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Perspectives



Crisis upon Crisis: Ruderal Landscapes, Traces and the History of Medicine

Guillaume Lachenal | ORCID: 0000-0003-4439-7866

Sciences Po médialab, 27 rue Saint-Guillaume, 75007, Paris, France

Institut Universitaire de France, Paris, France

guillaume.lachenal@sciencespo.fr

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Abstract

What happens to the history of medicine and health when the world surrounding us experiences crisis upon crisis? What kind of stories, methods and archives should we turn to? This article attempts to intensify the conversation between the history of medicine, the environmental humanities and the biosciences. I explore what we can gain, as historians of medicine, by engaging with landscapes – understood ecologically, historically and aesthetically. Such perspectives enable us to bring our histories of medicine and health “down to earth,” in the words of Bruno Latour. Noticing, unearthing and following the traces that form the landscape can also help us imagine unimagined histories, that are open-ended, and shaped in unexpected ways by non-human agencies and interpretations. Drawing from my research in East Cameroon, I examine how the genetic sequences of pathogens (HIV and the hepatitis C virus), as well as botanical, archeological and architectural traces, can help us locate histories of medicine within a broader consideration of ruderality – the shared condition of living among the rubble. Using molecular phylogeny and ethnography as arts of tracing, I explore how we can write a history of HIV-Aids and of other mid-twentieth

century disease emergences and bioinvasions by starting with the ruderal landscapes of Central Africa, shaped by crisis upon crisis and by medicine itself.

Keywords

epidemics – HIV-Aids – iatrogenic risks – Central Africa – colonial medicine – invasive species – environmental humanities

1 Introduction

In September 2022, the International Monetary Fund (IMF) entitled its annual report “Crisis upon crisis.”¹ Listing the invasion of Ukraine, the ongoing pandemic, and widespread inflation as among the most concerning challenges of the times, the managing director of the IMF remarked, quite astutely, that there is “no pause button on the climate crisis while we deal with these other crises.”² It is never a good sign to borrow anything from the IMF, but I think the title captures reasonably well the situation: how can we, as historians of health and medicine, engage with these interlocking crises – of environments and bodies, of health systems and planetary cycles, of civic trust and scientific truth, etc. – without pressing pause on any of them while we think about any one of the others? For the crisis is literally multifold, with all its dimensions and temporalities folded on themselves; it challenges us to think about the piling, the sedimentation, the articulation, the concatenation of crises; it incites us to return to Walter Benjamin’s vision of history as “one single catastrophe which keeps piling wreckage upon wreckage.”³ Where should we start? And perhaps this is the right question to start with, as we face the “pile of debris” growing skyward before us: where should we start?

As it is experienced, a crisis is precisely that: a not knowing where to start (this is my humble contribution to the theorization of crisis, which I draw more from self-help books than anything else). The parents among us may think of the Sunday evening homework crisis of their children: faced with too

1 This is an invited paper and an extended version of the keynote lecture given to the annual conference of the EAHMH, Oslo, 2 September 2023, on the theme “Crisis in Health and Medicine”.

2 International Monetary Fund, “Crisis upon crisis,” IMF Annual report 2022 (2022), 3 <www.imf.org/external/pubs/ft/ar/2022/downloads/imf-annual-report-2022-english.pdf>.

3 Walter Benjamin, *Selected Writings, Volume 4: 1938–1940*, ed. Howard Eiland and Michael W. Jennings (Cambridge, MA, 2006), 392.

many assignments, too many ideas, and a blank page, the solution is to go “bird by bird” – a classic line of advice from writer’s manuals, for those who don’t get the reference.⁴ Or think of the trader trying to cut its losses on a bad day, not knowing where to start. Think of an overwhelmed nurse in a full emergency ward. Or think of us all trying to figure where we should start to change our lives to contribute less to the ongoing climate catastrophe. A crisis in its purest form is this liminal moment of disarray when there is a need for triage, a need for process and form. And it is a condition that historians, as writers and storytellers, know well. “The pile of debris” still needs sorting,” wrote Nancy Rose Hunt, alluding to Benjamin, in her opening reflections on writing a history of health and violence in colonial Belgian Congo; “it needs form.” And “one continuous historical narrative,” she continued, is not the solution.⁵

In this article, I pursue this reflection from a nearby central African region – south-eastern Cameroon – also caught in the fracas of twentieth- and twenty-first century imperial histories. How to find a narrative form for superimposed, intricately sequenced pandemic and planetary crisis? How to relate them to histories of modern medicine and environmental histories of colonialism? Looking for places to start, I suggest points of entry, ways to process and proceed – bird by bird, or rather, flower by flower; ways to look for and follow some signs and folding lines. My article is about those ways of noticing and tracing medical histories in the ruderal landscapes of Central Africa. And so, we start, with a flower.

2 The Flower and the Virus: Notes Towards a Landscape History of the Aids Crisis in Central Africa

In 1893 Father Luc Gillet, head of the botanical garden of Kisantu in Belgian Congo, brought back from Antwerp some seedlings of water hyacinths, a beautiful pale purple flower of South American origin (*Eichhornia crassipes*). The flower was growing very well in the ponds of the garden, and Gillet decided to throw some in the Inkisi river, a tributary of the Congo river, to “decorate the river,” as he put it.⁶ Other enthusiastic Belgian gardeners followed his example and from 1910 planted hyacinths in their garden ponds in Léopoldville, Kinsangani and Yagambi. Very rapidly the hyacinths did what they knew best

4 Anne Lamott, *Bird by Bird: Some Instructions on Writing and Life* (New York, 1995).

5 Nancy Hunt, “An Acoustic Register, Tenacious Images, and Congolese Scenes of Rape and Repetition,” *Cultural Anthropology*, 23 (2008): 220–253, at 243.

6 Jeremiah Mutio Kitunda, *A History of the Water Hyacinth in Africa: The Flower of Life and Death from 1800 to the Present* (Lanham, MD, 2018), 170.

– they are among the most invasive plants on earth. Their ecological and social history in Africa has been retraced in an extraordinary book by historian Jeremiah Mutio Kitunda, from whom I borrow this story.⁷ The floating flowers invaded rivers and their banks, upstream and downstream, to the whole Congo basin, towards Cameroon and Ubangui Shari. In 1955, navigation on Congo river between Stanleyville and Leopoldville – the crucial economic corridor of Belgian Congo – was all but blocked. The crisis led colonial services to spray herbicide along the river – which only made the problem worse, with dead plants accelerating the deoxygenation of the water. The Belgian authorities created, as colonial powers do when they face trouble, an Inquiry commission: the “Mission DEC,” which stands for *Mission Destruction de l’Eichhornia Crassipes*, aiming “to destroy everything within six months”. In the whole colony of Congo, posters were hung on the walls, asking anybody who saw the plant to destroy it and to signal it immediately to the authorities. But as anthropologist Kristin Geenen and historian Jean Samba have found, the reaction of the Congolese population was unexpected.⁸ People found the flower beautiful, and called it “*Congo Ya Sika*,” which means “New Congo.” They took the invasion as a sign of the beginning of the end for the Belgian colonizers, heralding a time of prosperity, freedom and health to come, the end of Empire. The very fact that it made the Belgians nervous, that they hunted it, and that they guarded the pile of hyacinths they had collected and isolated, made it more attractive – it wasn’t clear, in the eyes of the Congolese, whether this was a criminal specimen or a welcome dignitary. Still the hyacinth continued its march towards the East and the Great Lakes, often via other botanical gardens and well-meaning horticulturalists. It arrived in Lake Victoria in 1989, when it was first spotted in the estuary of the Kagera river, a late arrival possibly linked to changes in human activities and pollution with nitrates and phosphates. These nutrients had by now made the immense lake fertile for proliferation, where the hyacinth had not found conditions for long-term establishment after its (likely) previous introductions. The invasion was massive and reached Kisumu, on the Kenyan shore, in March 1990. People in Kisumu were initially struck by its beauty and called it *Amosi*, which means “I greet you, welcome.” But the hyacinth invaded the whole gulf of Kisumu, and rapidly made fishing

7 Ibid.

8 Kristien Geenen, “How the People of Butembo (RDC) Were Chosen to Embody ‘the New Congo’: Or What the Appearance of a Poster in a City’s Public Places Can Teach about Its Social Tissue: The Chosen People of Butembo and ‘the New Congo,’” *International Journal of Urban and Regional Research*, 36 (2012): 448–461 <<https://doi.org/10.1111/ij.1468-2427.2011.01084.x>>; Jean Samba, *L’émergence de la conscience nationale congolaise dans les années 50: la symbolique des congo-ya-sika* (Paris, 2018).

and trading difficult, leading to a landscape of devastation, with boats and people getting hopelessly enmeshed by the weed. The plant was renamed *Ayaki*, the Luo name for HIV-Aids.⁹

Ayaki, Aids: I have made this long detour, to evoke another ecological history that happened at the same moment, along the same routes: the emergence of HIV-Aids. The consensus scenario for the spread of HIV-1 M (the main pandemic virus) in the region also began in the Western Congo basin (the site of cross-species transmission of HIV ancestors from chimpanzees), with the virus spreading along riverways, upstream towards Stanleyville in the 1950s – just like the hyacinths – and then towards the Great Lakes.¹⁰ In early 1982, a new disease, locally know as Slim, was detected in the Lake Victoria region among young men and women living near the aforementioned estuary of the Kagera river. One thing all of those afflicted with the disease had in common was having worked in the landing sites of Lukunyu and Kasensero, two boom towns busy with fisheries and trading.¹¹ Ugandan doctors soon confirmed a very high prevalence of the virus then known as HTLV-III (later HIV-1).¹² The virus spread to the hinterland, especially to the Rakai district, and to the rest of the region. In Kisumu, across the lake, the epidemic exploded at the same time of the hyacinth invasion, and reached proportions unseen in other parts of the world, with up to 30 or 40% of the adult population carrying HIV. Anthropologists Ruth Prince and Wenzel Geissler have described in their ethnographic work the sense of “profound crisis and loss” experienced in 1990s Luoland.¹³ It was a time of “confusion”: a time when the lake was hardly navigable, when most state institutions ceased to function properly because of structural adjustment plans, when “young adults die before they are married or even before they have had children, and children are orphaned and left with relatives, old people, or to care for themselves”; “when ‘Growth’ in the sense of ordered generational sequence can no longer be taken for granted.”¹⁴ Prince and Geissler insist on not collapsing the moment under one single epochal

9 Kitunda, *History of the Water Hyacinth in Africa*, 89.

10 Nuno R. Faria et al., “The Early Spread and Epidemic Ignition of HIV-1 in Human Populations,” *Science*, 346 (2014): 56–61 <<https://doi.org/10.1126/science.1256739>>. For broader perspectives, see also: John Iliffe, *The African AIDS Epidemic: A History* (Oxford, 2006); Jacques Pepin, *The Origins of AIDS* (Cambridge, 2011).

11 Ed Hooper, *Slim: A Reporter's Own Story of AIDS in East Africa* (London, 1990).

12 D. Serwadda et al., “Slim Disease: A New Disease in Uganda and its Association with HTLV-III Infection,” *The Lancet*, 326 (1985): 849–852 <[https://doi.org/10.1016/S0140-6736\(85\)90122-9](https://doi.org/10.1016/S0140-6736(85)90122-9)>.

13 Wenzel Geissler and Ruth Jane Prince, *The Land is Dying: Contingency, Creativity and Conflict in Western Kenya* (New York, 2010), 2.

14 *Ibid.*, 6.

marker – be it “Aids” or “neoliberal”; rather they listen to people’s much richer depictions and narratives of their disarray, to the ways in which they link intimate experiences, historical comparisons, and ecological clues, to diagnose a time of loss and anomia, a time of hyacinths and HIV, in both of which people were getting “stuck”.¹⁵

This tale of a flower named after a virus – or is this the other way around? – does three important things for us. It suggests a place to start, if we want to intensify the conversation between histories of health and medicine and environmental humanities, a place that several of us have begun exploring recently: *landscapes*.¹⁶ In this context, landscapes are to be understood as multi-specific ecological configurations, as multilayered spaces shaped by the sedimentation of time, history and crises, but also as aesthetical projections, repositories of signs, traces and meanings left, perceived and interpreted by multiple beings, including non-human beings. The tale, briefly sketched here, is also a reminder that we still need an environmental history of the HIV-Aids pandemic, and that it is possible and important to bring HIV-Aids within the frame of planetary health, not only as a narrowly political, social and human disease of behaviors, culture and biomedicine, but also as a product and symptom of environmental, technological and infrastructural “more than human” transformations.

Secondly, the tale of the hyacinth is one of ambivalence and polysemy, combining decay, rottenness, and diseases of bodies and water with arresting natural splendor and messianic expectations of a new, free, Congo. I like it for that reason, as it reminds us once more that our histories of epidemics, from the plague to COVID-19, should not be collapsed under catastrophist clichés of panic and flight, but should also attend to lives, humor, anger and invention as well as to people’s capacity to notice and name the world.¹⁷ Our histories should attend to “all the beauty and the bloodshed,” evoking here the title of

¹⁵ Ibid., 7.

¹⁶ Gregg Mitman, Michelle Murphy and Christopher Sellers, “Introduction: A Cloud over History,” in *Landscapes of Exposure: Knowledge and Illness in Modern Environments, Osiris*, 19 (2004): 1–17; Gregg Mitman, *Breathing Space: How Allergies Shape Our Lives and Landscapes* (New Haven, CT–London, 2007); Christopher Sellers, “To Place or Not to Place: Toward an Environmental History of Modern Medicine,” *Bulletin of the History of Medicine*, 92 (2018): 1–45 <<https://doi.org/10.1353/bhm.2018.0000>>; Richard Keller, “Environment,” in *A Cultural History of Medicine*, ed. Roger Cooter (London–New York, 2021); Linda Lorraine Nash, *Inescapable Ecologies: A History of Environment, Disease, and Knowledge* (Berkeley, CA, 2006).

¹⁷ Guillaume Lachenal and Gaëtan Thomas, “Epidemics Have Lost the Plot,” *Bulletin of the History of Medicine*, 94 (2020): 670–689 <<https://doi.org/10.1353/bhm.2020.0089>>.

Laura Poitras's and Nan Goldin's superb recent film about sorrow, creation and love among the ruins of an iatrogenic disaster.¹⁸

And thirdly, the tale of the hyacinth suggests that we treat the landscape not as an archive, where one can read, from a panoramic viewpoint, the passage of history and explain it, but as an enigma: as a question that calls for more questions, as something in need of form and signification, as something that “sets in motion,” to use the words of Vinciane Despret.¹⁹ The hyacinth-HIV enmeshed historical trajectories are not about mere coincidence (it is not a coincidence that ecological changes in the Lake Victoria region intervened at the moment of the Aids epidemic); nor are they about causation (the hyacinth invasion did not cause the spread of Aids). Rather, they are about *indication* – the biological invasion can be seen as a sign of the epidemic, and vice versa, as clues to a common enigma. A method, a regime of attention is suggested here, which –to borrow from Anna Tsing and many others in the environmental humanities– is akin to bioindication.²⁰ The flower is an *indicator species* not only of nutrient cycles and ecological change in the Lake Victoria, but of a broader, pathogenic transformation of environments, governments and policies in the 1990s. A plant, or a virus, can capture and manifest a political-ecological configuration quicker, with more wit, than social scientists – or at least point towards its enigmatic presence, telling us where to look.²¹ This may be the way to proceed: to provisionally leave aside historical causation, and follow those signs, indices and traces and figure out what kind of shapes and lines they draw in the landscapes, what connections they establish, and the ways in which they lead to the history of health and medicine.

3 Molecular Phylogeny as an Art of Tracing

I now move to other central African landscapes, more familiar for me: the roads, dispensaries, hospitals and forests of central and south-east Cameroon, where for the last 20 years I have conducted research on past, present and future pandemics, trying to bridge histories of colonial medicine and decolonization with ethnographies of contemporary global health.²² I would like to revisit

18 *All the beauty and the bloodshed* (documentary film, 2022).

19 Vinciane Despret, “Enquêteur auprès des morts,” *L'Homme*, 230 (2019): 5–26, at 8 <<https://doi.org/10.4000/lhomme.33844>>.

20 Anna Tsing, “Unruly Edges: Mushrooms as Companion Species,” *Environmental Humanities*, 1 (2012): 141–154 <<https://doi.org/10.1215/22011919-3610012>>.

21 On political bioindication, see Léna Balaud and Antoine Chopot, *Nous ne sommes pas seuls: politique des soulèvements terrestres*, Anthropocène (Paris, 2021).

22 Guillaume Lachenal, *The Doctor Who Would Be King*, transl. Cheryl Lynn Smeall, Theory in Forms (Durham, NC–London, 2022).

it with the method sketched above: with the help of molecular phylogeny, looking at viruses as political bioindicators, as traces of undescribed medical and environmental histories and crises. Cameroon is especially well-suited for this investigation: since the early 1990s it has become a central terrain for virological studies of HIV, with several high-profile discoveries leading to major progress in the understanding of the evolutionary history of the virus.²³ A discussion of the social history, ethics and coloniality of virus hunting in Cameroon would be important here, but for the time being, I would like to leave it aside, and engage directly with the stories that viruses can tell.

Molecular phylogeny, which means (when applied to epidemiology) the use of genetic sequences of pathogens to build evolutionary trees and reconstruct epidemic histories, has amply demonstrated its potential to help follow and understand the spread of pathogens in time and space. After three years of Sars-Cov2 pandemic, the world is familiar (perhaps unknowingly) with the language and tools of molecular phylogeny – trees, branches, sequence databases such as GISAID, and, of course, the infamous “variants” such as Delta or Omicron. As is well known in our field, the use of genetic sequences has provided revolutionary and controversial insights into the history of disease, from typhoid in the Neolithic to the great plague, to Ebola in West Africa.²⁴ Such progresses are linked to technical revolutions in sequencing technologies and ancient DNA study, as well as to the development of a community of researchers/developers strongly attached to the open and fair sharing of data and analytic tools. Seen from the history of medicine and medical anthropology, such a molecular turn in the history of epidemics and epidemiology has either been met with positivist enthusiasm or more often with distant, not always hostile, interest, in the form of defensive criticisms or of ethnographic curiosity. The work of Richard McKay on the history of HIV’s “patient zero” in the USA is an inspiring example, which combines social and molecular inquiries.²⁵ In this line, I would like to argue for a more generous, playful and collective engagement with molecular phylogeny, not only as a rival field to criticize or as an object of ethnographic, STS-style, descriptions. What if we worked *with* molecular phylogeny? – that is, not only as a source of data and dates that can *solve* puzzles (as virologists often claim) and close

23 Guillaume Lachenal, “Lessons in medical nihilism: Virus hunters, neoliberalism and the AIDS crisis in Cameroon,” in *Para-States and Medical Science: Making African Global Health*, ed. P. Wenzel Geissler (Durham, NC, 2015), 103–141.

24 Kyle Harper, *Plagues Upon the Earth: Disease and the Course of Human History* (Princeton, NJ, 2021).

25 Richard Andrew McKay, *Patient zero and the making of the AIDS epidemic* (Chicago, IL, 2017).

down long-running debates about the origin of syphilis or the nature of the 1890 Russian flu.²⁶ If we engage with it closely enough, molecular phylogeny can rather be seen as a way to *open up*. Genetic sequences are traces, remnants of pathogens; they may bring out something not yet articulated, imagined and named, about them and our world; something that is in need of signification and inquiry. In that respect, my perspective – molecular phylogeny as an art of tracing – is analogous to the “archaeology of the present” perspective theorized by Laurent Olivier: the traces found by archaeological excavations are part of the present, of its matter itself; they “bring out the part of the unknown, or the unrepresented, that is ingrained in the reality of our world.”²⁷ It is not by accident that phylogeneticist Michael Worobey sometimes describes his work as “molecular archeology.” Archaeological traces do not settle or solve anything but add questions to our investigations of the past and of the world, questions that we were often not able to even articulate. Such use of traces also echoes what anthropologist Amade Mcharek describes as “forensics” in her work on the material traces of migration on twenty-first century North African shores. Mcharek suggests broadening the “notion of forensics from an art of bringing evidence in front of the forum – such as the singular event of a court case with its promise of closure – to *an art of paying attention*, where the past and future of traces are open and where there are endless traces that could invite attention and produce multiple accounts of reality, multiple accounts of what happened.”²⁸ In a recent review of the burgeoning “anthropology of modern traces,” Wenzel Geissler summarized these common patterns as an emerging approach – tracing – bridging ethnography, STS, archeology and history. “Rather than understanding tracing as ‘backtracking’ into the past, to

26 For references preceding the COVID-19 pandemic and subsequent analysis of molecular epidemiology, see Vinh-Kim Nguyen, “Viral Speed: Infrastructure, Connectivity, Ontogeny; or, Notes on the Molecular Epidemiology of Epidemics,” *Cultural Anthropology*, 32 (2017): 28–34 <<https://doi.org/10.14506/ca32.1.04>>; Theresa MacPhail, *The Viral Network: A pathography of the H1N1 influenza pandemic* (Ithaca, NY, 2014); Frédéric Keck, “Compter les virus, observer les oiseaux: Des bases de données pour la grippe aviaire,” *Revue d’anthropologie des connaissances*, 7 (2013): 857 <<https://doi.org/10.3917/rac.021.0857>>; Lyle Fearnley, *Virulent Zones: Animal Disease and Global Health at China’s Pandemic Epicenter* (Durham, NC, 2020); Tamara Giles-Vernick et al., “Social history, biology and the emergence of HIV in colonial Africa,” *Journal of African History*, 54 (2013): 11–30.

27 Laurent Olivier, “Des vestiges” (Mémoire présenté pour l’obtention de l’Habilitation à diriger des Recherches) (Université Paris I, 2004), 12; see also idem, *Le sombre abîme du temps: mémoire et archéologie* (Paris, 2008).

28 Amade Mcharek, “Beach Encounters: Migrant Death and Forensics as an Art of Paying Attention,” in *Research Handbook on Irregular Migration*, ed. Ilse van Liempt, Joris Schapendonk and Amalia Esmeralda Campos Delgado (Cheltenham–Northampton, MA, 2023), 81–94.

reconstruct or explain origins, I prefer thinking of it,” Geissler writes, “as an open-ended and often erratic forward movement, progressing along with and among, losing and rediscovering, ultimately evasive traces.”²⁹ In that sense, I argue for the use of molecular phylogeny as an art of tracing, as a way to delineate the human and more-than-human “unimagined communities”³⁰ that give epidemics their contours.

4 Tracing Epidemics in the African Anthropocene: HIV and HCV in Cameroon

The phylogenetic study of Cameroonian viruses led to the formulation of an intriguing enigma. The gradual building (over two decades of international research) of an extended phylogenetic tree of the HIV family demonstrated that HIV-1 M, the main group of pandemic viruses (which likely caused more than 90% of all time HIV infections), emerged following a cross-species transmission of a simian immunodeficiency virus (SIV) circulating among chimpanzee populations of south-eastern Cameroon. It also showed that the family of HIV-1 viruses is related to not just one “successful” event of emergence, but more likely four, all of them happening independently in southern and central Cameroon, leading to the HIV-1 group O epidemic, likely following a cross species transmission from gorilla SIVs, and to the establishment in the human species (at very low prevalence levels, just above the threshold of detection) of HIV-1 N and HIV-1 P, also from chimpanzees and gorillas, respectively.³¹ Phylogenies also allowed the dating of these epidemic beginnings, based on the molecular clock principle. Note that such dating consists of inferring the past through regression from observations made *in the present* (with a substantial, but limited, temporal depth). The extrapolation of mutation rates observed over now several decades make such dating rather reliable with HIV. In the case of the four HIV-1 viruses, they point to the early to mid-twentieth century – a rather specific time-space window. That is the

29 Paul Wenzel Geissler, “Anthropology of Modern Traces,” in *Oxford Research Encyclopedia of Anthropology*, ed. Paul Wenzel Geissler (Oxford, 2023), 5 <<https://doi.org/10.1093/acrefore/9780190854584.013.197>>.

30 Robert J. Thornton, *Unimagined Community: Sex, Networks, and AIDS in Uganda and South Africa* (Berkeley, CA, 2008).

31 For an extended version of this discussion, see: Guillaume Lachenal, “The Cameroonian puzzle: Historical and Virological Aspects of the Emergence of HIV-1 Groups O, N, and P,” in *The histories of HIVs: the emergence of the multiple viruses that caused the AIDS epidemics*, ed. William H. Schneider (Athens, OH, 2021), 172–194.

enigma: what happened in Cameroon? Which conditions – including human-apes contacts, social infrastructures and sexual networks – enabled the emergence of HIV in human populations – and not earlier and not later and not elsewhere?

This is where my collaborative research enters the conversation. It began with an exercise in epidemiology, about a pathogen very much linked to the history of HIV: the hepatitis C virus (HCV). HCV was discovered in the wake of HIV in the late 1980s, although the virus has circulated in human populations for centuries. It is exclusively transmitted by blood and is one of the major causes of liver cancer globally; as is well known, it provoked major epidemics among intravenous drug users. In 2003, while I was conducting my doctoral research at the Centre Pasteur du Cameroon – I was the official historian of this large research laboratory – the local virologists (whom I interviewed several times for my institutional oral history) came to me with a question. They were exploring their large biobank for a multi-site HCV seroprevalence study. They found that HCV in Cameroon showed a strange profile: the virus heavily infected people aged more than 40 at the time, with strong differences between ethnic groups and regions. More than this, because the regions had been sampled at different times, it was possible to link the prevalence not with age, but with dates of birth: the people born before 1960 were the most infected sub-population. That was a crucial move, the eureka moment: the steep increase in prevalence with age was not produced by a social structure of transmission operating in a perpetual epidemiological present (seroprevalence increasing with age is a classic aspect of many chronic infections, since the risk of acquisition accumulates with time). Rather it was the product of an individual historical event which produced a so-called “cohort-effect.” In other words, HCV could be seen as a biological scar of history.³²

To further investigate this, our group – in which I played the modest role of the historian, and which interestingly did not include a single medical doctor – turned towards sequencing and phylogeny. In addition to building trees and timing emergence, we used another set of tools, developed since the late 1990s by computational biologists. Their main objective was to include in the phylogenetic analyses complex parameters such as the demographic history of the population studied, variations in mutations rates or geography. Such analyses, which form the basis of the sub-field of phylodynamics, rely on complex computational algorithms based on Bayesian inference; one of their key interests, when applied to pathogens, is that they allow a reconstitution

32 E. Nerrienet et al., “Hepatitis C virus infection in Cameroon: a cohort-effect,” *J Med Virol*, 76 (2005): 208–214.

of epidemic histories – one of the first demonstrations of the method, incidentally, was based on a study of HCV in Egypt by Oliver Pybus and his colleagues.³³ In Cameroon, the Bayesian coalescent analysis of HCV genomes sampled in the country pointed to a period of exponential growth of the HCV population between 1920 and 1960, which indicates the existence of a very efficient mode of transmission during this time window.³⁴ We conducted the same kind of Bayesian coalescence analysis with the Cameroonian virus HIV-1 O, and found a similar profile, indicating that this local strain of HIV benefited from the same ecological conditions, with transmission especially intense in the 1950s.³⁵

Our hypothesis was that this period of exponential growth corresponded to exposure to iatrogenic transmission (from *iatros*, doctor), in the context of invasive medical procedures during colonial public health campaigns. Such widescale iatrogenic transmission of HCV had recently been demonstrated in the case of Egypt, where anti-schistosomiasis campaigns involving intravenous injections conducted in the 1960s and 1970 massively transmitted the virus, especially in Lower Egypt.³⁶ The iatrogenic route (esp. the role of non-sterile injections) was also increasingly discussed in the case of HIV-Aids emergence.³⁷ In the case of Cameroon, three elements contributed to a risky configuration. First, Cameroon, like the rest of Central Africa in the early twentieth century, experienced a major epidemic of sleeping sickness (trypanosomiasis), itself a symptom and a cause of a deeper demographic and ecological crisis associated with the rubber boom. As colonial doctors noted, the rubber economy – from the Belgian Congo to Cameroon – fueled the spread of trypanosomiasis. It meant caravans of porters, intense fluvial trade and wild-rubber gatherers

33 O. G. Pybus et al., “The epidemiology and iatrogenic transmission of hepatitis C virus in Egypt: a Bayesian coalescent approach,” *Mol Biol Evol*, 20 (2003): 381–387.

34 R. Njoum et al., “The hepatitis C virus epidemic in Cameroon: genetic evidence for rapid transmission between 1920 and 1960,” *Infect Genet Evol*, 7 (2007): 361–367.

35 M. Leoz et al., “The Two-Phase Emergence of Non Pandemic HIV-1 Group O in Cameroon,” *PLoS Pathog*, 11 (2015): e1005029 <<https://doi.org/10.1371/journal.ppat.1005029>>.

36 C. Frank et al., “The role of parenteral antischistosomal therapy in the spread of hepatitis C virus in Egypt,” *Lancet*, 355 (2000): 887–891.

37 Early discussions of that aspect of HIV-Aids include: David Gisselquist et al., “Let It Be Sexual: How Health Care Transmission of AIDS in Africa Was Ignored,” *International Journal of STD & AIDS*, 14 (2003): 148–161 <<https://doi.org/10.1258/095646203762869151>>; Amit Chitnis, Diana Rawls and Jim Moore, “Origin of HIV Type 1 in Colonial French Equatorial Africa?” *AIDS Research and Human Retroviruses*, 16 (2000): 5–8 <<https://doi.org/10.1089/088922200309548>>; Ernest Drucker, Phillip G Alcabes and Preston A Marx, “The Injection Century: Massive Unsterile Injections and the Emergence of Human Pathogens,” *The Lancet*, 358 (2001): 1989–1992 <[https://doi.org/10.1016/S0140-6736\(01\)06967-7](https://doi.org/10.1016/S0140-6736(01)06967-7)>.

strolling through forests and river galleries, in other words a dangerous combination of population movement and exposure to the tse-tse flies that transmit the disease.

Secondly, Cameroon became an exceptional colony in the French Empire, because of its status as a League of Nations mandate, where the French “civilizing effort” was placed under international supervision and had to be carefully reported to Geneva.³⁸ The comparison with Germany, the ruling power in Cameroon until WWI, was a strong motive to intensify medical efforts in the 1920 and 1930s, as the German colonial lobby accused the French of inaction against tropical diseases and demographic collapse. The French colonial government spent considerable energy and money on medical infrastructure in Cameroon (much more than in neighboring colonies) and especially on mass medical campaigns against trypanosomiasis, which reached dramatic proportions in the 1920s. The campaigns against trypanosomiasis involved millions of patients, screened and treated for the disease by mobile teams but also through that process exposed to several invasive medical procedures, including repeated series of injections. These campaigns peaked in the 1950s, during which they also included the screening and treatment of yaws, syphilis, leprosy and tuberculosis, under the umbrella of “mobile hygiene campaigns.” They were gradually abandoned after 1960.

And thirdly, we know from the study of medical accidents during these campaigns, and especially from the terrible accidents which occurred during the campaigns of pentamidine prophylaxis after WWII, that the practical conditions of the campaigns, in retrospect, were at high risk of transmission of viruses. They involved injections repeated at high cadency; needles, syringes and drug containers were systematically reused; the programs had very ambitious aims in terms of coverage and repetition of campaigns, but had limited means, which led to the on-field adaptation – an euphemism – of official technical and ethical guidelines.³⁹ It is thus reasonable to hypothesize, as we did with the Pasteur epidemiologists, that people born in Cameroon before 1960 had been exposed to a series of invasive medical procedures, than can explain the massive transmission of HCV in the population – and that could explain the unique place of Cameroon on the map of HIV-Aids emergence, as Jacques Pépin suggested later.⁴⁰

38 Guillaume Lachenal, “Médecine, comparaisons et échanges inter-impériaux dans le mandat Camerounais: une histoire croisée franco-allemande de la mission Jamot,” *Bulletin Canadien d’Histoire de la Médecine*, 30 (2013): 23–45.

39 Guillaume Lachenal, *The Lomidine Files: The Untold Story of a Medical Disaster in Colonial Africa*, transl. Noémi Tousignant (Baltimore, MD, 2017).

40 Pépin, *Origins of AIDS*.

As a test of this hypothesis, we used the data gathered during a nation-wide Demographic Health Survey conducted in 2011. DHS surveys are a major tool of epidemiological surveillance in most African countries, and assemble a geocoded, nationally representative database combining questionnaires and blood samples. The Pasteur virologists screened the 14,000 samples for serological traces of HCV infection. With Jacques Pépin, I was in charge of going back to my archives of colonial medicine in Cameroon, to compile spatialized indicators of medicalization during the colonial period. What we found was, as expected, a high prevalence of the infection among people born before 1960, with strong regional differences (and, fortunately, no sustained transmission among younger cohorts, demonstrating that the health system of today's Cameroon, in spite of major infrastructural issues, is good at preventing iatrogenic transmission of blood-borne viruses). The spatial analysis showed that the people who grew up in regions with a dense network of medical infrastructure, because they were strongholds of missionary medicine or zones considered "useful" by the French colonial state, including most of the sleeping sickness endemic areas, were significantly more infected with HCV than the others. Importantly, the map of HCV prevalence did not follow a classic North–South gradient, which could then indicate vectorial transmission or other interferences with ecological factors. The Western region of Cameroon, in that respect, offered a striking "natural" experiment: the English-speaking region, where almost no HCV was found in our sample, was not part of French Cameroon during the colonial period; briefly stated, it was administrated by British authorities as a peripheral informal region of Nigeria, and it did not benefit from the French public health system. By contrast with the region just across the frontier (which has a similar highland ecology, and similar very high population density), it was spared massive HCV transmission. In brief, the study confirmed the link between past exposure to medicine and the present-day circulation of HCV.⁴¹

A significant body of evidence thus suggests an important iatrogenic component in the epidemic emergence of HIVs in colonial Cameroon, with HCV serving as a marker – a bioindicator, if you will – of medicalization and its risks. But I would rather not present this contribution as one more "virus detective" story (with dramatic background music), or as anything close to having "solved the puzzle of HIV origins."⁴² First, there is no scoop: this research

41 R. Njouom et al., "The Burden of Hepatitis C Virus in Cameroon: Spatial Epidemiology and Historical Perspective," *Journal of Viral Hepatitis*, 25 (2018): 959–968 <<https://doi.org/10.1111/jvh.12894>>.

42 Guillaume Lachenal, "La quête des origines du Sida (recension de Jacques Pépin, *The Origins of Aids*)," *La vie des idées* (17 October 2014) <www.laviedesidees.fr/La-quete-des-origines-du-Sida.html>.

took part in a much larger set of studies on the emergence of HIV, which have brought substantial evidence on the role of iatrogenic amplification in other contexts, especially in the city of Kinshasa, where HIV-1 M, imported from Cameroon before WWII, became epidemic through loops of sexual and medical transmission during the late colonial period, before its export to the rest of the world from the 1960s. More importantly, this scenario suggests a most-needed correction to the standard narratives of HIV emergence that served as pandemic preparedness commonsense.⁴³ Such narratives describe the emergence of Aids as being the result of an original transgression – Africans eating apes – and of global interconnections. This binary narrative, though not very subtle, was powerful, as it contained an implicit *warning* – nature conservation was a matter of global health security –, an implicit *condemnation* – of African “traditional” practices and of the opening of borders –, and an implicit *solution* – savvy systems of surveillance and eventually coercive border control.

Our narrative draws a different picture, and does so without this “politics of disgust” to use Mike McGovern’s terms.⁴⁴ A large range of research has indeed suggested that cross-species transmission itself (infective contact with great apes through blood exposure) is a relatively frequent event (counting HIV-1 and HIV-2, it happened not fewer than 10 times independently in the twentieth century, across West and Central Africa) and that it had not been a unique factor for HIV epidemic emergence, in spite of the initial obsessions among virologists with “exceptional” stories of contact through medical research, vaccine experimentation, etc. Our Cameroonian scenario shifts attention towards ecological conditions of spread, and relates them to broader historical and environmental conditions. It makes HIV appear as a quite *banal* event of disease emergence, as one biological aspect of an African Anthropocene, a condition it shares with many other pathogens and invasive species, including the water hyacinth, rinderpest virus or HCV, to name a few, which all took a ride on the infrastructures and environments of colonialism – and on the ‘intentionally inattentive’ colonial ways of dealing with other beings, as Anna Tsing put it.⁴⁵ In other words, we need to understand HIV in a wider colonial multi-species historical ecology: such a constellation included not only HIVs, their simian ancestors and their hosts, HCV, and the required medical infrastructure of parenteral transmission – dispensaries, mobile teams

43 Lachenal, “Lessons in medical nihilism.”

44 Mike McGovern, “Bushmeat and the Politics of Disgust” (blog), *Society for cultural anthropology. Hot Spots, Fieldsights* (7 October 2014) <<https://culanth.org/fieldsights/bushmeat-and-the-politics-of-disgust>>, accessed 16 October 2024.

45 Anna Tsing, “The new wild,” *The Clearing* (6 December 2018) <www.littletoller.co.uk/the-clearing/the-new-wild-by-anna-tsing/>, accessed 16 October 2024.

syringes, injectable drugs, diagnostic tools, and, of course, trypanosomes and other microbes and parasites. It also involved an enmeshment of tse-tse flies, of the shadowy shrubs they inhabit, and of all the beings, spaces, histories and relations – roads, rivers, plantations, rubber markets, porters, etc. – upon which they depended, which is exactly what French geographer Maximilien Sorre (an under-rated precursor of scholars on planetary health⁴⁶) described in the 1930s as the “pathogen complex” of African sleeping sickness, in an early piece of ecological relational thinking about human disease.⁴⁷

What matters in our exploration of HIV emergence in Central Africa is not the final argument, but what happened along the way, as we were observing and following viral phylogenies: the kind of relations that the viruses traced and helped us notice, linking *Landolphia* rubber vines, *glossinia* flies and landscapes of colonial extraction and care. To think with viruses, as we learned of Pasteur through Latour, is not a reduction; it is a way to make the world “richer.”⁴⁸ What matters are the questions that such interdisciplinary wanderings allow us to imagine; and the questions these questions raise, questions that were not thinkable with only textual sources. As archeological traces often do, HCV, in its own self-interested ways, records through its genetic sequences a material history of medicine that is otherwise inaccessible: the minute gestures of drug preparation and injection, the stress, the boredom, the fear, and the heat of a banal colonial medical campaign.

5 Ruderal Epidemics and Landscapes in East Cameroon

HIV and HCV are unexceptional ruins of Empire; or seen from their own viral perspective, they consist in their own biological interpretations of medicalization, colonial hubris and imperial environmental ruination. They invite a deeper reflection on the *ruderal*. The word, derived from the Latin *rudus* for rubble, comes from botany. Since Linneaus, a ruderal plant is defined as one that thrives on newly disturbed milieus, naked earth, piles of stones, scree slopes typically, and, of course, ruins. If ruderality is a specific condition of life among rubble, then HIV and HCV can be seen as ruderal epidemics. Following Rebecca Stoetzer, we can treat ruderality as an analytic, as way of

46 For an English-language genealogy, see Warwick Anderson and James Dunk, “Planetary Health Histories: Toward New Ecologies of Epidemiology?” *Isis*, 113 (2022): 767–788 <<https://doi.org/10.1086/722308>>.

47 Maximilien Sorre, *Les fondements biologiques de la géographie humaine. Essai d'une écologie de l'homme* (Paris, 1943).

48 Bruno Latour, *Les microbes guerre et paix suivi de Irréductions* (Paris, 1984), 161.

directing our attention, of noticing a pattern in the landscapes and in our medical histories. Such a ruderal analytic, writes Stoetzer, examines how “the ruinous effects of capitalism, racism, and nation-making become embodied in human–environment relations, beyond the boundaries of the human skin, in often unpredictable ways.”⁴⁹ The paths taken by the hyacinths and by HIV are about “how people, plants, animals, and their environments connect and get entangled in modes of capital accumulation, in projects of nation-making, and in environmental destruction – and how they traverse them.”⁵⁰ There is more to this ruderal heuristic that transposing to ecology and epidemiology the fascination for ruins and debris that has marked a vast anthropological scholarship recently.⁵¹ Quite the contrary, ruderal is a precious word precisely because it designates a way to look at the world, more than being a fascinating or arresting property of the world. One early and beautiful example of this careful relation to life in the ruins is the famous botanical inventory of the Parisian ruins of La Commune, by botanist Joseph Vallot, who carefully herborized among the ruins of Le conseil d'état, on Paris's left bank, a decade after it was burned down during the uprisings.⁵² Of course, the images of invasive “chinese” *ailanthus* trees making their ways in the rubble are beautiful and telling in themselves of a world history of botanical transfers, Empire and capitalism, but the distance brought by naturalist writing and inventory introduces a reflexivity and a tact that neutralizes the clichéd aspect of “ruin lust” – that had a long career ahead. Rubble, then, is the place to start.

With the artist and historian John Manton and with the historian Joseph Owona Ntsama, we tried to deploy such ruderal sensitivity to the landscapes of East Cameroon during a long-running ethnographic and historical study that aimed to *trace* the memories of epidemics, medical research and public health around the hospital of Ayos.⁵³ Located along the river Nyong, Ayos was at the epicenter of the sleeping sickness epidemic in Cameroon (and is close to several sites of HIV emergence). It became the headquarters of the colonial sleeping sickness missions during the German and French colonial period, and featured prominently in propaganda as the imperial capital of colonial

49 Bettina Stoetzer, “Ruderal Ecologies: Rethinking Nature, Migration, and the Urban Landscape in Berlin,” *Cultural Anthropology*, 33 (2018): 295–323, at 300 <<https://doi.org/10.14506/ca33.2.09>>.

50 Ibid.

51 Geissler, “Anthropology of Modern Traces.”

52 Joseph Vallot, *Essai sur la flore du pavé de Paris limité aux boulevards extérieurs, ou Catalogue des plantes qui croissent spontanément dans les rues et sur les quais; suivi d'une florule des ruines du Conseil d'État* (Paris, 1884).

53 For an extended presentation of the research project in Ayos, see P. Wenzel Geissler et al., *Traces of the Future: An Archeology of Medical Science in Africa* (Bristol, 2016), 62–105.

medicine, with photographers, filmmakers, writers and journalists regularly making the trip. From the 1950s, trypanosomiasis all but disappeared in the region – a success that French doctors attributed to their treatment campaigns, but that is also likely associated with the deforestation of the banks of the river Nyong (which was organized by the German sleeping sickness service before WWI), and more generally with a massive transition of the whole region to cocoa plantations, that radically changed forest ecosystems (not to mention the end of colonial violence, forced labor and displacements). The fieldwork in Ayos led us to a lively memory associated with the families of generations of nurses who worked for sleeping sickness control. They became pillars of the local hospital, founders of a genealogy of nurses, renowned nationally for their expertise, especially in surgery; they featured centrally in narratives of collective and individual “*émergence*” (the local word for development) in Ayos. But in addition to that memory inscribed in family archives and in the ruins of the buildings, we were struck by the visible presence of another epidemic: Buruli ulcer (BU).

The BU epidemic was detected in Ayos in the late 1960s. It is caused by an environmental mycobacteria, leading to skin lesions and causing severe disabilities (resulting in social exclusion). A rare and archetypically neglected tropical disease (NTD), it is limited to highly localized tropical foci (some of them linked to reservoir lakes). Ayos nurses have developed a precious expertise on the epidemiology and treatment of the disease, as the infection became endemic in the Nyong basin and as the decaying wards of the hospital gradually specialized in BU treatment (that often involved heavy surgery and skin grafts).⁵⁴ While we were there, locals pointed to us the wards of the former sleeping sickness camp reconverted for BU treatment and called them the “*Buruliserie*,” a pun that was a brutal reminder of the history of segregation and carceral logics of care in Ayos’s colonial *leproserie* (camp for leprosy patients) and *hypnoserie* (camp for sleeping sickness patients). Beyond buildings, any conversation about BU led to the landscape. The transmission of BU is still badly understood, with many vectors suspected but none firmly identified in African environments, and where complex, often contradictory, occupational risk factors are identified. The shift towards landscape epidemiology brought precious clues. A large interdisciplinary research project conducted in the

54 G. Lachenal et al., “Neglected Actors in Neglected Tropical Diseases Research: Historical Perspectives on Health Workers and Contemporary Buruli Ulcer Research in Ayos, Cameroon,” *PLoS Negl Trop Dis*, 10 (2016): e0004488 <<https://doi.org/10.1371/journal.pntd.0004488>>.

region by the Centre Pasteur du Cameroun and its Parisian collaborators showed that the risk of BU acquisition was associated spatially with landscape, and with a marked seasonality.⁵⁵ Contamination seems to occur not during rainy season, but after it, when the water recedes and when the river bed is turned into fields interspersed with residual ponds. Such attention to the landscape was new for epidemiologists, but actually featured centrally in the local narratives of the epidemic. The stories we heard echoed the ones reported by anthropologist Tamara Giles Vernick who has done extensive ethnographic research in areas close to Ayos. The local population relates the arrival of the epidemic in the 1970s (a timing that is confirmed independently by molecular phylogenies) to a series of environmental changes: the deforestation of the Nyong river bed, which was initiated as an anti tse-tse measure, and a series of droughts and bush fires in the 1980s (that they now spontaneously associate with climate warming), which definitively turned the once woody river bed (home of tse-tse flies) into a grassland. The crisis was not just epidemic and ecological, but was coproduced by political changes. The BU epidemic in the Nyong coincides with the economic crisis and structural adjustment plans of the 1980s, which led people to abandon cocoa cultivation (and state jobs) and turn towards subsistence farming and sand extraction along the river bed – the most likely environmental reservoir of bacteria. The crisis had intimate, affective dimensions as well, that people expressed in the veiled idiom of witchcraft: according to local people, Buruli, a debilitating, complex, poorly biomedicalized disease was manifesting the “end of love” among communities.⁵⁶ This was, as Giles Vernick explained, a nostalgic way to denounce the rising accusations and aggressions (some material, like theft, some invisible through witchcraft attacks) among communities in a context of economic collapse. Buruli times were times of austerity and generalized competition for land among farmers, that led them to the Nyong river bed; they were Aids times (*années sida*) too (and HIV infection is an established risk factor for severe BU). Causalities are multiple and multidirectional, but the signs are clear. In Kisumu, Kenya, Geissler and Prince report that people used

55 Jordi Landier et al., “Seasonal Patterns of Buruli Ulcer Incidence, Central Africa, 2002–2012,” *Emerging Infectious Diseases*, 21 (2015): 1414–1417 <<https://doi.org/10.3201/eid2108.141336>>.

56 T. Giles-Vernick et al., “The Puzzle of Buruli Ulcer Transmission, Ethno-Ecological History and the End of ‘Love’ in the Akonolinga District, Cameroon,” *Soc Sci Med*, 129 (2015): 20–27 <<https://doi.org/10.1016/j.socscimed.2014.03.008>>.

the same nostalgic expression to speak of Aids, hyacinth and everything that was lost in the 1990s: “there is no love these days”.⁵⁷

The changes in the Nyong landscape are not just about devastation and disease, but are also full of ambivalence. In Ayos, narratives related BU to other transformations. The epidemic of the 1970s coincided with the appearance of a large fat fish, *Heterotis niloticus*, initially named Tergal (like the synthetic fabric fashionable at that time) and later Kanga, a name that some attribute to Victor Kanga, the Minister who came to Ayos in 1969 to inaugurate the new bridge across the Nyong.⁵⁸ The Kanga fish is today considered a traditional dish in the Nyong basin and is a source of pride, exports and cultural tourism. It is actually an invasive species, that escaped its experimental ponds in the upper Nyong, where it was introduced by French colonial experts in the 1950s, and proliferated in the river from the late 1960s.⁵⁹ Kanga: a fish named modernity, whose name melancholically evokes both past moments of hope (the independence years) and future prosperity for some, who are digging large ponds along the river for pisciculture.

The ruderal landscapes of the Nyong basin – beautiful but devastated, ruined but productive, fecund but pathogenic – trace a transition from one NTD to another, from *Trypanosoma gambiense* to *Mycobacteria ulcerans*. They make tangible the superimposition of one crisis upon another, defining a link that concatenates an invasive fish, the collapse of cocoa prices, the deforestation of a river bed as part of colonial disease control, the progression of the HIV epidemic, itself nested into histories of colonial healthcare and economic hardship, and the shadow of sleeping sickness and mass death. Crises and epidemics contained one inside another, like Russian dolls.⁶⁰

I could carry on and on in this vein, precisely because what I am after is a narrative that defies closure. I am aware that the story I told is arborescent, that it functions by association and digression. This is how tracing may work, resembling a “walk along the branches” of a phylogenetic tree – a common way of thinking in phylogeny, to describe the iterative way of grasping evolutionary changes by mentally moving along the tree, node after node, down to the root

57 Geissler and Prince, *Land is Dying*, 8.

58 Joseph Parfait Owoundi, “Origine de la dénomination ‘Kanga’ de l’Hétérotis Niloticus ou Arowana du Cameroun,” *Go For Leaders* (29 May 2024) <<https://shs.hal.science/halshs-04593393>>, accessed 16 October 2024.

59 D. Depierre and J. Vivien, “Une réussite du service forestier au Cameroun. L’introduction d’*Heterotis niloticus* dans le Nyong,” *Bois et forêts des tropiques*, 173 (1977): 59–68.

60 Lachenal and Thomas, “Epidemics Have Lost the Plot.”

of the tree, deep into the past and back to the present, on a different branch – a path with endless possible combinations. Maybe life, as history, is all about digressions, and this is what we need to remember, as professional, peer-reviewed historians. And my article must end where we started. The Kanga fish also invaded the Congo river in the 1950s. Guess how it was named? *Congo Ya Sika*. Like the flower: A miracle fish for the new Congo.⁶¹

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61 Samba, *L'émergence de la conscience nationale congolaise dans les années 50*.