Democracy, Governance and Science

Strange Case of the Missing Discipline

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I

I write at difficult moment. As I write here, one of the great morality plays of the 20th century is reaching a resolution. The confrontation over the Narmada dam is reaching its final phases. Medha Patkar, one of our leading activists, has already stated that she and her comrades will offer *jal samadhi* (a sacrificial act of drowning). She will stay in one of the 354 villages to be submerged by the Narmada dam. The Supreme Court, which has done more for science studies than our science policy institutes, has upheld the height of the dam. It was not merely a question of a few antiseptic feet; it involves the destruction of hundreds of acres of forestland, a demolition of a whole way of life. The Narmada complex of dams is visualised as a set of 3,300 large and small dams which will eventually displace about half a million people.[1]

The tragedy of the Narmada dam is a drama that has been reduced to a cliché, to a soap opera about tribals with the Narmada Bachao Andolan (NBA) portrayed as a tribal movement. The media soap opera of Narmada hides the fact that the struggle over the Narmada dam is a combination of four separate tragedies.

There is first the tragedy of large development projects like dams which begin as emancipatory acts and have ended as acts of oppression. The *India Disasters Report* (IDR), after observing that most disasters in India tend to be underplayed, cites the number of dam-displaced people in India as 16.4 million.[2] The Report states that the total number of people displaced by development projects between 1951 and 1990 was 21.3 million. One in every seven tribals is a displaced person.[3] IDR notes that the world total of Internally Displaced People (IDPs), according to the Geneva based Norwegian Refugee Council, is 20-22 million. The comparative figures for India, as the *India Disasters Report* adds redundantly, is awesome.

The first tragedy thus is the irony of the Nehruvian imagination that talked of dams as the temples of modern India. Our dam projects are better known for their human rights violations than for the energy they deliver. There is, secondly, the tragedy of the middle class whose dreams of electricity have convinced it that what is good for the middle class is good for India. This General Motors Syndrome has made it indifferent to the voice of tribals and dalits convinced that they have to be dragged into modernity. The vision of electricity has little to say to the world of biomass.

There is a third failure – the failure of the Narmada movement itself. It is a story of a grass roots struggle that has produced heroic episodes, become one of the great struggles of the 20th century, and has yet triggered little response in the rest of India. There is more politics in the sports pages in India than in some of the anti-Narmada documents.

But the fourth tragedy, a minor sideshow till now, is more relevant in the context of this Review. It is the failure of Science and Technology Studies (STS) locally and abroad to respond to the issue of Narmada. The Narmada activists have produced their own eloquent critique of large dams, but STS remains deaf or silent. There is an occasional outburst from a retired scientist to be met by an equal emotional reply. Recently, a former director of IIT, P V Indiresan accused the Narmada activists of being responsible for the drought in Gujarat. It prompted our leading energy expert A K N Reddy to a passionate defence of Medha Patkar, Arundhati Roy and other activists. Emotion encountered outburst but science policy disintegrated to the sidelines.

This brings me to the second point. STS studies in India have found their impetus and site in social movements rather than in the academe and science policy centres. Our official scientists were eloquent about our nuclear power and our need for greater investment in science. But it is the movements that have provided the great critiques of science. The Chipko movement in the Himachal Pradesh produced one of the great critiques of forestry.[4] The movement at Baliapal in Orissa stopped the construction of Intermediate Range Ballistic Missiles (IRBM) aimed at Pakistan.[5] Fifty thousand people arose spontaneously to teach the Indian state what people's security meant.[6] The Kerala Sastra Sahitya Parishad (KSSP) has helped design one of the first people's plans for development and the Mazdoor Kisan Sangharsh Samiti (MKSS) fought for the right to information while our scientists remained tongue-tied at the idea of science as public knowledge. The works of Indian activist-scholars C.V. Seshadri, Claude Alvares, Sunil Sahasrabuddhe, A K N Reddy, Jayanto Bandhopadhyaya and Vandana Shiva owe much to the imagination of these movements. But STS in an academic sense has been the case of a missing discipline that democracy in India urgently needs but cannot access.

The questions we face are acute. Where do we stand on large dams – one of the great human rights issues of our time? And how do we articulate this discourse? What methodologies do we devise to unravel these controversies or do we remain trapped

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in the deathly academic amber of the logic of 'stakeholders' and the deafness of cost-benefit analysis? How do we give voice to the defeat of a scientific and technological project? Is the tribal voice to be limited to the quixotic ethnoscience of a forest or is it going to provide an alternative model of sustainability that Brundtland and her cohorts may not have dreamt of? And finally how does STS help adjudicate controversies where the idea of scientific closure may have to acknowledge the death of a society? How does one capture this within the contours of the enlightenment discourse we claim STS to be?

The issue of disasters is not restricted only to man-made projects like dams. It extends to the strange silence over Bhopal, the world's biggest industrial disaster. There is silence about the science, the medicine; there is vagueness to the roll-call of the dead. Fifteen years later, we know little of what happened. We might feel a bit like the English science journal that claimed that thanks to Bhopal we know more about methyl iso-cynate today.[7] The survivors of Bhopal have become one more set of nameless victims that our democracy and our science have erased from memory.

But there is a broader link of disasters that I wish to establish.

Indian nationalist science policy in fact began with the very idea of the plan. Planning in India arose around the great floods of North Bengal. The work of the physicist Meghnad Saha and his *Science and Culture* group can be read as the first formal STS studies in India.[8] Thus planning, science policy and the question of disasters were integrally related. But there is a second link which was established eloquently by Amartya Sen. The economist recognised the connection between political liberty, civil rights and freedom from economic disasters. Sen argues that "famines do not occur in democracies. Indeed no substantive famine has ever occurred in a democratic country no matter how poor."[9] Sen's argument has been seen as one of the great defences of democracy. But when one moves from famines to other disasters like floods, earthquakes, industrial accidents, cyclones, the story appears different. Prevention is one thing but the post-rehabilitation scenarios around these disasters reveals a different story. The annual floods in Bihar and Assam are erasing villages from memory and media does not even provide a roll call of these names. Villages disappear like victims of an Argentinean dictatorship and there is no documentary record of it. The tidal wave in Orissa in 1999 devastated 1.5 million people and there is little information on what is happening. At the most, the Indian answer to a disaster is a disaster institute. The media seems to fail in the aftermath of disaster and with it comes the failure of STS to link disasters – famines, flood, drought, cyclones, industrial accidents – to a wider theory of knowledge and democracy.

Recently a group of NGOs have become signatories of the Sphere Charter.[10] The Charter articulates systematically the rights of victims of a disaster – the right to medicine, the right to rehabilitation, the right to a defined calorific intake, but beyond it, the right to memory and the right to information about what happened. The Republic of Science must make a place for disaster victims as citizens. It can't be left to media alone because the mindset of our media rarely goes beyond a fortnight. What we need today is a link between disasters and violence with democracy in the 21st century.

We confront two radical problems in this context. Firstly, we have to challenge the current contract between science and the state. This hobbesian handshake has produced a nexus between Big Science, Development and the National Security State, a triangle of authoritarianism we need to question. India today has the 4th largest army in the world but what few people know is that we have one million paramilitary troops for internal order and control. India is the world's largest electoral democracy but today over six million people are directly involved in secessionist movements. We have the third largest pool of scientific talent in the world. But in this statist world, science as reason of state has little to offer the idea of civil society.

We face an even stranger phenomenon.

The history of our times is marked by a strange celebration, a celebration of democracy. Whether it is Eastern Europe in the aftermath of communism, Africa after apartheid and the dictatorships, or the struggles in Nepal and Bangladesh in Asia, democracy is seen as an epidemic whose time has come. But moments of official celebration miss out the everydayness of irony. The democracy one is celebrating is a narrow market-oriented version, where democracy to win approval mimics the market. What we face today is not so much an explosion of the democratic imagination but its impoverishment. The current visions of democracy have been reduced to elections, citizenship to consumerism, governance to expertise. In all this science and science studies function as a reason of state or market. The old paradigms of policy survive by throwing out epicycles or by hyphenating old metaphors to new problems. Thus we have equal development, community development, participative development, sustainable development – all desperate prefixes to keep the network of surplus around development alive. We don't say that the emperor has no clothes. We multiply the curtains, screens and lies around him. Further, security, which was a strictly defined idea, now works overtime in notions of food security, health security, quietly militarising discussions, adding the right touch of paranoia which increases the investment of foundations. In all this, the complicity of science and science studies has been complete. What we need to do is rescue science studies as a key part of the democratic imagination. My question is a simple one – how can STS add to the democratic imagination? How can science studies as a critical imagination add to the idea of governmentality/governance? What we face then is an essay in the politics of knowledge, appearing half like a syllabus and part like an agenda for a new constitution.

Let me begin by emphasising that the Baconian project is old hat. The fact that knowledge is power does not help realise that science is political and science studies an intrinsic part of political theory. It is true that science and scientists have provided some of the great fables of our time, from the Tragedy of the Commons to Prisoners' Dilemma. The immaculate innocence of science is a myth and has created its own rituals of purity. The word pure-science itself smacks of a pollution ritual, an act of political hygiene.[11] STS instead of turning official ideologist for science must become an early warning system for democracy.

As a subject, STS is iconic with democracy.[12] It is a muddy domain springing from several sources, inspired by different events. Its *identity* is never singular. Earlier it had an identity crisis but now it realises it is a pluralistic enterprise. It permits *boundary crossing* and its very interdisciplinarity treats trespassing as an everyday activity. Thirdly, it recognises its perpetual *liminality*, given its structured ambivalence to humanities, social science and the natural sciences. It is duck, rabbit, duckrabbit. It is gestalt shift and janus face. Finally it belongs to the oldest profession, the most maligned and misunderstood of them all – the middleman. It is not the middleman of a rural society, or the mafia of Sicily, it is an intellectual middleman who realises his role as a bridge, a hyphen, a translator, a village gossip for intellectual systems simultaneously seeking an Esperanto, or meta-language for all of them. It is this very fuzziness that makes it iconically ideal for reinventing democracy, carrying out thought experiments, the social innovations that democracy needs

to survive. Science studies can help democracy reinvent itself. This way, the works of Thomas Kuhn and Paul Feyerabend and Imre Lakatos, Garett Hardin, Ivan Illich, E F Schumacher, all become meditations, fables, heuristics for the democratic imagination. Science studies become thus a meditation on citizenship, governance, democracy and science.

II

I have always been fascinated with the figure of an Edward Jenner or a John Haldane experimenting on themselves. The iconography of these acts runs counter to the usual picture of the scientist objectively experimenting on the 'other'. What I am suggesting here is a thought experiment where science experiments on itself, bears witness to its own violence. If science is to become a morally and socially supple form of knowledge, it needs new ways of constructing itself. I believe STS can play a powerful role in the reinvention of the democratic imagination in the 21st century.

The debates over the last decades have already set the basis for it. We have had handbooks on the state of the world's poverty, development, rights, environment, energy, health but what we need to develop too is a philosophical handbook of science, a handbook of a very particular kind.

The history of the 20th century has been a story of violence, of genocide. The official history of science itself has been written as a warring history of science and religion. The new histories of the third world have shown the role of science in the obsolescence and museumisation of cultures. How does one confront the varieties of violence in science? Science studies itself has moved between a critical and constructive attitude to science. What institutional device or thought experiment can we invent to help create a deeper sense of the pluralistic possibilities of science? One realises clearly that one must move beyond the old siblings of science – the inquisition and the witch-hunt. One device used with varying degrees of success has been the Truth Commission.

The Truth Commissions established in Argentina and Chile were seen as political failures. They were also based upon a forensic construction of order which sought justice rather than healing. The South African Truth Commission was of a wider kind and raised, as Jacques Derrida said, some of the major philosophical problems of the 20th century. It was a meditation on truth, violence, healing, justice. Desmond Tutu, the chairman of the Commission, made a few epistemological assumptions about truth. It is obvious that he saw truth as one and truth-telling as a healing act which created the unity of the country.[13] He believed also that the truth could be deciphered and told. For all its limits, the Truth Commission offered a powerful tool for conversation, for encountering memory and erasure, for facing up to violence. One admits that it was not too productive of justice but it recognised the equal power of forgiveness. The drama of the Commission was not a sentimental set of rituals. Journalists have emphasised the traumatic impact on both truth-tellers and listeners.

I want to suggest to the STS community the necessity for a truth commission on the nature of violence and its relation to science and technology in the 20th century. I am suggesting the creation of a public forum of NGOs, scientists, other professionals, laypeople which examines testimonies about violence in science. I want to emphasise this is not an anti-science move or a format for a Nuremberg Court but an attempt to create within the polis, a conscience for science and technology. The Commission could invite scholars like Robert Lifton, Oliver Sacks, Richard Falk, Vandana Shiva, Ivan Illich, Thomas Szaz, Amory Levins, James Lovelock, Francisco Varela, Donna Harraway and Sandra Harding, The Intermediate Technology Group, Paul Richards to explore the question of violence in science. The Commission could reflect also on whether it is a question of use, abuse or reflect on whether violence is present in the very grammar of modern western science as a cosmology and an epistemology. One needs to create a glossary of the varieties of violence in science and obtain reasoned and reasonable testimonies. One needs to explore in this context the violence of vivisection, nuclearism, the violence of triage and obsolescence, the violence of ideologies of progress, the violence of scientific socialism and other forms of scientisation, the violence of development, the violence of reductionism and monoculture, the violence of urban planning, the violence of iatrogeny, of the globalisation of risk. There must be some way that scientists and others can confront the contemporary history of science confidently, but with humility, feeling grief but moving beyond despair. Science as an enlightenment project can only be redeemed if we enlighten ourselves on it.

But a mere litany of complaints won't do. We need to use the Commission to refight three battles – the alleged battle between religion and science, the continued tension between expert and layman and finally the struggle between science as privatised knowledge and the attempt to recreate science as a global commons. In enacting this ritual, we must restore citizenship to the lesser natives of science, those who have not fully belonged to the Republic – the tribal, the witch, the woman, the patient, the madman. One strategy for doing so is to adopt Jurgen Habermas' idea of the public sphere and extend it to the question of the transfer of technology.[14]

III

The question of science has to re-enter the public sphere in a powerful way. The old idea of the salons and coffee houses talking the gossip of science will not do. The notion of polls measuring 'public opinion' on various scientific technological projects is inadequate. We have to rework the notion of citizenship regarding science. Science and Technology is consumed today. The citizen becomes a spectator to the great acts of Big Science. What we need is a role that goes beyond spectatorship or consumption but we also need a notion of participation which sees the citizen as a scientist, a man of knowledge, with a theory of the cosmos and with technical skills for survival.

The entry of science into the public domain creates and in fact challenges the grand debates of political theory. Science stimulates democratic debate by becoming the site and even the cause of tensions and paradoxes. Three contradictions in particular come to the forefront. There is first the opposition between expert and layman. There is second the challenge between technological innovation and progress and its obverse face, obsolescence especially as it effects the community. Close to this and yet different from it is the opposition between science as an enclosure movement and science as part of a commons.

The discourse ethics of the public sphere emphasises the crucial nature of language and communication. Science has entered the public domain through three modes – the language of expertise or esotericism, the language of popularisation and the language of translation. But conversation about scientific and technological activity is missing. Jokes about science are predictable and the gossip is unnuanced. One needs to build a criteria for argument for science to enter the public realm in both a conversational and forensic sense. The Habermasian criteria for argument: intelligibility (coherence), truth (evidence), right (moral integrity) and equality (mutual reciprocity) should operate here. But the agencies of operation need to be reconstituted. What we need is not a salon, or a public poll, but a recreation of a polis through NGOs and movements recreating

and reliving the debates on science.

The model of controversies around science policy issues breaks down the models of rational and communicative discourse posited in political theory. Political theory often sees an ideal discourse between free and equal individuals. But Narmada and Bhopal are examples of discourses where the stakeholders disappear at the end of the debate. The question before us is what forms of weightage, voice, representation, cognitive validity do we give such disempowered voices? What methodologies do we devise to guarantee that the obsolescence of individuals and communities is not built-in into these projects? STS shows, in fact, that the standard models of liberal discourse breaks down in the resolution of many scientific controversies. The question is how does the aggregative model of political preferences consider the disappearance of a way of life. This is one of the challenges before science and democracy. Science studies need to play witness, chronicler, catalyst to this recreation of the public domain. It can do so through the invention of a new heuristics. The Viennese historian Robert Jungk talked of the possibility of using future studies to amplify the possibilities of citizenship. What we need is a new kind of network of knowledge-centred grass roots groups which can apply a critical muscularity to science, NGOs which are composites of clearing houses and compost heaps for ideas. Years ago the *Philosophes* helped create the phenomenon called the enlightenment. Now STS as a quarrelsome child of the enlightenment must create new possibilities of debate around science and democracy.

Let us apply the possibilities of these heuristics and methods to the transfer of technology model.

If there is a basic genetic code of power, linking democracy, science and governance it is the transfer of technology. The structure of the innovation as it straddles centre and periphery reflects both a civics and a paradigm of how to relate the knowledge-power nexus. As a theory of management, TOT might be adequate. As a theory of politics, of law, of justice it has none of the axiomatics of suffering Linus Pauling talked about. The politics of knowledge within the democratic imagination demands that we also see TOT as an enclosure movement, as devices for the obsolescence of Third World societies. We have to realise that every scientific hypothesis is a potential item in a constitutional agenda. The notions of time, standards, the concepts of normal and pathological all define notions of freedom. The civics of TOT has to go beyond R and D management.

One part of the debate obviously centres around the debates on large projects. The constitutionality of such projects goes beyond cost-benefit analysis. If TOT were a human rights problem, how would one recreate an open civics for TOT that moves it back to the idea of the gift? A few years ago in a critique of both the technology missions in India and World Bank projects, we made the following suggestions.[15]

We advocated that technological projects be seen as a dialogic, transparent and fallibilist enterprises. We suggested
(1) That human rights teams be attached to each project from the moment of inception. Why should human rights groups like ambulance-chasers enter only after the atrocity?
(2) An ombudsman should be present to register complaints about the displacement, the violence of the projects.

I see both these devices as attempts to construct what Hans Jonas called 'the heuristics of fear'.

Can we also think of insurance for people in large projects involving dams, thermal plants, genetic engineering, forest policy, urban planning? If science is public knowledge, can we have greater transparency about these projects? And couldn't we add to transparency, the processes of referendum and recall. Technological projects once begun are seen as inevitable. But if science studies has done so much to construct science as a fallabilistic and constructivist effort, why can't alternatives be simultaneously posited? We would also suggest annual hearings all over the world on S and T to be published in gazettes, internet, announced in fairs. Such public efforts can nuance the scientific effort in a way that all the works of Popper and Lakatos have failed to do. We would also like to suggest that science academies accept whistle-blowers in science as prisoners of conscience and create a special fund for them. The power of science as a dissenting imagination needs to be restored. The flattening of science achieved by media, security, and science policy has to recontoured. Governance needs new inventions that make science accessible and accessible to critique. Transfer of technology is one of the great dramas of our time. These are dramas which are challenges to civil society. The Bhopal Gas Tragedy was one such drama, yet STS as a group (with honourable exceptions) was silent on it. It was an opportunity to internationalise the moral space of civil society. I think it is time we try again.

But participation, transparency and communication by themselves cannot create an adequate democracy. Modern democracy is a collection of communities, with a variety of knowledges embedded in a diversity of cultures. One is reminded of Ananda Coomaraswamy's definition of the proletarian as a man disembedded from his culture. What we need for democracy is a sense of invention. Our notions of diversity cannot survive if the knowledge systems that created it become obsolescent. We cannot abstract the drug while abandoning the system of knowledge that created it for that would be strip-mining of a culture. What we need then constitutionally is the idea of *cognitive justice* – the right of different systems of knowledge to survive and reproduce themselves and secondly the widening of the idea of the *Commons* as an intellectual construct.

The opposition of *enclosures* and the *Commons* has been one of the guiding metaphors of history. The Commons were originally land accessible to peasant and pastoral communities providing them pasture for animals, and materials for their craft, timber and stone for building, wood for fuel, reeds for thatching.[16] The industrial revolution began with the destruction of the Commons and facilitated the destruction and dispossession of peasants. Proletarianisation became possible with the disappearance of the Commons. But what died with the Commons was not just access to resources but a gene pool of skills, techniques, recipes, cosmologies that kept alive these ways of life. What we need to do today, with the emergence of globalisation, is to counterpose it to the idea of globalisation the notion of a world Commons to keep diversities alive.

Today diversity is kept alive in parks and laboratories in a preservationist sense. Diversity is museumised as a resource rather than seen as a way of life. What I am suggesting is the revival of a Commons which keeps alive forms of alternative knowledges, dissenting theories counter to the dominant models of science and technology.

I am reminded of a Ray Bradbury story – *Fahrenheit 451*.[17] It is a story of a future regime where the net is not yet born and books are banned. To own a book is a crime and firemen are responsible for the destruction of contraband books. Within this world, there is a small community that memorises books. In fact, each individual is known by the book or the author he has byhearted. One is Hamlet, the other is Virginia Wolf, another *Ulysses*. STS might have a similar role to play as witness and as memory in the coming decades.

IV

I must emphasise that I am not looking for a new panopticon for science just as I am struggling against the panopticons

that science itself has helped create. Nor do I want a puritan repressive science studies enacting out a Macarthyite voluntarism. All I am suggesting is that many of the great movements like the peace movement or The Greens have either ceased or been truncated or coopted. What we need are new innovations, heuristics which reopen the scientific debates, which in turn can be debates about democracy. What one notices is that a lot of the debates in science studies anticipates or mirrors the debates in political theory. Richard Rorty or Habermas could empathise and learn from Paul Feyerabend or Ludwig Fleck. Yet political theory like Science Studies has often operated from 'ideal speech situations'. A pluralistic notion of knowledge can be a powerful basis for a pluralistic idea of democracy which does not rely purely on rationalist approach to life.

Consider the different kinds of scientific controversy. There is first the combat between two theories within the same paradigm. There are then debates between expert and laymen as around the nuclear movement or even the Bhopal disaster. There is also the battle between competing forms of medicine or agriculture. The triangulation of these debates has helped create a picture of science as a contextualised fallibilist enterprise. In fact, it is similar to the debates in liberal democratic theory between contextualist and universalist approaches to liberalism. But what one misses in both is a sense of play. How can science studies return the *ludic* and the *agonal* back to science and democracy?

Neither Democracy nor Science can confront pluralism without being playful and inventive, moving from case to case through improvisation. What do we do in societies that have neither shared concepts of justice or legitimacy? Here we have to see the constitution as an ensemble of practices improvising as we move along. Play and laughter becomes essential but unfortunately play and laughter are removed from everydayness. We oscillate between the routines of bureaucracy and appeals to the Carnivalesque, as specific ritual orders of inverted time. What we need is a set of thought experiments struggling with everyday institutions. Can we use net or our little assemblies to invent new modes of technology assessment based on local ideas of good life? Can we devise models of sustainable development based on shifting cultivation? Or modes of education or medicine that build alternatives into the everyday framework? Can we design constitutions for different energy systems?

Play is not only the availability of wider choice. It is the invitation to conversation across grids. Claude Alvares gives a combative example of a village in Kerala which catalogued its local biodiversity and laid claim to it. The question here is how to retain life as a part of the commons instead of succumbing to patents and the WTO regime?

STS can prevent these debates from turning rabid, superficial or fundamentalist and making it not just *antagonistic* but *agonistic*. One faces not merely an *enemy* but an *adversary*.[18] What makes this approach different from the old model of science and democracy lies in the way we look at consensus. Earlier a scientific consensus or a democratic one saw a decision as a final act. "They were unable to recognise that bringing a deliberation to a close always results from a decision which excludes other possibilities and for which one has to bear the responsibility."[19] Agnostic pluralism keeps certain contestations alive, sensitises us to forms of exclusion without disguising them under the veil of rationality, morality or progress.

V

I have been building up to the secret word that haunts this paper. It is the coming of Globalisation which has caught our movements flatfooted and made our scholarship outdated. Globalisation has found its historians in Manuel Castells and journalists like Thomas Friedman.[20] But I wish to make two small footnotes to their sociology. The first is the failure of dissent and dissenting imaginations and the second is a failure of language, caught in the paucity of metaphors to describe and contend with globalisation. The question one asks is how is democracy going to be pluralistic as globalisation is offered as a world metaphor.

I think STS is one of the few disciplines that does not get hysterical over *speed* and has a varied ethnography of *Time*.

Given the steam-rolling power and poetics of the global metaphor, dissent has been exiled into silence. Except for the battle against WTO which reminded one nostalgically of the peace marches of Vietnam or of Woodstock, the dualism between *netizens* and *citizens* is blatantly clear. The world of Marx or Gandhi seems quaintly potted. Their ideas of conflict, war, value, surplus appear a trifle paleolithic like the Iron age confronting cyberspace, or the first and second industrial revolution trying to encompass the third.

STS may play the role that literary critics did in the 1960s and 1970s. Critics like George Steiner or Roland Barthes or even the rediscovery of Bakhtin helped create a sense of the industrial world, its capacity for evil, its celebration of icons, even its ethnography of colour. STS can play an equal literary role in capturing, critiquing the grammar of cyberspace and NET. It could provide the equivalent of SF in the 1920s and 1930s, provide time, breathing space, fragments, politics, metaphors, hermeneutics, heuristics that dissent needs to recover and battle globalisation. Science has always been prim and functional about language and metaphor. STS can recover and reinvent a powerful semiotic role for itself. The politics of language and metaphor can be a way to the wider politics of knowledge within which the battle around globalisation will be fought.

Eventually the challenge is clear. The Third and Fourth World, which the Global world see as body shops or black holes face one problem: either we define ourselves or we get defined. If we allow ourselves to be defined, whole ways of life can disappear. Words can either be lifegiving or genocidal. My essay is a simple, maybe desperate, invitation to the world of STS to join the battle of definitions. EPW

Notes

1 See Jai Sen, 'Narmada Case in Historical Perspective', *Mainstream*, Vol XXXVIII, No 12, March 11, 2000, pp 7-10.
2 S Parasuraman and P V Unnikrishnan (eds), *India Disasters Report*, Oxford University Press, Delhi, 2000.
3 Ibid, p 277.
4 See Vandana Shiva, *Staying Alive*, Kali, Delhi, 1988.
5 Paul Routledge, 'Geographical Resistance: India's Baliapal Movement', *Alternatives*, Vol 25, No 3, July-September 2000, pp 375-90.
6 Ibid, p 375.
7 Shiv Visvanathan, 'Bhopal: The Imagination of a Disaster', *Alternatives*, Vol XI, No 1, January 1986, pp 147-65.
8 See Shiv Visvanathan, *Organising for Science*, Oxford University Press, Delhi, 1985, Chapter 2.
9 Amartya Sen, *Development as Freedom*, Oxford University Press, Delhi, 1999, see pp 178-80.
10 See *The Sphere Project*, Humanitarian Charter and Minimum Standards in Disaster Response, Geneva, 1998.
11 Donald E Stokes, *Pasteur's Quadrant*, Washington, DC, Brookings, 1997.
12 See Shiv Visvanathan, 'The Future of Science Studies', *Futures* (forthcoming).
13 Michael Ignatieff, *The Warrior's Honor*, Henry Hold and Co, New York, 1997, pp 170-175.
14 Jurgen Habermas, *The Structural Transformation of the Public Sphere*, MIT Press, Cambridge, 1994.
15 See 'Technology Missions', *Seminar*, No 354, 1989.
16 See Vandana Shiva, 'The Enclosure and Recovery of the Commons' in Muchkund Dubey (ed), *Indian Society Today*, Har Anand, Delhi, 1995, pp 186-204.
17 Ray Bradbury, *Fahrenheit 451*, Ballantine Books, New York, 1966.
18 See Chantal Mouffe, *The Democratic Paradox*, Verso, London, 2000, p 102.
19 Ibid, p 105.
20 Thomas Friedman, *The Lexus and the Olive Tree*, Harper Collins, London, 1999.