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Forget Decolonizing: *Atomic Visions* from the Radioactive Sahara

Ne craignez pas la métamorphose,	Do not fear metamorphosis,
déjà nous sommes	already we are
neuf milliards de fusées,	nine billion flares,
neuf milliards d'insectes	nine billion insects
soleils en revolte	uprising suns

Mahmoudan Hawad, *SAHARA visions atomiques*

(1) "Arlit My Spine"

In February 2014, a map showing nuclear fallout radiating into Europe from the Sahara was published in the French newspaper *Le Parisien* along with an article whose opening line was: "C'est une carte qui fait froid dans le dos" (it is a map that chills the spine). Based on secret documents not declassified by the French defense ministry until 2013, the so-called "document choc" (shocking document) shows the aerial spread of toxic particles over the thirteen days directly after the French detonated their first atomic bomb on the inhabitants of Reggane, Algeria, in February 1960 (fig. 1).[1] Gerboise bleue was the first of four aerial atomic bombs, followed by thirteen subterranean bombs and dozens of toxic chemical contaminations, that the French military deliberately unleashed on all those living in the African Sahara between 1960 and 1966 before moving nuclear bombing operations to occupied atolls in the Pacific Ocean.[2]

In February 2021, a flurry of photographs flickered across digital news and social media showing red dust that had fallen in Jura and elsewhere on the snowy mountains at the French-Swiss border. The dust hazed the sky,

ABSTRACT This paper considers the possibilities and limits of anticolonial resistance alongside the transmedial artworks of Tuareg poet and artist Mahmoudan Hawad, setting what he calls his "furigraphies" in a radioactive historical and geographical context that presently extends from Taourirt Tan Afela (Algeria) to Arlit (Niger) because of indelible—and currently unfolding—French nuclear imperialism that includes both nuclear bomb and uranium extraction infrastructures.
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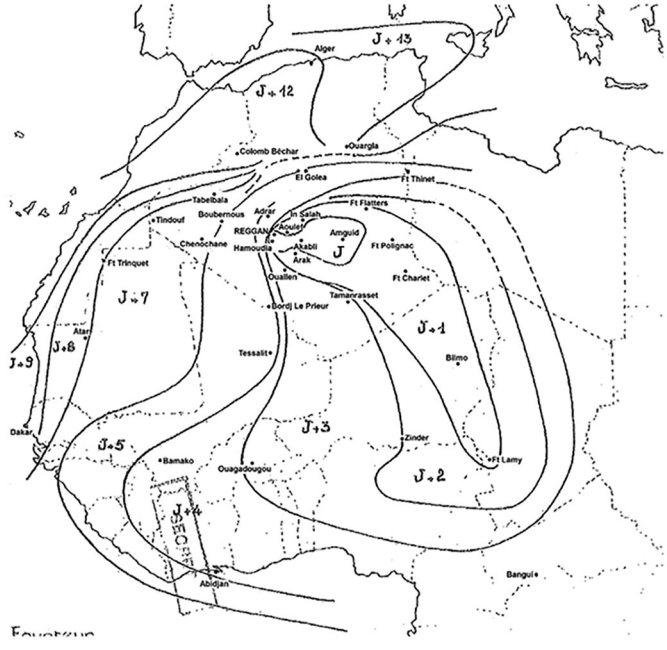

Gerboise Bleue. Chronologie des retombées lointaines (document déclassifié 27/154)

FIGURE 1. A classified French military map showing thirteen days' aerial fallout after the detonation of Gerboise bleue on 13 February 1960. The map, declassified with other military documents in 2013, was circulated publicly by the Lyon-based Observatoire des armaments in 2014.

coated car windshields, tinged the snow amber, and speckled French skins. It turned out that these sand particles, blown by wind from the Sahara across the Mediterranean, were radioactive. They contained traces of cesium-137, a byproduct of the nuclear fission of uranium-235—an isotope that, when processed as weapons-grade plutonium, can fuel nuclear bombs. The French Association for the Control of Radioactivity in the West (ACRO) confirmed that the cesium-137 was indeed an energetic trace of those seventeen nuclear bombs detonated by the French military in the Sahara during the 1960s. Experts assured the public that the dust was just faintly radioactive and not harmful, and many commentators noted the haunting material reminder of lasting ecological damage that France had inflicted in Africa during its colonial past.[3]

In March 2021, without eliciting comparable expressions of shock or chilled spines, one of the world's largest underground uranium mines—located near the town of Arlit in the Aïr mountains of Niger, near Algeria's

far southern border—closed forever. Called COMINAK, and predominantly owned by a massive French nuclear multinational called Orano (formerly Areva), this mine was shuttered after forty-seven years of extraction had depleted the 75,000 tons of uranium ore discovered there in 1957 by the French Atomic Energy Commission (CEA), the same entity that masterminded French nuclear bombing operations in Algeria.[4]

The COMINAK mine was one of two (the name is an acronym: La Compagnie Minière d'Akouta). The other, a massive multi-site open-pit mine called SOMAÏR (La Société des Mines de l'Aïr) that opened in 1968, is still fully operational. A gargantuan new mine, bigger than either of these and also owned by Orano, is slated to open soon at a nearby place called Imouraren.[5] As Orano's online propaganda cheerfully explains, the new mine is set to open "pending more favourable market conditions," and is expected to more than make up for the closure of the COMINAK mine with an anticipated yield of 174,000 tons of uranium, to be extracted through the year 2055. Meanwhile, Orano expects the SOMAÏR mine to continue yielding uranium until it too is depleted, in 2035.[6] The French company owns the majority share of all these mines, with minimal shares controlled by the government of Niger—an arrangement secured by economic treaties between France and Niger that were integral to Niger's independence negotiations in 1960.[7]

At present, more than 70 percent of the French energy supply is fueled by nuclear power—the highest percentage in the world—but France does not have the uranium reserves to feed its fifty-six nuclear reactors.[8] French "energy independence" in fact entirely depends on a highly radioactive but invisibilized uranium extraction infrastructure that is largely located in African places formerly colonized by the French. In particular, French nuclear power relies on these uranium mines near Arlit in northern Niger. Through 2021, when COMINAK closed, one in three lightbulbs in France was powered by uranium extracted from Arlit.[9] Niger is both the third largest exporter of uranium *and* the poorest country in the world.

As Gabrielle Hecht has argued, French "decolonization" at the end of empire in the mid-twentieth century was facilitated by a vision for renewed national "radiance" fueled by nuclear power.[10] The unspectacular infrastructures that create and sustain both nuclear weapons and nuclear energy depend on and reproduce a delusional and dangerous colonial ideology that imagines the desert to be empty of life but filled with material resources to be made available to France. During the 1950s and 1960s, the Sahara was depicted as a bright horizon and source of oil, uranium, natural gas, and other resources that would fuel French "energy independence" and grandeur. Beginning in 1960, the Sahara's arid landscapes were also dazzlingly illuminated by nuclear spectacle that circulated the planet through

photographs meant to stoke nationalist pride about France's entry into the exclusive club of nuclear states. Now, the Sahara appears in French media as an obscured and ominous site of both past colonial violence and impending ecological catastrophe. The expressions of shock elicited by that 1960 fallout map's declassification in 2014 gives a rough feel for the status of the Sahara as France's enduring horizon, a "frontier of late liberalism," in Elizabeth Povinelli's sense: "If you are sitting in certain places in Europe, the United States, and Australia," she writes, "you will see a multitude of the middle class and affluent staring at the horizon," which has "suddenly taken on a 'dark' aspect, when for so long it was brightly lit for those now staring at it in horror."[11]

The series of revelations with which I opened this essay raises a number of critical questions, but I want to pinpoint one irony: the electricity charging up the computers and iPhones on which people in France saw the "shocking" radioactive fallout maps in 2014 or tweeted photos of eerie and faintly radioactive Saharan dust in 2021 is fueled by uranium extracted and processed by a French multinational that is *presently* irradiating—as it has for the last five decades—all living inhabitants of a place in northern Niger that vanishes completely from the fallout maps and photographs that have been circulated to make visible, at least faintly, the material impacts of French nuclear imperialism. Maïa Tellit Hawad puts the point plainly: the radioactive red dust falling unevenly across African and European landscapes ought to "[remind] us of what centuries of extractive capitalism have tried to make us forget: our worlds are intertwined on an environmental scale."[12]

In other words, the matter that concerns me here is not that of repressed colonial ghosts boomeranging into European memories and awareness, nor the threat of imminent catastrophe brewing on the horizon of late liberalism, but rather the indelible but elusive presence of radioactive colonialism that is unfolding right now on inhabited and occupied indigenous land in northern Niger as the direct result of sustaining power infrastructures in France. Before it closed last year, the COMINAK mine drained billions of liters of water from an ancient fossil aquifer in order to process uranium. Useable ore is separated by water and chemicals from "waste" rock. Now thirty-five million tons of discarded and radioactive rock are piled in enormous mountains outside Arlit. Radioactive isotopes from uranium tailings and rock piles leach into groundwater and circulate in airborne particles, and the desert wind is known to be powerful in Arlit.[13] Over time uranium decays—into thorium, radium, polonium, and lethal radon that infiltrates the lungs and organs not only of miners digging up ore but of anybody who breathes, drinks, eats, touches, builds with irradiated scrap metal, or otherwise goes about everyday existence in proximity to uranium mines. Radon

inhalation alters DNA, seeding future diseases. Very little of such harm is visible; it has been actively rendered unknowable.[14]

That "shocking" and "spinechilling" fallout map drawn up by the French military in 1960 and made public to French readers in 2014 highlights a serious problem with existing perceptual frameworks designed to make nuclear harm knowable. The uranium mines at Arlit fall squarely inside the isodose curves that mark two days' windfall from Gerboise bleue's ground zero at Reggane, but those mines do not appear on this map, nor do they figure in discussions of radiation harm, let alone in calculations for reparation. In 1960, when the Gerboise bleue bomb spectacularly destroyed the living desert just a few hundred kilometers northeast of some of the largest uranium reserves on the African continent, the French government was busy organizing the terms of African decolonization through a series of defense and raw materials "accords" that would assure French access to uranium to fuel national radiance after the end of empire, specifically at the conclusion of Algeria's hard-fought decolonizing war in 1962. These designs play out visibly in this prospecting map found by Gabrielle Hecht in the CEA annual reports (fig. 2). By 1970, when this prospecting map was created, the mines near Arlit were becoming operational on terrain that had

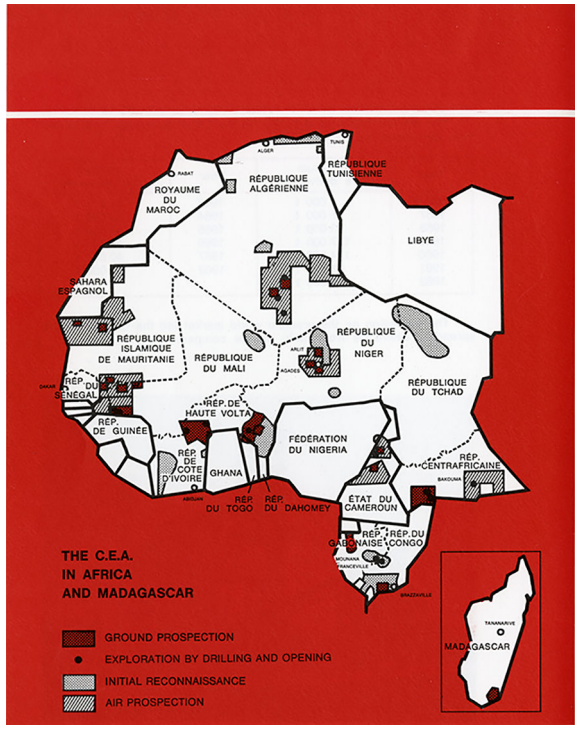

FIGURE 2. Map showing the activities of the French Atomic Energy Commission (CEA) in Africa in 1970. Reproduced with permission from Gabrielle Hecht, courtesy of Commissariat à l'Énergie Atomique.

already absorbed nuclear bomb radiation between 1960 and 1966. What none of these maps shows is that Arlit is also squarely on the territory of the Aïr Tuareg, and that these mines have destroyed fertile land where nomads had long brought their seasonal herds to graze.

Nuclear weapons and uranium mining are twin faces of nuclear imperialism; in the Saharan context these are especially shadowed operations that remain subject to intransigent mechanisms of French colonial disavowal. Furthermore, as Hecht points out, a powerful ontological division has long separated the "nuclearity" of bombs from that of nuclear energy and mineral extraction infrastructures, making it difficult to find critical frameworks that permit us to think about these twin faces of nuclear imperialism together. Rarely do they appear on the same maps, in the same pictures, or in the same discussions. The ontology delineating what does and doesn't qualify *as nuclear* has not only made it possible for companies like Orano/Areva to elude controls on uranium extraction and processing but also to ghost African lives from geographies of nuclear harm.

This essay envisions together the two faces of French nuclear imperialism by turning to works by Aïr Tuareg poet and painter Mahmoudan Hawad, setting what he calls his "furigraphies" in the radioactive context of Arlit. An incredibly prolific writer and artist active for decades, Hawad invented the word "furigraphie," fury-writing, to name his aesthetic practice. Furigraphie takes different forms and materials. Hawad etches and paints on rocks and bone to recreate ancient practices of marking land with petroglyphs; creates vivid paintings on canvas and paper that reanimate the Tifinagh alphabet; recites poems in Tamajaght at gatherings like the "Rencontres furigraphiques" that he organized at Agadez, Niger, in 2006 and 2010; and transcribes and collaboratively translates these spoken Tamajaght verses as French texts with titles like *SAHARA visions atomiques* (2003, SAHARA atomic visions), *Irradiés* (2015, Irradiated), and *Vent Rouge* (2020, Red wind).[15]

In this essay I consider how Hawad's furigraphies generate modes of *atomic vision* that counter and explode the blinding interpretive frames that so dramatically limit nuclear ontologies and geographies. These "visions" cultivate a sense for the multiscalar, multitemporal materiality of harm being done to those whom the visualization technologies of topographical fallout maps render so unimaginable.[16] Hawad's atomic visions also compel us to rethink temporalities of decolonization—or, rather, compel us to *forget* decolonizing, given the unimaginably longue durée of radioactive occupation, in order to channel fury to other ends. I will conclude by observing that Hawad's furigraphic atomic visions are oriented by a radical futurelessness that is neither debilitating nor annihilating but that stands to be transfiguring.[17]

Hawad's works deftly and explicitly layer together what existing interpretive frameworks either ontologically segregate or simply make vanish. For instance, these three verses from *Irradiés* counter the blanking effect produced by aerial fallout maps by focusing attention on a specific radioactive "hotspot" identified by proper name.[18] In the first verse, a toponym—Ahaggar—specifies the mountain range in southwestern Algeria inside which the French military detonated thirteen of its seventeen nuclear bombs during the 1960s:

J'ai disparu	I have disappeared
mais je hurle	but I scream
Et jusqu'à demain je hurlerai	And I will scream until tomorrow
car je porte le poid de dix-sept bombes	because I carry the weight of seventeen bombs
et la moitié de la dix-septième	and half of the seventeenth
coagulée dans mon poitrail	clotted in my chest
montagne Ahaggar	Ahaggar mountain
Le dix-huitième chaos	The eighteenth chaos
attend de naître dans mes poumons	is waiting to be born in my lungs
Jusqu'à quand ma poitrine	How long will my chest
attendra que naisse le chaos,	wait for chaos to be born,
chaos dix-sept fois endormi	chaos sleeping, times seventeen,
dans mes poumons?	in my lungs?

(*Irradiés*, 28)

The speaker's question, posed in future tense, concerns not seventeen past bombs but the present and future chaos that now sleeps within his lungs and thorax. The following verse links the network of bomb detonation tunnels inside "Ahaggar mountain" to the "abyssal dark" of uranium mines at Arlit, a place likened to a human spine bearing a crushing toxic burden so that Paris can sparkle with light:

Pour que tournent les réacteurs	So that the reactors run
de France et de Navarre	in France and in Navarre
nuit et jour, hiver et été,	night and day, winter and summer,
et que brille Paris	and so that Paris gleams
il a fallu me faire culbuter	it was necessary to throw me
dans les ténèbres abyssales	into the abyssal dark
Planche carapace tortue	Plank carapace tortoise
Arlit mon échine	Arlit my spine
à plat ventre j'avance sous le fardeau	crawling on my belly beneath the load
de cinquante millions de tonnes	of fifty million tons
de bouse et sciure toxiques	of toxic sludge and dust

(28–29)

The third verse moves from uranium tailings and dusty mountains of waste rock to the mining company Areva's rapacious waste of water as it drains the ancient fossil aquifer, sapping both the land and its inhabitants of precious life force:

Nous les momies du Sahara	We the mummies of the Sahara
nous avons soif	we are thirsty
nous sommes calcinées	we are charred
Et pourtant à coup de grenades dynamites	And yet with dynamite grenade blasts
les gorges ventouses d'Areva	Areva's sucking throats
chaque jour pompent de nos veines	pump daily from our veins
deux cent millions de mètres cubes	two hundred million cubic meters
d'eau, notre sève sang	of water, our lifeblood
eau sang feu	water blood fire

(29)

"Arlit my spine," Hawad writes of this stretch of Tuareg territory, where invisibilized nuclear infrastructures intersect. His precise toponyms invoke an intimately known geography ghosted by fallout map topographies: "Entre Aïr, Ahaggar, et Ajjer / nous voici sur la fourmilière, / nombril du cadavre touareg" (Between the Aïr, the Ahaggar, and Ajjer / here we are on the anthill / navel of the Tuareg corpse).

Hawad's suggestive image of an ant colony—intricate spirals, nests, passageways—connects the network of subterranean bomb chambers carved inside the Ahaggar mountain in Algeria with the treacherous mining tunnels and devastated water aquifers of the Aïr mountains in northern Niger. Here, the spine is emphatically not a figure for European shock and shame but, like the navel, a materialized metaphor of extreme vulnerability to mundane nuclear violence that reaches every aspect of life in Arlit, infiltrating and sapping vertebrae, aquifers, tissues, soils, and cells—not in the past but at this very moment, and for the unimaginable future.

(2) Atomic Visions

The cover of *SAHARA visions atomiques* is the same reddish hue as the dust emanating from the Sahara and bears an image composed of symbols scrawled in fluid black watercolor brushstrokes (fig. 3). Some of the marks look like letters of the Tifinagh alphabet, including letters in the poet's own name; others are suggestively figural and look much like the legions of petroglyphs etched by human hands on geological formations across the Sahara and Sahel, in particular in the Ahaggar, the Aïr, and at Tassili n'Ajjer, beginning some twelve thousand years ago.

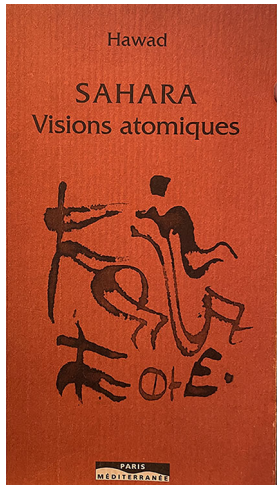

FIGURE 3. The cover of *SAHARA visions atomiques* by Mahmoudan Hawad (Éditions Paris-Méditerranée, 2003).

Reading the entire nine-part, book-length poem creates physical and psychic exhaustion; it is dizzying, torrential, sickening. Its composite and hallucinatory images accrete as its shifting rhythms generate a ceremonial quality, as if the poetry is a ritual not meant to be beautiful but rather to act like a medicine on whomever participates, perhaps to provoke ancestral rage or to exorcise radioactive demons. However, this text does not offer catharsis or consolation. It provides no material to fuel anticolonial romance, and no vision of a future free from disaster. What opens with scenes of nuclear bomb detonation ends with the poem's speaker—a sickly Tuareg scribe—caught in an impossible trap, excoriating the Algerian writer Kateb Yacine for his complicity with Algerian nationalism, then begging to be shot dead.

The opening page starts with a one-word explosion, first in Tamajaght, then in French. An altered echo of the angel Jibrīl's command that the prophet Muhammad *recite!* (*iqra'!*), here the Tamajaght imperative is to *drrream*—

Arrrget! Rêêêêvez!
Avant le commencement,
était le rêve.
Avez-vous vu l'image
image rêve
miroir en mirage?
En voici l'écho!
Rêve
vision rêve
voix des paysages de l'âme
brûlure carbonisée
par la soif de l'agonie.

Arrrget! Drrream!
Before the beginning,
was the dream.
Have you seen the image
dream image
mirror in mirage?
Here's the echo of it!
Dream
dream vision
voices of the landscapes of the soul
burn charred
by the thirst of death-throes

(*SAHARA visions atomiques*, 15)

An ink drawing appears on the facing page, its dynamic strokes, swoops, and dots almost shimmering with the energy of Hawad's swift hand (fig. 4). Beside this atomic petroglyph, the opening lines speak in scriptural register: "Avant le commencement, / était le rêve" (Before the beginning, / was the dream). Apocalyptic references to "beginnings" and "ends" circulate throughout the visions, often in direct connection with the series of nuclear bombs detonated by the French starting in 1960. The second verse begins by naming the first of them ("Gerboise bleue"), and on the next page we read: "Au début des débuts / c'était dans l'air" (In the beginning of beginnings / it was in the air).

At first read, then, the poem appears to be laying out a history of French nuclear bombing in the Sahara: starting in 1960, four aerial bombs, then thirteen subterranean ones. Yet the next line activates a visual repertoire that connects the French bombs to a planetary network, unsettling their neatly contained history and exploding the temporal ideology of state-sponsored narrative realism that has operated to conceal the true scope of their violence: "Avez-vous vu l'image / image rêve / miroir en mirage? . . . En voici l'echo!" (Have you seen the image / dream image / mirror in mirage? . . . Here is the echo!). The "en voici" guides a reader to see either the drawing on page left or a conjured mental photograph of Gerboise

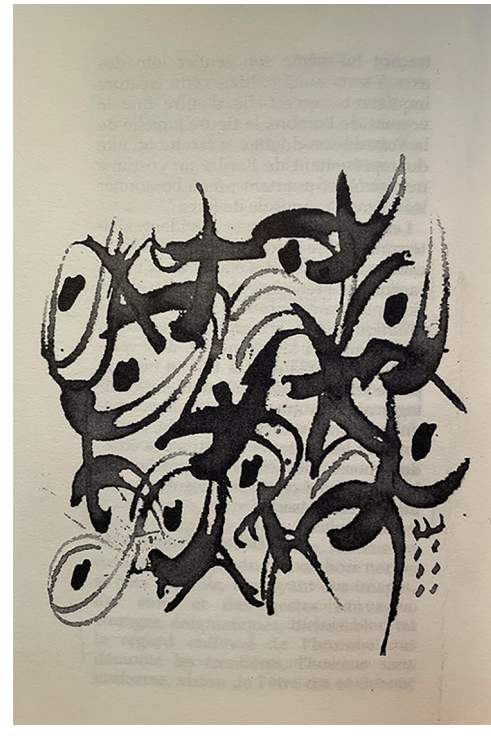

FIGURE 4. The opening page of Hawad's *SAHARA visions atomiques*, showing the first furigraphie that appears as part of the poem.

bleue as mirror, mirage, and echo—the first French bomb becomes just one iteration of a nightmarish visual pattern.

The allusions stir up an archive of images imprinted in any reader's mind. The media spectacle of the world's first atomic bomb (Trinity, Nevada, 16 July 1945) was replicated by thousands of other bombs, many of which were rendered "hypervisible" as the most photographed events in human history.[19] We might at first recognize that Hawad's furigraphic painting resembles a mushroom cloud on an aerial horizon; zooming in to subatomic scale, we might also see that it looks like the energetic chain reaction of nuclear fission, a process whose unfolding will ultimately defy any human sense of time. In this way, Hawad's atomic visions generate shifting and dynamic images, like mutating visual hallucinations.

Hawad's apocalyptic register reckons with the deep-time scale of an unprecedented violence that "challenges the terms of the reality that produced it."[20] The scriptural language of the poem's opening verses answers to that reflected by the (mis)translated passage from the Bhagavad Gita recalled by theoretical physicist J. Robert Oppenheimer after he watched the Trinity bomb detonate on the Nevada desert: "Now I am become death, the destroyer of worlds."[21] Visual expressions of the atomic sublime keep attention focused on the aerial horizon, much like Oppenheimer's gaze transfixed by that destructive and blinding flash. However, Hawad's next lines—"voix des paysages de l'âme / brûlure carbonisée / par la soif de l'agonie" (voices of the landscapes of the soul / burn charred / by the thirst of death-throes)—redirect attention to the scorched skin of the earth, conjuring images of the blackened radioactive scars left on the surface of deserts by the heat of nuclear blasts, such as the photographs taken after Trinity and after Gerboise bleue. This shift to the irradiated earth also quietly activates a temporal sense that is lost in Oppenheimer's misremembering of the Sanskrit line ("I am *time*, the destroyer of worlds").

Hawad's atomic vision does not linger long on either aerial horizon or terrestrial skin. The second verse at first appears to be a list of the names that the French military gave to their first series of nuclear bombs (Gerboise bleue, blanche, rouge, verte)—yet this list veers immediately out of sequence, off the historical script, and into a strange disorder:

Gerboise bleue	Blue jerboa
et gerboise verte	and green jerboa
née de la bleue,	born of the blue,
gerboise violette	violet jerboa
née de la verte,	born of the green,
gerboise blanche	white jerboa
née de la violette,	born of the violet,
gerboise jaune	yellow jerboa

née de la blanche,	born of the white,
gerboise rouge	red jerboa
née de la jaune,	born of the yellow,
gerboise noire	black jerboa
née de la rouge,	born of the red,
gerboise blême	pale jerboa
née de la noire	born of the black
et gerboise grise,	and grey jerboa,
la neuvième	the ninth
fille de la huitième,	daughter of the eighth,
gerboise blême.	pale jerboa.

(15)

With the second item in the list, we are askew; with the third, Hawad has started inventing colors (violet, yellow, black, pale, grey); by the end, the list of gerboises total *nine* rather than what anyone with knowledge of these bombs would expect—which is four (the aerial bomb series named for jerboas) or seventeen (plus the thirteen subterranean bombs named for gemstones).

Hawad's enumeration takes the form of a detailed genealogical lineage: blue begat green begat violet begat white begat yellow. This lineage form appears frequently in Abrahamic textual tradition, and it is also the way in which Tamajaght speakers introduce and place themselves, by articulating kinship lines. In French, it is notably a matrilineal genealogy: grammatically, the bombs are feminine, marked as daughters ("née") rather than sons; in Arabic this would be not "bin" but "bint."

This unruly cascade of daughters creates a mental picture of what is happening around the uranium mines outside Arlit right now. That is, Hawad's matrilineal genealogy directly echoes metaphors for describing the processes of radioactive decay—specifically, that of uranium's radioactive decay (fig. 5). Unstable uranium emits radiation and eventually turns into radon, a heavy radioactive gas. Radon further decays through a series of short-lived and very intensely radioactive particles called "radon's daughters" (now more usually called "progeny" and, in French, "descendants"). These daughters, the descendants of radon, infiltrate bronchial tissue, esophagus, and throat when they are breathed in, seeding thoracic and bone cancers and genetic mutations that can travel through generations before manifesting as disease. For uranium-238, the mineral currently being extracted and processed around Arlit, the half-life decay process takes an astonishing 4.47 billion years—that is, roughly the age of planet Earth. If the longevity of radioactive colonialism exceeds the future horizon of the entire human species, then what can decolonizing possibly mean, and does anti-colonial resistance have any ground on which to stand?

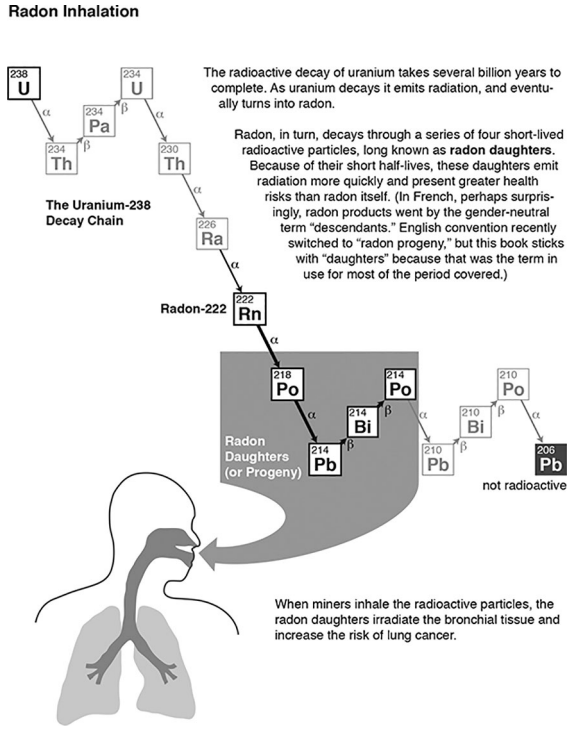

FIGURE 5. Diagram depicting the radioactive decay of uranium. Designed by Evan Handleigh and first published in Gabrielle Hecht, *Being Nuclear: Africans and the Global Uranium Trade* (Cambridge, MA, 2014). Reproduced with permission.

(3) Radiant Multitudes

Rather than tracking wind distribution of thirteen days' aerial fallout from a great distance or trembling in surprise when faintly radioactive dust falls on Europeans sixty years after the fact, Hawad's atomic visions of the radioactive Sahara register the apocalyptic force of nuclear radiance in the cells and particles that make up the matter of everyday existence in Arlit, which has been indelibly if invisibly altered by both bomb detonation and mineral extraction. These troubling visions of atomic-level processes make perceptible radioactive processes not available to sight. They render imaginable the layered forms of colonial toxicity that have infiltrated the deep layers of the desert's dry and granular sediment, its fluctuating strata penetrated by carcinogens and crawling with toxic djinns that lodge in and travel through soil and tissue, scrap metal, water source, stone.

Forget decolonization, if you've ingested this mineral memory of the radioactive Aïr! Instead, what those living on the toxified spine of land between Ahaggar, Aïr, and Ajjer have to work with is French atomic radiance infiltrating heart, lungs, thorax, esophagus, and bone: "et les omoplates des Touaregs / seront les planches / sur lesquelles trottera le chaos" (and the

Tuareg's scapulae / will be the tablets / on which chaos will trot) (44). Here the furigrapher's future tense obliterates any hope of a salvageable future, as there is no foreseeable end to the chaotic unfolding unleashed within Tuareg bodies, bones, and lands by nuclear violence. Radioactivity fundamentally defies linear time; there is no endpoint.

There are two important implications to this futurelessness. First, Hawad's radical temporal recalibration confounds chronologies keyed to the teleology of nation-states and blows apart the mid-twentieth-century timeline for narrating African decolonization. From a perspective tethered to Arlit, 1960—the year of Niger's national independence, two years from the end of Algeria's anticolonial war (1954–62), and the year that the French detonated Gerboise bleue on African land—does not look like a promising dawn after the long night of colonial terror, but like the gruesome birth of a child disfigured by radiation exposure:

L'année 1960 vit le jour par le coccyx,	The year 1960 was birthed by the coccyx
et brutalement par sa face entortillée	and brutally with her face twisted
dans les entrailles de la terre,	into the entrails of the earth,
elle entendit la fin	she heard the end
et le commencement	and the beginning
qui broyaient ses yeux.	that smashed her eyes.

In Hawad's furious multitemporal scansions, "1960" simply marks an acceleration from one colonial epoch to another that is orders of cosmological magnitude more chaotic and destructive than anything that has come before:

Année 1961,	Year 1961,
année de la fin du commencement.	year of the end of the beginning.
Année 1962,	Year 1962,
année du commencement da la fin.	year of the beginning of the end.
Année 1963,	Year 1963,
fin du commencement accompli.	end of the beginning achieved.
Année 1964,	Year 1964,
la vitesse atteignit la fin commencée.	speed hit the ending underway.
Année 1965,	Year 1965,
année de la vitesse commencée	year of speed underway
et de la fin redoublant de destruction	and of the end redoubling its destruction
jusqu'à la mort de l'année 1967.	until the death of the year 1967.
Année 1968,	Year 1968,
et les années perpétuèrent	and the years perpetuated
la puissance	the power
du carré aux neuf formules	of the square of nine
destructrices,	destructive formulas,
force de neuf pets atomiques,	the force of nine atomic farts,
vanité que le coq	vanity that the cock
mouchait et transvasait	sneezed and transferred
dans les gorges de trois millions	into the throats of three million

de chimères bleues	blue chimeras
transmuées en cinq millions	transmuted into five million
de scorpions	scorpions
rejoignant quatre millions	joining four million
de cafards.	cockroaches.

(32–33)

Hawad's frequent iteration of these dates across *SAHARA visions atomiques* disrupts rather than replicates tidy teleologies of African decolonization. Here, 1961 is just the end of a beginning, while 1962 is the beginning of the end, perhaps of the entire planet. Every year—in the time it takes this planet to circle the sun—destruction accelerates exponentially as the accumulating force of "atomic farts" lodges in the throats of scorpions, roaches, fleeting Tuareg ghosts. This disruptive timeline destroys any anticolonial vision of a utopian future or a clean slate. Every life—human, animal, insect, vegetal, fungal, mineral—in the irradiated desert becomes material archive, forever transformed by nuclear imperialism from which there is no getting free.

Yet Hawad's atomic visions do more than make palpable a slow violence that other perceptual frames obscure. Though bleak and terrifying, these visions are not an abdication nor a suicidal resignation. The furigraphies register other clandestine knowledge and collective practices of resistance that do not depend on an imagined or purified future. For instance:

Les experts ne voient rien.	The experts see nothing.
Une foudre, tir atomique	A thunderbolt, an atomic fire
pet en croûte	their ninth bomb
de leur neuvième bombe,	a fart in the earth's crust,
est déroutée dans le rectum du pays.	is lost inside the land's rectum.
C'est notre butin de guerre,	This is our war booty,
coagulé dans les mugissements	coagulated with the howls
aboiements et autres fureurs	wails and other furies
de la pénombre et du silence	of the shadow and the silence
enterré sous les fesses de la terre	buried in the land's ass
provision pour notre cri de demain	provision for the next day's cries
demain quand naîtra le soleil	tomorrow when the sun is born
sur le front couchant,	on its smashed setting face,
demain quand nous enduirons	tomorrow when we will smear
de poussière et de cendres	with dust and ashes
la face laide de votre troisième millénaire.	the ugly face of your third millenium.

(111–12)

The experts see nothing, but the Tuareg scribe-speaker of these verses knows that the noxious force of an "atomic fart" disappears into the crevices and depths of the underground, where it coagulates and commingles with the wails, furies, minerals, waters, rock, spores, seeds, bones, spirits, and other organisms that compose a vivid if shadowed and silenced network. This subterranean network not only facilitates the spread of poison but also stores treacherous "war booty" to be metabolized, metamorphosed, hijacked, and repurposed as "provision pour notre cri de demain," a fuel for the next day's cries. Hawad's sense of radical transfiguration does not rely on an imagined decolonized future cleansed of nuclear poisons but on the dormant energies of this already existing, growing, furious, and radiant multitude:

Ne craignez pas la métamorphose,	Do not fear metamorphosis,
déjà nous sommes	already we are
neuf milliards de fusées,	nine billion flares,
neuf milliards d'insectes	nine billion insects
soleils en revolte	uprising suns

(69)

Notes

1. The original article is in the *Le Parisien* archive, which no longer includes the infographic with which it was first published: https://www.leparisien.fr/archives/le-document-choc-sur-la-bombe-a-en-algerie-14-02-2014-3588699.php. The article including the infographic has been archived by the Hoggar Research Institute, available here: https://hoggar.org/2014/02/14/le-document-choc-sur-la-bombe-a-en-algerie-le-parisien/. Roxanne Panchasi analyzes this document in her article "'No Hiroshima in Africa': The Algerian War and the Question of French Nuclear Tests in the Sahara," *History of the Present* 9, no. 1 (Spring 2019): 84–112. The infographic published by *Le Parisien* in February 2014 reproduced details from a map that was selectively declassified, along with 153 other military documents, during the course of a legal dispute launched by a coalition of French military veterans and antinuclear activists who had been exposed to dangerous levels of radiation both in the Sahara and in French-occupied Polynesia during their service between the 1960s and 1990s and were seeking indemnity. On this see Bruno Barillot, "Essais nucléaires français, à quand une véritable transparence?," Note sur les documents déclassifiés le 21 mars 2013, *Observatoire des armements* (February 2014), which is also the source that originally circulated the declassified French military fallout map

on which the *Le Parisien* infographic was based: https://www.obsarm.info/spip.php?article226.

2. On these bombs, see Samia Henni, "Against the Regime of Emptiness," in *Deserts Are Not Empty*, ed. Samia Henni (New York, 2022); Samia Henni, "Toxic Imprints of Bleu, Blanc, Rouge: France's Nuclear Bombs in the Algerian Sahara," *The Funambulist: Toxic Atmospheres* 14 (November–December 2017): 28–33; Panchasi, "'No Hiroshima in Africa'"; and Jill Jarvis, "Radiant Matter: Technologies of Light and the Long Shadow of French Nuclear Imperialism in the Algerian Sahara," *Representations* 160 (Fall 2022): 54–89.
3. "Nuage de sable du Sahara," ACRO (website), https://www.acro.eu.org/nuage-de-sable-du-sahara-une-pollution-radioactive-qui-revient-comme-un-boomerang/. For more on the dust plume, see Roxanne Panchasi, "'Monster Saharan Dust Plume Heading for Europe': A Cultural History of the French Bomb," talk delivered Friday, 26 November 2021, in the Joint French History Seminar at the University of Toronto's Munk School; and Samia Henni, "Oil, Gas, Dust: From the Sahara to Europe," *e-flux Architecture: Coloniality of Infrastructure*, ed. Nick Axel, Kenny Cupers, and Nikolaus Hirsch (October 2021). Maïa Tellit Hawad, an independent scholar based in Marseille who is also the daughter of the poet Mahmoudan Hawad, opens her just published essay by describing another layering of dust in Europe (in 2022) and then recounts her father's childhood memory of seeing light from the nuclear bomb blasts in Aïr; "Sahara Mining: The Wounded Breath of Tuareg Lands," *The Funambulist: The Desert: Continental Lives and Anti-Colonial Struggles in Arid, Plentiful Lands* (November–December 2022): 26–33.
4. For a detailed account of the history of Areva (now Orano) and its connections to the CEA, see Raphaël Grandvaud, *Areva en Afrique: Une face cachée du nucléaire français* (Marseille, 2012), in particular chapter 1, "Les ancêtres d'Areva en Afrique, de l'exploration coloniale à l'exploitation néocoloniale," 21–59. For more on the CEA, see Gabrielle Hecht, "La françafrique" and "The Price of Sovereignty," in *Being Nuclear: Africans and the Global Uranium Trade* (Cambridge and London, 2014), 107–40.
5. "A new stage commences for the COMINAK mine in Niger," *Orano* (website), 31 March 2021, https://www.orano.group/en/news/news-group/2021/march/a-new-stage-commences-for-the-cominak-mine-in-niger. For a critical Amazigh activist perspective on these operations, see "Le nucléaire camouflé en énergie 'verte,'" *Tamazgha*, 13 February 2022, http://tamazgha.fr/Le-nucleaire-camoufle-en-energie.html.
6. These details are on Orano's propaganda website: https://www.orano.group/en/nuclear-expertise/orano-s-sites-around-the-world/uranium-mines/niger/mining-sites.
7. In addition to Grandvaud, *Areva en Afrique*, and Hecht, "La françafrique" and "The Price of Sovereignty," see also Jacques Frémeaux, "Le Sahara sous la Ve République," in *Le Sahara et la France* (Paris, 2010), 247–74.
8. This is a widely cited point, including by both Grandvaud and Hecht. See, for example, Odile Tobner, preface to *Areva en Afrique: Une face cachée du nucléaire français*, by Raphaël Grandvaud (Marseille, 2012), 12.
9. This, too, is a point widely cited by activists. For one example, see "Areva in Niger: who is benefiting from the uranium?," Oxfam press release, 19 December 2013, https://www.oxfam.org/en/press-releases/areva-niger-who-benefiting-uranium.

10. In addition to her book *Being Nuclear*, see Gabrielle Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II* (Cambridge, 2000).
11. Elizabeth Povinelli, *Between Gaia and Ground: Four Axioms of Existence* (Durham, NC, 2021), 37, 38.
12. Maïa Tellit Hawad, "Sahara Mining," 33.
13. There are several documentary films focused on radioactivity in Arlit. See Amina Weira's exceptionally powerful and award-winning *La colère dans le vent* (Niger/Benin/France, 2016, 54 minutes); Martin Boudot's film *L'uranium de la colère* has a strangely similar title and theme (France, 2021, 51 minutes); and Idrissou Mora Kpai, *Arlit: Deuxième Paris* (Benin/France/Niger, 2004, 78 minutes). For an astute discussion of the 2004 film, see Cajetan Iheka, "Ecologies of Oil and Uranium: Extractive Energy and the Trauma of the Future," in *African Ecomedias: Network Forms, Planetary Politics* (Durham, NC, 2021).
14. I draw critical insight here from a growing literature on the epistemologies that enable radioactive colonialism, much of it focused on the US settler-colonial context, including: Ward Churchill and Winona LaDuke, "Native America: The Political Economy of Radioactive Colonialism," *The Insurgent Sociologist* (Spring 1986): 51–78; Joseph Masco, *The Future of Fallout, and Other Episodes in Radioactive World-Making* (Durham, NC, 2021); and Jessica Hurley, *Infrastructures of Apocalypse: American Literature and the Nuclear Complex* (Minneapolis, 2020). Hurley writes: "the fact that the damage caused by long-term exposure to low doses of radiation seems unknowable to us is not because there is no way to establish knowledge about it but because for decades the state-sponsored corporations and government agencies that could monitor doses and health impact and generate such knowledge have refused to do so" (6–7). Gabrielle Hecht studies this refusal in chapter 6 of *Being Nuclear*, "History of Invisibility," where she writes: "Absent a dense network of institutions, infrastructures, and instruments to make radon contamination perceptible, exposures effortlessly faded from view" (199).
15. All English translations in this essay are my own, except the opening verses of Hawad's *SAHARA visions atomiques*, discussed in section 2, which were translated by Doyle Calhoun.
16. For a discussion of the imaginatively limiting function of fallout maps, see Masco, *The Future of Fallout*, especially chapter 1, "The Age of Fallout," 17–42; I am also thinking here of Rob Nixon's discussion of "unimagined communities," in the fifth chapter of *Slow Violence and the Environmentalism of the Poor* (Cambridge, MA, 2011), 151–74.
17. My sense of transfiguration is directly inspired by Jessica Hurley's powerful argument in *Infrastructures of Apocalypse*; see the section of the introduction entitled "Apocalypse and Transfiguration: Toward a Narratology of Futurelessness," 24–35.
18. For more on hot spots and what she calls "hotspotter aesthetics," see Hurley, "Nuclear Apocalypse from Below: Hot Spotter Aesthetics," in the introduction to *Infrastructures*, 14–23.
19. Hurley, *Infrastructures*, 7.
20. Ibid., 202: "Nuclear waste is bigger than us, more dangerous than us, and will outlive us. It is our own self-created predator. At the same time, however, it challenges the terms of the reality that produced it: a capitalist/colonialist present that can imagine the future only in the terms of its own continuation."

21. A digital archivist from the National Security Research Center/Los Alamos National Laboratory has written a short and interesting account of the source of this translated Sanskrit line from the Bhagavad Gita that Oppenheimer famously spoke in the televised interview, widely available online: https://www.youtube.com/watch?v=pqZqfTOxFhY. For the article, see Patricia Templeton, "Plutonium and poetry: Where Trinity and Oppenheimer's reading habits met Literary inspirations, correcting misinterpretation of his famous quote," Los Alamos National Laboratory, 2021, https://permalink.lanl.gov/object/tr?what=info:lanl-repo/lareport/LA-UR-21-26204.