(Nation) building civic epistemologies around nuclear energy in India

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Anti-nuclear activism provides a significant challenge for uniting India under a shared 'civic epistemology' that binds the state, broader publics, elite urban activists and rural communities together in collective institutionally-mediated practices of how to vet policy-relevant knowledge, adjudicate expertise and imbue certain kinds of evidence with objectivity and credibility. Instead, this article argues that nuclear India is experiencing epistemological crossfire from various groups as they attempt to coproduce their particular epistemic and political order. In particular, how the overt focus of India's nuclear authorities on Public Understanding of Science (PUS) and scientific literacy by the nuclear establishment is received by different groups point toward the idea that PUS is really a proxy for PUDDLERS. This acronym refers to the public's understanding for the means and ends of Development, desired participation in Democracy, the correct interpretation of Lived Experiences, and increasingly, to the subscription to the prescribed Religion of Hindu fundamentalist ideas, in addition to the state's institutional ideas of Science. With the increasing political debilitation and sometimes death of activists who are deemed anti-state or anti-development, these dynamics will not abate in the near future.

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Subaltern challenges to nation-building civic epistemologies

That technology is the path to better social and economic futures is a mantra chanted by most of the world's leaders, but arguably the loudest and with most persistence by India's political elite. In the view of Western-educated political and scientific elites of India, like India's first prime minister Jawaharlal Nehru and his close confidant and widely-credited founder of the nuclear program, Homi Jehangir Bhabha, the successful emergence of India in 1947 rested their ability to craft a double narrative of scientific and social progress. Investments in science and technology, along with a commitment to democracy, would generate novel institutions for economic production and redistribution, and catapult the nation from backwardness, poverty and religious foment into a uniquely Indian modernity of rationality, wealth and secularism (Chatterjee 1986; Prakash 1999). In the last three decades, however, the ends and means of science, technology and democracy have come under heavy fire in India's civil society. Although the narrative of a mutually beneficial 'social contract' between science and public welfare enjoys persistent resurrection within India's leaders and affluent classes (Mawdsley 2004; Gadgil and Guha 1995), it is considered dog-eared and worn by many who view the state as a perpetrator of violence—usually against the poor—through (and for) science and technology in

the name of the public good (Nandy 1988; Visvanathan 1997; Shiva 1997). Indian democracy, too, is regarded a 'sham' by many Indians who see democratic institutions and the bureaucracy it engenders as a system of oppression and disenfranchisement. India's paramilitary operations against its own tribals, the persistence of widespread poverty, gender violence and illiteracy, and the support of India's new industrial elites are seen as a failure of democracy to effect long-lasting social change.

A key question, then, for a nation like India, splintered along the fault lines of caste, class, religion, gender and language, is how effectively it is able to generate social and political processes through which diverse, competing technological visions of the future get made, critiqued, assessed, deliberated, and chosen in ways that comport with idealized democratic sensibilities about freedom, equality, justice, and the rule of the law. These socio-political processes for creating, debating, and choosing ideas have been called 'civic epistemologies.' By way of explanation, Jasanoff (2005: 255) writes:

> Faced with the same technological alternatives, societies at similar levels of economic and social development often choose to go in different directions, based on divergent framings of what is at stake, and correspondingly different assessments of the risks, cost, and benefits of various possible trajectories… epistemologies refers to the institutionalised practices by which members of a given society test and deploy knowledge claims used as a basis for making collective choices…These collective knowledge-ways…are distinctive, systematic, often institutionalised, and articulated through practice rather than formal rules.

In liberal democratic nations where many of these studies are situated, current scholarship on civic epistemologies is often predicated on the existence of arguably robust regulatory institutions (Felt *et al* 2010; Bandhauer *et al* 2005). Relatively unblocked channels of knowledge flow—in culturally and politically structured ways—between different nodes of public engagement within the state, private sector, academia, media, non-profit organisations, and legal domains. Scholars value both consensus and opposition for democratic vibrancy, and advocate for the diversifica-

tion of institutional sites of deliberation, representation, and participation (Dryzek 2010; Brown 2009; Kitcher 2003). As such, the concept of civic epistemologies is a powerful framework for describing national variation in debating and implementing the same technologies in many Western liberal democracies (Miller 2008; Jasanoff 2005; Miller 2004). Mature liberal democracies in North America and Europe try to practice, liberal ideas of individualistic citizenship and due process, enjoy—at least, for non-marginalised and well-represented minority groups—relatively equal public spheres, and tend to have highly institutionalised forms of contestation, through which the public can make claims to the government about technological trajectories. Regulatory bodies, in turn, respond to criticisms and concerns while attempting to maintain credibility with various publics through culturally appropriate registers of action (Hilgartner 2000; Jasanoff 1995; Ezrahi 1990).

In the so-called world's largest democracy, progressive scholars and activists highlight how those institutionalised knowledge channels for the disadvantaged can be experienced as clogged at best or nonexistent at worst. Such experiences are analogous to those shared by marginalised communities in the Global North attempting to seek recourse with the state, such as Black, Hispanic or indigenous communities. For marginalised groups in India, political participation tends to mobilised through protests and social movements, where government institutions are rarely seen by progressive champions of the oppressed, or as arbiters of justice and fairness, but as justices (in the case of the Supreme Court) who are prone to arbitrary exercises of power on behalf of the wealthy and powerful. For example, in the 1970s the Indian Supreme Court introduced public interest litigation (PIL) as a way to secure flagging public legitimacy after sanctioning Indira Gandhi's declaration of Emergency and its accompanying martial law and suspension of democratic rights. While PILs were intended to expand avenues of claims-making to disadvantaged groups, and indeed contributed to judicial activism over environmental concerns in the 1990s, longitudinal analysis of victories over claims to fundamental rights show a general preference for advantaged

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persons (Gauri 2009). Instead of more formalised and sanitised debate in state institutions, politics on both social and technological issues illustrate the pre-eminence of party politics with its practices of nepotism, favouritism, and corruption. Scholars studying Indian democracy argue how ideas of universal citizenship gain little traction in political arguments, when cultural citizenship is cultivated at the expense of social citizenship (Jayal 2006). Early efforts at political de-centralisation have failed to better link people to decision-making bodies, creating a political culture of brokers and dealers who act as patrons to client's interests—so called, 'patronage democracy'—where upper caste members and other elites become instruments of dominant interests (Chandra 2007). Such kinds of 'clientelistic representation' reinforces narrow group identities within specific castes and languages, while compromising broader civic identities because of political practices and channels that weaken the link from civil society to the state (Heller 2013; Jayal 2006; Mahajan 1999; Mamdani 1996; Fox 1994). As Heller (2013) states, 'the form of the local state and the mode of its interface is so institutionally weak and so thoroughly permeated by social power and extra-legal authority as to vacate the actual practice of citizenship.' Indian democracy, then, as it is being practiced, appears neither to be liberal, where individual rights are guaranteed, nor communitarian, with its focus on collective public good (Leach, Scoones & Wynne 2005), making the constitution of the Indian civic space fraught with contestation over who belongs in it and why.

The long history of scholarship in India and other post-colonial nations on the politics of the subaltern go far to interrogate the potential for national civic epistemologies by speaking more directly to those groups who are not represented in civic spaces—and indeed, how communities emerge, or not, as public. Partha Chatterjee (2004) perceives a division between 'political' and 'civil' society, where members of the former are only tenuously rights-bearing citizens who are treated as populations to be cared for, instead of citizens with guaranteed freedoms with access to civil-institutional forms of engagement with the state. In this formulation, those in civil society are seen as forward-

ing a liberal democratic vision of citizenship and democratic governance. In this vein, elite, urban-based anti-nuclear activists have long attempted to shape—and thereby constitute the Indian state—as one that would recognise nuclear expertise within civil society, instead of only legitimising nuclear knowledge produced within its own institutional walls (Haines 2019). Rather than comport to the shared rationality desired by the state, where citizens would not question its nuclear expertise, decision-making or military logics, anti-nuclear activists have attempted to cultivate different 'credibility economies' with the state to install themselves as credible nuclear counter experts in their own right, who are knowledgeable about human and environmental risks of nuclear power. Moreover, such attempts were, and continue to be, mediated through nationally recognisable institutions such as the court system, nationally-circulating newspapers and academic institutions (Haines 2019).

Yet the rationalities structuring the relationship between so-called political society and the Indian state is not reflected in this institutionally-mediated relationships. Political society has long been thought of has qualitatively 'different' from its civil society counterpart. Dipesh Chakrabarty (2000) writes about how the subaltern, particularly peasants, express themselves in protest, usually violently, by drawing on discourses on caste, religion, ethnicity and kinship, rather than recognised modes of 'rationality'. Although peasant insurgencies were previously thought to be pre-political by British Marxists working on so-called histories from below, subaltern theorists view peasant protests as a realm of politics separate and apart from the elite politics of civil society that are generally confined to government institutions. Fraser (1990) talks about how the formation of 'subaltern counterpublics' can undermine dominant structures of power and privilege. In drawing attention to huge inequalities in political power, Chatterjee, Chakrabarty and Fraser implicitly critique the nation-building project in terms of the state's capacity to enroll and include its population, and transform them into citizens. Indeed, the relationship the state has built with its subaltern, particularly in rural communities slated for nuclear development, has been one of welfare provision. The

only relationship desired by the state, and often its political society citizens, is one of handsome compensation and rehabilitation for land being purchased for nuclear reactors.

Yet, in these kinds of projects where the Indian government decides to build large-scale energy projects in rural areas, the boundaries between the civil and political spheres can grow porous. Throughout India's post-colonial history, epistemic and indeed, ontological, battle lines have been drawn and re-drawn, usually between the state and citizens, around large-scale industrial projects like hydroelectric dams, to mete out, sometimes violently, constitutional questions. How will rights, responsibilities and resources be distributed? What public goods and whose ideas of public well-being will gain currency? Which constellations of power are stabilised? Whose identities are recognised? What does it mean to be a citizen, and who can practice citizenship and how? These questions are answered through political-economic and cultural processes of purification that delineates and re-inscribes who belongs where. Yet, the marginalised of political society and the privileged of the civil society are not primordial characters, but are created and interpellated into these sociopolitical domains. In rural nuclear politics, what happens when the subaltern of the political society transgress their prescribed roles of negotiating monetary and livelihood compensation, and begin adopting rationalities of risk and safety that is the longstanding platform of urban, anti-nuclear activists of civil society? This paper deals with the politico-epistemic crossfire that occurs during such transgressions.

The extent of cohesive national level civic epistemologies, then, implicates the extent of institutional nation-building. Although nation-building is always a work in progress, always a 'democracy to come' (Derrida 2005), patterned forms of national civic epistemologies emerge along with the sedimentation of democratic institutions, its knowledge production practices and relationships to publics. In work that attempts to define the contours of civic epistemology in developmental states (e.g. Tironi *et al* 2013; Jasanoff 2007), the difficulty in categorising the registers of the politics of knowledge—objectivity,

demonstrations practices, modes of expertise—allude to the incompleteness of the nation-building project. But the national character of civic epistemologies has been sidestepped in recent literature, which focuses on local civic epistemologies within grassroots organisations (Mendez 2013), or the existence of hybrid epistemologies in nations (Tironi *et al* 2013). Although the existence of local civic epistemologies cannot be denied, what is more intriguing is whether and how these local epistemologies filter up to the national level, and if they get lost along the way. Equally important is what the existence of hybrid civic epistemologies, as has been proposed for Chile and its debate with genetically modified organisms (Tironi *et al* 2013), says about power dynamics latent in the project of nation-building and the creation of both citizens, who may not share culturally specific ways of making claims to the state, and institutions, who may be more likely to answer to elite segments of the polity in specific ways and not others.

Civic epistemologies, then, are not naturally occurring phenomena but rather must be socially constructed and made to work across widely divergent domains ranging from conversations at roadside *dhabas* and coffee shop to public protests and the civic square to the media and national policy-making. Assembling such epistemologies over time is a complex, lengthy, and politically fraught process, even in advanced industrial democracies, let alone in places where democracy remains fragile, as scholars like Ezrahi (1990, 1996) and Jasanoff (1990) have demonstrated. Yet, they are absolutely critical to the possibility of democracy in today's technological world.

If the already-complicated and frayed socio-political fabric is asked to accommodate an esoteric and shielded technology like nuclear power, the political and cultural dynamics that ensue sheds light on how civic and political spaces are being constituted. Nuclear power in India, as in many other nations, has been protected from public scrutiny since its inception on the heels of Independence under the aegis of the Department of Atomic Energy (DAE) formed in 1948. The minimal allowance of parliamentary scrutiny has been largely performative and has not

translated to effective oversight (Ramana). The amoebic civic space that expands and contracts around different publics and issues in India has been non-existent for nuclear energy. Even India's 1998 nuclear weapons testing nucleated a small civic sphere of urban, elite activists around opposing nuclear power, such as the Coalition for Nuclear Disarmament and Peace, which began creating transnational linkages to other anti-nuclear activists, such as in Pakistan, and became signatories to the South Asia Against Nukes and proponents of creating a South Asia nuclear weapons free zone (Vanaik, personal interview). Yet most criticisms of the most prized and heavily-invested symbol of hyper-modernity and energy and economic security in the nuclear state largely fell on deaf ears, albeit leading to some efforts to perform public legitimacy by making a few pieces of information online (Kaur 2009). As political scientist and affiliate of CNDP, Achin Vanaik, wryly noted, 'We are more like a mild irritant to the state.'

India has seen a history of largely unsuccessful rural mobilisation against nuclear development in the 1980s and 90s, with successes confined to the state of Kerala where agricultural land was not a point of contention, and scientific and political elites were able to mobilise both science and politics to put pressure on a pro-nuclear state government that was at risk of losing elections (Bhadra, 2016). But times have changed after the US-India nuclear deal of 2008 and the Central government's aggressive nuclear expansion into productive farmlands in the countryside to site and build new nuclear reactors from the US, Russia and France, and the Fukushima nuclear disaster that followed three years later. New rural participants, from mostly lower-class/caste farming, fishing and mining communities have begun to oppose the Central government's nuclear vision, and have begun to openly criticise nuclear energy for being destructive to land, livelihood and cultural cohesion—the timeless critiques against large-scale development projects such as big dams in India.

But through alternately sporadic and sustained engagements with urban-based elite activists, villagers have also begun to oppose nuclear power on environmental and human health grounds, and increasingly,

have portrayed nuclear power as anathema to democracy. Whether and how both registers and content of criticism travel to the national public sphere, enroll a wider public, and impact nuclear policy remains to be seen, especially when most Indian social movements have failed to create substantive change at the national level, with some even beginning to shun engagement with the state altogether, favouring an 'anarcho-communitarian' turn, remains to be seen (Heller 2006; Harriss 2000; Bardhan 1999). What does it mean, then, for civic epistemologies where social groups are not well connected to the state, and moreover, occupy different ontological spaces in which there is hardly any collectively shared experience of reality, let alone knowledge about it? In these murky and politically turbulent waters, Indian democracy is not illuminated through the invocation of stable sociotechnical domains, but with an attention to the uneven constitution of public spaces, the instantiation of nuclear energy, epistemic politics and the Indian state—that is, how the Indian nation is being imagined and built, by whom, and through what kinds of politico-epistemic practices. Jasanoff (2007) has indicated in her study of the Bhopal industrial disaster that moral argumentation and authority are the registers of expertise and authority in India. Moreover, she has shown how demonstration practices of expertise and registers of objectivity in India are at once characterised by views from everywhere and nowhere. I argue that such political-epistemological crossfire—where various registers of knowledge claim collide during conflicts over who can participate in civic spaces—is indicative of tumultuous nation-building.

In the following section, I illustrate epistemological crossfire by discussing how different domains of knowledge production and circulation—legal, scientific, moral—face friction as they traverse across India's nuclear landscape, and across different scales. Specifically, I show how elite urban activists have attempted to produce citizen science; how rural communities have engaged with state-sponsored environmental impact assessments, and how the Supreme Court has dealt with nuclear issues. I end with a discussion on how the Public Understanding

of Science model should be understood as a proxy for broader political concerns, specifically the public understanding of democracy, development, lived experience, religion and science, which all constitute the vectors of political and epistemic crossfire in India's nuclear landscape.

Epistemological crossfire in India's nuclear energy landscape

Despite its technical and technocratic nature, debates around nuclear power in India are not fought on scientific grounds, and little scientific knowledge is produced on either pro-, or anti-nuclear sides. Cultural, political and moral arguments that either criticise or support nuclear power are not hidden beneath a thick veneer of apolitical scientism—the exercise of power, or its absence, is readily visible. Yet, there are a handful of anti-nuclear citizen scientists who attempt to actively produce original studies in support of the anti-nuclear cause. Since the 1990s, a wife and husband scientist team, Drs. Sanghamitra and Surendra Gadekar, have conducted epidemiological surveys of a nuclear power plant in Rawatbhata in Rajasthan in 1993, and an existing uranium mining colony in Jadugora in the state of Jharkhand (then Bihar) in 2004. Other citizen scientists, V.T. Padmanabhan has performed epidemiological surveys of communities living in areas of naturally occurring high levels of background radiation on the Kerala coast and Dr. V. Pugalzenthi have performed epidemiological studies of the Kalpakkam nuclear reactor in Tamil Nadu. Both Padmanabhan and Pugalzenthi have ferreted out from Google-translated Russian documents that the Russian parts used for the Koodankulam nuclear power plant in Tamil Nadu was substandard. M.V. Ramana, a physicist now at Princeton, has delved into the economics of nuclear power production and nuclear waste storage, and recently wrote the book *The Power of Promise: Examining Nuclear Energy in India.* Yet none of these kinds of scientific and technical knowledge production travel very far from the point of origin.

Citizen science appears to be able to prompt government response when activists claims are legitimised by respectable, august institutions. For example, in 2013, Dr. V. Pugalzenthi inquired why the Atomic Energy Regulatory Board had not conducted bathymetric surveys on India's southeastern coast after the 2004 tsunami after the Smithsonian's Global Volcanism Program (GVP) released a document stating that there was an undersea volcano reported in 1757 (Janardhanan, 2013), which was later used by the International Atomic Energy Agency (Jesudasan 2015). Arguably, the symbolic and epistemic capital of the Smithsonian compelled the AERB to commission a study by the National Geophysical Research Institute (NGRI) to perform bathymetric surveys off of the coast of Puducherry in southeastern India. When the NGRI found no evidence, they contacted the GVP, which keeps historical records of volcanoes in the Hociene, to remove it from its records; the GVP obliged (Jesudasan, 2015).

Unanimously, all citizen scientists bemoan the absence of an audience for their scientific knowledge within either the nuclear establishment, or the anti-nuclear movement. Citizen scientists believe that 'the people' are not being made scientifically cognisant of the real dangers of nuclear energy by urban anti-nuclear activists, who take scientific material, and turn it into propaganda through simplistic pictures and colloquial metaphors. Dr. Surendra Gadekar has repeatedly complained that although his Gandhi ashram in Gujarat has extensive libraries full of research and writings on nuclear power, no one in the movement has shown interest in scientific arguments, and would rather rely on moral and political criticisms. Similarly, citizen scientists gain little traction with the nuclear establishment. After the Gadekar's epidemiological study of the uranium mining colony of Jadugoda, the Uranium Corporation of India, Limited, conducted their own study and said there were no statistical anomalies, and any diseases were related to excessive alcohol consumption and lack of hygiene. The Department of Atomic Energy (DAE) has closely monitored nuclear knowledge since its inception, with public universities only recently allowed to study nuclear matters in a non-titular and performative manner, and the Right to Information Act (RTI) of 2005 is an uneven aid in activists attempts to secure

nuclear information, where nuclear authorities have claimed immunity on the grounds of national security, and the RTI appellate has upheld their claims to secrecy. Indeed, Kaur (2009) writes about how activists gain access to information through the RTI is contingent to who happens to be the gatekeeper—sometimes drips and drabs of otherwise tightly monitored information will be leaked out. This rigid patrol of knowledge borders persists in the DAE's interactions with citizen scientists, with whom it is now compelled to engage following vocal criticism after Fukushima. All citizen scientists who have participated in invited debates with the nuclear establishment report how the 'debates' are staged so that follow-up questions cannot be asked, or references of studies sought. These invited spaces are a far cry from Polyani's republic of science, and are structured encounters to perform the ritual of deliberation, rather than mutually transformative engagement.

For its part, the nuclear establishment—in addition to the State's institution of a campaign of police harassment, intimidation, jailing and human rights violations against protesters—has embarked on a campaign of winning hearts and minds by increasing the public understanding of nuclear science as well as cultivating a celebratory awe in nuclear technologies, in hopes of regaining public trust, which, they feel was lost through the spread of misinformation and general public scientific illiteracy. For the Indian government, the political settlement of resolving the crisis of credibility and public trust around nuclear energy requires an epistemic settlement, that is, to increase scientific literacy. Yet, identifying the audience of this campaign is difficult. That the campaign was conducted in the English language, which very few in India can read, write or understand, implies that the campaign is geared towards the urban elite, who, as evidenced from comments about nuclear-related articles and editorial letters, view scientific reasoning (with its attendant economic and political justification) as a legitimate and rational mode of adjudication. Moreover, the educated, English-speaking urban elite have arrived on the world stage with India's economic liberalisation and tend to be supportive of the State (Lakha 2000; Gupta 2000). In recent years, pro-

nuclear propaganda has turned to local and Hindi-language communication and comics to create a less intimidating method of reaching non-elite audiences. Interestingly, such tactics were developed over three decades ago in response to rural-urban activism against the Kaiga nuclear power plant in Karnataka after techno-economic and scientific explanations failed to garner support, but this history has seemingly been 'forgotten' in the effort to present current activism as 'new' and 'unheard of.'

Now, as it was then, very few of those rural communities who are clamouring to enter the public sphere are won over by scientific reasoning, as much as by moral claims based on lived experience of livelihood and environmental destruction, and cultural degradation. Public deliberations over environmental impact assessments (EIA) over slated nuclear power plants provide an example of the kinds of interactions—and dissonance—between nuclear officials and villagers. Political manipulations consist of publishing EIAs only in English, rather than the vernacular; of distributing 800-page documents only three days before the hearing, at least in the case of the EIA on the Jaitapur nuclear power plant in the state of Maharashtra as claimed by local activists; mandating that no 'outsiders', including activists from neighbouring districts or Indian NGOs are allowed entry; and that the public hearing is only for the public to hear nuclear officials speak. Aside from overt orchestration, the proceedings themselves allude to epistemological, and even ontological, dissonance. When fishermen ask about the non-monetised value of their land and cultural identity, nuclear officials dismiss the question by claiming they already answered that question in the report. Yet, when one turns to the EIA, there is only a numerical table summarising fishing hauls. When officials claim that the heated effluent water will not harm fish and show 'glossy charts' to prove this, fishermen respond with embodied knowledge stating that they can simply put their hands into the water to estimate the temperature and know whether the fish will be harmed. Even though nuclear officials proclaim their expertise, their demonstration practices are not legitimate in the eyes of villagers, who view the public hearing as a space for

testimonials and generating empathy for their plight through moral arguments. This space is as much a deliberative site to debate the technicalities of whether or not the reactor should be built. As such, the EIA public hearings have become another regulatory ritual to perform, another box to check off, rather than substantive engagement. Increasingly, all EIA public hearings are being boycotted by villagers and activists all over India who view the proceedings as farce in which they no longer wish to participate.

Nowhere is moral knowledge better deployed than during street protests, marches and rallies. The Tamil fishing village of Idinthakarai at the southernmost tip of India began protesting the nearly-built Koodankulam nuclear power plant after Fukushima, and they continue their opposition to this day. The protesting villagers, mainly comprised of women, oppose the nuclear power plant on grounds that the heated effluent water from the reactor will destroy their livelihoods, that nearby thorium mining gives them high rates of cancer, and increasingly, that nuclear energy is anathema to democracy. Although they have become poster children of Gandhian activism, garnering support from intellectuals like Noam Chomsky, Arundhati Roy and other international figures, their moral claims have little currency with the broader public, the nuclear establishment, and even within the anti-nuclear movement.

The Indian, urban elite, who took to the streets in righteous indignation against government corruption, have historically given little support of the Indian anti-nuclear movement (Roy 2003; Roy 2009) and show few signs of changing. Nuclear energy is largely seen as a necessity for economic growth and energy security, and now, fighting climate change, as well. Moral claims of livelihood destruction are of the same piece as other industrial development projects, and that the poor bear the largest burden of this development is seen by many as a sad but necessary evil (Gadgil and Guha 1995). The nuclear establishment view moral claims of livelihood destruction as an acceptable price for the eventual economic upliftment that will follow energy security.

The anti-nuclear movement has an ambivalent relationship to moral claims. The national face of the anti-nuclear movement, embodied in the CNDP, remained a fringe effort in the eyes of the Central government. The journalists, writers, some scientists and academics who would come together under the banner of CNDP were primarily opposed to nuclear power prior to the 1998 Pokhran explosions, with a vocal minority criticising nuclear energy, but in the aftermath of the tests unified into a stronger contingent (Roy 2003). The educated elites who fill the ranks of CNDP seek to convince the state and its supporters to abandon its quest for nuclear weapons by staging public marches, demonstrations, rallies, writing against the 'nuclear option' through a variety of English-media outlets, as well as convening and participating in national and international conferences and workshops. Only in 2010, with the attrition of Communist members who supported nuclear power's civilian instantiation, did CNDP publish a resolution that it would oppose nuclear energy in addition to the bomb. Yet, the kinds of livelihood concerns introduced by villagers were slow to percolate through the primarily peace and environmental movement. Now, most urban activists view the villagers of Idinthakkarai, in the anti-Koodankulam struggle as a powerful symbol, but not necessarily as a knowledgable participant in nuclear debates.

For example, one activist, Anitha Sharma, recorded unedited interviews with the women of Koodankulam about their ideas of nuclear energy, their hopes and fears, and published these interviews as a widely-publicised book, *No: Echoes Koodankulam*. Many anti-nuclear scientists were embarrassed by this book and wished it had not been written, because it just proved 'the people' were not scientifically minded like the nuclear establishment already suspected. More telling is the example of the People's Charter On Nuclear Energy Summit held in Ahmedabad, Gujarat, in July 2013, organised by CNDP. The goal of the summit was to produce a 'People's Charter on Nuclear Energy' (whether it should be 'on' nuclear energy or 'against' nuclear energy was one of the matters debated). There were representatives from numerous protests around India, and all had a chance to express their thoughts, which ranged about issues of livelihood destruction, to ecological devastation, to the

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dangers of foreign direct investment and the growth of Wal Mart in India. Although diverse opinions were raised, when it came to writing the charter, panel members produced a draft pre-written by one the leading, long-time anti-nuclear activists, Praful Bidwai. There was a chance to pose question to the all-male panel comprised of urban, elite activists, but ultimately, behind closed doors, the charter was edited cosmetically, taking into greater consideration the opinions of the panel of men present. The next day, during the unveiling of the charter, which repeated the same narrow nuclear exceptionalistic framings, women from Idinthakarai were part of the panel, and their photographs were taken holding the charter, even though they only had a symbolic role in its creation.

In the legal domain of the constellation of nuclear-related knowledge, the Supreme and High Courts have consistently upheld the expertise of the nuclear establishment, in the handful of cases they have adjudicated. Two cases exemplify this stance: the case of Irish butter and the prosecution of Manoj Mishra. In the first case of *Shivrao Shantaram Wagle (Dr.) v. Union of India (1988)*, Dr. Wagle and two others filed a public interest litigation (PIL) against India in the Bombay High Court alleging that India had imported 200 metric tons of butter from Ireland, and that is was contaminated from the radioactive nuclear fallout from the Chernobyl accident. The case advanced to the Supreme court, where the Court appointed an expert committee from the Department of Atomic Energy to assess the safety of the butter. The expert committee declared the butter safe and the case was dismissed. The Court stated:

> We are satisfied that the best scientific brain available in the country has applied itself to the question… Having regard to the magnitude, complexity and technical nature of the enquiry involved in the matter and keeping in view the far-reaching implications of the total ban of certain medicines for which the petitioner has prayed, we must at the outset clearly indicate that a judicial proceeding of the nature initiated is not an appropriate one for determination of such matters.

 In the second case of *Manoj H.Mishra vs Union Of India*, the Department of Atomic Energy clearly

defined their ideas of who could be a hero and a villain. On June 15-16 1994, heavy rains in southern parts of the state of Gujarat flooded the Kakrapar Atomic Power Plant. Workers had to swim in chest-high waters to get to work. Floodwaters had carried away canisters of radioactive waste and it is uncertain if they were ever recovered. The control room, as well as other parts of the reactor complex, was inaccessible due to flooding, and equipment in the turbine building, including the water pumps used to cool the reactor core, were submerged. Luckily, the reactor had already been shut down because of a major fire at a sister plant and was awaiting inspection of the turbine blades. The foreman of the plant, Manoj Mishra, recalled all of this during an interview of the near disaster, which was subsequently published in the regional newspapers. For this breach of trust, the Nuclear Power Corporation of India, Limited fired Mishra in 1996. Mishra has been fighting this wrongful termination in the courts, and it even reached the Supreme Court in 2007. I quote it here at some length, which discusses the characteristics of an 'ideal' whistleblower and how Mishra does not fit that mold:

> It will be apposite to notice the growing acceptance of the phenomenon of whistleblower. A whistleblower is a person who raises a concern about the wrongdoing occurring in an organisation or body of people. Usually this person would be from that same organisation. The revealed misconduct may be classified in many ways; for example, a violation of a law, rule, regulation and/or a direct threat to public interest, such as fraud, health/safety violations and corruption. Whistleblowers may make their allegations internally (for example, to other people within the accused organisation) or externally (to regulators, law enforcement agencies, to the media or to groups concerned with the issues)…In our view, a person like the respondent can appropriately be described as a whistleblower for the system who has tried to highlight the malfunctioning of an important institution established for dealing with cases involving revenue of the State and there is no reason to silence such a person by invoking Articles 129 or 215 of the Constitution or the provisions of the Act…**In our opinion, the aforesaid observations are of no avail to the appellant…the appellant is educated only up to 12th standard. He is neither an engineer, nor an expert on the functioning of the Atomic Energy Plants. Apart from being an insider, the appellant did not fulfill the criteria for being granted the status of a**

whistle blower. One of the basic requirements of a person being accepted as a whistleblower is that his primary motive for the activity should be in further-ance of public good. In other words, the activity has to be undertaken in public interest, exposing illegal activities of a public organization or authority. The conduct of the appellant, in our opinion, does not fall within the high moral and ethical standard that would be required of a bona fide whistle blower.

From the above quote, Mishra could not possibly be a whistleblower because his education ended at 12th grade. Moreover, the Court does not recognise Mishra as an insider, a necessary characteristic of a whistle-blower, even though Mishra worked for the nuclear authorities. That, in the eyes of the Court, he was an on-the-ground laborer, and not someone in the upper echelons of the nuclear knowledge economy perform-ing intellectual and scientific work, someone like Mishra could not possibly know enough to blow the whistle on anything. Moreover, in the view of the Court, there were proper channels that Mishra could have pursued rather than seeking to make the case of ineptitude known to the external media. That Mishra's liminal positionality foreclosed his option of following due process and reporting to senior officials, where he would not be taken seriously, was not ad-mitted into the Court's understanding of the hierar-chy of a nuclear knowledge economy and how it intersects with procedures for establishing accounta-bility.

The two cases of Irish butter and Manoj Mishra show how the India's legal apparatus has policed the boundaries of knowledge production and in doing so, who is considered a credible participant in the civic space and with what kinds of expertise. The Irish but-ter case illustrated that the Supreme Court thought that the legal domain was not a place to adjudicate scientific knowledge and left the nuclear establish-ment's expertise intact. In the second case, the idea that Mishra, because of his limited education cannot be a whistleblower, shows how the Supreme Court protects civic spaces from interlopers, who, in their brief brush with civic society are once more obscured in subalterneity.

Conclusion: Subaltern Casualties of Epistemological crossfire

The painstaking and painful nation-building process the Indian state and polity have undertaken since In-dependence is still underway in their combined, often antagonistic, efforts to create the kinds of citizens, politics, and economy they desire. The meaning and form of Indian democracy is still very much a work in progress—not the linear, teleological path of progress, with liberal democracy, economic develop-ment and inequality reduction at the end—but a jagged, circuitous trail of both epic and mundane bat-tles being fought within the public sphere and be-tween citizens and government officials. Such tussles include - over whose and what kinds of knowledge should count in imagining and managing technolog-ical trajectories, and what responsibilities the govern-ment should have towards its citizens, and indeed, the meaning of citizenship, when individual rights are fre-quently flouted. As such, 'postcolonial democracies' like India (Witsoe 2013) are characterised by episte-mological crossfire, as various, subaltern groups at-tempt to pry open civic spaces and gain entry into highly technocratic and nationalistic domains. In these contests, the techno-economic rationale of the nuclear establishment against which the state meas-ures all criticisms clashes with scientific argumenta-tion of citizen scientists, as well as the moral and political registers of producing and validating knowl-edge made by villagers.

Moreover, techno-economic rationales of the state often hide far-reaching political assumptions. The no-tion of civic epistemologies is premised on hidden and implicit values that have already been sedimented into national institutional structures, norms and discourses of science and technology. In contexts where political culture and values have already been 'settled'—at least for the time being, as contemporary politics show that even these norms are once more a point of con-tention, especially in Trump's America—the seem-ingly objective and apolitical venue of science opens a window to the cultural situatedness of various reg-ulatory practices. Yet in India, the stature of science has only been self-evident to only a certain group of people who have held on, time and time again, to

political power. The practices, institutional forms and discourses of how to adjudicate science and technology are open and malleable to interpretation and politicisation. In other words, Indian publics of various stripes do not see science as an apolitical tool as American publics view (or, used to view) it in the United States, for example. Instead, science is a proxy for broader social and political concerns.

The nuclear establishment's campaign to increase scientific literacy contains within it implicit models of citizenship and democracy, the means and ends of economic development, and the proper interpretations of lived experience. In other words, the nuclear state focus' on public understandings of science (PUS) is really a proxy for other forms of cultural and epistemic regulation—what might be called PUDDLES, the publics understanding of development, democracy, lived experience and science. Increasingly, one might even add an 'R' for religion to the acronym, making it (PUDDLERS) to account for the zeitgeist of the 'proper' understanding of nationalism as one anchored in right-wing Hindu fundamentalism. For the Indian government, the ideal citizen is passive, only politically active during elections, does not meddle in scientific and technological matters, and moreover, subscribes to dominant interpretations of lived experience as gleaned from cost benefit analysis and probabilistic risk assessments. And indeed, many middle-class Indians, who already enjoy representation in the civic space, share this techno-economic nationalism. Thus, both the construction of the civic space of who is included and how one is represented is inextricably tied to the particulars of the politics of knowledge that make inclusion possible for some, but not others.

These conflicts with the state, however, come at high costs. Unable thus far, to change state plans to expand its nuclear energy capabilities, and faced with instances of police intimidation, brutality, and even killing during protests, activists have increasingly boycotted all engagements with the state. Activists dismiss as farcical the nuclear establishment's attempts at dialog through invited spaces of debate. Public hearings of environmental impact assessments are seen as illegitimate. The legal community's attempts to influence

nuclear policy through the courts of law have failed to do so effectively, and activists now see the courts as a delay tactic rather than a source of transformative change. The process of disengagement has the disturbing effect of not only failing to carve out a civic space vis-à-vis the government, but also of creating subaltern identities where previously there was none. For example, those in political society, such as farmers and fishermen with only tenuous ties to the government through their local village representatives, may demand, through the course of interacting with, and representation from, urban activists, membership to civil society in their opposition against the state, and ask to be treated as rights-bearing citizens. Yet, they may be bitterly disappointed when leaders and movements fail to prevent their land from being acquired for development, or cannot stop the police from pursuing a tactic of chronic intimidation.

Although epistemological crossfire is a manifestation of nation-building as communities imagine futures for themselves and India, and actively work towards making concrete their imaginaries, what is at stake is how the dust settles, and who the casualties are. Creating a more cohesive—and inclusive—national civic epistemology will entail reception of subaltern imaginaries into the broader public sphere through a more reflexive and humble politics of knowledge, where the diverse and contradictory suite of technical, economic, moral, humanitarian and political arguments for or against nuclear energy in India not only co-exist, but interact in mutually transformative ways. Achieving such a robust ecology of epistemologies means creating knowledges that can travel far from the source. No one needs to necessarily agree on the modes of argumentation; but everyone must agree to be open to surprise and mutual transformation. Yet, thus far, all evidence points toward the reality that the political economy of nuclear knowledge-making may foreclose these kinds of mutually transformative phenomenon from taking root at larger scales.

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