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The Long Continuity: Assamese Popular Science Writing as a Vernacular Knowledge Ecosystem, 1846–2018

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Abstract

This article presents a sociohistorical analysis of Assamese popular science writing (*bigyan sahitya*) over nearly two centuries (1846–2018), arguing that what has often been described as a regional literary tradition is more usefully understood as a durable vernacular knowledge ecosystem—a sustained institutional, periodical, and discursive infrastructure through which scientific modernity has been linguistically mediated, socially circulated, and culturally embedded in Assamese-speaking publics. Drawing on Assamese-language archival sources and engaging international scholarship on the public understanding of science, vernacular modernity, and postcolonial knowledge circulation, the article reconstructs three interlocking structures through which the ecosystem has operated: the print public sphere consolidated by the missionary newspaper *Arunoday* from 1846; the civic-scientific institutional architecture of *Pashupalan* (1925), the Asom Bigyan Samiti and *Bigyan Jeuti* (launched in 1961), and the Asom Bigyan Lekhak Sangstha (1999); and the literary-scientific mediation that produced the science-fiction tradition (*kalpabijnan*). The ecosystem has reproduced itself through workshops, handbooks, and terminology projects, navigating four political-economic ruptures without institutional collapse. The case offers a productive empirical basis for theorising how societies vernacularise scientific knowledge over the long term.

Keywords: vernacular knowledge ecosystem; popular science writing; print public sphere; vernacular modernity; science and society; postcolonial science communication; institutional mediation; Assamese; bigyan sahitya; kalpabijnan

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1. Introduction

In May 1846, four months after the Sibsagar Mission Press published the first issue of the Assamese newspaper *Arunoday*, the paper carried an article on a petrifying river reported by an exploration party in California, whose waters were said to turn to stone

whatever fell into them. The same issue published “*Tej Joa Sirar Bibaran*” (“Circulation of the Blood”), which explained human haemodynamics through an analogy with the pumped watermains of London: just as water is carried through branching pipes to houses, “*blood is carried to every part through the various vessels of the body*” (Neog [1983] 2008, p. 37). Arunoday thus presented science not as abstract technical knowledge but as a set of processes made intelligible through everyday structures already meaningful to Assamese readers; this analogical mediation is central to the present article’s argument about vernacular scientific explanation.

The above-mentioned article inaugurated something larger than a tradition of texts. It was an early move in what this article calls a vernacular knowledge ecosystem—an institutional, periodical, and discursive infrastructure within which scientific concepts could be rendered publicly meaningful in Assamese, and within which subsequent generations of writers, editors, scientists, and readers would learn to operate. This article argues that the long history of Assamese popular science writing (*bigyan sahitya*) is best understood through this ecosystem framework rather than through the more familiar conventions of literary or institutional chronology. The reframing matters for several reasons that are at once theoretical and methodological.

First, it foregrounds questions central to the science-and-society field (Bauer and Buchi 2008; Burnham 1987; Jasanoff 2004): how does scientific modernity become socially rooted in vernacular public cultures? How does scientific knowledge circulate through institutions other than the laboratory or the elite university? What kinds of mediation—linguistic, periodical, organisational, imaginative—translate scientific concepts from their domains of professional production into the registers of public meaning-making? The case of Assamese popular science writing provides an empirical instance of these processes operating across nearly two centuries in a regional public-cultural setting that has received minimal attention in the international literature on the public understanding of science (Lightman 2007; Fyfe 2012). A brief comparison with Bengali *bigyan-sahitya* in the Discussion clarifies both the shared Indian-language pattern of vernacular science writing and the distinctive rural-literary orientation of the Assamese case.

Second, the ecosystem framing illuminates what discrete histories of authors, publications, or institutions cannot: the systemic character of vernacular science communication, its capacity for self-reproduction across institutional ruptures, and its integration with the broader literary public sphere (Calhoun 1992; Orsini 2002; Robinson 1996). The Assamese ecosystem has navigated four substantial political-economic transitions without institutional collapse—the late-nineteenth-century decline of missionary print dominance, the post-independence transition to Assamese-controlled publishing, the post-1991 economic liberalisation, and the contemporary digital transition since approximately 2015. Each of these transitions could have plausibly terminated the tradition; that none has done so calls for explanation, and the explanation lies in the ecosystem’s institutional density rather than in the agency of individual writers.

Third, the case extends the comparative analytic resources of postcolonial science-and-technology studies (Arnold 2000; Prakash 1999; Raj 2007). The dominant theoretical frame for thinking about colonial-era science communication has been the deficit model: science is produced in metropolitan laboratories and transmitted to passive vernacular publics whose deficit of knowledge the communication is meant to fill (Wynne 1991). The Assamese case complicates this framework. From Arunoday’s May 1846 treatment of blood circulation and natural phenomena onward, vernacular science communication in Assamese has addressed readers as already competent—possessing relevant interpretive resources from non-scientific domains, capable of analogical reasoning, and embedded in their own observational traditions of empirical reasoning. The deficit model cannot describe what was actually happening.

Three interlocking structures define the ecosystem. The first is the print public sphere—the periodical infrastructure that *Arunoday* initiated in 1846 and that subsequent publications (*Pashupalan* from 1925, *Bigyan Jeuti* from 1961, *Goriyoshi*, *Drishti*, *Lekhika*) extended into the contemporary period. The second is the civic–scientific institutional architecture: the Asom Sahitya Sabha’s *bigyan sahitya* programming from the 1930s, the Asom Bigyan Samiti from 1953, the Asom Bigyan Lekhak Sangstha from 1999, and the workshops and editorial initiatives through which writers were trained and a vernacular scientific terminology was negotiated. The third is the literary–scientific mediation through which scientific discourse entered Assamese imaginative culture—visible in popular science writing as such, but most fully developed in the science-fiction tradition (*kalpabijnan*) that runs from Barua’s (1937) “Birachatiyar Desh” to the contemporary work of Lakshminandan Bora and Abhijit Sharma Barua. These three structures are not separable. They share authors, venues, and readerships, and their interaction is what gives the ecosystem its durability over time.

The article first develops the conceptual framework of the vernacular knowledge ecosystem by bringing together public sphere theory, vernacular modernity, sociology of knowledge, and postcolonial science studies. It then explains the qualitative sociohistorical method used to reconstruct Assamese popular science writing across incomplete archives, periodical histories, and published surveys. The substantive analysis moves from pre-print and missionary-era foundations to the institutional consolidation of *Pashupalan*, the Asom Bigyan Samiti, *Bigyan Jeuti*, and the Asom Bigyan Lekhak Sangstha. It then examines the lateral expansion of the print public sphere, the *kalpabijnan* tradition, and the reproductive mechanisms—workshops, handbooks, and terminology projects—through which the ecosystem has sustained itself.

The Assamese case is offered not as a unique exemplar but as a theoretically productive instance of vernacular scientific modernity sustained over the long duration—a case whose specific institutional mechanics may help refine our broader understanding of how scientific knowledge circulates, reproduces, and embeds itself in non-metropolitan public cultures and how comparable ecosystems elsewhere in South Asia and beyond have functioned, persisted, or declined.

2. Conceptual Framework: The Vernacular Knowledge Ecosystem

This article’s analytical contribution rests on a conceptual move from understanding “popular science writing” as a literary genre to a “vernacular knowledge ecosystem” as a sociohistorical formation. The shift draws on four overlapping bodies of scholarship—public sphere theory, vernacular modernity, sociology of knowledge, and postcolonial science-and-technology studies—each of which contributes elements to the framework deployed here.

2.1. Public Sphere Theory

Habermas’s classical account of the bourgeois public sphere as a discursive arena of rational–critical exchange (Habermas 1989) has been substantially extended and contested since its publication. Calhoun (1992) and others have shown that the singular Habermasian “public” must be replaced with multiple, overlapping, partially autonomous public spheres, each constituted by its own discursive conventions, institutional supports, and reading or speaking publics. For the Indian-language context, Orsini’s (2002) work on the Hindi public sphere and Robinson’s (1996) work on Islam and print in South Asia have demonstrated how vernacular print created distinctive publics whose relationship to scientific, literary, and political modernity was shaped by language-specific institutional ecologies (see also Anderson 2006 on print capitalism and vernacular collective identity). The “print public sphere” deployed in this article extends these analyses to the Assamese

case: a periodical-mediated arena of public discourse in which scientific knowledge has been one of three editorial pillars (alongside literary and political content) since the 1846 publication of *Arunodaya*.

2.2. Vernacular Modernity

Pollock's account of the "vernacular millennium" (Pollock 2006)—the long-lasting shift from cosmopolitan Sanskrit to vernacular literary languages across South Asia between roughly 1000 and 1500 CE—provides a useful conceptual precedent for the long-term analysis this article undertakes. The Assamese ecosystem this article describes constitutes a kind of second vernacular shift, in which the languages of scientific authority (Sanskrit, Persian, English) were progressively translated, supplemented, and partially displaced by vernacular Assamese as the medium of public scientific discourse. This shift is not complete—elite scientific work still happens primarily in English—but its institutional infrastructure has been substantial enough to sustain a public readership for vernacular science for nearly two centuries. The concept of vernacular modernity, as developed in postcolonial scholarship (Chakrabarty 2000; Kaviraj 2010), names the broader phenomenon of which the Assamese ecosystem is one specific instance: the indigenisation of modern intellectual forms within non-metropolitan linguistic publics, often through institutional configurations distinct from those of the metropolitan original.

2.3. Sociology of Knowledge

Mannheim's (1936) insight that knowledge is produced within specific social formations, refined through Latour's actor–network theory (Latour 1987, 2005) and Bourdieu's analysis of cultural fields (Bourdieu 1993), provides the framework for understanding the ecosystem as a structured set of relationships among institutions, periodicals, writers, and readers rather than as a sequence of texts. Latour's emphasis on the role of inscription devices—periodicals, manuals, and dictionaries—in stabilising and circulating scientific facts is particularly relevant: the Assamese ecosystem's editorial conventions, terminology projects, and handbook traditions function as inscription practices that have stabilised scientific knowledge in vernacular form across decades. Jasanoff's concept of "civic epistemologies" (Jasanoff 2005)—the distinctive institutional and cultural arrangements through which different societies organise public knowledge claims—offers a comparative frame for situating the Assamese case among other regional, national, and linguistic configurations (Foucault's 1972 analysis of discursive formations supplies a complementary lens, treating the ecosystem as a regime of statements about science and the public readership sustained over a particular historical period).

2.4. Postcolonial Science-and-Technology Studies

Raj's (2007) account of the circulation of scientific knowledge between South Asia and Europe in the early modern period, Raina's (1996, 2003) work on knowledge production in colonial India, Prakash's (1999) analysis of science as a colonial epistemic project, and Arnold's (2000) history of medicine and science in colonial India together provide the postcolonial analytic context for situating the Assamese ecosystem. The encounter with European science in colonial India never occurred with disembodied knowledge. It was an encounter mediated by missions, by colonial educational institutions, by translation practices, and by indigenous intellectual traditions—Ayurveda, Sanskrit astronomy, and Indo-Persian medicine—whose claims to scientific authority were both engaged and contested in the encounter (Chakrabarti 2004). The ecosystem analysed in this article emerged within and against this colonial epistemic configuration, drawing on indigenous resources while incorporating European scientific content and producing a distinctive vernacular form whose specific features cannot be derived from either pole alone. Later

science-communication scholarship has complicated the deficit model by emphasising contextual, dialogic, and participatory models of public knowledge. Bucchi's work on science communication stresses the situated and culturally mediated character of public understanding (Bucchi 1998), while Lewenstein's discussion of contextual, lay-expertise, and public-engagement models moves beyond one-way transmission (Lewenstein 2003). The Assamese case is closer to these post-deficit models: readers imagined not as empty recipients of metropolitan science but as situated interpreters whose everyday knowledge, language, and cultural analogies help make scientific concepts publicly meaningful.

2.5. Synthesis: The Vernacular Knowledge Ecosystem

Drawing these elements together, this article defines a vernacular knowledge ecosystem as a sustained institutional, periodical, and discursive infrastructure through which scientific knowledge is linguistically mediated, socially circulated, and culturally embedded in a specific public-cultural community. Such ecosystems comprise three interlocking structural elements. First, they require a print public sphere made up of periodicals and related publications addressed to a specific linguistic public. Second, they depend on a civic-scientific institutional architecture consisting of organisations, workshops, editorial networks, and associational bodies that support the production and reproduction of vernacular science writing. Third, they require literary-scientific mediation, through which scientific discourse enters the broader imaginative culture, often through speculative fiction and related genres. Continuity in such ecosystems—their persistence across political-economic transitions—depends on institutional density: the existence of multiple overlapping institutions whose combined effect maintains the ecosystem even when individual institutions falter. Reproduction depends on specific practices—workshops, handbook culture, terminology projects, and editorial mentorship—that transmit conventions and competencies across generations. The Assamese case provides an empirical instance of such an ecosystem operating over nearly two centuries; its specific mechanics, examined in Section 4, contribute to the broader theoretical understanding of how vernacular science communication is sustained.

3. Methodological and Analytical Framework

This study is a qualitative sociohistorical investigation. It is not a quantitative bibliometric study, nor is it primarily a work of literary criticism. The analytical aim is to reconstruct the long-term development of Assamese popular science writing as a vernacular science infrastructure—identifying its constituent institutional and discursive elements, tracing their interlock and reproduction over time, and analysing the social processes through which scientific knowledge has been mediated, circulated, and embedded in Assamese-language public culture.

Methodologically, the article combines four overlapping approaches. Intellectual history is used to trace the evolution of editorial conventions, scientific concepts, and reading-public expectations from the 1846 publication of *Arunoday* to the 2018 *Asomiya Bigyan Sahitya* volume. Archival analysis draws on the holdings of the Asom Sahitya Sabha at Jorhat, partial periodical runs of *Arunoday*, *Pashupalan*, *Bigyan Jeuti*, and *Lekhika*, supplemented by the major published Assamese-language critical surveys (Vaisya 1982; Baruah 2005; Bora 2012; Neog 1998; Sharma 2003; Tamuly 2017), which together function as the field's working bibliography. Print-culture studies (Eisenstein 1983; Darnton 1995) inform the analysis of the periodical infrastructure and its role in constituting reading publics. The sociology of vernacular knowledge (Pollock 2006; Chakrabarty 2000) provides the framework for understanding how scientific concepts have been translated, indigenised, and stabilised in Assamese.

Several methodological cautions are worth flagging at the outset. First, the historical archive of pre-1947 Assamese periodicals is incomplete. Complete runs of *Arunoday* and *Pashupalan* are not currently held in any single repository, and reconstruction of their full output relies on partial holdings, secondary citations, and the published bibliographies of subsequent surveys. Empirical claims about pre-independence periodical output are therefore conservative orders of magnitude rather than precise figures.

Second, the quantitative scale of the tradition—total articles, books, and named contributors across 1846–2018—is approximate rather than exact. The figures used in this article are derived from documented periodical runs combined with the named contributors' counts in the published critical surveys. A precise bibliometric exercise—matching periodical issues against current library holdings and verifying contributor identities—would refine these estimates and is identified as a future research direction.

Third, reception studies—what Assamese readers have actually done with the popular-science texts they have encountered—remain underdeveloped in the existing literature, including this article. The argument presented here is therefore production-side: this research documents the institutional infrastructure of vernacular science communication and infers, from circulation data and editorial conventions, plausible patterns of reception. Strengthening this with dedicated reception-history work would significantly improve the empirical basis of claims about social impact.

Fourth, the comparative analytic frame—situating the Assamese case alongside Bengali, Marathi, Tamil, Hindi, Kannada, and other Indian-language vernacular science traditions—is sketched here but not developed at length. Systematic comparative work across these traditions, organised around the ecosystem framework advanced in this article, is a research direction worth pursuing through subsequent collaborative projects.

Within these methodological constraints, this article aims to make a sociohistorical contribution: demonstrating that Assamese popular science writing constitutes a resource of sufficient depth, longevity, and institutional density to bear comparative analytic weight and identifying the specific institutional and discursive mechanisms through which the ecosystem has been sustained.

4. The Vernacular Knowledge Ecosystem in the Long Term

This section presents the substantive analysis, organised through five interlinked subsections. Section 4.1 examines the foundational substrate—pre-print observational traditions and the missionary-era print foundations that initiated the print public sphere. Section 4.2 traces the institutional consolidation of the ecosystem from *Pashupalan* (1925) through the Asom Bigyan Lekhak Sangstha (1999). Section 4.3 follows the print public sphere into its lateral expansions in daily journalism, broadcast media, and women's writing. Section 4.4 examines the speculative–imaginative extension of the ecosystem in the kalpabijnan tradition. Section 4.5 addresses the reproductive mechanisms—workshops, handbooks, and terminology projects—through which the ecosystem has sustained itself.

4.1. The Foundational Substrate: Pre-Print Vernacular Reasoning and Missionary Print Foundations

The print ecosystem established in 1846 did not enter an empty space. It entered a field where Assamese-speaking communities had developed two distinct repertoires of vernacular reasoning about the natural world: the observational traditions transmitted through folk verse and proverb and the scholarly translation projects undertaken thanks to courtly patronage. Neither repertoire constitutes “science” in the modern sense, and analytical caution against retrospectively assimilating them into that category is essential (Baruah 2005). They are better described as a substrate of vernacular epistemic culture: observational, didactic, and empirical in orientation and oriented toward agricultural, me-

teorological, medical, and pastoral practice. This substrate established Assamese as a legitimate medium of empirical–technical discourse.

The clearest example of the observational–traditional repertoire is the body of proverbial verses attributed to the legendary figure of Dak, transmitted orally and recorded in manuscript form, and known collectively as *Dakar Bachan*. These verses encode empirical generalisations about agriculture, weather, livestock, plant medicine, and seasonal resource management. To call such verses “proto-scientific” is overclaiming: their epistemic apparatus is correlational and traditional rather than experimental and theoretical. To call them mere superstition is an underclaim: their empirical accuracy across many domains is high. The most accurate description is that they constitute a repertoire of practical empirical reasoning, transmitted through poetic form, whose disposition toward observation, generalisation, and didactic transmission would prove generative when print culture later supplied a different vehicle for similar orientations.

The pre-print scholarly tradition is the second strand. From 1434 CE—when Bakul Kayastha translated the mathematical treatise *Kitabat Manjari* into Assamese verse—a tradition of translating scientific texts from Sanskrit, Persian, and Arabic to Assamese developed under royal patronage (Sharma 2003). The Ahom-period courts of Sivasingha and Ambika Devi extended this work: Sukumar Barkath’s illustrated *Hastibidyanava* (1734) is at once a treatise on elephantology and a work of considerable visual sophistication. The companion text *Ghora Nidan*, on equine medicine, was composed anonymously around 1740. These works are translational rather than original, presuppose courtly readerships, and operate in genres inherited from Sanskrit, Indo-Persian, and Arabic precedents. What they establish is a vernacular scholarly orientation that legitimates the use of Assamese for technical subjects—an orientation on which the missionary print culture of the 1840s would build, even as that print culture introduced different content and addressed different readers.

The missionary print foundation arrives in this context. The American Baptist Mission established the first printing press in Assam at Sibsagar in 1846, with Nathan Brown and Oliver T. Cutter as its principals. The press’s first major undertaking was *Arunodoy* (Arunodoy 1846), launched as a monthly in January 1846 with the explicit subtitle “A Monthly Paper devoted to Religion, Science and General Intelligence.” The trinitarian editorial framing positioned popular science not as a marginal supplement but as one of three editorial pillars, on equal ground with evangelism and current affairs.

What *Arunodoy* initiated was not simply a body of texts but a print public sphere (Habermas 1989)—an arena in which scientific information could be addressed to a diverse readership in Assamese, in which editorial conventions of accessibility could be developed and stabilised, and in which a habituated readership could be formed. The May 1846 issue exemplifies these editorial conventions. Its article “*Tej Joa Sirar Bibaran*” (“Circulation of the Blood”) explains human haemodynamics through an analogy with the pumped watermains of London: just as water is driven through branching pipes to houses, blood is carried through the body’s vessels. Analogical reasoning grounded in familiar infrastructure addresses the reader as already competent. The same issue’s account of a petrifying river and stone-preserved buffalo also shows how *Arunodoy* presented distant natural phenomena as objects of public curiosity and explanation. The August 1853 article “*Borokhunor Akhyan*”, on the meteorological cycle, deploys a teacher–student dialogue to walk through evaporation, atmospheric water vapour, condensation, and rainfall—drawing on European primary-school pedagogy and on the older Indic prashnottar tradition simultaneously.

Crucially, these editorial conventions, established in the *Arunodoy* decades, became durable infrastructure. They persisted through the missionary period and survived the late-nineteenth-century transition to Assamese-controlled publishing. Hemchandra Ba-

rua's translation of *Way to Health* as *Swastha Raksha* (1897) deploys the same analogical-didactic register as Arunoday's blood-circulation article. Kushakanta Borkakoti's *Prathamik Dhatribidya* (1897), the first vernacular Assamese midwifery manual, addresses readers in the same accessible form. Satyanath Bora's *Akash Rahasya* (1916) introduces astronomical concepts through observation, analogy, and dialogue (Vaisya 1982; Baruah 2005). By the time *Pashupalan* launched in 1925, the editorial conventions of accessible vernacular science writing in Assamese were seventy-nine years old. They were not invented anew with each periodical; they were inherited as the working infrastructure of the field. This inheritance is a form of institutional reproduction that operates across discrete periodicals and individual writers—a foundational feature of the ecosystem.

4.2. Institutional Consolidation: *Pashupalan*, the Asom Bigyan Samiti, and the Lekhak Sangstha: 1925–1999

The watershed moment in the institutional consolidation of Assamese popular science writing came in 1925, with the founding of *Pashupalan* ("Animal Husbandry") under the editorship of Dr. Kanak Chandra Sharma (Pashupalan 1925–1950). Dr. Kanak Chandra Sharma was an early Assamese veterinary practitioner and served as the editor and publisher of *Pashupalan*. Qualified as G.B.V.C. and M.R.A.S. (London), he played a foundational role in the development of Assamese popular science writing through the magazine (Rajkhowa [2018] 2019). His career combined veterinary practice with sustained editorial leadership of the periodical.

In the ecosystem framework, *Pashupalan* represents the first emergence of an autonomous Assamese-language science-publishing institution—a periodical organised around a defined editorial project, addressed to a specific public, and sustained over a period sufficient to shape readerly expectations. Its sixteen-page monthly format combined expository articles on cattle disease, dairy management, and animal breeding with verses for rural farmers and biographical sketches of scientific figures. Its distribution reached, by Sharma's contemporaries' accounts, well into rural cattle-keeping households across pre-independence Assam. *Pashupalan* demonstrated that a popular science periodical in Assamese could be sustained on its own institutional terms, without missionary or colonial patronage. This established the institutional possibility on which subsequent developments built.

The post-independence period saw two further institutional developments that would prove decisive for the ecosystem's evolution. The Asom Sahitya Sabha, the apex literary institution of the Assamese-speaking world founded in 1917, had begun from the 1930s to give organised attention to bigyan sahitya, with annual sessions on the genre and a Bigyan Sahitya Sabha section. More decisively, the Asom Bigyan Samiti was established as an Assamese-language science institution—neither a state agency nor a private commercial venture, but a civic-scientific body drawing personnel from working scientists, educators, and writers. The organisation was founded on 13 February 1953 as the Gauhati Science Society and was renamed the Asom Bigyan Samiti on 19 November 1956. Hariprasad Barua, the author of the foundational Assamese science-fiction story "Birachatiyar Desh" (1937), served as the chair of its executive body from 1968 to 1970. The Samiti's flagship periodical, *Bigyan Jeuti* (Bigyan Jeuti 1961), launched as a quarterly in September 1961, carried articles on physics, chemistry, biology, geology, mathematics, technology, environmental science, and the history of science—generally written by working Indian scientists in formats accessible to general readers.

What distinguishes *Bigyan Jeuti*, within the ecosystem framework, is not the volume of its output but the multiple institutional functions it concentrated. The magazine simultaneously served as the principal venue for popular-science articles by working scientists; published the science-fiction stories of writers like Santanoo Tamuly and Dinesh Chandra

Goswami; mediated the negotiation of an Assamese-language scientific terminology; and functioned as a node connecting the Asom Sahitya Sabha, the practising scientific community, the literary establishment, and the broader Assamese reading public. Its editorial board overlapped with the Sahitya Sabha's; its contributors were drawn from across the spectrum of Assamese scientific and literary life. The magazine was, in effect, the central node of the second phase of the ecosystem—a point of institutional convergence at which multiple constituencies met.

The Samiti's institutional form deserves analytical attention in its own right. As a civic-scientific body, it occupied a position structurally distinct from both state agencies and commercial enterprises. Its membership combined working scientists employed at universities and government laboratories, schoolteachers, journalists, science writers, and educated lay readers. Its operating budget came from a mix of membership subscriptions, modest state grants, sale revenues from *Bigyan Jeuti*, and occasional donations. Its governance structure drew on the conventions of Assamese literary associations rather than on those of professional scientific societies. This hybrid form—civil society in legal status, scientific in expertise, literary in operating culture—proved durable in ways that purely scientific or purely literary institutions might not have been. It is an instance of the kind of institutional configuration that postcolonial STS scholarship (Arnold 2000; Chakrabarti 2004) has identified as characteristic of how scientific modernity becomes institutionally embedded in non-metropolitan contexts.

Institutional consolidation continued through specific moments of organised activity. The Asom Bigyan Samiti's first major science-writing seminar, on 5–6 October 1980 in Guwahati, organised by chief secretary Kulendu Pathak with Birendra Kumar Bhattacharya, Bhuvan Mohan Das, and Pramod Chandra Bhattacharya as principal speakers, established terms of reference for the next two decades of work. In 1999, the Asom Bigyan Lekhak Sangstha was founded as the third major institution in the field, complementing the older Asom Sahitya Sabha and Asom Bigyan Samiti. The Sangstha addressed the professional concerns of science writers in a more market-oriented post-liberalisation environment—editorial standards, vocabulary, royalties, engagement with non-Assamese science publishing. Its more than two dozen volumes published since 1999, its national-level workshops, and its engagement with the National Council for Science and Technology Communication on questions of vernacular science popularisation gave the field new institutional capacity.

The institutional sequence—*Pashupalan* 1925, Asom Sahitya Sabha bigyan sahitya programming from the 1930s, Asom Bigyan Samiti from 1953, and Asom Bigyan Lekhak Sangstha 1999—demonstrates the ecosystem's capacity for institutional reinvention. Each new institution did not replace the previous one but supplemented it, producing the layered institutional structure on which the field's continuity depended. By the late 1990s, an Assamese science writer could draw on three overlapping civic-scientific institutions, multiple periodicals, the broadcast infrastructure of AIR Guwahati and Doordarshan, the daily and weekly press, and the editorial networks formed at the workshops and seminars convened across the previous decades. This overlapping configuration is what the ecosystem framework defines and what the field's quantitative survey-based descriptions have tended to leave under-theorised.

4.3. The Print Public Sphere in Lateral Expansion

The civic-scientific institutional architecture described in Section 4.2 was articulated through a print public sphere that extended substantially beyond the flagship periodicals. To understand the ecosystem's reach, we need to follow the print public sphere into its lateral expansions: the daily and weekly press, the broadcast media of AIR Guwahati and

Doordarshan, and the women's literary culture organised around the magazine *Lekhika* (Lekhika 1975).

The daily Assamese press absorbed substantial popular-science content from the 1960s onwards. Bijoy Krishna Dev Sharma's career exemplifies this pattern: more than five hundred popular-science articles were published in *Dainik Asam*, *Nabajug*, *Asam Sambad*, and *Janambhumi* between 1963 and the 2000s, alongside SF novels and a sustained engagement with Akashvani Guwahati's science programming. Dev Sharma represents not an outlier but a type. The mature ecosystem produced writers who moved fluently between popular-science articles, daily journalism, broadcast scripts, and SF stories—writers whose practice was constituted by the ecosystem rather than by any single institutional venue.

AIR Guwahati's role from the late 1970s was to extend the print public sphere into broadcast. Dinesh Chandra Goswami's *Akanir Mel* was serialised on Akashvani Guwahati from 1980; his *Padartha Bigyanar Manorom Jagatkhan* (Goswami 1996) is a print compilation of his Akashvani scripts from 1970 onwards. Goswami's stage play *Tritonar Abhijan* (1991) was first performed for Akashvani Guwahati. The cross-registration between print and broadcast meant that the ecosystem's audiences expanded beyond the literate periodical-readership into the listening public—a substantial widening of social reach. Doordarshan Guwahati from the 1980s extended this further into television, with school-curriculum-aligned content reaching audiences in the millions across the broadcast footprint. The mediascape framework developed by Appadurai (1996) is useful here: the ecosystem's expansion across periodical, broadcast, and (later) digital media is not a sequence of substitutions but a layering of communicative modalities through which scientific knowledge has continued to circulate.

Within this expanded public sphere, women's contribution operated through a combination of mainstream venues and specifically gendered institutional forms. The women's literary periodical *Lekhika*, founded in 1975 by the Asom Lekhika Samaroh Samiti, carried science articles in many of its early issues alongside its broader literary content. *Lekhika* should be understood as a node within the broader ecosystem rather than as a separate parallel institution. The Asom Sahitya Sabha's *Bishwakosh* project (1996–2003), the four-volume Assamese encyclopaedia, drew on approximately 260 contributors to its science volumes, of whom approximately 45—roughly seventeen per cent—were women (Sharma 2003). The figure indicates visible institutional presence, but it also reveals persistent gender asymmetry within the ecosystem. Sharma's role as the founding editor and publisher of *Pashupalan* in 1925 was one of the most consequential individual contributions to the early development of the ecosystem; the *Lekhika* generation later extended women's participation within a broader literary culture; the *Bishwakosh* contributors documented women's collective presence at scale; and the contemporary period has produced novelists like Bandita Phukan and editors like Aditi Bezbaruah. A dedicated study of women's role in the ecosystem would significantly strengthen the existing account.

4.4. Speculative-Imaginative Extension: Kalpabijnan as Vernacular Scientific Imagination

The literary-scientific mediation that the ecosystem enables finds its most developed expression in the Assamese science-fiction tradition (kalpabijnan). The tradition is not peripheral to the popular-science ecosystem; it is its speculative-imaginative extension—the register in which the conceptual material of vernacular science writing entered the imaginative culture of Assamese letters. Treating SF as an integral element of the popular-science ecosystem rather than as a separate literary phenomenon clarifies a central feature of the ecosystem's social function: its capacity to not only communicate scientific content but also cultivate the speculative imagination through which scientific concepts enter public meaning-making.

The case begins with Barua's (1937) "Birachatiyar Desh", published in the magazine *Awahan* (Barua 1937). The story is satirical-allegorical, set on an extraterrestrial planet whose inhabitants communicate by telephone. What is striking about its placement in 1937 is the institutional context: by this point, Assamese readers had been encountering popular-science articles in *Arunoday* and its successors for over ninety years, and *Pashupalan* had been publishing for a dozen years. The reading public "Birachatiyar Desh" addresses is one already trained in vernacular scientific exposition. The story's deployment of scientific motifs relies on that prior training. Existing analytical work on the Assamese SF corpus, notably Nath's doctoral study (Nath 2017), has focused primarily on textual interpretation of individual stories; the present article instead reads the SF tradition as one expression of the broader ecosystem within which it emerged.

Subsequent foundational texts deepened the speculative-imaginative project. Nagendra Narayan Choudhury's "Rasayan" (1938) reframes the Ayurvedic concept of *kayakalpa* within a modern scientific frame: a chemist's "ape's gland" extract restores an old man's youth, with disastrous consequences. Kumudeswar Borthakur's "Atom Boma" (1946) responds to the Hiroshima moment from rural Assam and is set in the uranium-rich Garo Hills. Saurav Kumar Chaliha's "Awaaj" (drafted 1950, published in revised form in the Puja issue of *Asam Batori* on 16 October 1966) introduces a sound-emitting machine—the "Mininoins"—capable of cancelling all natural sound by saturating the auditory environment with engineered noise. Its anticipation of *shabda-pradushan* (sound pollution) by approximately two decades is an early instance of speculative function: the SF text imagines a concept before the public-policy discourse names it. Bhabendra Nath Saikia's "Gahbar" (1968) is constructed around the experience of cardiac transplantation in the immediate aftermath of Christiaan Barnard's first successful human heart transplant in Cape Town in December, 1967. By 1968, the foundational corpus of Assamese SF was established.

What is analytically significant is the relationship between this corpus and the popular-science ecosystem within which it emerged. The same writers who produced *kalpa-bijnan* stories produced popular-science articles in the same magazines. Goswami—whose first SF story "Konkal" appeared in the 1970 *Dainik Asam* Puja special and whose first SF collection *Bhadrata Mapak Yantra* appeared in 1985—is also the author of the popular-science books *Bigyane Anib Joar*, *Anka Janka Panka*, *Telar Kahini*, and *Padartha Bigyanar Manorom Jagatkhan*. Tamuly's first SF story "Borokhun" appeared in *Bigyan Jeuti* in 1968; the same magazine carried his popular-science articles. Mihir Kumar Goswami's SF novels appeared alongside his medical-popularisation volumes. Science fiction is not a separate genre carried by distinct institutional infrastructure. It is the imaginative register of the same writers, in the same magazines, addressed to the same readers.

This integration has shaped the character of Assamese SF in distinctive ways. The tradition has tended toward what Anglophone genre criticism would call Soft SF—stories whose primary interest is the human, ethical, and social consequence of scientific or technological development rather than technical extrapolation as such. "Awaaj"'s interest is the lost voice of the singer-wife, not the engineering of the Mininoins. "Gahbar"'s interest is Mary's emotional dislocation following her husband's transplant, not the surgical procedure. The Soft SF orientation, traceable to the foundational corpus, persists across the tradition over time. It is best understood not as a relative weakness of the genre but as a structural consequence of the ecosystem within which SF emerged: writers trained as popular-science expositors brought to SF a register that prioritised accessibility, ethical resonance, and analogical reasoning over technical extrapolation.

The contemporary period has consolidated SF's position within the ecosystem. Lakshminandan Bora's novel *Kayakalpa* (2002), which returns half a century later to the *kayakalpa* theme of Choudhury's "Rasayan", was awarded the Saraswati Samman in 2008—the first As-

Assamese-language work treating SF themes to receive a national literary award. Santanoo Tamuly's *Asomiya Kalpabijnan Galpa-Sankalan* (Tamuly 2017), published by the Sahitya Akademi, anthologises twenty-three foundational stories and represents the institutional culmination of the tradition. Abhijit Sharma Barua's prolific contemporary output, represented by *Natun Prithibi* and other works, shows the continuing vitality of Assamese *kalpabijnan* (Tamuly 2017). The science-fiction tradition, then, is not a footnote to the popular-science ecosystem; it is the mode through which that ecosystem has cultivated speculative–imaginative engagement with scientific knowledge. A vernacular knowledge ecosystem that produces both journalistic exposition and imaginative literature has, by that fact, demonstrated the capacity to sustain a fully developed scientific culture in the language.

The canon-forming significance of the tradition is visible in the anthology's contents. It brings together stories by Hariprasad Barua, Nagendra Narayan Choudhury, Saurav Kumar Chaliha, Bhabendra Nath Saikia, Dinesh Chandra Goswami, Santanoo Tamuly, Bandita Phukan, and others. Its contents demonstrate that Assamese *kalpabijnan* developed not as an isolated curiosity but as a recognised literary–scientific corpus, and the anthology therefore represents an institutional moment in which Assamese science fiction entered a national literary framework.

4.5. Reproductive Mechanisms: Workshops, Handbooks, and Terminology Projects

The continuity of any institutional ecosystem depends on its capacity to reproduce itself—to train new generations, transmit conventions, develop technical infrastructure, and absorb new participants. The Assamese popular science writing ecosystem has done this through a specific set of practices that are the social mechanisms of ecosystem reproduction: workshops, handbook culture, terminology projects, and editorial mentorship networks. These mechanisms convert what would otherwise be a sequence of texts into a sustained socioscientific tradition.

The workshop is the clearest mechanism of writer training. The 30 April–2 May 1998 Jorhat science-writing workshop, convened immediately before the Asom Bigyan Lekhak Sangstha's formal founding, exemplifies the ecosystem's reproductive logic. Organised by the Asom Sahitya Sabha and held at the Chandrakanta Sandikoi Bhawan, the workshop was led by Dinesh Chandra Goswami and brought together established figures—Sonneswar Sharma, Paramananda Mahanta, Santanoo Tamuly, Kshiradhar Baruah, Bijoy Krishna Dev Sharma, and Ratindranath Goswami—with younger writers including Bhabesh Mahanta, Abhijit Sharma Barua, Aditi Bezbaruah, Bandita Phukan, Amiya Rajbangshi, and Kalyan Bhuyan. The workshop's significance lies in what it produced. Of those younger participants, several became the dominant figures of the next two decades. Sharma Barua's prodigious SF and popular-science output across 2005–2016 originates institutionally in the 1998 Jorhat workshop. The 1998 workshop was one moment in which the ecosystem reproduced itself—a pedagogic event in which the older generation transmitted conventions, expectations, and institutional contacts to the cohort that would carry the tradition forward (Baruah 2005).

The handbook is the second mechanism. The major Assamese-language critical surveys—Vaisya's *Asomiya Bigyan Sahitya* (Vaisya 1982), Pramod Neog's *Bigyan Sahitya* (Neog 1998), Baruah's *Asomiya Bigyan Sahitya: Atitorpara Bartamanoloi* (Baruah 2005), Tamuly's anthology (Tamuly 2017), and Rajkhowa's edited *Asomiya Bigyan Sahitya* (Rajkhowa [2018] 2019)—have collectively functioned as the working handbook of the field. These works are not merely descriptive. They are norm-establishing. They identify the key writers, establish the canonical texts, transmit the editorial conventions, and delineate what counts as bigyan sahitya within Assamese letters. The handbooks function as the ecosystem's means of self-description and self-reproduction: an aspiring writer entering the field has access to a substantial body of meta-literature that defines the field's expectations.

Terminology development is the third mechanism, and arguably the one with the deepest sociolinguistic significance. The Asom Bigyan Samiti's editorial commitment, sustained across *Bigyan Jeeuti*'s history, has been to use Assamese-language terms wherever possible, supplementing with English originals on first use. This editorial practice has, across decades, produced a substantial Assamese-language scientific vocabulary covering physics, chemistry, biology, mathematics, computing, environmental science, and medicine. Madan Sharma's *Bishwakosh* Vol. 4 (Sharma 2003) codified much of this vocabulary; Manabendra Kumar Barua's www.xobdo.org online dictionary, developed since 2006, has extended terminology development into the digital age. What matters analytically is not the existence of an Assamese-language scientific vocabulary—any sufficiently developed vernacular science culture would produce one—but the institutional infrastructure that has sustained its development across decades. The vocabulary is a collective artifact of the ecosystem, not an individual achievement, and it functions in the manner of Latour's (Latour 1987) inscription devices: a stabilising technology that allows scientific concepts to be reliably reproduced across writers, periodicals, and generations.

The deeper analytic point is that vernacular terminology development is not merely lexical work but a form of epistemological practice. Each term coined in Assamese—for atom, gene, photosynthesis, orbital, and antibody—is the product of a small interpretive negotiation between the inherited Sanskritic and Indo-Persian conceptual vocabularies of the language and the contemporary scientific concepts being introduced (Pollock 2006; Chakrabarty 2000). The cumulative effect, across decades, is the construction of a scientific vocabulary that is neither a transliteration of English nor a direct importation from cosmopolitan scientific Sanskrit, but a distinctively Assamese register in which scientific concepts can be reliably stated, debated, and reproduced. This work has happened largely below the level of explicit theoretical reflection within the ecosystem itself. Its sociolinguistic significance is nonetheless substantial: a vernacular language in which substantial scientific discussion can be conducted at a working level of precision is itself a form of scientific modernity, distributed across the institutional architecture rather than concentrated in any single writer or text.

These reproductive mechanisms—workshops, handbooks, and terminology projects—have together enabled the ecosystem to navigate the political-economic transitions of the past century without losing its institutional substance. Continuity, in this analytical sense, is not the persistence of any single periodical or writer but the ongoing reproduction of the discursive infrastructure that enables periodicals, writers, and readers to operate together.

5. Discussion: Vernacularising Scientific Modernity

The substantive analysis presented in Section 4 supports several broader analytic claims about how societies vernacularise scientific knowledge in the long term. This discussion identifies three such claims and considers their implications for the wider science-and-society literature.

The ecosystem's durability becomes clearest when the four political-economic transitions are considered separately. In the late nineteenth century, the decline of missionary print dominance could have ended the *Arunoday*-based model of vernacular scientific explanation; however, analogical and didactic prose continued through texts such as *Swastha Raksha*, *Prathamik Dhatribidya*, and *Akash Rahasya*. After independence, the risk was that science writing would remain dispersed across isolated authors and periodicals; the Asom Sahitya Sabha and the Asom Bigyan Samiti supplied civic-scientific institutional anchoring. After the liberalisation of the 1990s, market-oriented publishing and English-language science media could have weakened Assamese popular science; the Asom Bigyan Lekhak Sangstha, workshops, anthologies, and handbook culture gave the

field new professional coherence. In the digital transition after roughly 2015, print-based authority faced pressure from online circulation; digital dictionaries, terminology resources, and the continuing prestige of institutional print culture helped the ecosystem adapt rather than collapse.

First, vernacular scientific modernity is constitutive, not derivative. The dominant historiographical tendency has been to read vernacular science communication as a downstream effect of metropolitan scientific production—translation, popularisation, and dissemination of knowledge produced elsewhere (Wynne 1991). The Assamese case complicates that reading. From *Arunodoy's* May 1846 treatment of blood circulation and natural phenomena forward, the editorial conventions, analogical resources, and reading publics of Assamese popular science have constituted a distinctive vernacular-mediating practice that cannot be reduced to translation alone. The London watermains analogy for human haemodynamics, the prashnotar-derived dialogue form, and the integration of Ayurvedic *kayakalpa* with modern medical concepts in Choudhury's "Rasayan" are not inadequate approximations of metropolitan scientific discourse but distinctive vernacular forms in which scientific concepts have been rendered publicly meaningful. The case supports broader theoretical claims (Pollock 2006; Chakrabarty 2000) that modernity in postcolonial contexts is plural, that scientific modernity has been distinctively vernacularised in different linguistic and institutional contexts, and that the Assamese ecosystem represents one such vernacularisation rather than a peripheral instance of a metropolitan original.

Second, the persistence of vernacular knowledge ecosystems is best explained by institutional density rather than by individual genius. The Assamese case has navigated four substantial political-economic transitions across nearly two centuries without institutional collapse. The conventional historiographical instinct is to attribute such persistence to the agency of individual founder-figures—Nathan Brown for the missionary phase, Kanak Chandra Sharma for the institutional phase, and Hariprasad Barua and Dinesh Chandra Goswami for the post-independence phase. Such individual attribution is not inaccurate, but it is incomplete. The ecosystem has persisted because at every moment from the 1960s onwards, it has been supported by multiple overlapping institutions—the Asom Sahitya Sabha, the Asom Bigyan Samiti, the Asom Bigyan Lekhak Sangstha, AIR Guwahati, Doordarshan, the daily press, commercial publishers, women's literary networks, and educational institutions—whose combined effect has maintained the ecosystem even when individual institutions or figures have faltered. This finding aligns with broader STS scholarship on institutional mediation (Latour 1987; Jasanoff 2005) and suggests that comparative analyses of vernacular knowledge ecosystems should focus on institutional configurations rather than on heroic-individual narratives.

Third, the integration of literary-scientific mediation with popular science writing is constitutive, not incidental. In the Assamese case, it appears in the *kalpabijnan* tradition and in the literary register of *bigyan sahitya* prose; it is one of the conditions through which scientific modernity becomes culturally embedded. Where popular science writing has been institutionally separate from literary culture, the social embedding of scientific concepts has tended to be shallower; where the two have been integrated, as in the Assamese case, the embedding has been deeper. This claim warrants comparative testing across other Indian-language vernacular science traditions and across non-Indian contexts; comparable phenomena are documented in Anglophone Victorian and Edwardian contexts by Burnham (1987), Lightman (2007), and Fyfe (2012). The implication for science-communication theory is that the deficit model is doubly inadequate: it underestimates the agency of vernacular publics, and it misses the role of literary mediation in cultivating the imaginative cultures within which scientific concepts find public resonance.

A Comparative Note: Bengali and Assamese Bigyan-Sahitya

The most useful comparative case is the Bengali bigyan-sahitya tradition, which shares with the Assamese case both a long duration (running from the mid-nineteenth century onwards) and a similar institutional architecture combining periodicals, civic-scientific bodies, and an integrated literary-scientific mediation (Banerjee 2020; Sismondo 2010). Both traditions emerged from missionary print encounters; both developed civic-scientific institutions in the post-independence period (the Bangiya Bigyan Parishad founded in 1948 paralleling the Asom Bigyan Samiti); both produced significant science-fiction traditions in which the same writers who produced popular science writing also wrote speculative fiction (Premendra Mitra's Ghanada stories and Satyajit Ray's Shanku corpus in Bengali parallel the Assamese kalpabijnan tradition). But a comparison also reveals structural differences worth noting. The Bengali tradition has had access to a substantially larger linguistic public, deeper integration with metropolitan elite scientific institutions (the Indian Association for the Cultivation of Science; the Bose Institute), and a more pronounced metropolitan-urban anchor in Calcutta. Acharya Prafulla Chandra Ray's vernacular chemistry writing in early-twentieth-century Bengali emerged from and reinforced this metropolitan-scientific configuration in ways the Assamese case does not parallel. The Assamese tradition, by contrast, has been rural-oriented in a way that the *Pashupalan* founding moment of 1925 made constitutive—addressing tenant farmers and small landholders rather than the urban professional middle class—and has depended more heavily on literary culture (the Asom Sahitya Sabha) as the integrating institution rather than scientific elite networks. The two ecosystems are best understood not as instances of the same model but as distinct configurations within a broader Indian-language pattern of vernacular scientific modernity (Encyclopaedia of Indian Literature 2001). Further comparative work across Marathi, Tamil, Hindi, Kannada, and Malayalam ecosystems would clarify the range of variation within that pattern and the structural factors that explain it.

The argument about overlapping institutional supports resonates with broader STS scholarship on the role of mediating institutions in sustaining knowledge cultures (Latour 1987; Jasanoff 2005; Bauer et al. 2007). Latour's (1987) account of how scientific facts are stabilised through inscription practices and institutional networks suggests that the Assamese case shows the long-term operation of such mediating infrastructures, scaled to a vernacular linguistic public rather than to elite scientific institutions. Jasanoff's (2005) concept of civic epistemologies points to the same phenomenon from a different angle: different societies develop different institutional arrangements through which they organise public knowledge claims, and these arrangements have specific historical genealogies. The Assamese case suggests that comparative STS analysis of civic epistemologies should attend not only to elite institutional configurations—research councils, regulatory bodies, expert advisory committees—but also to vernacular knowledge ecosystems of the kind described here, which operate at different scales and through different institutional logics but perform analogous social functions in their own linguistic publics.

A further analytic implication concerns the concept of vernacular modernity itself. Recent scholarship has increasingly argued that modernity in postcolonial contexts is not a single phenomenon imported from metropolitan centres but a plurality of locally mediated formations (Pollock 2006; Chakrabarty 2000; Kaviraj 2010). The Assamese case provides a specific instance of how scientific modernity—often taken to be the most universalising of modernity's aspects—has nonetheless been distinctively vernacularised. Vernacularisation is not merely linguistic translation. It is the construction of a complete institutional ecosystem within which scientific knowledge is produced, communicated, contested, imagined, and reproduced in a specific linguistic and cultural community. To recognise the Assamese ecosystem is, in this sense, to recognise that the languages, institu-

tions, and imaginative cultures of South Asia have not been passive recipients of a metropolitan scientific modernity but active producers of distinctive forms of scientific modernity in their own right.

Three further implications of the analysis warrant brief mention. The Assamese case provides empirical support for the broader claim that postcolonial science-and-technology studies should attend systematically to non-metropolitan vernacular ecosystems rather than focusing exclusively on metropolitan production sites and elite intermediaries (Arnold 2000; Prakash 1999; Raj 2007). The case suggests that civic–scientific institutional formations like the Asom Bigyan Samiti—neither state agencies nor private commercial ventures but civil–society institutions drawing on practising scientists, educators, and writers—may be a particularly effective institutional vehicle for sustaining vernacular science communication, with implications for science-communication policy in other contexts. The case also shows that women’s participation, though historically constrained and uneven, has been more significant than the male-dominated canon alone would suggest, and that such participation—from the *Lekhika* generation through to the contemporary cohort—deserves dedicated analytic attention. Each of these implications connects the Assamese case to ongoing debates in science-and-society scholarship and suggests directions in which the ecosystem framework can productively travel.

The argument has limitations. The ecosystem framework developed here may not generalise directly to all vernacular contexts; differences in linguistic ecology, political–economic context, and institutional history between Assam and other Indian-language regions may produce different ecosystem dynamics. The analysis privileges production-side data over reception-side; what readers have actually done with the texts they have encountered remains under-theorised. Finally, the comparative apparatus, while invoked, is not developed at length. Each of these limitations identifies a future research direction.

6. Conclusions

This article has reframed Assamese popular science writing as a vernacular knowledge ecosystem—a sustained institutional, periodical, and discursive infrastructure through which scientific knowledge has been linguistically mediated, socially circulated, and culturally embedded in Assamese-language public culture across nearly two centuries. The reframing has analytic consequences. It foregrounds questions central to the science-and-society field: how scientific modernity becomes socially rooted in vernacular publics, how non-metropolitan publics have developed their own scientific cultures, and how institutional mediation rather than heroic individual agency sustains intellectual traditions across political–economic transitions.

The Assamese ecosystem comprises three interlocking structures: a print public sphere consolidated by *Arunoday* and its successors; a civic–scientific institutional architecture anchored by *Pashupalan*, the Asom Sahitya Sabha, the Asom Bigyan Samiti and *Bigyan Jeuti*, and the Asom Bigyan Lekhak Sangstha; and a literary–scientific mediation through which scientific discourse has entered Assamese imaginative culture, most fully in the *kalpabijan* tradition. The ecosystem has reproduced itself through workshops, handbooks, terminology projects, and editorial networks. Folk knowledge such as *Dakar Bachan* and the courtly–scholarly translation traditions of the Koch and Ahom periods constitute the substrate on which the print ecosystem of 1846 onwards was built—a substrate of vernacular epistemic culture rather than proto-modern science.

The case offers a productive empirical instance for theorising how societies vernacularise scientific knowledge. It contributes to international debates on the public understanding of science, vernacular modernity, the print public sphere, and postcolonial knowledge circulation. It suggests that comparative analytic studies across other Indian-language vernacular science ecosystems—Bengali, Marathi, Tamil, Hindi, Kannada, and

Malayalam—represent a promising research direction and that the ecosystem framework may transfer productively to other postcolonial linguistic contexts.

Three directions for further research surface. Reception-history work, addressing what Assamese readers have actually done with the popular-science texts they have encountered, would significantly strengthen the empirical foundation of claims about the ecosystem's social impact. A dedicated biographical and institutional study of Dr. Kanak Chandra Sharma and the *Pashupalan* project would clarify what is currently the most archivally underdeveloped element of the foundational period. Systematic comparative work across Indian-language vernacular science ecosystems, using the framework developed here, would test whether the ecosystem framework supports robust cross-linguistic analysis.

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