Alvares, Claude. 1991. *Decolonising History: Technology and Culture in India, China and the West, 1492 to the Present Day*. Goa: The Other India Press, India.

A Review

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'I have never found one amongst them [the orientalists] who could deny that a single shelf of a good European library was worth the whole native literature of India and Arabia. It is, I believe, no exaggeration to say that all the historical information which has been collected from all the books written in the Sanskrit language is less valuable than what may be found in the most paltry abridgment used at preparatory schools in England.'

--Minute of Lord Macaulay on the 2nd of February 1835

This obnoxious statement may incite a murderous response in a young reader today, but the fact remains that the British in particular and the West in general did denigrate the East, its culture and scientific legacy. The worst part is that quite a few Indians too believe such blatant condemnation of the Indian legacy. Western Science created hegemonic categories of science vs magic, technology vs superstition etc., which were both arbitrary and contrived. Prabably the Western model initially gained momentum of its own accord within a particular socio-cultural environment, but Alvares endeavours to show that in time it was deliberately used to betray, exploit and demolish other systems. The nature of the Western mind was thought to be disposed to logic and consistency, while the primitive mind floated easily in contradictions and was generally more emotional and childish, and so forth. They taught that non-literate peoples in Southern countries possessed something like a "primitive mentality", that was not merely different from, but inferior to its Western counterpart.

But today a lot of new facts are coming out which show how the West plagiarized Indian traditional science and called it its own. Even the botanical taxonomy was essentially based on Ezhwa traditional knowledge, but no Western scientist ever refers to the contributions of Itty Achuden to the now famous *Hortus Malabaricus.* As our main concern is History of Indian Science and Technology, Claude Alvares' book under review thus assumes great relevance. He relentlessly exposes the claims of the West of its superiority and brings out the fact that till the advent of the British in India, it was a far richer and scientifically superior a country than the West. His book is an eye opener and a must for all interested in understanding the machinations of the British in condemning our great achievements of the past.

Alvares very forcefully debunks the claims of the West that extols the virtues of the Western mind and civilization and denigrates those of the Indian and the Chinese. He quotes from the offensive claims made by Macaulay in 1835. Macaulay condemned outright the intellectual and scientific legacy of India, to introduce the Western model of education system.

Alvares explains how the West succeeded not only in denigrating the Oriental science and culture but also the self-esteem of the Indians. Alvares quotes extensively from the works of the renowned Ghandhian and historian of science, Dharampal, as to how advanced the Indian science and technology was before the advent of the British. He exposes the claims of the

Western Industrial Revolution, which made its poor people poorer. The British could survive only by making its people work for 12 hours a day and by making the women and children also work in the factories. Alvares explodes the myth of the European *Homo Faber*. Above all, Alvares debunks the false claims of the West that the Indian mind was merely saturated with spirituality. He refutes this claim by highlighting the achievements of ancient Indian agriculture, industry and medicine etc.

Alvares goes to the extent of even accusing liberal scholars such as Karl Marx, Needham, and Peter Gayle of belittling Indian achievements in science and technology.

Rajini Kothari, the famed sociologist, pays a profound tribute to the importance of the book when he says, "It is an ambitious undertaking though not modestly carried out. A political battle that is intellectually waged."

Countries and nations around the world during the latter half of the 20th century saw uprisings against the colonial regimes and their gradual collapse resulting in the creation of independent, sovereign states. The colonial domination had uprooted the very foundations of these nations and while they revelled in their newfound independence they realised they had a very low faith in what remained of their identity. The rapid advancement of the West allured them and they looked up to the West as a model for their own rapid advancement. Apparently, with the socialist and communist models earlier providing alternatives to the Western model ran out of steam at a time when the new nations and peoples contemplated making quick progress. At such a time the West alone stood out as an unchallenged alternative for speedy development. In his book Claude Alvares points out that this limitation of a choice for a model on a part of the world was exploited opportunistically by the West to further its own interests. The adoption of the Western model, whatever may have been its achievements, necessitated a disregard of traditions and bypassing the socio-economic conditions peculiar to the countries that adopted the model. In time it was realised that for most of the developing countries the adoption of the Western model was a misguided approach. India too, which had taken to the Western model, realised its mistake after its independence by its Sixth Plan, during the 1970s.

Technology and culture on the one hand influence development and on the other are themselves affected by development. Claude Alvares in his book explores the impact of the Western interpretation of technology and culture, and its emerging impact on the developing countries. Rajni Kothari, an eminent Indian sociologist, in his foreword to this book says, 'the relevance of this book goes beyond its scholastic title. It sheds light on and sets in perspective the large questions of our time, questions of both theory and human choice. It is an attempt to relate the basic anthropological concern regarding the nature of man and the predicament that faces him, the role of technology in defining this in our time, the dominant cultural paradigm underlying such a relationship between technology and human destiny, and the political processes through which this relationship and its transmission of a particular culture are sought to be legitimised and challenged in our time.' Kothari says that most of the current debates on technology, development and international order are reflected in the analysis presented here. The ecological crisis and the role of Western technology in it are spelt out vigorously. The theme that it is not merely technology that is at fault but also the meaning and direction given to it by the cultural paradigm of the modern West is pointed out. The author is aware of the central importance of the

politics of technological choices and the international and global structuring thereof. He is at the same time unsparing of the elite and intelligentsia of the Third World for their falling prey to such choices and in the process ravaging their lands and exploiting their peoples. He further says that this book points to the necessity of rejecting the Western pretence of universalism and for non-Western cultures to seek answers to their problems 'within'. This is a perspective that is beginning to be widely shared. Among other things, it can enable man to transcend the extreme parochialism of Western science and its so-called objectivity, a myth that the author explodes quite ably.

Claude Alvares has divided the book into seven chapters, along with an after-word. The first chapter is - *A New Anthropological Model*. The second and the third chapters look closely at the Indian and the Chinese Technology and Culture while the fourth discusses the English Technology and Culture. In the fifth chapter Alvares looks at the Technology, Culture and the Empire in the Colonial Age; in the sixth chapter the renewal of the Chinese and Indian technology and culture are covered. Finally, the seventh chapter evaluates the logic of appropriate technology.

Since Alvares is concerned with the plight of the people, their cultures, communities and their development on account of the politics of the West, he introduces the subject matter under the sub-titles, *The Politics of Anthropology, The Politics of Political Science, The Politics of Psychology, The Poor as scapegoats,* and *The Survival Engineer*. The introduction part of the book is very important for it exposes the subject matter at a macro level, which is then elaborated upon in later chapters with particular examples of the Indian and Chinese situations. It may have been that the Western model initially gained momentum of its own accord within a particular socio-cultural environment, but Alvares endeavours to show that in time it was deliberately used to betray, exploit and demolish other systems.

Alvares is critical of the anthropologists and says that when they documented faithfully the ways of life of an alien community, they did it within a framework of mind that located the community at a level lower than the one on which they themselves, as a member of Western culture, stood and lived. Such a situation favoured the proliferation of comfortable myths, the most persistent one of which taught that non-literate peoples in Southern countries possessed something like a 'primitive mentality', that was not merely different from, but inferior to its Western counterpart. This 'primitive mentality', the myth noted, was highly concrete, while the Western mind was more 'abstract'. The former was also supposed to connect its ideas by rote association, while the latter used general relations. Further, the nature of the Western mind was thought to be disposed to logic and consistency, while the primitive mind floated easily in contradictions and was generally more emotional and childish, and so forth. By 1830, the British had acquired, in what was to become a completely European century, a flattering notion of the nature of their own civilization, and a thoroughgoing contempt of every other. In India itself, this new attitude found expression in the infamous Minute of Lord Macaulay on the 2nd of February 1835:

'I have never found one amongst them [the orientalists] who could deny that a single shelf of a good European library was worth the whole native literature of India and Arabia. It is, I believe, no exaggeration to say that all the historical information which has been collected from all the books written in the Sanskrit language is less valuable than what may be found in the most paltry abridgment used at preparatory schools in England.'

Macaulay advised that the Board of Public Instruction would be wasting public funds should it print books of Indian learning "which are of less value than the paper on which they are printed was while it was blank", and that the artificial encouragement to "absurd history, absurd metaphysics, absurd physics, absurd theology" would end in the raising of a "breed of scholars, who live on the public while they are receiving their education, and whose education is so utterly useless to them that, when they have received it, they must either starve or live on the public all the rest of their lives". Alvares says that little did Macaulay realize that it would be precisely the English system he introduced that would produce the "breed of scholars" so characteristic of India and the other Southern nations today - the educated unemployed. He points out that the Dutch historian, Peter Geyl, had no different view of these matters. Even Marx, we are told, seemed to hold similar views as he said that England had to fulfil a double mission in India: one destructive, the other regenerating - the annihilation of old Asiatic society, and the laying of the material foundations of Western society in Asia. Marx went on to emphasize how the British were breaking up the village community, uprooting handicraft industry, and establishing private property in land, which he termed "the great desideratum of Indian society". This in the view of Alvares was the politics of anthropology that belittled the people who were non-Western or non-European. Even Needham put this sarcastically when he said, 'European music was music, all other music anthropology'. The study of white men even was a separate science called sociology; anthropology covered the rest. A hundred years later, Peter Drucker, the godfather of the global corporation was still theorizing along similar lines. In one of his not so well known books, *The Landmarks of Tomorrow*, he urged his readers to face the new reality of the collapse of the East, that is, of non-Western culture and civilization, to the point where no viable society anywhere could be built except on Western foundations.

The end of the Second World War was followed by the rise of a fresh generation of states and by the time the world had entered the fifties a growing concern with the phenomena of 'backwardness and underdevelopment' had come to the fore. Walt Rostow, in one of the most influential books of the decade to follow, set out to argue the credibility of the prescriptions given by the American experts for the development of the underdeveloped. Actually, as is now well known, Rostow's book *The Stages of Economic Growth* was not concerned at all with the 'backwardness' of the new states, but formed part of a tactic designed to aid Dulles against Khrushchev in competing for the allegiance of these nations, still uncommitted to either of the two power blocks. Rostow argued that the key to successful development lay not with the Soviet Union, but with the West, it was therefore in the interests of the non-aligned nations to jump on the Western bandwagon.

It would take another fifteen years before scholars would isolate the fundamental deficiencies of Rostow's model. By the time the critique had been accomplished, the economic and industrial elements of the Western paradigm, in so far as they might have had significance for the new nations, had lost their great appeal. By then the serious flirtation on the part of the industrializing nations with the model had resulted in a powerful current of dismay, disillusion, and disappointment. Western scholars had been equally busy constructing similar, only more bizarre, models and disseminating slanted advice. The model presented by these scholars on a platter, so to speak, was again a distinctly Western one: formal democracy in combination with a rationalized bureaucracy. The new states should attain this goal, since it represented the 'summit'

of political development. New states not yet incorporated within the model were to be termed 'traditional' or better still 'transitional' that is, still undergoing the throes of modernization. W.F. Wertheim exposed their political implications and pointed out that the chief exponent of the school, Daniel Lerner, was guilty of extreme ethnocentrism in identifying the traits of modernity with those of the American society. It is not difficult to prove that the godfathers of the gospel of modernization, including Lerner, S.N. Lipset, and Karl Deutsch, were influenced in their studies and policy recommendations concerning the Southern nations by categories and historical possibilities fashioned in their own context.

There is a more serious criticism Alvares levels against the modernizers, available to us in the writings of the Indian political scientist, Rajni Kothari. Kothari said that the mode of development presented under the generalized package of the 'modernization' process, undermined, in one continent after another, national independence in real terms, in the name of economic development. Alvares therefore says that the consequences of such an empty, context-free model of modernization had indeed been disastrous. It had produced an economic, bureaucratic, and technocratic elite intimately tied to the metropolitan areas of the world, treating the vast rural hinterlands in its own countries as colonies that provided cheap food and raw materials and surplus labour (and markets for inferior industrial products and obsolete industrial machines); an elite that had achieved high economic status at the expense of large numbers of people huddled in the 'countryside', and in the process lost both its independence and its social conscience. Alvares says that in the ultimate analysis, there is absolutely no reason for restricting the models of modernity and the processes and sequences of modernization to the experience of the Western nations. If, however, we continue to do so, we are open to the charge that we are subduing vast and varied societies of the world to the totalitarianism of a single historical pattern. History might pattern itself on the past, but there is no reason why it should pattern itself on the Western past merely because the Western nations realized urbanization and literacy before political democracy.

Alvares says that when all these theories of evolution, anthropology, political science and psychology dismally failed as prescriptions for development and confounded the Westerns as to how the miracles could have bypassed the backward nations, they obviously looked around for a scapegoat. He says it would have been glaringly impolite to put the burden on the white man and, on the other hand, it would have been quite embarrassing to accuse those governments of failing to address the issues. So the only scapegoats left were the low income groups, including the landless labourers, the small farmers, the unemployed craftsmen and so on. And since these could be depended upon not to react or return the attack, experts and governments set about the task with a will. In literature, he says it was Gunnar Myrdal who lent some sanction to the stereotype of the poor man as being mostly passive, apathetic and inarticulate. That the tide of false perceptions did not abate says Alvares is evident in the population control measures exported to the developing countries. He puts it sarcastically that a variant of that legendary Marie Antoinette proposal has become the order of the day: if they have no bread, let them swallow pills. The subtitle 'the survival engineer' is an ode to the poor, traditional and yet not modernised or perhaps Westernised human being. It is towards the cause of the insecure groups around the world that this book is written in which Alvares exposes the ominous designs of the West against the poor. The economically insecure man in the Southern nations is engaged in the task of survival, but this time, primary survival. Considering the range of odds against which he

must struggle and his experience thus far in using all his wits about him to remain alive, he comes very close to being an engineer par excellence. The technology he uses is not invented for the maximization of profit; it is, instead, a survival technology, an expression used by Dutch philosopher K wee Swan-Liat. Fully half the population of today's world are survival technicians; they do not exploit the Western technological system. They are craftsmen of necessity.

Alvares quotes Joseph Needham in the very first chapter, which could well be taken as gist of the entire chapter. Needham said, 'for three thousand years a dialogue has been going on between the two ends of the Old World. Greatly have they influenced each other, and very different are the cultures they have produced. We have now good reason to think that the problems of the world will never be solved so long as they are considered only from a European point of view. It is necessary to see Europe from the outside, to see European history, and European failure no less than European achievement, through the eyes of that larger part of humanity, the peoples of Asia (and indeed also of Africa).'

Alvares begins by objecting to the use of the word *Homo faber,* 'Man the maker' in the West, which has found wide acceptance around the world. Carlyle called man a tool-using animal and Benjamin Franklin called him a tool-making animal. Alvares thinks that it all goes on to show the obsession with technology which has wrongly been suggested as a faculty that separates and distinguishes man from the whole range of animals. It seems that here Alvares is trying to challenge a very important and a fundamental assumption in relation to man. It is wrong to presume that biological development of man preceded the beginning of culture. Geertz has been able to show with evidence based on archaeological and palaeontological records that the greater part of human cortical expansion followed, not preceded, the beginning of culture. In other words, it makes more sense to believe that 'culture was ingredient', and that too central1y ingredient, in the production of the human animal, rather than to think of it in terms of being added on, so to speak, to a finished or nearly finished animal. And by culture, Geertz has in mind much more than the mere perfection of tools. It also includes the adoption of organized hunting and gathering practices, the beginnings of true family organization, the discovery of fire, and the increasing reliance upon systems of significant symbols (language, art, myth, ritual) for orientation, communication, and self-control.

The Dutch historian of technology, R. J.Forbes was one of the first historians of technology to conclude that technology was the work of mankind as a whole, and that no part of the world can claim to be more innately gifted than any other part. Yet, Alvares says that, for the past fifteen decades, particularly during the last three, the peoples of Asia, Africa, and Latin America were told a different version of the story. They were taught, directly and indirectly, to compare their technological systems in terms of the Western production system, and to define themselves and their cultures in relation to a particularized philosophical anthropology. Every aspect of the life of their societies was then compared, judged, or assessed in terms of what obtained in the West. Alvares says that the wrong notion that the Western technology is the only viable model has been extensively projected in books, journals and research works which identify science and technology with the science and technology of the West. Thus, Alvares says that our preoccupation with the Western technology has resulted in more attention being paid by the new nations to transplanting elements of the Western technological system instead of updating their own indigenous ones. So in the chapter where Alvares objects to the use of the word *Homo*

fabre, since it excludes the animals who are in many cases better creators than man, he also proposes to have a new model where *Homo fabre* does not only stand for the Western white man but also includes the African *Homo fabre*, the Chinese and the Indian *Homo fabre* as well.

The second chapter looks into the Indian technology and culture. At the very beginning Alvares concedes that so great a quantity of paper and print has been devoted to Indian philosophy and art, and so pervasive is the opinion abroad that these aspects of the Indian mind have remained saturated with "spirituality" and "world-denying" tendencies, that it has seemed but natural to conclude that technology or material culture could not have been attended to in the measure desired. To counter this Alvares studies the Indian technology under the subheads of Indian agriculture, Indian Industry, Indian medicine and lastly discusses the mind of the Indians. He cites the case of Dr. Wallick, a superintendent of the East India Company, who told the English Commons Committee that the Europeans out of India had in a great measure misunderstood the husbandry of Bengal. The Bengali husbandry, although in many respects extremely simple and primeval in its mode and form, was not so low as people generally supposed it to be. He found that very sudden improvements in them have never led to any good results. He said, "I have known, for instance of European iron ploughs introduced into Bengal with a view of superseding the extremely tedious and superficial turning of the ground by a common Bengali plough. But what has been the result? That the soil which is extremely superficial, as I took the liberty of mentioning before, which was intended to be torn up, has generally received the admixture of the under soil, which has deteriorated it very much." He has put on record that he was asked whether the techniques could be improved. He had answered it in the negative.

We are told that in 1820 Colonel Alexander Walker had prepared a more comprehensive report on the agriculture of Malabar and Gujarat. Alvares quotes him extensively and says that the entire report may be found in Dharampal's *Indian Science and Technology in the Eighteenth Century*. Walker wrote that in a climate where the productive powers were so great, it was only necessary to put the seed a little way into the ground. It must be a strong proof that the Indian plough was not ill adapted for its purpose when it was seen arising out of the furrows it cut, for the most abundant and luxurious crops. What could be desired more than that? The labour and expense beyond that point must have been seen as superfluous. The Indian peasant was commonly well enough informed as to his interest, and he was generally intelligent and reflecting. He was attached to his own modes, because they were easy and useful; but furnished him with instruction and means, and he would adopt them, provided they got him his profit. Alvares cites extensive paragraphs from these reports, which go on to show the crops, farming practices and irrigation methods used by the Indian farmer.

Next to agriculture, cotton and cotton goods constituted the principal industry in the Indian sub-continent, as did the woollen industry in England. Up to 1800, no country produced a greater abundance or variety of textiles in the world than India and that too with most simple of tools. China remained the only close rival. In 1700 itself, India was the largest exporter of textiles in the world. Here Alvares quotes Dubois:

"With such simple tools the patient Hindu, can produce specimens of work, which are often not to be distinguished from those I imported at great expense from foreign countries."

Alvares says that the world today cannot understand production except in terms of high-energy

inputs, complex machines and processes, and massive organisations. But foreign travellers to India one after the other remarked on the perfection of the manufacture and the simplicity of the tools. Alvares tells us that the loom provided the basis of the Indian industry, particularly in the eighteenth century. It provided employment to 'hundreds of thousands of inhabitants, comprising the weaver caste' and to 'countless widows' and families, who engaged themselves in the subsidiary processes of cotton spinning. The weaving industry itself was extensive, stretching from 'the banks of the Ganges to the Cape'. 'On the coast of Coromandel and in the province of Bengal, when at some distance from the high road or a principal town, it is difficult to find a village in which every man, woman or child is not employed in making a piece of cloth.'

The fact is that the textile industry was highly coordinated with agriculture. It was usually when the crops were growing or had just been harvested, that one found a great number of villagers applying themselves to the loom, 'so that more silk and cotton was manufactured in Bengal than in thrice the same extent of country throughout the empire and consequently at much cheaper rates'.

In the north, the great Moghuls maintained *kharkhanas* (factories) for their specific needs. Elsewhere, native princes preserved their own arrangements. And one economist has noted how this constant source of employment declined and withered as the princes fell prey to the machinations of British power. Surat, an emporium of foreign commerce, manufactured the finest Indian brocades, the richest silk stuffs of all kinds, calicoes and muslins. The woollen industry was situated in Kashmir, which produced the extraordinary cashmere shawls, whose beauty was considerably 'enhanced by the introduction of flower work'. The wool was imported from Tibet, after which it was bleached and manufactured. As for silks, in Western India, fabrics from them were often mixed with cotton. Printed silk, *culgar* is still produced in the same places today as in those times, in the form of saris of artificial, printed silk or *kalgers*. One species of cotton and silk fabrics consisted of *alachas*, striped fabrics, later consciously imitated in England. The *cuttanee* was a satin weave; the cheapest of the mixed fabrics were called *tepseils*, produced for the West African trade. And for the Portuguese demand, there were silk and wool fabrics, called *camboolees*, produced in Sind.

Talking of the Indian industry how could one forget the mention of iron and steel produced in India. Dharampal observes, there are a number of accounts concerning the production of iron and steel in India during the Vasco da Gama epoch. There were other centres during the Iron Age where steel was produced by holding wrought iron in the charcoal of the forge until it reached white heat and then quenching it, but the resulting product did not reach Celtic standards. The latter itself, however, was not as good as the so-called Damascus steel, the only true spring steel known before the Age of Gunpowder. And this steel was made in India as early as the 5th or 6th centuries B.C. in the Hyderabad district by smiths through a process of fusion known as wootz. By the 1790s, a sample of Indian wootz had landed in England, where it roused considerable scientific and technical interest. It was examined by several experts and found it in general to match with the best steel available in England. People also found this steel excellently adapted for the purpose of fine cutlery, and particular for all edged instruments used for surgical purposes. Demand increased, so that 18 years later, one frequent user could write:

"I have at this time a liberal supply of wootz, and I intend to use it for many purposes. If a better

steel is offered to me, I will gladly attend to it; but the steel of India is decidedly the best I have yet met with."

The founder of the Indian Iron and Steel Company, J .M. Heath, soon discovered that the Indian method of wootz making lasted two hours and a half, while the processes at Sheffield required four hours.

The literature on Indian medicine is enormous, rich and various. Alvares in this book describes two of the more important medical arts of India, plastic surgery and inoculations against smallpox. Both were indigenously evolved. However Alvares concedes that he has left out a number of other technical processes used by the Indians before and, during the colonial period, including the making of paper, ice, armaments, the breeding of animals, horticultural techniques, and others. Such industries have been described in detail by Dharampal, whose Collected Works Claude Alvares has helped to reprint.

Alvares maintains that Indian science and technology should not be construed as constituting the total interpretation of the Indian *Homo faber* paradigm alone. For the technology of India can be related to other aspects of an Indian philosophy, or an Indian mind and his experience of the world.

The third chapter of the book is devoted to the consideration of the Chinese technology and culture where Alvares says that the Western influence on the Chinese mind has had its effects and even Chinese scholars, educated in Western universities, have not been able to refrain from manipulating Chinese history to reinforce conclusions reached earlier by frankly ideological means. At least their activities are intelligible in the light of almost total devaluation of the role of the intellectual in the life of modern China. Thus, the late Lin Yutang, born and raised in China, but with his spirit moulded in the United States, was ready to confess in 1937 a complete lack of confidence in the regenerative powers of his own people. He opined that China then was undeniably the most incoherent and chaotic nation on earth, the most dramatically weak and impotent, the most incapable of rising up and marching ahead, while in the West, attention was principally diverted to nature, and the natural sciences were developed earlier and further than the human sciences. In China, man formed the focus of both theory and practice. If in the West man saw himself as able to dominate nature, the Chinese refused that attitude, instead placing man not merely as central, but also as an integral part of nature.

Alvares discusses Chinese history and philosophy through Taoism, Confucianism and Buddhism in the book. He says that Needham is quite fond of constantly repeating his claim that, 'Chinese science and technology were very much more advanced than those of Europe between the third century B.C. and the fifteenth century AD Renaissance in Europe.'

The English Technology and Culture have been taken up by Alvares in the fourth chapter. He begins by maintaining that contrary to all that has been written on the subject, Europe did not produce the industrial revolution -- Britain alone did. He quotes Forbes, which is quite relevant and might come to us as a surprise for in our imagination we are prone to think that the Industrial Revolution in England took place all of a sudden. Forbes wrote: 'The Industrial Revolution was by no means as sudden as is often claimed or as revolutionary as some have believed. It had its

roots in the important technological changes of the 16th century, although it did not gain momentum until about 1800. From a social point of view, however, the changes during the period from 1730 to 1880, dramatic in their strange medley of good and evil, often tragic in their combination of material progress and social suffering, might indeed be described as revolutionary.'

Alvares says that an agricultural revolution preceded or ran simultaneously with the industrial revolution. A more thorough scrutiny of the agricultural scene at this early date will lead to the conclusion that the word 'revolution', when seen from the angle of technological development, exaggerates the extent of the changes involved. It is pointed out that the 'official' dates demarcating the period of the revolution are 1760 and 1830. However, the most important innovations concerned resource changes, and these came much before 1760. No industrial revolution would have been possible without them. By the 1830s, the handloom weavers had been reduced to a wage of less than a penny an hour. They were able to keep alive only when their children and wives joined in the factories. The application of steam power to looms gradually undermined their independence and their number. They did not give up easily, but they had to in the end, provoking Ashton to term the period one of the most depressing chapters in the economic history of the time. If convicts had been compelled to work a twelve-hour a day as part of their punishment, in jails, it would have provoked a humanitarian outcry. Yet the twelve-hour working day in factories had been established on commercial grounds - and *not just as the norm but also as the minimum*! It was this, rather than the cruelty involved, which was the most hideous aspect of the factory system. It imprisoned men, women and children for so much of their lives. The mill-owners did not deny the cruelty. They merely found the discussion about it irrelevant. In their opinion, the factory worker was better off. He was enjoying a standard of living higher than he otherwise could have hoped for, especially if his lot were compared to a century earlier when there had been no factories. In 1834, Jean de Sismondi, though accepting the fact that machinery had vastly increased England's productive potential, and had made fortunes for many employers enabling England to become the foremost trading nation in the world, made it known that all of it had been built up only at the expense of the worker. The Industrial Revolution brought the majority of the population of England to face a situation where the total adaptation of their lives to the rigours of a new productive system became a virtual necessity. Thus, if we have the majority poor in mind it seems that the English society had to pay for increased production of basic subsistence items by undergoing a worsening of cultural, social, and environmental conditions during at least a part of the nineteenth century. Alvares emphasises that he has observed that people only accepted the rigours of industrial life in the hope of improving their subsistence; but in the bargain they suffered severe cultural, social, and environmental deprivation - they came to living on bread alone. Poverty in one sphere was exchanged for poverty in others. New needs sprang up because of the changed life-styles. The old methods of satisfying human needs were destroyed or rendered obsolete. There were undoubtedly many aspects of the pre-industrial way of life, which were especially satisfactory, and it was only after the disruption of this way of life that people experienced some particularly pressing needs outside the sphere of traditional subsistence. The question is not whether, in the final analysis, pre-industrial primitive societies could not enjoy some of the goods of modern life, rather one should ask whether pre-industrial populations would have been prepared to work the long, tedious hours for these goods and services.

In the final analysis, Alvares says that it does appear from what he has observed thus far that rich

societies are less rich and poor societies less poor than has been hitherto imagined. Therefore he suggests that the words 'developed' and 'rich' be dropped when describing the industrial nations, and that the adjective 'sick' might do a better job!

While looking into the technology, culture and empire in the colonial age in the fifth chapter, Alvares quotes the Asian historian, K.M. Panikkar who wrote that till the nineteenth century there was no large demand for European goods in any Asian country. The Empires of Asia had self-sufficient economies. Though the trade of India was large at all times, the economy of the country was not based on trade. This was true of China also, and the imperial government seems at all times to have discouraged the import of foreign goods into its territory.

Europe during the middle ages had but little to offer to the Asian economies. But a serious crisis of overproduction in the 1550s in England stressed the need for new outlets and the most hopeful prospect then seemed to be that of establishing trade with the Far East - both China and Japan. Here Alvares embarks upon a discussion of the international trade that took shape in those days to the detriment of Indian manufactures. Besides setting up institutions for collecting revenue, the colonial government set about making institutional changes in agriculture by transforming traditionally restricted property rights into something more closely resembling the unencumbered private property so characteristic of Western agricultural systems. William Woodruff sees in this, one of the principal ideas that signalled the application of the Western idea of progress in the non-Western world. The consequence of the half-Westernized land policy, the change from custom to contract, was the creation of one of the greatest curses ever to settle on the structure of the Indian rural economy: the rise of the power of the moneylender. Before the arrival of the colonizer, for centuries in fact, the moneylender had been nothing more than a servile adjunct to the cultivator, socially despised as much for his trade as for his religion. The institution of property rights was specifically intended for the collection of the land tax. It established a direct legal relation between the colonial government and the peasant or landowner. This in itself led to the beginning of inheritance and thus to the problem of the division of land. Indeed the legacy of the colonial past still pesters India and China, but China to a lesser extent as China was never a full-scale colony.

There are many such examples around the world and the question in the end Alvares asks is who is going to help bring about this shift to the necessary and desired technological development for each country. What is involved here is the issue of distribution of power, and the concentration of it in the hands of private interests and concerns. The politics of technology often reinforces the *status quo,* and the question remains as to who is going to impose solutions. How do we help separate the aims of a democratic society from those of private industry, and make the former control the latter?

Having exposed the deleterious consequences of the Western model of development, Claude Alvares presses home not only the desirability of alternative development strategies, but also their feasibility and necessity.