, 2002.
von Fischer, S. "Von der Konstruktion der Stille zur Konstruktion der Intimität." In *Auditive Medienkulturen: Techniken des Hörens und Praktiken der Klanggestaltung*, edited by A. Volmar and J. Schröter, 249–268. Bielefeld: transcript Verlag, 2013.
Williams, S. *Spies in the Congo: America's Atomic Mission in World War II*. First ed. PublicAffairs: New York, 2016.
Winand, P. *Eisenhower, Kennedy, and the United States of Europe*. New York: St. Martin's Press, 1993.
Wynants, M. *Van hertogen en Congolezen. Tervuren en de Koloniale Tentoonstelling 1897*. Tervuren: Koninklijk Museum voor Midden-Afrika, 1997.