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FORGING SOCIETY

being an account of a journey through
ten nations

February 6 - April 14, 1977

Submitted to the
American Association for Advancement of Science

September 1982

My very grateful thanks for all the trouble
that they went through on my behalf, to:

the American Association for the Advancement
of Science; in particular to, Irene Tinker,
Bill White, and Rita Doherty

Dinesh and Peggy Mohan

and all those other friends who helped me
from Bangkok to Paris.

Go East, young man . . .

February 1977, and Bangkok was under curfew. My first step outside my own native land, and I land at an airport full of menacing soldiers with terrifyingly efficient looking weapons and not a familiar face to draw sustenance from at an hour early in the ayem. A courteous soul told me how to get to a hotel and I took my first hesitant look at the room I was ushered into. Large windows, draped in lace, an immaculate bed, a gleaming loo, and a lovely deep carpet. In an attempt to relax in an alien environment I took off my shoes to let my toes luxuriate in that carpet, opened the windows to let in some fresh, unsanitized air, went over to switch off the droning air-conditioner, and retreated in dismay as the switch greeted me with the mildest electrical jolt ! Is this what is called 'culture shock', I asked myself. In the best-sellers the hero (or villain) invariably calls up the telephone operator, so that is what I did. A puzzled Thai operator sent up an equally puzzled 'engineer' to find out what was bothering me. He fiddled around with the switches - with apparently no ill effect - shot a quizzical glance at me, and ambled out of the room, throwing his puckish remark over his shoulder at me, "Put on your shoes . . . sir !" Ah, the inscrutable Orient that the Occident is forever discovering ! Nevertheless, I put on my shoes - and no more jolts from that switch ! Later on I discovered it had a simple explanation - too much static and a synthetic carpet.

So imagine, if you can, kind reader (and, please, be kind) a young man, fresh out of a village in India, where one read, if one read at all, by a smoking lamp burning diesel because of a shortage of [illegible], setting out into a great unknown void, trying to discover the role of technology in making the world tick, and presented by a sympathetic American Association for the Advancement of Science with a round-the-world ticket, confronted with the many and various ways with which people all over this globe make science and technology a part of their lives. There was the girl in Manila who tucked my hand under hers to get me across a complex spaghetti of roads where the cars raced past in pursuit of the unimaginable - unthinkable, too, in India for that physical contact; my parent would have wondered, is he going to marry her ? The airport and highway at San Francisco: miles and miles of superb technology with not a soul to be seen; it seemed as if the phones, the luggage-roundabouts, the cars, were all self-driven, propelled by their own innate mechanisms; a harsh disjuncture after the teeming populations of South-East Asia. There was the splendiferous young lady sitting in that glass cubicle poised above the railway platform at Paris; disdainful of my timorous queries; intent on the shape, texture, and symmetry of her nails; as I tried to find my way out of the concourse into a city where not a word could I understand or make understood. There's much more of that; a total skewing of the mind; all my education, my surface 'Westernisation' nose-diving into the intricacies of daily survival in ten nations sprawled over a seeming terrain of oases joined only by the threads of screaming jet aero-engines. But, I am not complaining. Indeed, I asked for it !! So, five years after the event, I pen down what I absorbed in that 68 days and which still amazes me by its colours, sounds, and fragmentary visions of what we are all a part of.

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The forge of Vishwakarma

Vishwakarma is the artisan in the Hindu pantheon, building palaces and worlds, refining the base metals, forging the tools and weapons whereby the endless cycle of creation may go on; the presiding deity for the mechanics, fitters, welders and operators, repairmen and electricians who walk the shop-floors of Indian industry. I am an engineer, trying to carry the burdens of technology I learnt to shoulder in the Institute of Technology at Bombay to rural India to see where best others may be found to share the load. Before catching that plane to Bangkok I had bravely penned down what I felt was the crux of my (and my other colleagues') concern:

> " While the concept of development in a particular social system determines the nature of planning and the technology used, nevertheless, it is possible for technology, when systematically used, to challenge and change the concept itself. "

What was this "sytematic use" of technology ? I had ventured:

> " It is the failure of technology that changes perceptions. It is not the failure of the theoretical development of science but its application within certain restrictions that tends to break those restrictions. Technology must, therefore, demonstrate that it has the answers but is unable to implement them within a particular context before that context can be called into question. It is, therefore, the test of the "appropriateness" of a technology whether it can show its technical competence to solve a problem and, at the same time, expose the structural limitations that make it helpless so that men may take conscious action to change the structure they live within. "

I little realised then that little frogs croak louder, the smaller the well they are in. But, consciously or unconsciously, the AAAS magic carpet afforded me a unique chance to peer into other wells, lakes and oceans, and - though it is difficult to silence a frog - now I find that there is an appropriate season for greeting change, and that season is upon us, and there are so many of us to greet it, but so many more who can only look sullenly into an inanimate future. Construct a pair of bellows large enough and you can forge a new society !

Everyone asks me, What did you learn ? I wish I had a degree to show them as proof of 'learning'. But that is not the point. The point is that I had gone with a framework, a template - if you will - in my mind. Did the patterns constructed by the people I met conform to my template ? Did technology emerge as an instrument of change ? The answer is - I am not sure. But what I did see was the power and the helplessness of technology everywhere. And I can think of no better way of presenting my lessons as anecdotes of contrast between technology and society.

Speak softly, but carry a big stick

There is a widespread concern amongst the intelligentsia of Thailand about the causes of underdevelopment. There is an implied rejection of 'Western' models; a search for an indigenous path for the peoples of Asia towards a new society of prosperity. ACFOD, the Asian Cultural Forum on Development, is a forum established for expressing these views in a systematic manner. Putting forward the conception of Technology and Culture in South-East Asia they assert a feeling of 'Asian-ness', rejecting Western ideas of capital-intensive technologies and alienation in production. They support the use of appropriate technologies and of 'moral force' to restructure the social system. Paralleling their work is the activity of Thai students who undertook a survey of the Klong Tuey squatter settlement in Bangkok and recommended an appropriate government policy with emphasis on people's resourcefulness to develop educational and health programmes through their own organisations. But, in 1977, martial law had been declared in Bangkok, the bullet marks were still to be seen on the walls of Thammasat University,and Asian ideas were retreating before American bullets. Other cultures too: on the return trip to the airport my kindly hosts had suggested to me that I might try conversing with the taxi-driver in sign language; I did; he turned to me and revealed his vast knowledge of English; "You want girl ?" he said.

The International Rice Research Institute in the Phillipines has done sterling work in, as its name indicates, rice research, as also some other crops. It now offers technical advice all over Asia and Africa. Prominent amongst its activities is the genetic work on rice strains, developing varieties resistant to disease and drought, appropriate to conditions in Asia and elsewhere. They have developed cheap and portable threshers and grain cleaners. Plans for small-scale agricultural projects for threshers, tillers, harvesting equipment are available free of cost with them. In addition, they offer training facilities to entrepreneurs, development workers, and researchers. The development of technology and technical services for the increase in grain production has been their central focus for a number of years. Yet poverty stalks the land and martial law is the only answer that governments find for hunger. The conflicts are merely polarising the population and whole families are split asunder obeying the pressures of the economy. At a lunch I attended on a farm outside Manila the extended family had gathered for the birthday of the patriarch and young men in the green of the military sat side by side with bright-eyed militants from the University, but the talk was inane and superficial, each guarded with the other, of the same blood but on opposite sides of the moral fence.

Rice husk disposal is a serious problem in centralised rice-milling facilities. One ton of paddy yields 200 kg of husk. It has no protein to be used as animal fodder, and too high ash and lignin contents for making cellulose products. Hence, it is generally burnt in the steam generators. Burning gives 20 % by weight of ash - essentially silica in inert form and, hence, useless. But there is the possibility of burning to produce a reactive silica, under controlled conditions, which, when blended and ground with quick lime/hydrated lime, gives hydrated cements adequate for masonry, plastering, and many structural requirements. Considerable work has been done to develop this technology at the University of California,

Berkeley. It promised to be an appropriate technology at the village level in major rice-producing countries. But the technology was patented by the University of California and purchased by a Los Angeles firm, Industrial Materials. It is now being offered on an exclusive rights basis in India to an Indian company for a fee of hundreds of thousands of dollars in royalty. So there goes another "appropriate technology". One may ask why it cannot be developed indigenously. Somebody tried; we bought the cement and built a house; today it's literally falling apart as the cement did not set. Anybody for royalties ?

I attended a Solar Energy conference at Davis. California is reputed to be an "Energy-conscious State" and its then Governor was pushing hard for energy conservation, alternate energies, solar and wind power, and State-sponsored incentives for the development of new technologies. At Davis there was even an emphasis on riding bicycles to work - a phenomenon we were pointed out while driving around in a gas-guzzling bus. We were shown energy-colecting roofs and two-toned drums lining entire walls, underground heat-sinks and strategically designed houses, all putting the sun to work. But at the same time we learnt of a private corporation in North California that is experimenting with a fusion reactor trying to capture the stellar process at its early burning phases, utilising the phenomenon of 'masing plasma'. It will be self-contained and governed by its own micro-wave output setting up a standing wave with the reactor chamber walls, generating electricity directly (without heat transfer mediation) from micro-wave drain-off. And then there was the school of thought that held that life should be measured in terms of 'biological prosperity' - the degree of biotic utilisation of the energy flux incident into the biosphere; dependent on the rate and mass of the photosynthesis of biomatter. Since the rate of photosynthesis is accelerated by the rise in Carbon Dioxide levels - in other words, by the increased burning of fossil fuels - hence, according to this school of thought, there was no need to fuss about energy alternates. Considering that the US uses over 44×10^6 kcal. per capita, over 20 times the amount used by India, it is not difficult to understand why the alternative energy programme has not made any headway since it was initiated in the mid-70s.

From Davis I moved on to Denver, the real purpose of my trip being to attend the AAAS Annual Conference there (their 143rd National Meeting). And what a Meeting ! Spread over six days with a daily average of 17 simultaneous sessions covering virtually every discipline known. I shared with William D McElroy, Chairman of the Board, the difficult decision-making process of which session to attend. Matters were made even more difficult by the fact that I'd never come across anything like this before. During the day everyone seemed to be heading towards some session or the other in the numerous Lobbies and Complexes and Convention Rooms scattered in the four Hotels monopolised by the Meeting. Then there were the tours and special events and cultural activities. And, I discovered, Denver was supposed to contain some justly renowned dining places and watering holes which the participants were expected to sample. It was crazy ! A far cry from the sessions in India where leisurely cups of tea carried the spirit and the flesh far into the wee hours of the early dawn. In short, I was totally lost. In consequence, it was probably my least productive period. I met so few people and attended so few sessions that its embarassing to recall. Half the time I seemed to be following the green lights up in the ceiling leading me from one point to another in the massive complex of hotels rooms

and meeting places. And when I did get to any of the sessions the technology of presentation was incredible. Slides, projectors, tape recorders, diagrams and charts, photographs, models - every speaker seemed to be equipped with paraphernalia to get his or her point across with added vigour. What happened to the tongue as a teaching aid ? And me with my last-minute sketches made on the largest piece of hotel stationery I could filch and no overhead projector to show them on ! Poor material for a memorable encounter with E F Schumacher, the prophet of Appropriate Technology. So it was good to find two equally mystified souls from Indonesia and Ghana - the three of us being the contingent from the Third World. How quaint ! No wonder we Orientals are supposed to carry a mystique with us - it must be the total sense of disorientation when we encounter the scrutable West.

There is a large apprppriate technology establishment at Georgia Tech. A range of equipment has been developed and modified. There is a fishing pole string winder, evidently for the enthusiastic sportsman. There is paper glue, a strength(tension) tester, equipment for peanut processing, oil drum chimneys, corn huller, foam polystyrene mattresses, a low-cost immersion pyrometer, welded pipe hand-pumps, solar tunnels for drying, and so on. How much of it, I wondered, as I sat amidst the extremely impressive set-up, is going to be used ? Because, just before that I had come across the Foxfire Books. These books were an expressive collection of the daily techniques used by the mountain folk of the Appalachians, just across from Georgia Tech. What captured my imagination was that the lore had been collected by high school kids exploring their own roots with the assistance of an inspired teacher trying to find a welcome alternative from teaching boring classes of English and Geography. From hog dressing and log cabins, to planting by the signs, snake lore, an interview with the sherrif about a bank robbery, hide tanning, butter churning, wagon making, and ghost stories - it was all there, each scintillating fragment mounted on another to make a magnificent mosaic. And the sad thing was that it was passing out of people's lives. The kids who put it all together came from the mountain families but had no idea of the richness of their tradition until they began their investigations, really talking to their relatives for perhaps the first time. And if such live experience was being discarded in the face of modern progress, what chance, I asked myself, did Georgia Tech have ?

Northwards towards Cincinnati and Michigan, and I got the first glimpse of industrial life and letters giving me an inkling that there was more to technology than I had so far seen - not so much because it had not been there earlier, but perhaps I was now in a better frame of mind to absorb what was there before me. A tour through the General Motors plant at Cincinnati; gleaming cars coming off the assemby line; the hammer of presses and the screech of grinders; automatic arms extending forth like prehensile claws to spotweld; and men in blue submerged in various innards tightening nuts and attaching wires. Suddenly one of the men in blue leaped out of his slot, gawked artificially at the tourists, and leapfrogged into an empty wire bin to rattle the bars and screech at us. What did he think this was ? Darkest Africa ? Anything to break the monotony of the assembly line, I suppose. The Cincinnati Can Company was a repetition of efficient, smoothly-running machinery with a series of bored operators poised high above at their controls. It all reminded me of the time I spent as a trainee at the Burmah-Shell Refinery at Bombay,

except that there were qualitatively different factors in the production process and the attitude towards technology - how do I put it ? perhaps a greater feeling of annui, a lackadaisical approach towards all those terribly efficient machines, a deeper despair with technology. This despair manifests itself in all those 'back-to-nature' groups experimenting with 'radical' and 'appropriate' technologies. In Michigan I found that it's become the focus for a considerable amount of research too. The University of Michigan is running the Quality of Work Programme through the Institute of Social Research and the National Quality of Work Center. The programme is directed towards the betterment of industrial life, to "improve effectiveness of organisations and enhance the quality of working life", with labour and management participation. It is being (or was being, five years ago) implemented in four workplaces, Rushton Mining in Pennsylvania, Harman International in Tennessee, the Transmission, Planning and Engineering Division of TVA in Tennessee, and the Mt Sinai Hospital at New York. The hypothesis of the programme is "that when employees in any kind of organisation, public or private, are provided expertly structured opportunity to contribute ... to designing and implementing activities for organisational change, the organisation will become measurably more effective and the quality of working life for all employees will improve". The findings of the research programme indicate that "productivity increased with increased cooperativeness" - which still does not answer the question: did the quality of life increase ?

Across the Atlantic I found the same concern for relating technology to not only the needs of production but also the needs of those who did the producing. The British Society for Social Responsibility in Sciences has done sterling work in researching and publicising the dangers of industrial wastes, products, and processes to workers, and in exploring the relationship between science and society. Some of them have also been assisting the workers of Lucas Aerospace in presenting an Alternative Plan. Lucas Aerospace was heavily dependent on military contracts from the Government, but with severe cutbacks in public spending on engines and arms in the mid-70s Lucas proposed to reduce production at the unit at Burnley and to retrench workers. Workers responded with an alternative proposal - to retool certain sections of the factory and to produce items of 'social use'. When I met some of them at a seminar at Crawley College they were full of plans for making heat pumps and putting their gas turbines to work in hybrid road/rail vehicles. I learnt that university academics were assisting workers in other factories and arguing for different production schema and the organisation of work: at Chrysler Corp, promoting the production of buses, coaches, tractors, heavy trucks - vehicles for public use; at C & A Parsons, Newcastle - proposing the 'Rocking Duck' method of harnessing wave power; at Scraggs & Son in Manchester, for the production of alternative textiles more needed by the common people. Even in the US, I was told, similar work was being attempted at plywood factories in the Pacific Northwest, in a strawberry workers cooperative inCalifornia, and with an insurance company in Washington, D C.

This, therefore, is a widespread phenomenon. The challenge to society's use of resources and technology takes different forms. In the US I was thoroughly taken with the work of the Public Interest groups. Nader's Raiders alone, I was given to understand, cover over a dozen areas.

Amongst the task forces: the Fisharmen's Clean Water Action Project; the Retired Professional Action Group; the Health Research Group; the Centre for Auto Safety, the Aviation Consumer Action Project; the Centre for Science in the Public Interest; Consumer Action for Improved Food and Drugs; and so on and on . Even groups like VITA (Volunteers for International Technical Assistance) in the US, and ITDG (Intermediate Technology Development Group) in the UK are beginning to look into the issues that relate technology to society, particularly in areas of ecology and environmental despoliation. In Europe I found the same trends at the Volvo Kalmar Plant in Sweden and the Glass Works at Surte, workers and academics working jointly to reorient production decisions and make technology more meaningful.

Germany and France were not particularly inspiring, possibly because I was tired, certainly because I was in a hurry to get back to India to see my ailing mother. So I skipped the other bits of Europe and Africa that I wanted to see. But one other facet stood out throughout my sojourn through the US, UK and Europe - and this was in the libraries and museums in Washington and Philadelphia, Boston and Montreal, London and Oxford, Amsterdam and Tubingen. What a reservoir of knowledge at one's fingertips; an application of technology to information storage and retrieval so superb that I was left cocooned in awe at the thought of what we could have done with such systems in India. Here it takes me half-a-day to find a monograph and another four to get a copy of it made. We fight a losing battle against rats and dust and spiders and the mammoth explosion in information. To locate a source of information requires correspondence over many months and the computer is still the preserve of the affluent and the effete. Above all, this country is so vast that it takes five days to get across from one end to the other and one who makes the journey is as likely to be as topsy-turvy as I was when I got back to my native land after a little over two months of new smells and sounds, ideas and impressions.

So I got back to New Delhi in the middle of the night. (Why is it that my memory of all international flights is of arriving at a strange airport in the middle of the night ? Is this too technology by design ?) From the winter of Paris to the summer of Delhi was a little hard on my woollens. And then the customs inspector pawed through my suitcase and stung me for three hundred rupees (of course, we bargained for it !). The scooter-taxi driver lifted another twenty off me for the benevolence of dropping me home at two a.m. A warm welcome home ?!

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