

and a linkage of the Soviet projects to production schedules of Indian machine tool plants. Desai accepted the oil deal, but turned down the nuclear plant at the time.

In a parallel development, Indo-U.S. relations continued to slide downhill. Despite many letters between Jimmy Carter and Morarji Desai, the U.S. has continued to renege on its contractual obligations to supply enriched uranium to India. The only U.S. initiative on the Indian scene was a blatant effort to prevent India from recognizing the new government in Kampuchea, and to induce it to play second fiddle to China's foreign policy aspirations in Asia. In exchange, in hard bargaining, the U.S. gave nothing.

On economic policy the high point was the June Aid-India Consortium meeting where, working closely with the World Bank and Britain, the U.S. praised India's maintaining its \$6 billion hoard of nonworking foreign reserves, and its emphasis on rural development. The U.S. warned that, while economic troubles may reappear in the near future, India was best advised to draw on World Bank project-linked aid.

The government's answer was a little delayed but forthcoming. Mararji Desai visited Moscow during a tour of socialist countries and West Germany which lasted from June 10 to June 22. Domestically his government began to collapse, but the kind of foreign deals he lined up were impressive.

The Soviet Union and India finalized agreement on the following projects:

- full Soviet credits for a new steel plant in the southeastern port city of Vizakapatnam.
- a go-ahead for the previously offered Soviet nuclear plant, along with assurances of greater oil, nuclear supplies, heavy water and even enriched uranium if the need arises in the event the U.S. shuts down the Tarapur plant.

The highlight of the trip was the launching by the Soviet Union of India's second satellite, "Bhaskhara," to monitor drought and climatic conditions for Asia. The Soviet Union at the same time offered to put an Indian astronaut in space in the 1980s in a joint space program—the first such Soviet offer ever to a non-Comecon nation.

World's tenth largest

Janata ruralization policies threaten

India today ranks as the tenth most industrialized nation in the world, although the stereotyped view of India in the West is still that of a semi-naked, emaciated holy man taking a dip in the sacred Ganges River. That view is far from reality.

While one still sees an occasional "holy man" when traveling in India today, what is most striking to the visitor is not India's proverbial backwardness and poverty, but the large—and rapidly growing—number of industries which are springing up across the country. Aside from the older, traditional urban industrial cities, Bombay and Calcutta, new industrial centers are emerging throughout India.

It is not surprising, therefore, that the recent efforts by the Carter administration to lure U.S. business into China as part of its overall "China Card" policy have met with a great deal of scorn in India. One Indian business leader put this quite bluntly: "American businessmen who think that China is a better investment than India should have their heads examined. China simply doesn't have the industrial infrastructure and scientific and technical manpower that we have."

From all indications, despite recent economic problems India is excellently situated today for a real "take-off" in its development. It has plentiful natural resources, a well-established capital goods industry and, most important, the third largest pool of scientists and technicians outside of the U.S. and the Soviet Union.

The opportunities available to the advanced industrialized nations—the U.S., Europe and the socialist countries—for doing business in India in the years ahead, are virtually unlimited. This magazine, in an in-depth economic program currently under preparation, estimates that by the year 2025 India could be producing as much as the total world economy produces today, with an industrial labor force of well over 20 million! Without a doubt, in the years to come, India can become the center of a vast development effort stretching from Africa to southeast Asia.

With a concerted policy in the advanced sector aimed at the rapid industrialization of the Third World—such as that originally envisioned by the founders of the European Monetary System—there is no doubt that these goals of rapid development can be achieved in India.

Because of its historic friendship with the Soviet

industrial economy

industrial legacy of Nehru

Union and the socialist countries, India is also ideally situated to provide not only a bridge for North-South economic cooperation, but, also to serve as an example of how East-West economic cooperation can develop the Third World.

Despite the current turmoil in India, there exists a deep commitment to such a "grand" development policy among key layers of its political leadership, bureaucracy, business and the population at large. That commitment is the result of the leadership and vision provided by India's first Prime Minister Jawaharlal Nehru following Independence from the British. Nehru traced out a clear-cut strategy for India's development, based on "the rapid industrialization of the country" as the only way to insure that the "standards of living of the people rise substantially and poverty be combatted."

As part of that strategy the Indian government in

its first five-year plans undertook to build up the strategic heavy industries and capital goods sectors which are vital for industrialization—from steel plants to large machine-tool production required for building up other industries. Nehru referred to these heavy industries as "the temples of modern India."

Without a doubt India has come a long way since 1947 when the British withdrew after plundering the "jewel of the Empire" for over 150 years. As a result of Nehru's vision, India today has acquired an impressive industrial base capable of manufacturing entire steel and fertilizer plants, nuclear power generating stations, as well as sophisticated computers and advanced military aircraft.

In a country like India with over 650 million people, only an ambitious development policy like the one initiated by Nehru is capable of even beginning to solve the major problems of underdevelopment. Evidence of that is the fact that even with the substantial increase in industrial production over the past 30 years (see table) and the large number of people brought into the urban labor force, 80 percent of India's population still lives dispersed throughout the countryside. Further proof is the startling fact that 40 percent of energy produced in India today is "non-commercial"—i.e. wood and dung burning.

However, in recent years, following Nehru's death in 1964, and particularly under the Janata government,

30 years of industrial development in India

Industrial sector	1950	1968	1978	% increase	
				between 1950 & 1968	between 1950 & 1978
Mining					
Coal (mil. tons)	32.8	68.5	103.2	108%	214%
Iron ore (mil. tons)	3.0	26.0	54.0	766%	1,700%
Metal products					
Finished steel (mil. tons)	1.0	4.2	5.1	320%	408%
Aluminum (thousand tons)	4.0	96.3	178.5	2,307%	4,362%
Industrial machinery					
Machine tools (mil. \$)	.4	29.3	125.0	7,733%	33,233%
Railway cars (thousands)	2.9	13.2	12.0	355%	313%
Cement machinery (mil. \$)	.5	8.2	22.5	1,540%	4,400%
Electric power equipment					
Transformers (mil. KVA)	.2	8.1	18.0	3,950%	8,900%
Electric motors (thousand BHP)	99.0	2,120.0	4,000.0	2,041%	3,940%
Fertilizers					
Nitrogenous (thousand tons)	9.0	367.0	2,060.0	3,977%	22,788%
Phosphatic (thousand tons)	9.0	190.0	660.0	2,011%	7,233%
Building material					
Cement (mil. tons)	2.7	11.5	19.5	326%	614%
Energy					
Electricity (billion kwh)	7.8	43.0	92.0	451%	1,079%

the fact that India did not develop rapidly enough to resolve these lingering problems has been used as the justification for implementing ruralist, "back to the villages" policies. Coupled with that, Nehru's vision of building India into an advanced industrialized nation has also faded.

In fact, under the Janata government a concerted effort was made to reverse the emphasis on industrial development. Under the "populist" guise of resolving the problems of unemployment and poverty which still plague India, the Janata government implemented policies based on a "rural bias" and, inspired by the World Bank, emphasis on appropriate technologies and intensive labor.

The central notions of this policy, as enunciated most consistently by former Finance Minister Charan Singh, are that the industrial path traced out by Nehru was unsuited for a country like India with a vast peasant population. Instead what was required was to give "the highest priority" to rural development based on a labor-intensive, job-creating approach. Aware of the fact that there is not enough land to go around to employ India's millions in Chinese-style agriculture, the Janata government proposed large-scale employment in "village, cottage and small scale industries."

This "small if beautiful" approach to the economy was clearly reflected in the Janata's economic program which set out as its priorities (1) greater emphasis on solar and bio-gas energy; (2) a policy of "de-tractORIZATION" for the countryside (to save fuel and increase employment); and (3) greater utilization of "animal and human labor."

There is little doubt that the Janata government brought about its own collapse through these backward-looking economic policies. While the government could rely on unprecedented stability in two key areas—a food reserve of 18 million tons of grains and foreign exchange reserves of \$6 billion (built up before the Janata came to power)—there was no effort to move ahead with bold development initiatives. On the contrary, the past year had seen a steady deterioration of the economic situation. In April the industrial region of Calcutta was shut down for virtually an entire week when several power plants broke down due to coal transportation bottlenecks and poor maintenance; the same situation was repeated two months later in Bombay, the largest industrial center in the country. Inflation has been steadily rising and is expected to surpass the two-digit figure this month, and a threatened railway workers' strike could paralyze the economy. The head of India's Federation of Chambers of Commerce and Industry, several weeks ago, summed up the current state of the economy by warning that India faces the "virtual breakdown of infrastructural facilities affecting production and trade."

—Paul Zyckofsky

India emphasizes R & D for energy production

The heart of any economy is energy, and with that in mind India under Nehru established its first plant to produce heavy electrical equipment for power generation in 1956. Since then, heavy electricals production has grown rapidly under the centralized, public sector corporation Bharat Heavy Electricals, Ltd. (BHEL) established in 1964.

In 1953, at the conclusion of India's first five-year plan, installed capacity for power generation was 2,500 megawatts (MW). This figure has since risen by more than ten times to 26,000 MW. More than 15,000 MW of that capacity has been supplied by BHEL and today BHEL has the capability to produce *annually* equipment with a generating capacity of 4,000 MW including thermal, hydroelectric and nuclear power. BHEL, a virtual newcomer to the field by most standards, today ranks among the top ten international companies in terms of annual production of power generation and transmission equipment. With over 56,000 workers at its four major manufacturing plants, BHEL is also India's largest engineering and manufacturing organization. Its total energy-related services range from feasibility studies, project formulation, and systems design through manufacture and coordinated supply of equipment to erection and commissioning.

While BHEL throughout the years has relied heavily on foreign collaboration with companies from the U.S., Soviet Union, West Germany, and other countries, since 1975 a new impetus has been given to its own research and development.

During a recent visit to the South Indian city of Hyderabad this reporter had the opportunity to visit the new BHEL R&D center which is currently under construction there, and to talk to some of its officers. While the Hyderabad center is still small in comparison to R&D units in the Western industrialized nations, it reflects India's growing concern with building up its R&D capabilities. When concluded in 1980 it will be the largest single R&D unit in the country with twelve laboratories and a staff of 1,000 scientists and technicians. Among the areas which are being examined by BHEL's R&D division are new systems to increase the efficiency of coal combustion, magnetohydrodynamics and metallurgy.

Given its long experience with foreign technical collaboration, the BHEL R&D division is excellently situated to function as an important link for the import

and adaptation of advanced technologies. While controversy has recently erupted over a wide-ranging cooperation agreement involving the West German firm Siemens, BHEL is not adverse to enter into selective agreements, especially for "joint development" of new products. A BHEL executive was quite candid about the mutual benefits U.S. companies—which have generally stayed away from India and its public sector—could find in such understandings: While India with its plentiful skilled manpower is in a position to assist in the development and adaptation of advanced technologies, the U.S. could look forward to new markets—especially in the Middle East—which are politically closed off to it now.

The executive gave the following "pointers" to U.S. companies who are interested in exploring linkups with Indian firms, particularly those in the public sector:

1) Contacts between foreign companies and Indian firms are best carried out "at the working level" with technicians, R&D staff and engineers discussing with their counterparts those aspects in which expertise is available and joint development projects can be carried out.

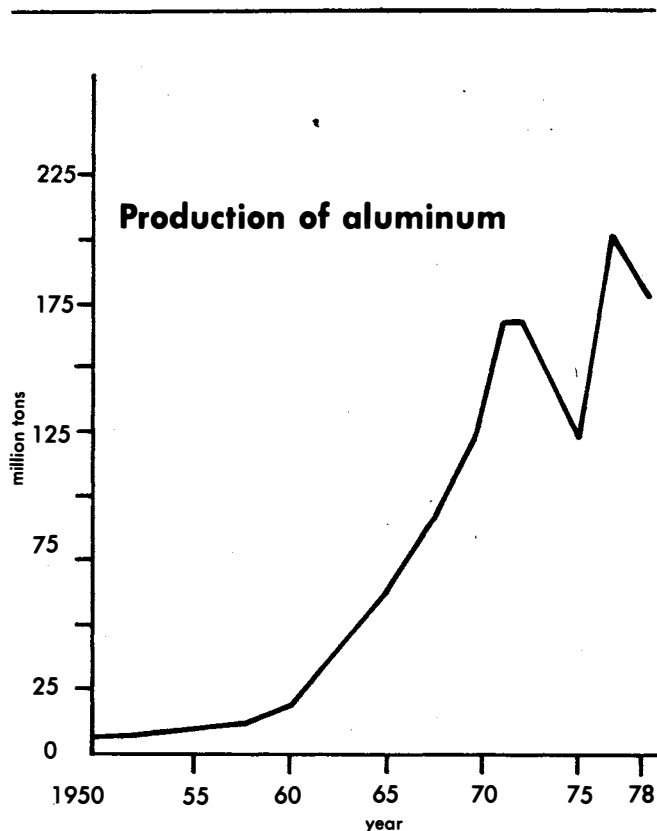
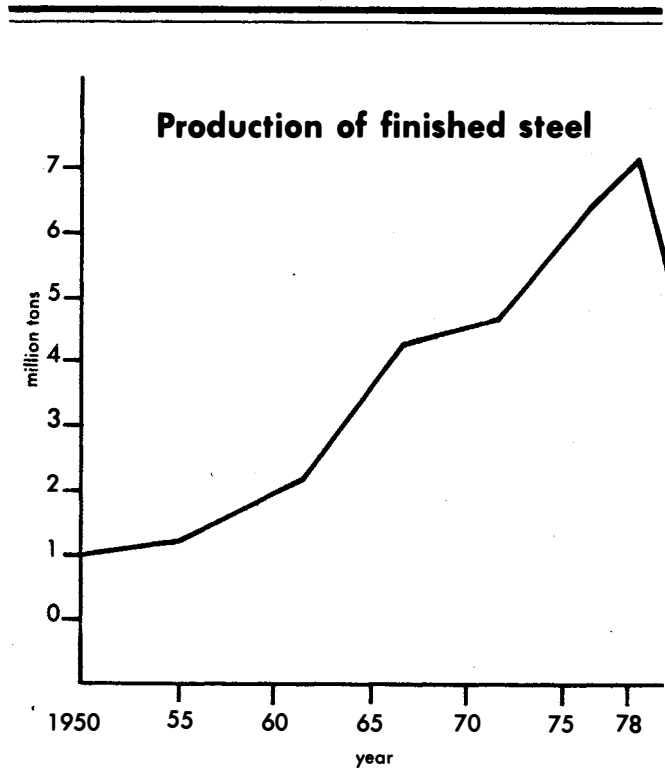
2) Relations should be carried out directly between firms, that is between the private U.S. company and the public sector Indian company. Government mediation, especially in the case of the U.S. where the Department of Energy or like-minded agencies get into the act, have proven to be more of an obstacle than an asset. The method traditionally used by West Germany where the government merely identifies those companies involved in a particular field, and then steps out, has proven to be much more effective.

—Paul Zykovsky

ECIL: from nuclear energy to advanced electronics

The story of the Electronics Corporation of India Limited (ECIL) provides devastating evidence against the advocates of appropriate technologies and the opponents of the transfer of nuclear energy technology to the Third World.

ECIL is one of the model public sector companies which in its mere twelve years of existence has become one of the largest electronic firms operating today in India. It was established in 1967 with just over \$100,000 by scientists and technicians working on five product divisions. Today it employs over 6,500 workers. Its production has since expanded to 12 product divisions



with over 250 distinct products including instruments for nuclear power generation, defense, transport, communications, as well as semiconductors, oscilloscopes, intensive care coronary units, television sets, desk calculators and computers.

At first sight ECIL would appear to be a "typical" electronics company. But during a recent visit by this reporter to its sprawling, 200 acre ultramodern plant on the outskirts of Hyderabad, one of the rapidly growing industrial centers in the south of India, two things in particular stood out: the unique history of ECIL, and the fact that without any foreign collaboration ECIL's scientists and technicians have rapidly mastered the advanced technologies demanded by the electronics industry today.

ECIL's history

ECIL was a spinoff from India's nuclear energy program begun in the 1950s by the brilliant scientist and father of the Indian nuclear program Homi J. Bhabha.

It was founded in 1967 based on the knowhow acquired by scientists and technicians at the Bhabha Atomic Research Center (BARC) involved in developing electronic instruments and components indigenously for the nuclear program. An ECIL pamphlet describes its establishment in the following way: "The moving spirit behind this ambitious objective and the programme of action evolved to achieve it was Homi J. Bhabha. Under his encouragement, significant advances in many technological disciplines were made ... In particular, knowhow for making a large line of electronic instruments and components finding general application in industry, communications, defence, research and other fields accumulated in course of time and it was proposed to establish a commercial venture through which accumulated knowhow could be turned into industrial production." Three years after its incorporation ECIL demonstrated that such a perspective was more than feasible when it turned the corner into profitable operation.

Because ECIL grew out of the sensitive nuclear industry, a great deal of emphasis has been placed on the need to make it entirely "self-reliant." Unlike many Indian public and private sector firms which sought foreign technical assistance to build up their industrial and technological base, ECIL has gone it alone.

An ECIL pamphlet minces no words in discussing the strictures imposed on it from the start by the efforts of the industrialized nations to prevent the transfer of nuclear technology to the developing nations: "Such an objective [self-reliance] was unavoidable since no developed country could be expected unreservedly to help a developing country to acquire nuclear power."

However, despite the drawbacks imposed by this consideration, it impelled ECIL to invest a high percentage of its resources and manpower in R&D—an

especially high percentage for a company in the developing sector. Ten percent of ECIL's total manpower and over 5 percent of its capital employed go for R&D.

Because of this it has also developed skilled scientific personnel who can today assimilate the rapid technological advances which are being made in the field of electronics in the industrialized nations.

A tour of the computer assembly and programming facilities fully confirmed this. Without any outside assistance ECIL is building from scratch third generation computers. Currently it is the sole manufacturer in India of digital computers. ECIL has supplied one out of every five computers in India today and it has provided a specially designed system to the Fast Breeder Test Reactor currently under construction in Kalpakam, Madras. Work is also under way to develop a large computer which will equal in performance some of the world's most modern and powerful computers.

Lessons of ECIL

The development of ECIL provides some important lessons to both industrialized as well as to Third World nations.

Through its experience ECIL has demonstrated how the development of the most advanced technologies like nuclear energy in the Third World can play a key role in "pulling forward" the technological levels of a vast array of other industries. A major effort today to export nuclear energy plants to the Third World would thus not only lead to an obvious increase in available power for industrialization but could generate a whole series of ECIL-like advanced technology companies.

Secondly, the argument that advanced technology creates unemployment, peddled by appropriate technology advocates, is exposed as a total fraud. The 6,500 jobs created by a plant like ECIL are only a small fraction of the employment generated by technology when we consider the multiplier effect created by ECIL's many products, both as inputs as well as as outputs.

This point was made sharply by Dr. A.S. Rao, one of the founders of ECIL and its retired Managing Director, in a speech in January on "self-reliance in development": "It can and has to be shown to the nation-at-large that science and technology are the breath of life, that they are the hope of the nation for solving its problems in general, but particularly the very human problem of unemployment."

The case of IBM

For U.S. and other advanced sector corporations who want to do business in the Third World, India's experience with IBM, which led to IBM's expulsion from India in 1977, can also serve as a useful lesson.

Instead of contributing to India's development by transferring not only the most advanced computers but also providing expertise in computer development, pro-

gramming and manufacturing to India, IBM was reportedly using India as a "dumping ground" for outdated computers. According to ECIL spokesmen, the computers IBM was selling in India were seven to eight years behind the computers being used in the advanced sector. Furthermore, IBM did not establish manufacturing or computer development operations which would help transfer computer technology to India. When IBM refused to dilute its shares according to new legislation for "Indianizing" foreign corporations—a measure which in no way undermines the control of the parent company since it still retains 40 percent control—the Indian government was more than willing to ask IBM to pack up its bags and leave.

—Paul Zykovsky

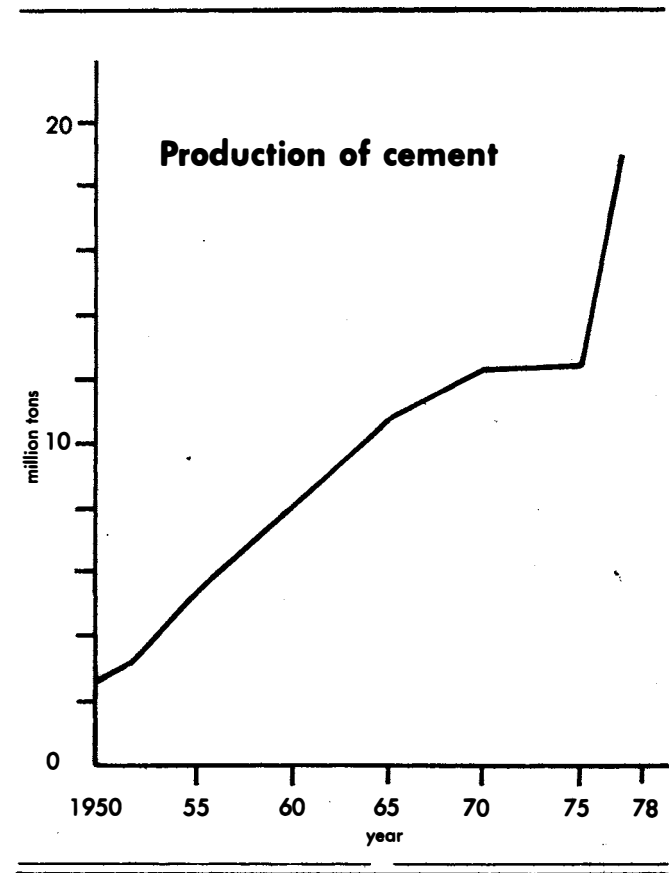
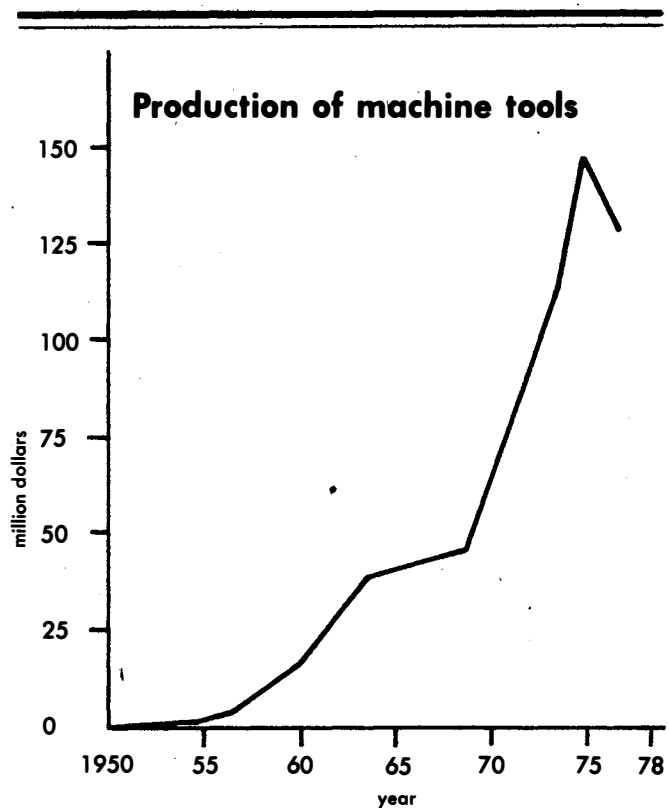
Indian businessmen begin to speak out

Indian businessmen who had expected the Janata government to be "better for business" than the Congress Party government are beginning to have serious second thoughts. While the Janata government took steps to "liberalize" the economy, businessmen, particularly those involved in industry, complain that the Janata's emphasis on "rural development" and small-scale production units, combined with the deterioration of the economic situation, has made it more and more difficult to increase production and investments.

Recognition of this fact is reflected in the higher public profile taken recently by Indian business leaders. In May, for example, the dean of Indian industrialists, J.R.D. Tata, delivered an unusually harsh public denunciation of a parliamentary committee study on Air India—the company originally founded by Tata and chaired by him until 1978. Several days earlier the chairman of the Federation of Indian Chambers of Commerce and Industry (FICCI), H. Singhania, warned of "the virtual breakdown of infrastructural facilities affecting production and trade."

The following report, based on interviews with several business leaders, sums up the prevailing sentiment of the Indian business layer.

The general sense among businessmen is that no direction was given by the Janata government to the country's development. Given the heteronomic nature of the various components which make up the Janata government, business leaders report that "each minister pull[ed] in his own direction." Policy statements made



by one minister were contradicted or opposed by others, measures were implemented without consultation, and so on.

But, as businessmen will agree, there was a method to this apparent madness. At the roots of the problem was the government's new emphasis on "rural development" and "small scale industry." As explained by Industries Minister George Fernandes in a recent interview with an Indian magazine, that this meant is the following: "if there are two applications for a licence ... between a large house or a medium or small unit, I will definitely prefer a medium or small unit. And between the urban or rural I would definitely prefer the rural, so my whole direction is towards the decentralized, towards the small man."

Redistribution vs. growth

Businessmen complain that at a time when India has accumulated an unprecedented surplus of close to 18 million tons of grain as well as sizeable foreign exchange reserves of \$5-6 billion, the government should be moving ahead with bold programs for economic expansion. Instead the opposite appears to be taking place. The government's emphasis on redistributionism and small scale industry instead of increased production has led to the point where companies are fined if they produce over and above their licensed capacity. The most recent case is that of a company producing rayon fabric, Gwalior Rayon, which is being threatened with fines and curtailment of necessary import licenses for raw materials because it is allegedly producing in excess of its licensed capacity.

"This is nothing less than a disincentive to produce, when the need of the hour is more production," one business leader recently told me. "It is a policy which only helps to perpetuate the scarcity psychology which already plagues India."

The problem of manipulated scarcities is also one of the factors which businessmen feel is responsible for growing inflationary pressures. Another related factor which some businessmen I have spoken to consider to be playing an important role in fueling inflation is the existence of a vast, parallel "black money" economy. Aside from the obvious effects of "black money" on government efforts to regulate the money supply, it creates a parallel economy which adds an inflationary premium to the cost of many scarce goods.

Another disincentive to increased production is the constant threats, delivered primarily by Industries Minister Fernandes, to nationalize this or that private sector company. The threat to nationalize Tata Iron and Steel

Co. (Tisco), a healthy, profit-making company run by the dean of Indian pro-development industrialists, J.R.D. Tata, is the most glaring example. In a response to Fernandes' threat Mr. Tata notes that Tisco did not meet any of the "economic reasons" which could be cited as justification for nationalization. Furthermore, businessmen point out that most large corporations like Tisco are already largely under public sector control through the nationalized banking sector. In commenting on the nationalization issue one businessman cited the difference in approach taken by the current government and Jawaharlal Nehru: "Nehru used to say: 'if we're going to agree to a mixed economy then why go on attacking the private sector. Let them work.'"

Nuclear energy

On the energy front, all the businessmen I have spoken to insist that the current government's emphasis on solar and bio-gas energy is not only foolish but dangerous. Given the severe energy shortages faced by industries in the Calcutta and Bombay regions, businessmen are demanding that India move ahead with its vast hydroelectric capacity as well as nuclear energy.

This was evident at a meeting in May on energy sponsored by the Association of Indian Engineering Industries at which a high-ranking member of the Planning Commission, V.G. Rajadhyaksha, formerly of the British corporation Hindustan Lever, announced an energy policy based on "conservation" and emphasis on solar and bio-gas energy. While one businessman present noted that the solutions presented by Rajadhyaksha were very similar in approach to the Club of Rome's "Limits to Growth," several industrialists called for greater emphasis on nuclear energy.

The same point was made several days later by F.A. Jasdhanwalla, president of the Associated Chambers of Commerce (Assocham) at his organization's annual meeting when he stated that in the future India will have to depend more and more on nuclear energy. "We must not waste time on this, we have to start now," he added.

To deal with the "deteriorating energy situation," the Assocham has called for the formation of a special "high-powered and broad-based" Energy Commission to map out a centralized policy for this sector. This is particularly urgent, the Assocham notes, for tapping India's plentiful water resources, where state jurisdiction over water and power are "the main stumbling block" to large-scale water management projects.

—Paul Zykovsky