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Entangled Modernities and Locations of Knowledge in Amitav Ghosh's Science Novels

ABSTRACT "Modernity was not a 'virus' that spread from the West to the rest of the world," Amitav Ghosh writes in his treatise on literature and climate change, *The Great Derangement*. It is, rather, a "global and conjectural phenomenon," and what is unique about Western modernity is only "its insistence on its own uniqueness" (2016, 95). Throughout Ghosh's work, his plots unearth the disparate roots and entangled trajectories of multiple modernities. This includes Ghosh's science novels, *The Hungry Tide* and *The Calcutta Chromosome*, which demonstrate that the notion of science as a uniquely Western form of knowledge production is a colonial construction. At first glance, both novels seem to position indigenous, colonial subjects as preter- or even supernatural sources of knowledge: in *The Hungry Tide*, an illiterate fisherman's intimate understanding of river dolphins and their movements through the Sundarbans delta occasions a scientific breakthrough for the novel's cetologist heroine; and in *The Calcutta Chromosome*, a cult-like conspiracy of Indian "counter-scientists" are portrayed as the puppet masters behind Roland Ross's discovery of the transmission of malaria in colonial India. However, on closer inspection, in both novels, the positioning of colonial subjects as the Other of scientific knowledge production is subverted: *The Hungry Tide*'s illiterate fisherman is not a font of ancient local knowledge, he is a patient observer who looks at the dolphins with scientific precision; *The Calcutta Chromosome*'s shadowy conspirators are not keepers of occult knowledge but are working within and through the laboratories of colonial scientists to do their own original research. Like modernity, then, science has many roots and entangled trajectories in Ghosh's fiction.

KEYWORDS Amitav Ghosh, science, subaltern knowledge

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The Dark Hemisphere

In his most recent book, *The Nutmeg's Curse*, Amitav Ghosh combines his preoccupation with the cultural repercussions of global environmental hazards with his interest in hidden and forgotten histories of colonial violence and postcolonial modernity.[1] The history of the nutmeg—and the colonial trade in the precious spice—serves, as per the book's subtitle, as a "parable of a planet in crisis."

> Like a planet, a nutmeg too can never be seen in its entirety at one time. As with the moon, or any spherical (or quasi-spherical) object, a nutmeg has two hemispheres; when one is in the light, the other must be in darkness—for one to be seen by the human eye, the other must be hidden. (Ghosh 2021b, 10–11)

The inciting incident of the book's argument is the Dutch East India Company's violent dispossession and displacement of the indigenous people of the Banda Islands, then the single source of nutmeg, in 1621. To Ghosh, this is a paradigmatic moment for the colonial practices of extraction that have ultimately led to the current climate crisis. The hidden hemisphere of the nutmeg thus signifies the unacknowledged colonial history of the modern world. But the nutmeg subsequently also becomes an epistemological metaphor that signifies the limitations of scientific knowledge, a *pars pro toto* for a world that science alone cannot adequately understand:

> The modern gaze sees only one of the nutmeg's two hemispheres: that part of it which is *Myristica fragrans,* a subject of science and commerce. The other half eludes it because it will only manifest itself in songs and stories. And in today's stories and songs there is no place for the nutmeg; it is merely an inert object, a planet that contains no intrinsic meaning, and no properties other than those that make it a subject of science and commerce. (Ghosh 2021b, 35)

Much of Ghosh's work seeks to recover what is hidden from the modern gaze in this dark hemisphere. Many of his novels focus on the forgotten and deliberately obscured colonial histories of global capitalist modernity—the Indian Ocean slave trade in *In an Antique Land,* the teak and rubber commerce in *The Glass Palace,* or the opium trade in the Ibis trilogy. And

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throughout his work, we find instances where these histories of colonial capitalism touch the question of scientific rationality and its relationship to other forms of knowledge—from the misguided rationalist utopianism explored in *The Circle of Reason* to the globetrotting exploration of the climate crisis in *Gun Island* and his non-fiction books, *The Great Derangement* and *The Nutmeg's Curse*.

However, the metaphor of the two distinct hemispheres, evocative as it is, could also be read as a deceptive oversimplification about what kind of knowledge is located where: the light of European rationality here, the murky world of myth over there. But Ghosh himself stresses that scientific observation and modern technology are not the exclusive domains of the European metropolis; an indigenous industrial revolution in nineteenth-century South Asia, for instance, was preempted by the force of colonial armies, not by a lack of technological expertise and scientific literacy in Asia. "Modernity was not a 'virus' that spread from the West to the rest of the world," Amitav Ghosh argues in *The Great Derangement*. It is, rather, a "global and conjectural phenomenon" (2016, 95); what is unique about Western modernity is merely "its enormous intellectual commitment to the promotion of its supposed singularity" (103).

In this paper, I will focus on two of his novels that are overtly and centrally concerned with science and knowledge production: *The Hungry Tide* and *The Calcutta Chromosome*. I read both texts as science novels: rather than being an incidental part of the texts' setting, science forms a central thematic concern of both novels and a crucial part of their commentary on colonial and postcolonial modernity.[2] Both novels focus on a confrontation between a Western or Western-trained scientist with other, indigenous, forms of knowledge—that hidden hemisphere receding from the modern gaze. Here, Ghosh's metaphor is equally instructive and misleading as a way into these novels. Both texts seem to set up the encounter in oppositional terms, as confrontations of science with its others: quantifiable scientific data versus the practical, local knowledge of the indigenous informer in *The Hungry Tide*; enlightened scientific practice

2 Kirchhofer and Auguscik define science novels as texts that "variously involve scientist characters, they are set at least partly in scientific institutions or laboratories, and they present emplotments of science by integrating scientific conceptions, problems or practices into the structures of their plots" (Kirchhofer and Auguscik 2017). This kind of emplotment, Gaines, Farzin, and Haynes add, provides a "fictional space for slow, contemplative, nuanced thinking about the socially and economically contingent power of science to both illuminate and transform nature and to both mitigate and generate social change and risk" (2021, 11–12).

versus occult, gnostic mysticism in *The Calcutta Chromosome*. As Robbie Goh points out, such a dichotomy, which would cast "science as the villain of the piece and the source of oppression," is emancipatory to a degree but also problematic in that it retains colonial taxonomies of knowledge. "Therefore even discourses which seek to excoriate science and its acts of power perpetrated on racial and cultural others stand in danger of replacing and replicating those very acts" (Goh 2011, 57–58). However, a closer look at both novels shows that they proceed to subvert these structural oppositions and depict the advancement of scientific knowledge as a process deeply entangled with forces and knowledges outside the traditional purview of science. This will become especially clear once one pays attention to the location of knowledge in the novels—by which I mean both where knowledge production takes place in the diegetic world of each novel and the use of narrative perspective as the location of textual knowledge production. Opting against a conventional chronological ordering of the novels, I will first turn to *The Hungry Tide* (2005) and explore how this comparatively realist text explores the relationship between 'local,' 'indigenous' knowledge and globalized science. I will then use a critique of *The Hungry Tide* as a springboard into *The Calcutta Chromosome* (1995), which uses elements of science fiction and fantasy to imagine an inversion of the unequal exchange between indigenous knowledge and global science. While this may implicitly position *The Calcutta Chromosome* as the more open, aesthetically challenging, or politically subversive text, I will argue that *The Hungry Tide*'s position and role in Ghosh's overall body of work complicate this contrast.

Inscrutable Depths: *The Hungry Tide*

Ghosh's 2004 novel *The Hungry Tides* has become a focal point of postcolonial environmental criticism (see, for instance, Mukherjee 2010; Weik 2006) and has often been identified as a precursor of Ghosh's later, explicit engagement with climate change (see Trexler 2013; Kluwick 2020). The novel focuses on Piya, a marine biologist tasked with conducting a survey of marine mammals in the Sundarbans, a wetland area in the Bay of Bengal, on the border of India and Bangladesh, characterized by an ever-shifting landscape of estuaries and mangrove forests. On the train to the area, Piya meets Kanai, an enterprising Delhi-based translator visiting his aunt, who runs a local charity. By accident, Piya winds up alone on a small fishing boat with Fokir, an illiterate local fisherman, and his small son Tutul. Piya has Bengali parents but grew up in the US and does not

speak Bengali, so she and Fokir cannot communicate verbally. Nevertheless, Fokir is able to take Piya to a population of Irrawaddy dolphins, whose unusual behavioral patterns promise a scientific breakthrough for her. After spending a day out on the river, they return to the island of Lusibari, where Kanai's aunt Nilima runs her charity. Here, Piya organizes a second expedition to gather more data on the Irrawaddy dolphin population, this time including both Fokir and Kanai, who is to act as a translator between them. The expedition ultimately ends in tragedy when Piya and Fokir are isolated from the rest of the group and caught in a cyclone, which only Piya survives because Fokir shields her with his body from flying debris.

At first glance, the tripartite constellation of Piya, Kanai, and Fokir suggests three different locations of knowledge and, moreover, three different kinds of knowledge: a native informant who draws on experiential knowledge and a trove of local mythology that saturates the landscape with meaning and, thus, knows where to find the object of scientific interest; a translator who has the linguistic knowledge to mediate this information; and, finally, a scientist, who conducts observation and measurements to transform local reality into data that then forms the basis of scientific discourse.[3]

To this we can add the kinds of spaces that characters move in and the narratological function they fulfill: Fokir is unequivocally associated with the river as a space; "he feels out of place" anywhere else (Ghosh 2005, 133) and seems to prefer being out on the river alone to being in the company of other fishermen (84). Kanai comes to the Sundarbans from Calcutta and is part of the globalized economy—he subsequently spends most of the narrative on the island where his aunt runs a hospital and a school around which a small town has sprung up. Associated with the land, urbanity, and the globalized world, Kanai finds that "[t]his is not my element" (334) when he joins one of Piya's expeditions on the river. Piya also comes from a metropolitan background, but like Fokir, she prefers being out on the river alone. Nevertheless, Piya's trajectory over the course of the novel oscillates most between the river and the island of Lusibari. This back-and-forth between land and water mirrors a suggested romantic rivalry between Kanai and Fokir, but it also positions Piya as a mediator

3 Cf. Huttunen's reading of the character constellation: Huttunen reads Kanai as "representing the commodification of Indian languages affected by global industries," Piya as "symbolizing the suppression of Indian languages" in favor of scientific data, and Fokir as "a mediator between man and nature" who "is instrumental in making both Piya and Kanai transcend their discursive ontologies" (2012, 128).

between the human realm on land and the largely human-less, waterlogged world of the Sundarbans (Gurr 2010, 75). On the level of narrative discourse, however, the novel oscillates between Piya and Kanai, who serve as the novel's focalizers; and for most of the novel, the narrative alternates between their perspectives. Fokir, and the knowledge that he brings to the scientific process, are continuously filtered through the perspective of two outsiders to the Sundarbans community—and through the epistemologies that their perspectives are informed by.

Thus, the novel seems comprehensively organized around three characters and three different types of knowledge embodied by them (scientific, linguistic, and experiential/ecological). But Ghosh establishes this constellation only in order to later undermine its neat separation. First of all, as I have already mentioned, for its first half, the novel focuses on Piya and Fokir alone on a boat, cutting out the translator as the middleman between the scientist and her 'local informant.' And Piya and Fokir get along just fine: while their communication is perfunctory and often fraught with the possibility of misunderstanding, their collaboration in finding the population of dolphins and then exploring and measuring their habitat works surprisingly well. This is, at least in part, because Fokir breaks the mould of what one would stereotypically expect from a mere local guide or informant. As Piya explains to Kanai:

> "[B]asically that's all I do—I watch the water. Whether I see anything or not, it's all grist for the mill: all of it's data. […] For a long time nothing happens, and then there's a burst of explosive activity and it's over in seconds. Very few people can adapt themselves to that kind of rhythm—one in a million, I'd say. That's why it was so amazing to come across someone like Fokir. […] It's like he's always watching the water—even without being aware of it. I've worked with many experienced fishermen before but I've never met anyone with such an incredible instinct. It's as if he can see right into the river's heart." (Ghosh 2005, 267)

Fokir does not represent 'traditional' or 'indigenous' knowledge, nor is he 'merely' a local guide or informer; his knowledge about the river dolphins' migratory patterns is not something that he has passively acquired. Indeed, having arrived in the Sundarbans as a refugee from Bangladesh when he was still a child, Fokir is a first-generation immigrant—as are virtually all of the ostensibly 'local' characters in the novel (see Bartosch 2013, 107–8; Mukherjee 2010, 182–83). Rather than knowledge handed down through tradition, his understanding of the river dolphins' migratory pattern is the result of active observation, which the passage above explicitly compares to the specialized scientific labour Piya performs.

While the narrative thus suggests a similar aptitude for scientific observation in Piya and Fokir, it also posits a parallel between Piya and Kanai—at least in Kanai's perception:

> Minutes later she's back in position, with her binoculars fixed to her eyes, watching the water with a closeness of attention that reminded Kanai of a textual scholar poring over a yet-undeciphered manuscript: it was as though she were puzzling over a codex that had been authored by the earth itself. He had almost forgotten what it meant to look at something so ardently—an immaterial thing, not a commodity nor a convenience nor an object of erotic interest. He remembered that he too had once concentrated his mind in this way; he too had peered into the unknown as if through an eyeglass—but the vistas he had been looking at lay deep within the interior of other languages. (Ghosh 2005, 269)

Focalized through Kanai, this passage reproduces a number of clichés about science—as a disinterested, idealist pursuit; as reading the book of nature; as a penetrating gaze into the depth of things—that the novel's otherwise discerning, ethnographic look at the minutiae of Piya's research undercuts. But the passage also temporarily levels the distinction between different forms of knowledge. Piya's and Fokir's observation of the river dolphins and Kanai's study of languages are here juxtaposed as experiences of immersive curiosity beyond economic, political, or personal entanglements.

Central to the description of this experience is the metaphor of depth—Fokir looks into "the heart of the river" while Kanai explores the "interior" of languages. Indeed, the relation of depths and surfaces is both a central motif and a structuring device for the novel, but usually, depths remain hidden beneath the surface. The forest often appears as "a barrier, like a screen or a wall," obstructing visual observation (Ghosh 2005, 125). As Laura Wright notes, "the landscape confounds the ability of the human eye to oversee and compose order; the movement of the tides and the trees continually shifts the eye's relation to the land, preventing the single point perspective that is necessary for linear mapping" (Wright 521). Piya's research can be understood as an attempt to understand what is going on under the surface of the river. However, the river, like the forest, mostly remains a visually impenetrable depth. When Piya, a practised swimmer, falls into the heavily silted river, she is so disoriented that she almost drowns in the "eerily glowing murk" of the water (Ghosh 2005, 54).

It is not merely the environment that remains inscrutable: Fokir, the principal character associated with the river, similarly remains a depth unprobed. The early chapters in which Piya and Fokir are alone out on

the water in particular are full of observations of surfaces, as the narrator offers exhaustively minute descriptions of Fokir's gestures and activities, filtered through Piya's perception. Piya constantly wonders about what any particular action means and what Fokir is thinking at any given moment:

> What was he thinking about as he stared at the moonlit river? The forest, the crabs? Whatever it was, she would never know: not just because they had no language in common but because that was how it was with human beings, who came equipped, as a species, with the means of shutting each other out. The two of them, Fokir and herself, they could have been boulders or trees for all they knew of each other: and wasn't it better in a way, more honest, that they could not speak? (Ghosh 2005, 159)

Even later in the novel, when Kanai is nominally available as an interpreter, we get little more insight into Fokir's thinking. While we, as readers, get a sense of a complex personality guiding his actions, this interiority remains hidden from us, and Fokir thus remains something of a cipher. This is compounded by the fact that both Kanai and Piya project their own values and assumptions onto him: Piya sees "a muscular quality of innocence" about him (Ghosh 2005, 99), while Kanai sees him as an uneducated simpleton who could never be his or Piya's equal (268). Returning time and again to inscrutable depths and untranslatable meaning, the narrative can be read as calling into question the notion of translatability itself (Griffiths 2012, 112). If we read the novel as an attempt to give voice to the contribution of indigenous knowledge in the scientific process, then this narrative distancing is a striking admission of its own limitations, its own inability to 'translate' the voice of the subaltern knowledge producer into the discourse of the Anglophone novel.

This is all the more striking since, on the formal level, *The Hungry Tide* seems to be very much invested in translatability. *The Hungry Tide*'s narrative voice uses standard English, Bengali terms are often immediately glossed in English, and Kanai sometimes laboriously explains untranslatable puns or nuances of meaning from Bengali (for instance, Ghosh 2005, 212). The narrative is told in an "integrating voice [that] provides coherence and explanations that are particularly necessary for readers unaccustomed with the cultural sphere the story narrates and, thus, enables a dialogue" (Bartosch 2013, 115). Rather than performing a sense of alterity through the use of abrogated or hybridized English, *The Hungry Tide* is conspicuously *explaining* alterity. While its characters constantly deal with moments of untranslatability and murky, inscrutable realities, the narrative discourse itself strives to be a completely transparent medium of communication.

These conflicting impulses, I would argue, also inform the novel's problematic ending. While they are out on the river, trying to locate the dolphin population, Piya and Fokir are caught in a cyclone. In the novel's dramatic climax, Piya loses the data she has collected over the course of the plot when the storm blows away a backpack with her data sheets, but survives the storm, while Fokir dies shielding Piya from flying debris. However, after what seems like a tragic ending, the novel's epilogue concludes the novel on a markedly more optimistic note. It turns out that the data wasn't lost after all: Piya's and Fokir's movements searching for the dolphins on the river were recorded by her GPS-tracking device. Fokir's knowledge about the dolphins' patterns of movement is thus converted into satellite data. Piya is able to leverage this data into funding for further research, which she plans on conducting in collaboration with the local community, involving local fishermen in the conservation efforts. She even hires Fokir's widow to help her run the administration of the project. Within the span of just five pages, the epilogue provides a whiplash reversal of fortune in a *deus ex machina*—actually, *data ex machina*—ending. Clearly, Piya's encounter with Fokir really proves transformative for her, and her intensified engagement with the community can be read as a model for a more locally embedded and reciprocal practice of science in a postcolonial context. But the narrative also repeats the very erasure Ghosh seems to want to overcome: once the local knowledge of the native informant has been converted into hard data, the informant is expendable—and, sure enough, the narrative disposes of him.[4] Thus, the epilogue may read as somewhat forced because it attempts to reconcile two contradictory impulses in the novel: an ethical impulse to give voice to indigenous epistemologies and a reflexivity about its own potential shortcomings in mediating these epistemologies to a global audience—the danger of opening them to projections, to romanticization, and oversimplification. It is this ambivalence about the communicability of subaltern knowledge and experience—even when it is integral to the progress of 'Western' science—that also informs *The Calcutta Chromosome*.

4 Cf. Li (2009), who similarly detects "a sacrificial logic" in the novel: "Kusum and Fokir, as 'authentic' subalterns who resist and remain heterogeneous to hegemonic modernity, die so that their stories can be recounted and memorialized by literate, modern characters" (290).

Subaltern Hauntings: *The Calcutta Chromosome*

Subtitled "A Novel of Fevers, Delirium and Discovery," *The Calcutta Chromosome* presents a sharp contrast to the realist aesthetics of *The Hungry Tide*. Borrowing generic elements from science fiction, the thriller, and the ghost story, the novel presents an alternative, conspiratorial counter-narrative of Ronald Ross's discovery of the transmission of malaria in colonial India from 1895 to 1897. The novel alternates between two timelines, the first of which is set in a near-future New York and focuses on Antar, an Egyptian-born researcher, who catalogues archival items with a global networked computer system. When his work turns up an old ID card by one of his former colleagues, archivist and historian Murugan, Antar is spurred on to recollect Murugan's idiosyncratic theory concerning Ross's discovery. Murugan's hypothesis is that Ross's success was secretly engineered by a cult-like indigenous conspiracy, engaged in what he calls "counter-science" (Ghosh 2010, 103). Their aim, Murugan believes, was achieving immortality through "interpersonal transference," i.e. a chromosomal migration of personality "from body to body" (106–7). The second timeline focuses on Murugan as he travels to Calcutta in 1995, where we already know he will eventually disappear without a trace. Murugan meets and teams up with two journalists, Urmila and Sonali, to uncover evidence of the continued activities of the counter-science conspirators.

Twice mediated—as Antar's recollection of Murugan's narrative—the novel opens up a counter-history of Ross's research that undercuts the (self-)construction of Ross as a divinely inspired "knight of science" crusading against the scourge of malaria (Taylor-Brown 2014). Drawing on Ross's own writing as well as on letters and documents from other contemporaneous colonial researchers, Murugan polemically depicts Ross as an incompetent amateur who is unknowingly steered by Indian lab assistants: "'What gets me about the scenario is the joke. Here's Ronnie, right? He thinks he's doing experiments on the malaria parasite. And all the time it's him who is the experiment on the malaria parasite'" (Ghosh 2010, 78).

In Murugan's account, the secretive group that guides Ross's research is principally represented by two figures. One is a young man calling himself Lutchman, who first volunteers as a test subject for Ross and later becomes his indispensable lab assistant, manoeuvring him towards crucial research steps; the other is an older woman called Mangala who works ostensibly as a cleaning woman in the lab, but who seems to wield some hidden authority over the other Indian lab assistants and over the scientific work in the laboratory itself. The novel points out that both seem inconspicuous to their colonial overlords because they inhabit

the lowest rungs of colonial society—Lutchman is said to have been a "dhooley-bearer" and Mangala a day labourer recruited by her British employer at Calcutta's Sealdah railway station. Their exact identity remains fuzzy and fluid throughout the novel; their motives and intentions are only surmised by Murugan and Antar. Relegated to the margins of colonial texts, these figures become a sinister if not supernatural force in Murugan's account, part of a conspiracy that dabbles both in advanced microbiology and in occult practice. The novel intimates, but never completely confirms, that both characters—or reincarnations of them—return both in Murugan's research trip to Calcutta in 1995 and in Antar's near future New York.

Throughout the novel, then, this "counter-science" emerges as the inverted mirror image of science, which is here specifically coded as a Western, colonial practice. Western science in the novel is pursued by knowable historical subjects—either real-life scientific figures in colonial medicine, such as Ross, Patrick Manson, and D. D. Cunningham, or fictional characters that are nevertheless historically documented within the diegetic world of the novel, such as the linguist J. W. D. Grigson and a young American missionary doctor called Elijah Farley. Meanwhile, counter-science is pursued by "slippery," shadowy subjects, whose identity and motives are a matter of conjecture and whom the reader gets to know only through multiple layers of mediation (Lutchman through Murugan's interpretation of Ross's writing, as remembered by Antar [Ghosh 2010, 73–78]; Mangala through an AI-generated reconstruction of an uncatalogued letter by Farley [126–28]). Western science is depicted as a public "narrative of expertise" (Jolly 2022, 287) and revolves around a logocentric practice of the naming of scientific objects and thus, implicitly, taking possession of them. By contrast, counter-science is obscure, secret, and undocumented. Murugan's hypothesis is that the group uses "secrecy as a technique or procedure" and deliberately refuses claims to know because "to know something is to change something" (Ghosh 2010, 103). At first glance, the opposition of science and counter-science, a central thematic throughline of the novel, would seem to reinscribe, perhaps deliberately and ironically, Orientalist stereotypes of Eastern opacity, superstition, and deceitfulness.

Indeed, some of the descriptions of "counter-science" in action seem to suggest such Orientalist fantasies: in 1894, Farley chances upon a ritual gathering when he visits a Calcutta laboratory at dusk and furtively observes Mangala "seated on a low divan, but alone and in an attitude of command, as though enthroned," surrounded by syphilitics "in various attitudes of supplication, some touching her feet, others lying prostrate"

(Ghosh 2010, 149). In 1995, Sonali observes a similar ritual, although, again, the description of the ritual is furtive and incomplete (164–66). It is tempting, then, to read the location of different forms of knowledge in the novel as an oppositional geography of scientific knowledge and its "counter-scientific" inversion, an opposition that neatly maps onto the distinctions between West and East, metropole and colony, power and subalternity. But on closer inspection, the novel's structuring opposition between Western science and its opposite is not strictly dichotomic but, rather, an entangled duality, a structure already implied in the titular figure of the chromosome (cf. Fendt 2015).

This entanglement is manifested in the use of space in the novel: Mangala's counter-scientific group does not occupy its own spaces; there are no secret temples or underground lairs. It operates instead within the marginal spaces of the colonial scientific enterprise itself: its gatherings take place in antechambers and outhouses of colonial laboratories, in ruined hospital yards, and in Ross's abandoned "'Europeans only' boardinghouse" (Ghosh 2010, 79).

The physical proximity of science and counter-science emphasizes that, despite its cult-like trappings and the aura of the fantastic and the uncanny that surrounds Mangala and Lutchman, counter-science is not mystical or primordial knowledge, not "a native, mythologically based knowledge" separate from the discourse of science (Fendt 2015, 180). Nor is it quite accurate to describe their project of "interpersonal transference" as "a scientific investigation into Hindu reincarnation" (Shinn 2008, 146). Indeed, the novel does not discuss a connection with Hindu beliefs in reincarnation at all. Presumably, Lutchman and Mangala would be subaltern outsiders in the social hierarchy of the Hindu caste system just as much as in the colonial social order. As Suparno Banerjee has pointed out, the novel "does not employ classical Hindu mythology or invoke traditional Vedic knowledge. Rather, the book also subverts established Indian epistemology" (2010, 58). Ghosh thus also avoids a conflation of scientific and Vedic concepts that has taken root in recent Hindu-nationalist discourse.[5] As Murugan theorizes, counter-science is not traditional or ancient knowledge; like science, it is the outcome of an active investigatory process, a form of scientific labour:

5 See Nanda (2016) and Subramaniam (2019) for trenchant critiques of this discourse.

> Let's say that just about the time that Ronnie's beginning to work on malaria there's this other person—this team—that's also been working with *Plasmodium falciparum* but in a different way; a way so different it wouldn't make sense to anyone who's properly trained. But let's say that by accident or design they've made a certain amount of progress; they've taken their work to a certain point and then they've run smack into a dead end: they're stuck, they can't go any further—because of glitches in their own methods, because they just haven't got the right equipment. [...] they've got to find a conventional scientist who'll give it a push. (Ghosh 2010, 104)

Not only does it seem that Mangala and Lutchman are clandestinely utilizing the work of European researchers, but the conspirators also seem more than willing to deploy state-of-the-art technologies and infrastructures to advance their aims, from the laboratories of colonial epidemiologists to the sophisticated, artificial-intelligence-powered computer network that Antar works with in the novel's near-future narrative. What differentiates counter-science from science, then, is not that it is "unscientific" in how it generates knowledge; the point of distinction is its seeming incommunicability and invisibility. While the conspiracy always seems to be near the centres of colonial knowledge production, it is also always just out of view. This is underlined quite literally, as encounters with the group's gatherings and actions are accompanied by moments of impeded or distorted vision: Elijah Farley first observes Mangala's direction of other laboratory assistants in a glass reflection, "mirrored on the convex surface of [a] glass tumbler" (142); later, he catches glimpses of a ritual-like gathering from behind a closed door (148–52); Sonali's discovery of a similar gathering is impeded by dense clouds of heavy smoke—so much so that she can barely keep her hurting eyes open (164–66). The impossibility of the novel's Western and Western-educated characters getting a clear look at counter-scientific practice reflects the inability of these characters to view non-Western sources of knowledge and expertise unclouded by their own biases. It may also reflect the novel's inability to articulate subaltern knowledge in the form of the Anglophone novel (with all its colonial baggage and generic blinders).

The novel underscores this by complementing the oppositional constellation of colonial scientists and subaltern counter-scientists with a third group of characters and a third location of knowledge generation: Murugan, Antar, Sonali, and Urmila are all postcolonial investigators trying to piece together the truth about the connections between the other two groups. While the scientists and counter-scientists work in the laboratory, these investigators' work is in the archive; rather than in experimentation

and observation, their work is in reading.[6] Sometimes, they are interpreting physical evidence, but very often it is literally through the reading of journals, letters, and stories that they seek to generate knowledge—knowledge that would itself take the form of a narrative to logically connect all the mysterious and sometimes fantastical elements they encounter. The structure evokes a kind of literary detective fiction that Suzanne Keen (2003) has called "romances of the archive." However, instead of working out a cogent historical narrative of what 'really' happened in Ross's laboratory, the past is resistant to their quest for meaning-making, "an unstable zone of deliberate coverups and still-active conspiracies" (Keen 2003, 226). At the end of the 1995 narrative, Murugan, Urmila, and Sonali set out for a remote small-town train station that they suspect to be a centre of the counter-science conspiracy. We know from Antar's part of the narrative that Murugan disappears at this point; the fate of Sonali and Urmila is unclear. Antar, in turn, becomes increasingly feverish and his perception increasingly unreliable as he unearths more clues of the conspiracy and Murugan's fate. He eventually enters a virtual reality simulation (apparently uploaded to his computer system by the conspirators before Murugan even began investigating the matter) in which he experiences a scene from early in the 1995 narrative through Murugan's eyes. A chorus of ominous voices then assures him "We're with you; you're not alone; we'll help you across" (Ghosh 2010, 306). Like Ross, Antar, the ostensible subject of knowledge production and discovery, turns out to be the object of manipulation, "his subjectivity apparently co-opted by the objects of his research, who have sought him out in the first place" (Keen 2003, 227).

In their attempt to make sense of these different embedded narratives and intertexts, Murugan, Urmila, Sonali, and Antar are aligned with the readers of the novel. The four 'detective' characters also serve as focalizers for the events of the novel, aligning the reader even more closely to their experience—like them, the reader "is forced to put clues together on his/her own in order to construct probable conclusions" (Hoydis 2011, 157). Just like these characters, the reader is propelled to read on by the desire for a solution to the mystery of the counter-science conspiracy that never comes. There is no final moment of epiphany; Murugan, Urmila, and Sonali go missing and their perspective disappears from the narrative,

6 In a second narrative strand of *The Hungry Tide*, Kanai fulfills a similar role. While reviewing the papers of his deceased uncle, he uncovers the involvement of Fokir's mother, Kusum, with a community of refugees who had settled on the island of Morichjhãpi in the Sundarbans. The factual, but largely forgotten, history of the settlement ends in tragedy when police evict the settlers from the island in a brutal massacre that claims Kusum's life and leaves Fokir orphaned.

while Antar's narrative ends in a disconcerting *mise en abyme* that seems to conflate Murugan and Antar but leaves the latter's fate open. Rather than pulling the work of the counter-scientists from the "dark hemisphere" of subaltern history, the literary detectives disappear into it, and the reader's quest for meaning-making is frustrated.

Beyond Closure

The Calcutta Chromosome thus presents the relationship between institutionalized science and other forms and locations of knowledge as a disruptive haunting, an encounter of science with its uncanny other. As with *The Hungry Tide*'s Fokir, there are silent subaltern subjects at the centre of the plot, whose capacity for knowledge production initially goes unnoticed. But unlike Fokir, Mangala and Lutchman resist efforts to codify their knowledge into Western terms. While *The Hungry Tide* provides an all-too-neat narrative closure when Fokir's understanding of the river dolphins' movements is turned into published scientific knowledge, *The Calcutta Chromosome* eludes such closure. The novel foregoes resolving its central mysteries: how the counter-science group operates, whether certain characters are 'really' the reincarnation of Mangala and Lutchman, or even if the group 'really' exists or is just a product of Antar's feverish imagination in the middle of a fatal malaria relapse. It is, as Claire Chambers argues, a novel that rejects the notion of a central truth, providing instead a network of "stories that contain layers of mystery, but have no real revelation at the core, like an onion which has nothing in the centre" (Chambers 2009, 46). The novel thus ultimately represents a refusal by Ghosh to speak for the novel's subaltern subjects, to reduce them to knowable objects of someone else's discourse (see Banerjee 2010, 52). Their counter-scientific knowledge production remains within the "dark hemisphere" of modernity, obscured not only from the novel's colonial scientists but also from the readers and their literary stand-ins, the detective figures Antar, Murugan, Sonali, and Urmila. While this disrupts the "sacrificial logic" (Li 2009, 290) by which the subaltern becomes expendable once their knowledge is translated into Western knowledge, it also relegates them to the shadows, not an articulated presence in the history of modernity but a haunting on the edges of discourse.

I have read the novels against their chronological order to highlight this contrast more clearly, yet this reshuffling also suggests reading *The Calcutta Chromosome* as a critique of *The Hungry Tide avant la lettre*. However, this risks imposing its own narrative closure on the two texts by privileging the

unknowability of subaltern knowledges and subjectivities in *The Calcutta Chromosome* as the more subversive and radical approach. This also provides a solution for the wicked problem of Anglophone postcolonial literary criticism—who can speak for the subaltern and how to speak for it in the language of the colonizers. Placing the two texts in the overall body of Ghosh's work indicates that he, for one, is not satisfied with the simplicity of this solution. Indeed, while I have criticized the abrupt resolution of *The Hungry Tide*, in Ghosh's larger oeuvre, it is *The Calcutta Chromosome* that is the closed text, while the setting and characters of *The Hungry Tide* are an ongoing literary project. The Sundarbans are a major touchstone in his treatise on literature and climate change, *The Great Derangement*. In *Gun Island* (2019), Ghosh revisits the central characters and places, the ecological and social conflicts in the Sundarbans in the larger context of the global climate crisis, as well as in a history of migration and cultural exchange that ranges from the Middle Ages to contemporary climate migration (see Kluwick 2020; Wilton 2021). In *Jungle Nama* (2021a), Ghosh retells the legend of Bon Bibi, a mythological figure in the Sundarbans whose story problematizes environmental exploitation and greed—providing, potentially, another "parable of a planet in crisis." In the context of the environmental crisis especially, the relationship between science and other knowledges is entangled and ambivalent. As Ghosh, reflecting on *The Hungry Tide*, notes, science is the indispensable interpreter "that allows the environment to speak back to us," but at the same time, "science cannot be the final arbiter in the matter of our relationship with Nature, for the very good reason that its procedures and methods cannot acknowledge or address questions of meaning, intention and lived history" (2017, 22). Like the shifting landscape of the Sundarbans, the complex trajectories of science and its entanglements with other forms of knowledge in a globalized, colonial modernity perhaps defy the strictures of a single text or even a single genre and call for dialogic encounters of different texts, genres, and perspectives instead.

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Bibliography

Banerjee, Suparno. 2010. "*The Calcutta Chromosome*: A Novel of Silence, Slippage and Subversion." In *Science Fiction, Imperialism and the Third World: Essays on Postcolonial Literature and Film*, edited by Ericka Hoagland and Reema Sarwal, 50–64. Jefferson: McFarland.

Bartosch, Roman. 2013. *EnvironMentality: Ecocriticism and the Event of Postcolonial Fiction*. Leiden: Brill.

Chambers, Claire. 2009. "Networks of Stories: Amitav Ghosh's *The Calcutta Chromosome*." *ariel: A Review of International English Literature* 40 (2–3): 41–62. Accessed September 27, 2024. https://journalhosting.ucalgary.ca/index.php/ariel/article/view/34892/28910.

Fendt, Julia. 2015. "The Chromosome as Concept and Metaphor in Amitav Ghosh's *The Calcutta Chromosome*." *Anglia* 133 (1): 172–86. https://doi.org/10.1515/ang-2015-0011.

Gaines, Susan M., Sina Farzin, and Roslynn D. Haynes. 2021. "Introduction: Science under the Literary Microscope." In *Under the Literary Microscope: Science and Society in the Contemporary Novel*, edited by Sina Farzin, Susan M. Gaines and Roslynn D. Haynes, 1–18. University Park: Pennsylvania State University Press. https://doi.org/10.1515/9780271090139.

Ghosh, Amitav. 2005. *The Hungry Tide*. London: Harper Collins.

Ghosh, Amitav. [1995] 2011. *The Calcutta Chromosome*. London: John Murray.

Ghosh, Amitav. 2016. *The Great Derangement: Climate Change and the Unthinkable*. Chicago: University of Chicago Press.

Ghosh, Amitav. 2017. "Wild Fictions." Last modified September 8, 2017. https://amitavghosh.com/docs/Wild%20Fictions.pdf.

Ghosh, Amitav. 2019. *Gun Island*. London: John Murray.

Ghosh, Amitav. 2021a. *Jungle Nama: A Story of the Sundarban*. Illuminated by Salman Toor. London: John Murray.

Ghosh, Amitav. 2021b. *The Nutmeg's Curse: Parables for a Planet in Crisis*. Chicago: University of Chicago Press.

Goh, Robbie B. H. 2011. "The Return of the Scientist: Essential Knowledge and Global Tribalism in Amitav Ghosh's *The Hungry Tide* and *The Calcutta Chromosome*." In *Narrating Race: Asia, (Trans)Nationalism, Social Change*, edited by Robbie B. H. Goh, 49–67. Leiden: Brill.

Griffiths, Gareth. 2012. "Silenced Worlds: Language and Experience in Amitav Ghosh's *The Hungry Tide*." *Kunapipi* 34 (2): 105–12. https://hdl.handle.net/10779/uow.27671958.v1.

Gurr, Jens Martin. 2010. "Emplotting an Ecosystem: Amitav Ghosh's *The Hungry Tide* and the Question of Form in Ecocriticism." In *Local Natures, Global Responsibilities: Ecocritical Perspectives on the New English Literatures*, edited by Laurenz Volkmann, Nancy Grimm, Ines Detmers, and Katrin Thomson, 69–80. Amsterdam: Rodopi.

Hoydis, Julia. 2011. *Tackling the Morality of History: Ethics and Storytelling in the Works of Amitav Ghosh*. Heidelberg: Winter.

Huttunen, Toumas. 2012. "Language and Ethics in *The Hungry Tide* by Amitav Ghosh." In *History, Narrative, Testimony: Essays on Amitav Ghosh's Fictional Narratives*, edited by Chitra Sankaran, 121–32. New York: State University of New York Press.

Jolly, Priscilla. 2022. "Tropical Topographies: Mapping the Malarial in *The Calcutta Chromosome*." *eTropic* 21 (1): 285–304. https://doi.org/10.25120/etropic.21.1.2022.3837.

Keen, Suzanne. 2003. *Romances of the Archive in Contemporary British Fiction*. Toronto: University of Toronto Press.

Kirchhofer, Anton, and Anna Auguscik. 2017. "Triangulating the Two Cultures Entanglement: The Sciences and the Humanities in the Public Sphere." *Journal of Literature and Science* 10 (2): 26–37. https://doi.org/10.12929/jls.10.2.04.

Kluwick, Ursula. 2020. "The Global Deluge: Floods, Diluvian Imagery, and Aquatic Language in Amitav Ghosh's *The Hungry Tide* and *Gun Island*." *Green Letters: Studies in Ecocriticism* 24 (1): 64–78. https://doi.org/10.1080/14688417.2020.1752516.

Li, Victor. 2009. "Necroidealism, or the Subaltern's Sacrificial Death." *Interventions* 11 (3): 275–92. https://doi.org/10.1080/13698010903255478.

Mukherjee, Pablo. 2010. "Surfing the Second Wave: Amitav Ghosh's *The Hungry Tide*." In *Literature and Globalization: A Reader*, edited by Liam Connell and Nicky Marsh, 177–89. London: Routledge.

Nanda, Meera. 2016. *Science in Saffron: Skeptical Essays on History of Science*. Gurgaon: Three Essays Collective.

Shinn, Christopher A. 2008. "On Machines and Mosquitoes: Neuroscience, Bodies, and Cyborgs in Amitav Ghosh's *The Calcutta Chromosome*." *MELUS* 33 (4): 145–66. http://www.jstor.org/stable/20343511.

Subramaniam, Banu. 2019. *Holy Science: The Biopolitics of Hindu Nationalism*. Seattle: University of Washington Press.

Taylor-Pirie, Emily. 2022. *Empire under the Microscope: Parasitology and the British Literary Imagination, 1885–1935*. Cham: Palgrave Macmillan. https://doi.org/10.1007/978-3-030-84717-3.

Trexler, Adam. 2013. "Mediating Climate Change: Ecocriticism, Science Studies, and *The Hungry Tide*." In *The Oxford Handbook of Ecocriticism*, edited by Greg Garrard, 205–24. Oxford: Oxford University Press.

Weik von Mossner, Alexa. 2006. "The Home, the Tide, and the World: Eco-Cosmopolitan Encounters in Amitav Ghosh's *The Hungry Tide*." *The Journal of Commonwealth and Postcolonial Studies* 13 (2): 120–41.

White, Laura A. 2013. "Novel Vision: Seeing the Sunderbans through Amitav Ghosh's 'The Hungry Tide'." *Interdisciplinary Studies in Literature and Environment* 20 (3): 513–31. https://doi.org/10.1093/isle/ist051.

Wilton, Demi. 2021. "'We are the Dispossessed': Displacement, Knowledge Production and Bare Life in West Bengali Climate Fiction." *Parallax* 27 (3): 344–61. https://doi.org/10.1080/13534645.2022.2071249.