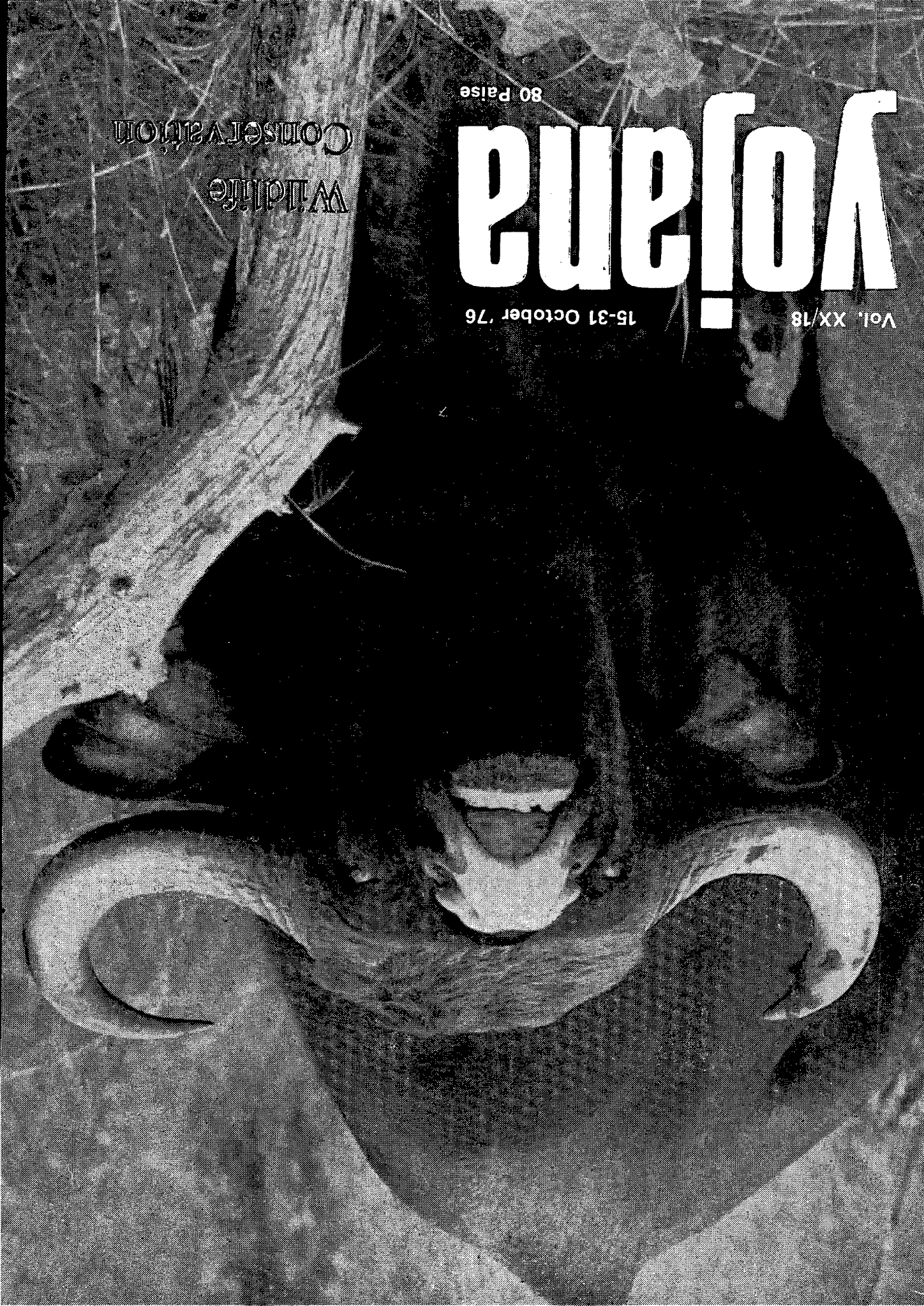




Wildlife
Conservation

80 Paise

Yojana

15-31 October '76

Vol. XX/18

BANKING IN THE ANDAMANS

I have read with much interest your Special Number on The Andaman Islands. That was indeed an excellent work on that part of our country about which very little is known to many people in the country. The pictorial portrayal of the social and economic conditions in the Islands is also very useful. However, I have felt that one major omission made in the entire Supplement is the omission of any reference to the banking activities in the Islands.

Banking activities in the islands have made good progress in the recent years. Syndicate Bank has two branches in the Andaman Islands namely Port Blair and Campbell Bay. State Bank of India is the Lead Bank. They have also published their Credit Plan for South Andaman. Our Bank has been the pioneer in the field of mobilisation of small savings. We introduced our Pigmy and Adarsh savings schemes in these Islands as soon as our branch was opened in 1969. The Pigmy and Adarsh agent stationed in Port Blair has won an all-India level prize given by the Bank for collecting the largest amount of Pigmy deposits. The Bank has been thus able to inculcate the saving habits among a large number of persons in the Islands. The Bank has also played an important role in extending credit facilities in the Islands. I think, therefore, the coverage of your supplement would have been very much enhanced if a write-up on the banking activities in the Islands was also included.

K.K. PAI

**Chairman and Managing Director,
Syndicate Bank, Manipal, Karnataka**

YOJANA Correspondent, Shri S. Kariyal, writes:

The Syndicate Bank can indeed claim kudos for doing valuable pioneering work in the Islands.

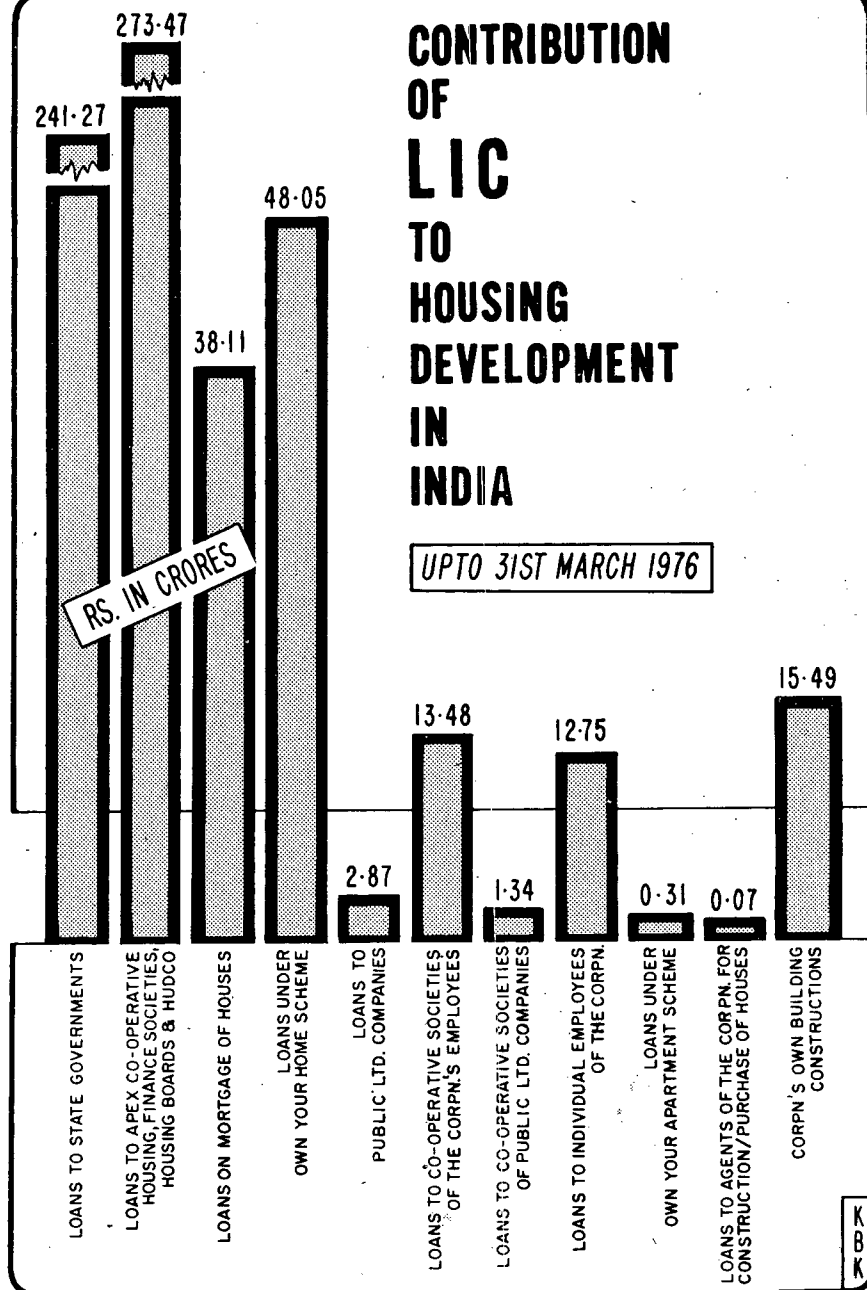
During our visit to Campbell Bay in Great Nicobar, the Syndicate Bank's manager in charge of the Campbell Bay branch, Shri B.R. Madhava Rao, and his wife were extremely kind to us and had insisted on entertaining us to tea. We later came to know that Shri Rao, one of the Syndicate Bank's brighter young managers, had actually volunteered to serve in the remote settlement (actually, India's remotest region) and his willingness to go there from his home State of Karnataka had involved the sacrifice of his wife's job, herself at the time em-

ployed in the Syndicate Bank. Shri Rao's branch opened in December 1973 had by March 1976 mobilised Rs 1,500,000 in deposits and had advanced Rs 950,000 as loans, mostly to some 800 small agriculturists. Hopeful of still improving business, Shri Rao had then approached the Andaman Administration for half an acre of land for putting up their own building.

In compressing the numerous development activities unfolding on a difficult virgin frontierland into a few pages of the journal, *Yojana* indeed had to leave many things unexhumed in its notebooks. The Statistical Outline given on page 36 of the Special Number on the Andamans, (itself taken in toto from the Syndi-

CONTRIBUTION OF LIC TO HOUSING DEVELOPMENT IN INDIA

UPTO 31ST MARCH 1976



cate Bank's own *Pygmy Economic Review*), was an attempt to correct some of the imbalances. Apart from the five banks mentioned in the Outline, (the State Bank's two branches at Port Blair and the one at Rangat; the Syndicate Bank's branches at Port Blair and Campbell Bay), there are also four other cooperative banks in the Islands: Two at Port Blair, one at Rangat and one at Mayabunder. The Syndicate Bank was also hopeful in April of opening another branch at Wimberlygunj in the South Andaman. As the Outline mentions it, total deposits mobilized by all the banks in 1973-74 amounted to Rs. 25.8 million, and advances were Rs. 6.5 million.

YOJANA

Volume XX, Number 18

New Delhi

15-31 October 1976

23 Asvina-9 Kartika 1898

Published on behalf of the Planning Commission in Assamese, Bengali, English, Gujarati, Hindi, Malayalam, Marathi, Tamil and Telugu.

Yojana seeks to carry the message of the Plan, but is not restricted to expressing the official point of view.

Chief Editor

S. SRINIVASACHAR

IN THIS ISSUE

SELF-SUFFICIENCY IN GRAINS S. Bhootalingam	4
EDIBLE OILS Badar Alam Iqbal	7
BANKS HELP WEAVERS Digant K. Dave	10
APPROPRIATE TECHNOLOGY M.Y. Ghorpade	13
BAGASSE O.P. Vimal	17
WILDLIFE CONSERVATION M. Krishnan	20
NILGIRI KOTHAS T.G. Nallamuthu	24
OIL POLLUTION Avinash Nafday	27
BOOKS	34

Cover: Gaur bull calling to his herd. Photo by M. Krishnan. See story on pages 20-23.

Editor: N.N. Chatterjee. **Assistant Editors:** N.G. Chaudhry, Mrs. Swatantra Radhakrishnan. **Senior Correspondents:** AHMEDABAD—Raman Patel, BOMBAY—Avinash Godbole, CALCUTTA—P.B. Ray, GAUHATI—P.K. Chankakoti, HYDERABAD—N.K. Sastry, MADRAS—Poornam Viswanathan, TRIVANDRUM—Rosscote Krishna Pillai, **Correspondent:** Siddharthan Kariyal. **Photographic Officer:** P.K. Kapoor, **Sub-Editor:** Jasbir Batra, **Advertisement Manager:** D. Krishna Rao.

Editorial Office: Yojana Bhavan, Parliament Street, New Delhi-110001. **Telegraphic Address:** Yojana, New Delhi, **Telephones:** 383655, 387910, 385481, extensions 402 and 420, **Circulation:** Business Manager, Publications Division, Patiala House, New Delhi-110001.

Subscriptions: Annual—Rs. 18, Two years—Rs. 30, Three years—Rs. 42, **Foreign Subscriptions:** One year—£1.80 or \$5.50. Two Years—£3.00 or \$9.00. Three Years—£4.20 or \$12.50 Single copy—eight pennies or \$0.25.

EDITORIAL

Lessons From Manila

PRICES OF RAW materials exported by poor countries have in recent years declined by 25 to 50 per cent, while at the same time the prices of industrial goods imported by poor countries from rich countries have gone up by 200 to 300 per cent. Another telling iniquity of our times is that during the second half of the first Development Decade, 1961-70, the profits transferred by multinational corporations from poor countries to rich countries have amounted to a fantastic \$23 billion, one-and-a-half times the total aid from the countries of their origin.

There are more:

The debt burden of developing countries have risen from 16.1 per cent in 1972 to 18.9 per cent in 1973, according to the World Bank report for 1975. In 1973, their outstanding debt burden was dollars 119 billion.

According to the International Monetary Fund, the commercial deficit of developing countries stood at \$35 billion in 1975, as compared to \$28 billion in 1974 and only \$9 billion in 1973.

The rich countries are making good their losses arising from inflation and higher energy prices at the expense of poor countries: Although their export growth had fallen by six per cent in 1974 because of a 25.6 per cent rise in their average unit price, their export prices have gone up by 27.3 per cent.

Poor countries are having to pay more not only for vital agricultural inputs like fertilizers and farm machinery, but also for foodstuffs. Prices of grains and other food-stuffs from rich countries were marked up 52 per cent in 1973, and again by 24 per cent in 1974. And as for manufactures, their prices have gone up by 17 per cent in 1973 and again by 21 per cent in 1974.

To cap it all, while 70 per cent of the world's natural wealth were in the hands of poor nations, the control of their exploitation continued to be in the hands of multinationals. An example will illustrate the point. While the poor countries produced 55 per cent of the world's bauxite, they produced only 18 per cent of the world's aluminium. A full 82 per cent of it was produced by the rich nations who got most of their raw materials for it from the poor nations. This aluminium was then sold back to the poor countries at a price determined by the high-cost economies of the rich themselves.

This kind of iniquity which now goes on in the name of trade means that poor countries would have to depend more and more on 'credit' for their very survival, which is often humiliating. But the irony of Manila was that neither aid nor credit will be forthcoming in adequate quantities.

The helplessness of all the world's poor was reflected in Finance Minister Subrahmaniam's words when he warned the rich of possible 'confrontation'. Asked to explain, he observed that in this dynamic world, even within nation states the persisting gulf between the rich and the oppressed poor gave sufficient cause for revolutions.

While some industrialised nations like Sweden, West Germany, Holland, etc., have taken a more sympathetic attitude to the Third-world problems, it is now apparent more than ever that their views are only marginally more liberal and understanding than those of the U.S. On the more basic issues raised by the developing countries like the index of commodity prices, a rescheduling of debts and liberalisation of lending terms, the Manila Meet has brought forth little encouragement.

In a sense the Manila meeting proved to be both a warning and an eye opener. The World Bank President's call for immediate talks on the increase in the Bank's capital came from a far deeper understanding of the economic situations in the developing world than was displayed by the most affluent of the nations. The IMF, as Mr Subrahmaniam and other leaders from developing countries rightly observed, has to function as a development-oriented bank and not as a commercial bank. The Manila meet has only highlighted the gulf that still unfortunately persists between the reasonable credit requirements of the developing world and the unchanged attitude of the affluent who still find it difficult to see the writing on the wall. If anything, this IMF-World Bank meeting at Manila has underlined once again the historic imperative which the developing countries have to face in the coming years. They must unite to find a common strategy for mutual cooperation and self-reliance, or surrender to new forms of subservience.

We now produce enough to meet our needs and we can confidently look forward to maintaining a fair and steady level in growth of production to meet the growing demands of the population. But the management of buffer stocks and imports, of price-control which hurts neither the producer nor the consumer, and above all of distribution to ensure maximum

possible satisfaction to the consumer will need an intelligent and sophisticated approach to meet the demands of changing circumstances and varying situations. In all this, the Government's role is of paramount importance and the benefits of research and scientific management practices should reach the individual farmer and consumer.

SELF-SUFFICIENCY



IT HAS NOW been officially announced that there will be no further import of foodgrains this year. Surely, this news would have been received with relief and with some satisfaction—I, for one, don't attach any particular importance to importing or non-importing as such. There is no special virtue in not importing, nor is there anything to be ashamed of in importing when it is necessary. Nevertheless the present decision has significance in that it is a new expression of self-confidence.

Since Independence we have been importing foodgrains in millions of tonnes, more in some years and less in others. It has always been our ambition to do without imports. In 1971, we nearly achieved it. But the very next year we had again to go in for imports on a large scale. This experience has left its mark.

Even though we had a very good crop last year, we continued to import, determined not to be caught a second time. With large stocks in hand, nearly 17 million tonnes, and the near certainty of another very good year, this excessive caution is no longer necessary.

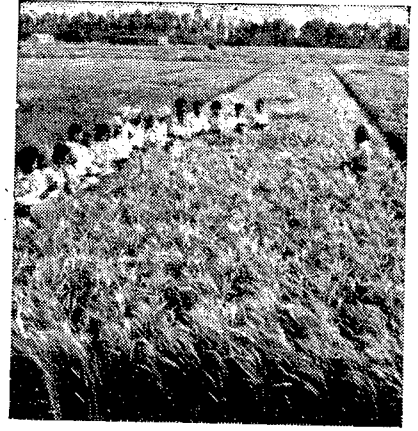
We Are Self-Sufficient

So far so good. The question to ask ourselves now is, whether we have attained self-sufficiency on a fairly stable basis? Without being a starry-eyed optimist, I would definitely say yes. The steady, even though rather slow, increase in irrigation facilities on the one hand, and the knowledge acquired by large numbers of farmers to get better yields on the other, should give us

Shri Bhootalingam is a former Director-General of the National Council of Applied Economic Research, New Delhi.



S. BHOOTALINGAM



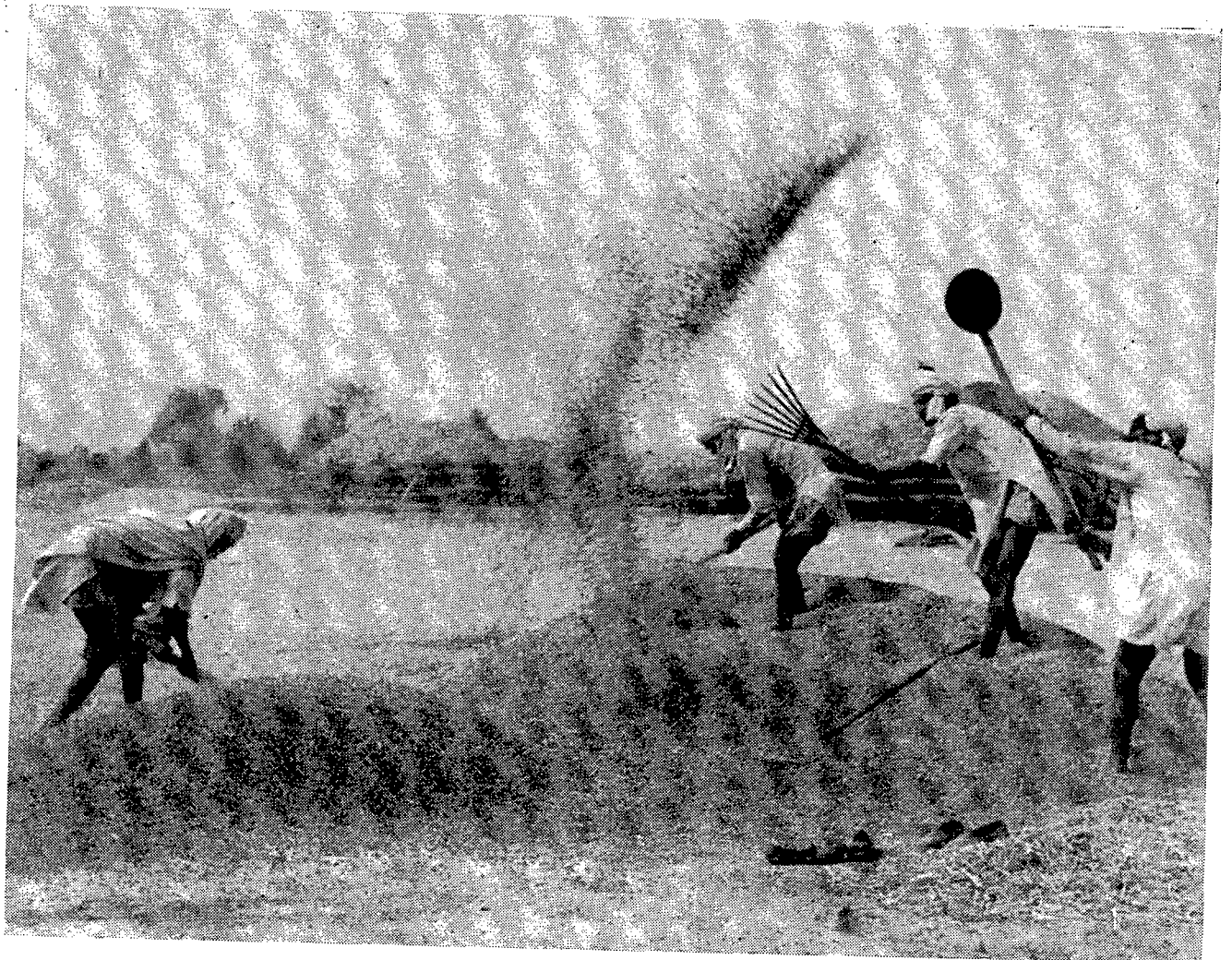
IN GRAINS *WHAT IT PORTENDS*

this confidence. There will be fluctuations, of course, but I do not think that hereafter they are likely to be of the terrifying dimensions of 1965. A much greater proportion of total output is now grown under conditions less subject to the vagaries of the weather and with more

irrigation and multiple cropping this should increase. On a rough estimate, I would say that fluctuations due to the monsoon will not hereafter be more than about six or seven million.

The next question is, can we maintain this position, with population

increasing by twelve million or so every year? Here again, there are solid grounds for confidence. Fluctuations apart, what is needed is a secured increase of two to three million tonnes a year. This order of increase is well within our capacity, so long as steady agricultural policies are followed which give confidence to the farmer that this increased out-



put will be absorbed at a fair price.

A third and related question is whether self-sufficiency can be maintained as higher standards of living are realised, even though slowly? Here again, the answer could well be yes.

The main effect of higher standard of living will be greater demand, not so much in quantity, as in quality, variety and sophistications of processing and use. These will present new problems which would call for thought and action on lines hitherto unfamiliar to us, but the problems need not be intractable.

For sustained increase of production to meet growing demand in quantity, variety and quality two sets of conditions are required. One is to take the results of research to the farmer and to ensure inputs and credit for his operations. This is familiar ground.

The second, which is equally important, is to create an economic environment which will give a steady incentive to the farmer to increase and to improve output. This has to be provided through a fair and stable price policy, largely sustained by a skillful and imaginative management of the buffer stock.

The nature of buffer stock opera-

tions has not been generally understood. It is simple enough in times of scarcity when there is not enough of it. It would be seen that the job is only storing the grain and issuing it out on allocation, for public distribution.

But when it grows to the size it should be, that is large enough to tide over a bad year, the problem becomes complex. The crux of it lies in the fact that grain not being indestructible, the stocks have to be turned over, that is to say, existing stocks should be sold and equivalent new grain bought even when current production is enough to meet demand.

Problems of Plenty

In the year to come, for example, the draw on stocks for public distribution may be no more than seven or eight million tonnes. Nevertheless, the balance of ten million tonnes of old grain has to be sold, if only to avoid deterioration or destruction.

Simultaneously, the Government has also the obligation to buy whatever is offered at the declared minimum price. This obligation must be honoured under all circumstances. It is a matter of satisfac-

tion that Shri Jagjivan Ram has reaffirmed that this will be done.

In the short turn, therefore, the stocks may swell a great deal. Hence the immensity and complexity of the problem. Old stocks have to be sold but in such a way as not to cause a glut or fall in prices.

The main strategy for this has to be thought out and planned in advance, while the tactics of execution have to be flexible, and quickly responding to circumstances. Export and import has to be part of this overall process, and *ad hoc* answers cannot meet the needs of the moment.

Production as a whole may be just equal to demand but there will always be more of something and not quite enough of another, and these have to be evolved by an intelligent policy of both exports and imports. The process may also require some adjustments in prices, both to the producer and to the consumer or to certain classes of consumers.

I need not elaborate further to make the point that this will require skilled and sophisticated management. And that is the challenge which we have to face, not in the distant future, but right now. □

SUPPLIERS TO MODERN FARMING

K.A.I.C. STANDS FOR.....

Bringing Green Revolution to the farmers' door steps by;

- * Sales & Services of Tractors, Power Tillers, Etc., through Agro Equipment Centres.
- * Undertaking Rock Blasting, Well Boring, Tractor-Ploughing, Land Levelling, Power Spraying Etc. on hire through Agro Engineering Service Centres.
- * Sale of Fertilisers, Seeds, Insecticides and other Farm inputs to farmers through Agro Kendras.
- * Supply of spare parts of Agricultural Machinery through Agro spare parts centres.

For further details please contact:

The Public Relations Officer

Karnataka Agro Industries Corporation Limited
Hebbal, BANGALORE-560024.

Phone: 31071

(8 lines)

EDIBLE OILS:

Performance and Prospects

The production of edible oils in the country has been stagnating over the years and as a result the gulf between production and consumption has been widening. To cope with the nation's growing demand, it is imperative to maximise production of traditional edible oils and to augment utilisation of non-traditional oilseeds.

BADAR ALAM IQBAL

EDIBLE OILS which play an important role in our country's economy are obtained mainly from four oilseeds namely, groundnut, rapeseed and mustard, sesamum and copra. Our country is the largest producer of groundnut seed and ranks second in the production of rapeseed, mustard and sesamum. Coconut oil obtained from copra is being used only by a small section of the people living in the coastal areas where the coconuts grow in plenty.

However, the production of coconut has remained unchanged in recent years due to widespread leaf disease in coconut trees. Moreover, Sri Lanka has imposed a ban on the export of this commodity. As a result the price of coconut oil has been showing an upward trend for quite some time along with other edible oils. Amongst the major oilseeds groundnut accounts for 59 per cent, rape and mustard seed 25 per cent and sesamum accounts for the balance of little over 4 per cent.

The statistics in respect of output of five major oilseeds for 1974-75 are not yet available. However according to an estimate production of Kharif oilseeds has received a setback due to abnormal weather conditions. Trade estimates place the groundnut crop from 1974-75 at 5 million tonnes. This shows a decline of 14 per cent from the estimated 5.8 million tonnes during 1973-74. Production of sesamum and castorseed is placed lower at 4.5 lakh tonnes and 2.25 lakh tonnes respectively during 1974-75. Production of rapeseed, mustard-seed and linseed the two main rabi oilseeds in 1974-75 was expected to be higher at 2.2 million tonnes and

Shri Iqbal is U.G.C. Research Fellow, Dept. of Commerce, Aligarh University.

0.5 million tonnes respectively. Thus, on present reckoning, the output of five major oilseeds was expected to be lower at around 8.4 million tonnes during 1974-75 as compared to 8.7 million tonnes (final estimates) in 1973-74. Thus production in 1974-75 was expected to be short by 16 per cent of the target of 10 million tonnes. Even so taking into account the estimated carry over stock of 3 lakh tonnes of groundnut, the domestic availability of five major oilseeds would be almost the same as in 1973-74.

In view of the substantially lower production of groundnut, the maximum level of utilisation of groundnut oil in manufacture of vanaspati was reduced from 55.7 per cent in different zones in the country to a uniform level of 25 per cent for all zones with effect from January 5, 1975. Simultaneously, the minimum level of utilization of cotton seed oil for manufacture of vanaspati has been increased from 15 per cent to 30 per cent.

Area Production and Productivity

The trends in area under oilseeds production and productivity of oilseeds for the period 1948-49 to 1974-75 are given in Table I.

It is evident that area under oilseeds has increased from 96,79,000 hectares to 1,55,85,000 hectares i.e. an increase of 61 per cent in 1974-75 over 1948-49, while production has increased by 79 per cent during the same period, and the productivity has increased from 481 per hectare to 696 per hectare showing an increase of 44 per cent during the same period. The Table further shows that the increase in production has occurred mostly as a result of the increase in the area of cultivation.

But the productivity continued at a low level. According to an estimate the productivity of groundnut in India is abysmally low at 770 per hectare as compared to 1980 in U.S.A. and 1480 kg in Pakistan; in rapeseed it is only 410 kg as compared to the world average of 630 kg.

Groundnut is cultivated mainly in the states of Gujarat, Andhra Pradesh, Tamil Nadu, Maharashtra and Karnataka. Rape and mustard seed is grown in Uttar Pradesh, the state accounting for over 80 per cent of the total production in 1973-75. Uttar Pradesh also produces gingelly seed (sesamum seed), other important states producing the same being Rajasthan, Orissa, Madhya Pradesh, Gujarat and Andhra Pradesh.

The year 1970-71 proved to be a fortunate year for India with a bumper crop in foodgrains. Oil seeds production also rose all time high in that year. However, in 1974-75 while there was a marginal increase in linseed production i.e. from 5,04,000 kg in 1973-74 to 5,37,000 kg in 1974-75, production of other oilseeds suffered heavily. Although production of edible oilseeds over the years has increased because of extension of the area, the increase in production did not match the growth in population, leaving a fall in the per capita availability. Table II will indicate the per capita availability of edible oils from 1970-71 to 1974-75.

It may be observed that per capita availability of edible oils has increased to 3.2 per kg in 1974-75 while the per capita availability of vanaspati has decreased from 1 to 0.6 kg. However the total fat availability was slightly better during this period. The over all annual per capita availability of 4 kg in India compares poorly with the average of 20 kg of the world. By 1976 the total requirements of fats and oils are expected to rise to 40.85 lakh tonnes. As that much quantity cannot be procured from major oilseeds, groundnut, linseed and sesame, the Indian economy has perforce to fall back upon cottonseed and non-traditional sources like minor oilseeds and oilseeds true origin.

Bridging the Gap

The Union Agricultural Ministry is contemplating vigorous measures to offset the shortfall by introducing new package of practices and incentives. The strategy is to increase the yield per hectare. Out of the total area of seven million hectares, Centrally sponsored groundnut

TABLE I: AREA, PRODUCTION AND YIELD PER HECTARE OF OILSEEDS
(in 000' tonnes/bales)

Year	Groundnut	Rapeseed and Mustard	Sesamum	Linseed	Castor seed
1948-49	2984	767	350	445	111
1950-51	3481	762	445	367	103
1955-56	3862	860	467	420	125
1960-61	4812	1347	318	398	101
1965-66	4230	1276	425	335	80
1966-67	4411	1228	416	260	110
1967-68	5731	1568	445	438	121
1968-69	4475	1572	415	352	111
1969-70	5130	1564	488	469	123
1970-71	6111	1975	562	474	136
1971-72	5712	1415	459	510	144
1973-74	5932	1704	484	504	229
1974-75	4990	2211	408	537	216

Source: The Oilseeds Journal, July 1973 and Record & Statistics, Jan-March 1976.

scheme will cover an area of two million hectares. The Ministry also proposes to bring command areas of Tungabhadra, Hirakud and Nagarjunasagar dams under summer groundnut crop.

Only a breakthrough in the production of major oilseeds can fill the widening gap between supply and demand. The problem of low productivity is firstly due to insufficient rainfall, and secondly due to lack of evolution of high yield varieties of oilseeds. Despite the high prices of oilseeds, the return per hectare is not as attractive as in the case of wheat and other high yielding varieties of foodgrains. Thus the fertile land is switched over to production of foodgrains and other competing crops. Under the circumstances, the type of land that is used for growing oilseeds is marginal and submarginal and this affects the average yield per hectare.

According to reliable estimates hardly five per cent of the land under oilseeds cultivation is irrigated and it may not be possible to provide irrigation to these tracts for many years to come because of their scattered nature and uneven terrain. Thus, an increase in production of oilseeds will depend upon the application of new techniques of dry farming, protective irrigation and other techniques.

In order to overcome the problem

of low productivity the Government of India has taken a series of steps in respect of traditional and non-traditional crops.

The development of non-traditional areas envisages introduction of groundnut and sunflower in the Sunderbans area of West Bengal. In addition a crash programme for the development of sunflower cultivation over 350,000 hectares by the end of 1975 had been taken up under a centrally-sponsored scheme. The project which had already been implemented in Andhra Pradesh, Tamil Nadu, and Karnataka was likely to yield about 350,000 tonnes of seed equivalent to about 130,000 tonnes of oil.

Non-traditional Oils

But it is not enough to concentrate on the development of a few traditional oilseeds. To bridge the gap between demand and supply, development of non-traditional sources of oil as well as promotion of various types of minor oilseed would be necessary. To that end it would be appropriate to introduce a programme for increasing the cultivation of soyabeans which contain 20 per cent oil. This will be of great help for making up for protein deficiency in Indian diet. With more than 40 per cent protein; over 6 per cent lysine, Vitamin B-complex, Thiamine and other nutrients, soyabean is of immense significance. It is also

a cheaper source of protein, one kilogram of soyabean flour contains protein equivalent to 12 kg of milk, 6 kg of rice, 3.5 kg of eggs and 2 kgs of meat. It could be used for supplementing the traditional pulses in the Indian diet.

The use of soyabean oil in vanaspati manufacture has increased over the year, the requirements being met mainly through imports. In 1974-75 25,000 tonnes of soyabean oil was imported. The following Table shows the soyabean oil imports from 1969-70 to 1974-75.

TABLE III

Year	Rs. (In Lakh)
1969-70	14.66
1970-71	22.7
1971-72	18.27
1972-73	5.02
1973-74	6.00
1974-75	12.00

Source: Compiled by the author from Bank of India Bulletin, and Records & Statistics, Jan-March, 1976.

The Ministry of Agriculture has already sanctioned a scheme for soyabean development in three states namely Madhya Pradesh, Maharashtra and Gujarat. Earlier in 1971-72 the Government had introduced a crash programme for bringing 4 lakh hectares of land under soyabean cultivation by the end of the Fourth Plan. It was estimated to yield 5 lakh tonnes.

Sunflower is an important oil yielding crop in developed countries like USSR, Rumania, Turkey and Bulgaria. USSR accounts for about 80 per cent of the world production of sunflower seed. The yield per hectare and oil content of sunflower seed are higher than those of soyabean. Therefore, greater stress should be laid on the cultivation of sunflower seed. It is a rich source of high quality edible oil (45-50 per cent) because of its non-cholesterol and anti-cholesterol properties.

With proper cultivation techniques yield up to two tonnes per hectare can be obtained. The estimated average yield from rain fed areas is 800 kgs per hectare. Since the oil content ranges between 45 to 50 per cent the oil yield of sunflower seed per hectare could be higher than other oilseeds crops. This is a short-duration crop maturing in 90-100 days which could be introduced as a cash crop in multiple cropping patterns. Climatic conditions in the southern states are most favourable for this crop. Only 100 kgs of sunflower seed is required for

TABLE II: PER CAPITA AVAILABILITY OF EDIBLE OILS AND VANASPATI

YEA	Edible oils ¹ Kgs	Vanaspati Kgs	Total fat availability Kgs
1970-71	3.3	1.0	4.3
1971-72	2.7	1.1	3.8
1972-73	2.4	1.0	3.8
1973-74	3.4	0.8	4.0
1974-75	3.2	0.6	4.6

¹ Includes groundnut oil, rapeseed and mustard oil, coconut oil and sesamum oil, but excludes oil used for the manufacture of Vanaspati.

Source: The Oil Seeds Journal, July 1973 and Records and Statistics, Jan-March 1976.

one hectare and would yield one tonne seed. All efforts should, therefore, be made to popularise this crop among farmers through effective publicity.

Protein from Cotton Seeds

Recently demonstrations have shown that cotton seed oil is edible and has a good measure of protein content. In 1950-51, hardly any cotton seed was crushed in India. But since 1972 more cotton seed oil is being used in the manufacture of vanaspati. It has increased from 4 per cent in 1959 to 21 per cent in 1972-73 accounting for 127,000 tonnes. The increased use of cotton-seed oil has resulted in the saving of Rs 27 crore in foreign exchange. Today India produces nearly 2 million tonnes of cotton seed a year and it should be possible to get nearly 3.2 lakh tonnes of edible oil.

In highly developed countries like Japan and USA rice bran oil is used extensively for edible purposes. Our country produces 44 million tonnes of rice. If all the bran which constitutes 6 per cent of the weight of the grains, were recovered by solvent extraction the country could produce 0.4 million tonnes of rice bran oil instead of the present 60,000 tonnes.

But the present method of polishing rice is depriving the country of 180,000 million tonnes for human consumption by the use of hullers. Therefore, the use of more scientific method of polishing rice could result in the production of 1.1 million tonnes of rice bran oil.

There are other large number of minor oilseeds which are capable of yielding a large quantity of oils for industrial and other uses including soap manufacturing, which if fully exploited will reduce the pressure on edible oils. According to an estimate the total potentialities of minor oil seeds at 6.6 million tonnes is equivalent to 1.0 million tonnes of oils. These minor oilseeds include, Mowha, Kusum, Karanja, Kapok, Sal, Nahor, Tobacco seed, Undi, Khakkan, etc. The current availability of oil from minor oilseeds is projected at around 70,000 tonnes. In the context of the present shortage of vegetable oils, the need for organised collection and effective utilisation of minor oilseeds has assumed special significance. Needless to mention that increasing use of non-conventional oils in various oilbased industries particularly soap making, would

TABLE IV: FIFTH PLAN—ADDITIONAL IRRIGATED AREA BE DEVELOPED
COMMAND AREA

State	Project	District	Potential area that could be developed (hect)
Andhra Pradesh	Nagarjunasagar Pochampad	Guntur & Nalgonda Karimnagar	80,000 60,000
Karnataka	Tungabhadra	Raichur	18,000 (groundnut) 26,000 (sunflower)
Orissa	Hirakud delta Irrigation	Cuttack	25,000
Rajasthan	Rajasthan Canal	Ganganagar	20,000 (groundnut) 40,000 (rape-mustar)

Source: Draft Fifth Five Year Plan 1974-79 Vol. II p. 21.

release equivalent amount of edible oils specially groundnut oil for direct consumption.

The demand for vegetable oils by the end of the Fifth Plan is estimated about 43 lakh tonnes. This includes about 23.5 lakh tonnes for liquid edible use. Against the total demand, it is projected that, through appropriate policies, about 8.7 lakh tonnes of edible oil supply may be secured from different sources such as cotton seed, rice bran and coconut. This will leave a balance of about 3.5 million tonnes to be met by cultivated oilseeds.

In order to achieve self-sufficiency in edible oils it is proposed to produce 55.0 million tonnes of oilseeds over the five years of Fifth Plan i.e. 1974-79 as against the anticipated production of 41.5 million tonnes, in the course of the five years of the Fourth Plan.

It is obvious that the targets envisaged in the Fifth Plan involves a far greater effort than what has been accomplished in the past. For achieving a growth rate in production of 5.8 per cent it is projected that a growth rate of about 2.4 per cent in area and 3.4 per cent in yield will have to be sought.

The area under oilseeds cultivation which is barely 5 per cent at present, needs to be considerably increased. For this, special attention is to be given in the Fifth Plan on the development of oilseeds under major irrigation projects. There are possibilities of extending irrigation facilities to about two million hectares of oilseeds during the Fifth Plan as against one million hectares likely to be reached by the end of Fourth Plan. Out of the one million hectares of additional irrigated area proposed to be developed during the Fifth Plan, about 275 hectares of potential area, mostly of groundnut

lies in the command area of the following major irrigation projects.

Another important programme visualised in the Fifth Plan, relates to the development of non-traditional oil-seeds. In the later half of the Fourth Plan, centrally sponsored scheme for development of sunflower and soyabean have been taken up. Sunflower has shown promising results in Andhra Pradesh, Karnataka and Tamil Nadu. In the Fifth Plan, it is projected that the total area under sunflower will be increased to 933,000 hectares as against a likely base of 350,000 hectares. As regards soyabean, for a variety of reasons, it has not so far been widely established but its cultivation is being promoted in Madhya Pradesh and Uttar Pradesh. It is also projected that the area under soyabean will be increased from 100,000 hectares to 430,000 hectares by the end of the Fifth Plan i.e. 1974-79.

From the foregoing analysis it emerges that the basic handicap of the edible oil industry is the low productivity of oilseeds. Therefore, the need of the hour is to increase the production of traditional oilseeds and increasing utilisation of non-traditional oilseeds. One of the reason for shortfall in production of oilseeds in the Fourth Plan is that arrangements for supply of pure seed of improved varieties were found to be extremely inadequate. Even systematic stage-wise multiplication has been lagging in groundnut where the rate of multiplication is only 1.5. In the Fifth Plan, attention is proposed to be given towards production and distribution of seeds of selected varieties, particularly of groundnut and castor. The National Seed Corporation in respect of non-traditional seed varieties such as soyabean and sunflower should also play an active part. □

Banks go to the Aid of Handloom Weavers

DIGANT K. DAVE

Maniben of Badarkha Village



THERE ARE about 37,000 handloom weavers in Gujarat groaning under poverty for the past many years. Their problems are in no way different from handloom weavers in other parts of the country. These problems are three-fold: exploitation by master weavers and money-lenders, insufficient income in spite of hard labour and want of funds to keep the looms running, leading to frequent dislocation of work.

In the wake of the Twenty Point Programme, highlighting the need to help the handloom weavers, the State Directorate of Cottage Industries has prepared a comprehensive scheme for intensive development of the handloom sector in the State.

In 1975-76, the State Government spent Rs 876,000 under the various schemes for the development of the handloom sector. To help clear the unsold handloom cloth, Rs 824,000 were given by way of rebate on sale. It is proposed to set up 5,000 additional handlooms in the State at a cost of Rs. 2,443 million by the end of the Fifth Five Year Plan.

Banks Come Forward

Meanwhile, the nationalised banks in the State have come forward in a big way to help the handloom weavers. Two banks—State Bank of India and Dena Bank, have so far assisted about 300 handloom weavers by advancing individual loans ranging from Rs. 500 to Rs. 2,000 to continue production without interruption. Both the banks have at present centred their activities in the villages of Dholka taluka of the Ahmedabad District, which is one of the main centres of handloom weavers in Gujarat. Other centres are scattered over in the districts of Broach and Mehsana.

Bank loans have no doubt helped much the poor Harijan weavers in augmenting their income by enabling them to keep the wheels of production running. It has also freed them from the clutches of master weavers and money-lenders. All the recipients of bank help commended the role played by the two banks in improving their lot when I interviewed them in their homes-cum-working places.

With the continuous hum of the loom filling the room, Maniben of the Chaloda village explained to me the significance of a bank loan. "Thanks to the loan of Rs. 500

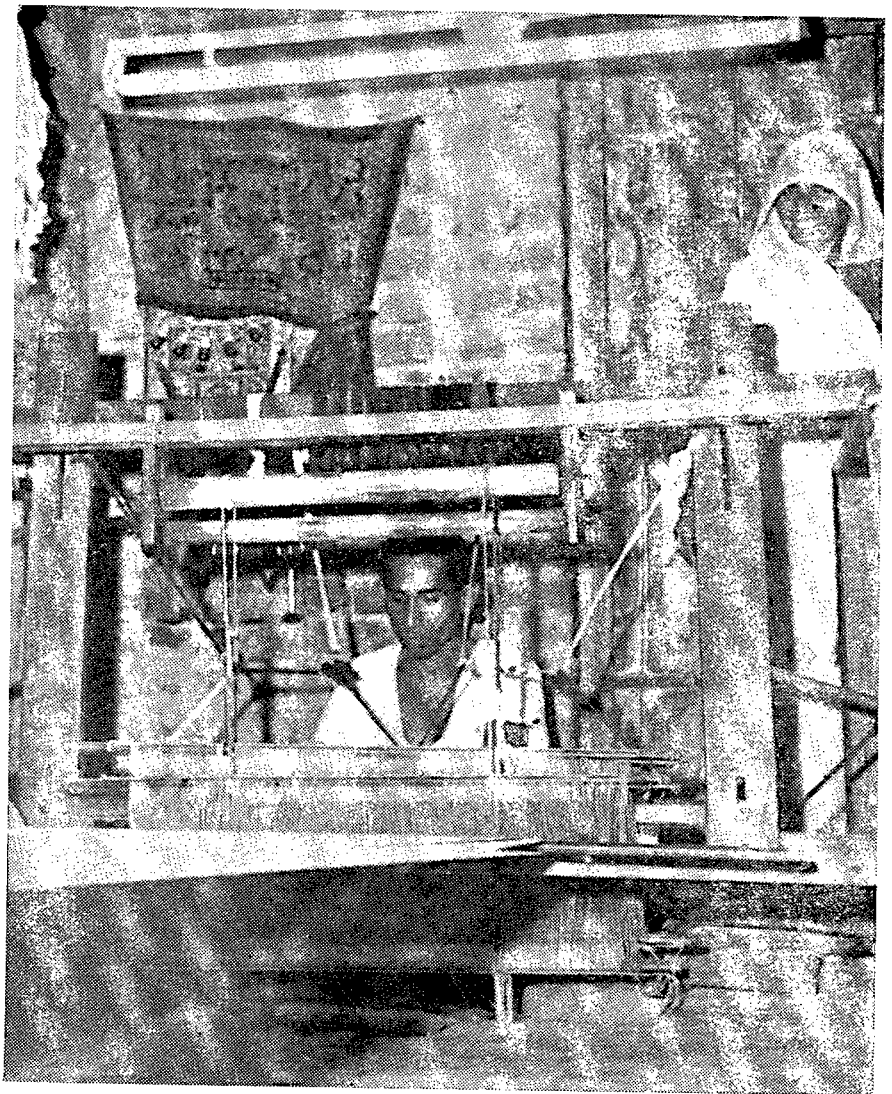
Shri Dave is Assistant Editor, Yojana, (Gujarati).

from the Dena Bank, I am no longer a slave to the master weaver in the town. For all these years he was supplying us the cotton yarn after a lot of entreaties and that too at a rate higher than the market price. Now we ourselves go to Ahmedabad to purchase the cotton yarn. Our purchases are in cash and we also get a discount on it."

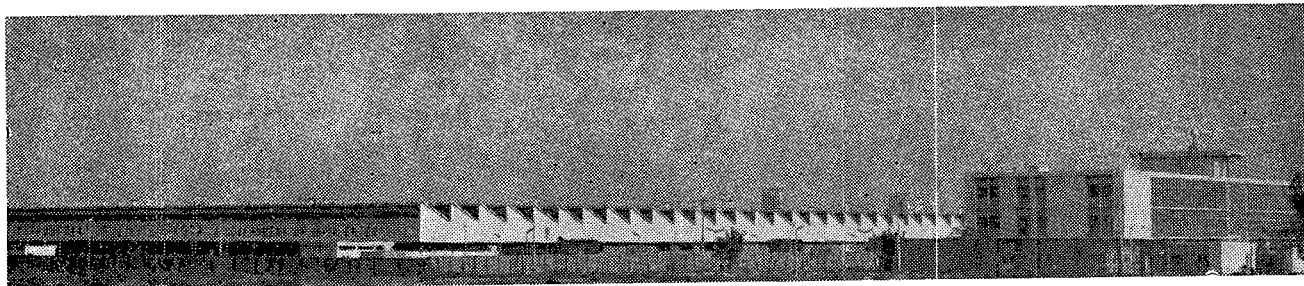
Kalabhai Karsanbbai and Maftabhai of the Badarkha village, who have received a loan of Rs. 500 each from State Bank of India, said, "Apart from cash discount on purchases of cotton yarn, we now have a bargaining capacity and greater scope for the selection of the yarn. Secondly, with enough stock of yarn in our homes we are not forced to make a sale of cloth to the master weavers or to the local merchants just to keep the production going. In fact, we now get better return on our labour by selling the cloth in Ahmedabad or in any other city. In the off-season we are also able to stock our products instead of disposing them off with a negligible margin or at times even at a loss."

From my discussions with a number of weavers it appeared that in spite of eight hours labour by a whole family of weavers, they hardly earn about Rs 200 to 250 per month. From morning to dusk the weavers keep themselves busy in weaving the cloth while the women and children do about four to five hours' job in preparing hanks from the yarn or weaving. Dholka taluka's weavers produce sheets, pillow covers, towels, *dhotis*, sarees, carpets and *Pachhedi*—a very thick cloth especially used by the cowherd community for almost all their clothing purposes. The Chaloda village is well known in Gujarat and neighbouring States for its *Pachhedis*.

With bank loans, the weavers have been able to increase their net income by about Rs 60 to 70 per month. Panchabhai Amrabhai and Bachar Govind said, "Now with cash in our hands we are able to save at least Rs 30 or so every month by means of bargaining in the purchase of yarn and by avoiding distress sale. Secondly, now there is hardly any stoppage in our work because we keep good stock of



Weavers of Dholka Taluk, Gujarat, aided by the State Bank of India and the Dena Bank



Instrumentation Limited Marches Ahead

WITH THE PROCLAMATION of Emergency and the announcement of the Prime Minister's 20-Point Economic Programme in June-July 1975 India entered into a new era of economic and social progress.

At Instrumentation Limited, Kota, the management took a number of steps to streamline production, for workers' participation and creating a climate where each one of the employees whether a worker or a manager could work in harmony. The results achieved by these measures have been extremely encouraging. Over a period of one year, Instrumentation Limited was able to register a growth rate of over 52 per cent. It achieved a record turn-over of Rs 101 million (including Rs 10 million in foreign exchange) this year i.e. in 1975-76 against last year's turnover of Rs 66.2 million. Besides maintaining the prices stable the Company continues to keep its record of profitability. The Palghat Unit of this establishment set up in collaboration with M/s Yamatake-Honeywell Co. Ltd., Japan for production of control valves started

production only in December 1975 (as per schedule) and achieved production of Rs 5.4 million during four months of the financial year. The production at Kota unit was Rs 52.1 million as compared to Rs 39.7 million during 1974-75.

Higher norms of punctuality and regularity have been set in this public enterprise, and maximum time is being spent in productive and constructive activities with renewed dedication. A number of shop-floor committees have been formed to enlist workers' participation in management. Under the new suggestion scheme, a number of good suggestions for improving production and controlling wastage have been received from employees and are being implemented. This has also resulted in improved discipline and rise in production.

Vigorous efforts are being made to engage more and more apprentices, particularly from SC/ST communities and other weaker sections of the society. However, shortage of SC/ST candidates continues to be experienced.

Continuous drive is being made in

educating employees on family planning through film shows, lectures and meetings. Cash and other incentives have been enhanced to induce more and more employees to limit their family size.

Against 77 allotted vacancies in various trades, 71 apprentices were engaged. In addition, 54 Engineer Graduate Apprentices were engaged with assured job and stipend, higher than what is laid down in the Act. Technicians and other Engineering Graduates were also taken as apprentices.

Shares of Rs 100/- were given in the name of the employees' wife/mother/daughter to enable them to form a Women's Consumers Co-operative Society. Staff was provided to run the Co-operative store. The Society makes available essential commodities at reasonable prices to employees and their families.

For the lady employees' children, a well equipped creche was started. An exclusively ladies class was organised as a part of worker's education at the plant level. An educational tour was also organised for lady employees. □

yarn. What is more, with this yarn at our disposal, we can also work for longer hours. Unhampered production and additional labour yields us an extra income of about Rs 80 to 90 a month out of which we easily pay our monthly instalment of Rs 55 to the bank."

The bank officials said that there were hardly any defaulters amongst the weavers. In fact, seeing the utility of the loan in increasing their earning capacity, many weavers have plans to secure more loans and expand their production. A few are also thinking of switching over to powerloom with the help of the banks.

Bank loans on easier terms and interest rate of 10 to 13 per cent are

in great contrast to the money advanced by money-lenders, both registered and clandestine. It was quite shocking to hear narrations of this exploitation from two weavers of Ranoda and Chachar-vasna villages. As they explained to me, "Supposing we take a loan of Rs. 100 for cultivation during the monsoon in May, with the condition that we pay interest in kind, we will have to return the loan in about seven months by December, together with 50 to 60 kg. of paddy as interest. In case we fail to return the principal amount, it will be due for repayment in March, along with 30 kg of wheat. A further delay of three months in repayment would invite interest in the form of 30 kg of cotton. Thus in a period of one year, a sum of Rs. 100 invites interest of Rs. 120 to 130

in the form of paddy, wheat and cotton."

Handloom weavers consider themselves God-blessed at the relief from the exploitation of money-lenders. For this, they are extremely grateful to the banks. The Dena Bank has advanced an amount of Rs 257,900 to about 230 weavers while the State Bank of India has advanced a loan of Rs 35,000 to more than 70 weavers in the Badarkha village. Both the banks have plans to help more weavers under the Twenty Point Programme. In keeping with the spirit of the Programme to uplift the poor and the downtrodden, the banks have advanced loans to the weavers without any pledge of security.

They are confident that the weavers won't fail them.

WE SHALL HAVE to take crucial decisions on what we propose to do with our available resources and manpower to obtain maximum possible returns from minimum capital investment. It calls for a revised value system and a revolutionary approach to the problems of poverty and mass unemployment. The time factor involved in ensuring higher production and its equitable distribution is of the highest importance. We have concrete models which have proved their efficacy in specific situations. All we need do is to work out a carefully planned methodology for selecting an environmentally sound and appropriate technology,

says

M. Y. GHORPADE

FINANCE MINISTER, KARNATAKA

in this thought-provoking article on

THE CHOICE OF APPROPRIATE TECHNOLOGY

APPROPRIATE TECHNOLOGY has become a subject of historic significance to the future of the developing world because it lays emphasis on basic human needs and employment. There cannot be any disagreement on the basic proposition that scarce resources should be so harnessed as to maximise human satisfaction. There are many sophisticated models of development which are internally consistent, on the basis of certain assumptions, but which are not necessarily equitable or just. As Gunnar Myrdal has put it, "there is a tendency for knowledge, like all ignorance, to deviate from truth in an opportunistic way". The real problem is to accord proper value to the concept of growth with social justice. Available technology can be used within limits for whatever purpose we choose but it also creates its own consequences and logic of development. In this sense it is not completely neutral. The problem therefore is to precisely evaluate the effect of technology on various aspects of life and develop a methodology which truly reflects our preferences and promotes a just social order. There is thus great need to improve the practical applicability of economic tools in our decision-making.

The New Philosophy

I should broadly indicate the recent trends of thinking in India on this subject of appropriate technology and development. Mr. C. Subramaniam said in his budget speech in March 1976 that "Social justice is not merely a matter of increased production even though higher production is an indispensable

condition for securing greater social justice," and observed: "the overall aim of our approach should be to evolve an operational strategy with the twin objectives of productive employment of the available workforce and of the scientific utilisation of all our natural resources. It is true that such a development strategy cannot be put into operation overnight. Much spade-work is necessary before genuinely operational programmes can be devised. There must be scope for innovation and adaptation in the light of varying needs and circumstances." The budget clearly recognised the need for such an effort in the field of integrated rural development and hoped that, on the basis of experience gained, the scope of the programme could be progressively expanded.

Compatible Objectives

The Fifth Five Year Plan document also emphasised the need for a strategy that would not only ensure a higher rate of growth than in the past but also reduce inequality in the distribution of income and consumption. It stressed that: "institutional reform and the fiscal policy must be oriented to reduce inequality alongside increased productivity." It drew pointed attention to the fact that "a higher growth rate and an increased equality in terms of consumption are mutually compatible objectives if planning and implementation are conceived along appropriate lines."

It was in the same spirit that in my budget speech to the Karnataka Legislative Assembly on 1 March 1976, I said: "The capacity to generate adequate employment, both rural and urban, will also depend on

our economic philosophy and capacity to develop a technology which is appropriate to our circumstances. Capital intensive technology of the developed world may be necessary in certain fields but, by and large, for the economic system to become self-reliant and self-generating, our technology will have to be consistent with the incomes and saving capacity of the Indian people. What is scarce here is not labour but capital. Hence our production strategy will have to be cheap, relatively simple and make maximum use of local materials for local consumption and use. It has to be basically a labour intensive technology to produce consumer goods, agricultural implements and equipment for the common man and within his reach. It is obvious that Western technology designed primarily for the purpose of saving labour will not enable us to abolish inequalities and reach full employment in the foreseeable future. *This would in effect amount to a restatement of Gandhian economics in terms of the modern economic idiom.* Our scientists, administrators and entrepreneurs will have to collaborate more purposefully to find an Indian solution to the problem of growth and stability." The new national climate of discipline and self-confidence should enable us to see the fundamental issues of Indian development and progress in their proper perspective.

Integrated Rural Development

The strategy for "integrated rural development" initiated by Mr C. Subramaniam has tremendous possibilities. At a recent Group meeting at Bangalore he suggested "the establishment of a research and extension

centre in each district as a focal point for research-development-extension of appropriate technologies in agriculture and agro-related industries." Blueprints for action will be prepared for a few selected districts in different parts of the country by a group of inter-disciplinary experts. Dr M.S. Swaminathan, Director-General of the Indian Council of Agricultural Research, has also emphasised the urgency of accelerating the pace of application of science and technology for rural development as some 114 million jobs would have to be created in the rural areas by the end of this century. Agriculture was estimated to provide only 54 million jobs. The idea is to create far greater employment opportunities especially to the rural poor by appropriate application of science and technology to make optimum use of existing local resources—human, animal, plant, soil, water, mineral, etc. The programme should be simple to operate, cheap enough and capable of being multiplied under similar or varying conditions. *In short it is to be an employment generation policy based upon a scientific understanding and utilisation of local resources to improve the standard of life and the purchasing power of those below the poverty line. This would call for an integrated rural development programme based on an integrated resource inventory and a strategy of economic growth which will secure maximum beneficial results within minimum possible time.* In this gigantic task all educational and scientific institutions and peoples' organisations at all levels must be made to get fully involved.

With the Villager, for the Villager

The question remains: *What is the appropriate technology we need?* As Mr C. Subramaniam said in his address at Bangalore, "Supposing we are working in villages which are predominantly based on rice culture, our first step would have to be the development of techniques by which every part of the rice plant can be effectively utilised. Thus, the rice straw will have to be processed and fortified with other sources of energy and "nutrients". Such fortified straw could be given to landless labour and marginal farmers for feeding to cross-bred cows, buffaloes or goats or other animals. Oil can be extracted from rice bran and the de-oiled bran used for feeding animals or poultry. Since energy is a basic need for increasing output, the development and introduction of integrated energy supply systems should

receive priority in all projects. Tree planting for raising energy plantations can become a national movement. Mr Subramaniam cautioned: *"While approaching the villager, we must always remember that although he may be illiterate in the formal sense he has the wisdom and knowledge coming from long experience and from toiling in the sun and rain. He is close to nature and therefore understands it best. Those who undertake this programme should keep this in mind and go to the villages as seekers of knowledge and as workers in development."* The wisdom and importance of this advice cannot be over-emphasised.

There is no doubt that at all levels the problem has been fully recognised. The difficulty is to make the necessary effort on a sufficiently accelerated scale.

The Lokvastra Mill

Conceptually the problem is fairly clear. But theoretical models and tools can help us only upto a point; they cannot be wholly depended upon for making the right choices or selection of methods and technologies in a wide variety of situations. Case studies should be made of as many examples as possible to illustrate—(i) what choices are available, (ii) what choices can be made available by relevant research, and (iii) why exactly is one choice superior to the others. A series of meaningful micro-level decisions with regard to different projects and products is bound to have its influence on macro-level planning and priorities. By meaningful case studies a new awareness and framework to compare and judge technologies and their use can be created.

A mini-textile mill or a *Lok Vastra* (People's Cloth) unit sponsored by

the Karnataka State Khadi and Village Industries Board is an instance in point. It is a low-cost, labour-intensive, small-scale unit with potential for wider application and it is being successfully operated at Bangalore. There are many striking points about this mill which I would like to refer to; it is a viable mini-mill built around nine 48-spindle ring frames, each operated by a single worker. Twelve semi-automatic looms are used. The plant employs 48 workers per shift of whom 32 are women. Production on the basis of 8 hour shift is 300 metres of coarse cloth per day or 90,000 metres in 300 days, valued at about Rs. 600,000. The capital cost of the unit is about Rs. 500,000. The great advantage of the *Lok Vastra* is that it can be disaggregated or assembled in various combinations in terms of size and distribution between factory and home. If the factory is limited to the spinning stage, the cost of the plant and machinery would be Rs. 100,000 and the unit will employ 15 workers. It would produce 45 to 54 kgs of yarn per shift which is sufficient for 40 hand-loom, each producing eight square metres per day or 320 square metres in all. The daily wage in the spinning unit is Rs 5 to 6 while the weavers earn Rs 8 per day.

The rationale of the mini-textile mills deserves to be explained at some length. It is intended to provide adequate supplies of standard cloth of 20 to 40 counts which the regular textile mills find most uneconomic to produce. It permits decentralised spinning, weaving and even processing without sacrificing quality or having to depend on subsidy. It employs an appropriate labour-intensive technology though it uses a modest amount of power. There

TABLE 1

Item	Standard Cotton Spinning Mill	Decentralised Lok Vastra Spinning Units
1	2	3
1. Investment	Rs. 30 million	Rs. 30 million
2. Number of Units	1	300
3. No. of Spindles	25,000	1,29,600
4. Capital cost per spindle	Rs. 1,200	Rs. 232
5. Percentage of indigenous parts	85%	100%
6. Employment per shift of 8 hours	300	7,200
7. Production of yarn (33 metric counts) per day	4,500 Kgs.	16,200 Kgs.
	(with 80% efficiency)	(with 75% efficiency)
8. Price of yarn per kg.	Rs. 15.8	Rs. 11.50
9. Output per year (2 shifts) Rs. in million	42.6	111.8
10. Capital—Output Ratio	1 : 1.42	1 : 3.72
11. Output per worker employed (Rs.)	71,000	7,764
12. Capital per worker employed (Rs.)	50,000	2,083

Basic data for Ambar Charkha and traditional Charkha

is, besides, a distinct possibility of using non-conventional sources of energy from bio-gas plants, wind-mills, etc. The technology is simple and inexpensive which can be easily adopted wherever rural wages are low. As an agro-industry both the producer and consumer would stand to benefit considerably. The handlooms would not have to depend on yarn from big textile mills, co-operative or joint stock. No doubt the wage level in such a unit may be lower than in a conventional size textile mill; but what is the use of a few workers earning a higher wage, if in the process a far larger number go without employment? This is a crucial consideration. Spinning is in any case a low paid job as the value added is low at this stage of production. But wages to the spinner are bound to respond to improvements in productivity. The assumption that a large-scale factory employment necessarily gives a superior product at lower cost on an adequate scale can be questioned with very good reason.

In the case of the *Lok Vastra*, the output per unit of capital is much higher than a conventional textile mill while the capital per person employed is much lower. (See table below) The capital costs are kept down by making the machines as simple as possible. A rural worker can be trained within a month to operate it and boys and girls can also work it. Besides, the problem of maintenance and availability of spare parts has been greatly simplified. It answers a very basic need, viz., good cheap cloth. It helps growth rate as both the productivity and employment per unit of capital is better than in capital intensive textile mills. Besides improving the quality of life, it becomes a socially sustainable development based on wider participation. Environmentally, it is least hazardous and the goods and services become available at lesser cost. By any accepted standards this can be a good example of appropriate technology. The principles and preferences represented by the decision filters can be directly applied or used in evaluating the economic consequences of a certain type of production or technology.

The process cannot be over-simplified either. We may be aware of the merits of a particular type of production but a lot of related work will have to be done before it can be developed to optimum limits, within a given set of circumstances, which may also be capable of alter-

nation over a period of time. *In this case of the Lok Vastra we will have to decide to what extent and in what manner this type or production can be spread. The whole process of interaction with other co-existing types of production will have to be clearly envisaged. Thus, at any given point of time, it would not be much use to say that all but one or two types of production do not pass the test.* Even on the basis of optimisation under a given set of circumstances there would be a logical case for the co-existence of different types of production.

The duality in the existing economies of many countries is well known. Exports and the need to earn foreign exchange will always be there alongside the need to cater to a growing home market. Other examples may not be as neat and clear cut as the *Lok Vastra*. It may not be just possible to efficiently produce certain products like steel, for instance, in a labour intensive way. The inherent capital intensive nature of certain products should be, and is, taken for granted. Thus in realistic decision making a host of factors, both short term and long term, will have to be carefully considered.

Relevance of the Bullock-Cart

Take the bullock-cart for example. It has been integral to India's rural economy come automobiles, come railways, come airplanes. It has been estimated that about 20 million people (which incidentally is the entire work

force in the organised sector) find employment directly or indirectly from the bullock cart. According to a study made by the Indian Institute of Management, Bangalore, the aggregate investment on bullock carts including the cost of animals may well be of the order of Rs 30,000 million. The outlay on the Indian Railways is estimated at Rs 40,000 million and on public goods road transport vehicles Rs 25,000 million. Still, rural produce is taken to the market mainly in bullock carts which is estimated at 10 million tonne-km. as against 180 billion tonne-km. of freight carried by Railways and 80 billion tonne-km. by mechanised road transport. This should clearly illustrate that no one type of transport is adequate for India. While Railways carry much bigger loads in relation to investment, the bullock cart provides livelihood to millions and provides transport under extremely difficult conditions. It is cheap enough to take what would be uneconomic loads for other mechanised forms of transport. We do not have the fuel or pollution problems with bullock carts. The skills needed to operate them are of the simplest kind and a part of the traditional experience of the people. So, there is no question of the bullock cart going out of use in the foreseeable future. But should it? On the other hand it is a sad commentary on our value systems that so little has been done to improve the technology of this vital mode of transport. What

TABLE 2

Item	Amber Charkha (6 Spindles)	Traditional Charkha
1	2	3
1. Investment (Rs.)	800	800
2. Number of Units	1	32
3. Number of Spindles	6	32
4. Capital cost per spindle (Rs.)	133	25
5. Percentage of indigenous parts	100%	100%
6. Employment	1	32
7. Production of yarn (33 metric counts) per day	0.66 Kgs.	2.11 Kgs.
8. Price of yarn per Kg. (Rs.)	11.5	10.0
9. Output per year (Rs.)	2,277	6,330
10. Capital-Output Ratio	1:2.85	1:7.9
11. Output per worker employed (Rs.)	2,277	198
12. Capital per worker employed (Rs.)	800	25

Indicator	Standard Cotton Spinning Mill	Decentralised Lok Vastra Spinning Unit	Amber Charkha (6 Spindles)	Traditional Charkha
1. Capital-Output Ratio	1:1.42	1:3.72	1:2.85	1:7.9
2. Output per worker employed (Rs.)	71,000	7,764	2,277	198
3. Capital per worker employed (Rs.)	50,000	2,083	800	25

little work has been done has shown that considerable scope exists to improve the design of the bullock cart to enable it to carry bigger loads and improve the income about threefold without putting additional strain on the oxen.

The income of Rs 6 to 10 per day can increase to as much as Rs 30 to 40 ! The traditional cart costs about Rs 3,000 with two bullocks. The improved cart with roller bearings, special axle and wheels will cost about twice as much. But this additional investment will step up the income to more than twice of what it is at present. Even the traditional bullock cart is today a bankable proposition in areas where there is enough work, with an earning of Rs 10 to 15 per day. It is not difficult to repay the bank loan (with interest) at the rate of Re 1 to 2 per day. The study made by the Indian Institute of Management, Bangalore, estimates that, assuming daily gross earnings of Rs 10 per day per cart for 200 days in the year, for 10 million carts, the present aggregate earnings of this sector would be of the order of Rs 20,000 million.

This could be doubled over the next ten years. *Improved bullock carts with three-tonne load will have five times the employment potential of the truck and the investment per person will be Rs 3,000 as compared to about Rs 20,000 estimated for the rural sector.* This is a clear case of increased employment for lower investment with provision of crucial transport services in a manner which would not be possible otherwise. Of course India is a big country and the dimensions of any problem is vast. To modernise a million carts per year would need about Rs 40000 million of credit per year spread over thousands of borrowers. This is as much a matter of attitude and organisation as of technology. Our values and preferences will play a crucial role in determining the priority that we are able to give to such aspects of development. In a situation where almost everything is scarce, the problem of allocating investible resources becomes a very difficult task.

Measuring the benefits

Macro and micro level planning is inter-dependent. Certain relationships are assumed between investment and rate of growth. But how realistic those assumptions turn out to be depends on the accuracy of our statistics and knowledge about a number of projects and goods and services and how the economy will

develop. Macro planning can only be gradually improved in the light of experience in micro-planning and vice-versa. One can never hope to have an optimum plan. At best one strives to direct investment to those sectors and within a sector to those products which will yield the most benefits to the economy. If this is to be done in a rationally optimum manner the costs and benefits of great many different projects should be evaluated on a comparable basis. Here there are obvious limits to economic analysis however sophisticated we may try to make our methods. Benefits are more difficult to compare in this manner. For instance, how do we compare the benefits to society to things like literacy, medical facilities, irrigation power, etc? All the known techniques including shadow pricing have their limitations. However, at the macro-level, by the use of input-output analysis and such other techniques one can work out a consistent model which gives a certain product mix. But whether this can be adjudged as optimal is a different matter. Here our preferences and value judgements will come into play. It would be wrong to assume that all that is needed is to plan for our investments and leave development to trickle down to the poorest of the poor. This will never happen.

The scope for employing unskilled labour for developmental work is considerable in developing countries. There are areas like soil conservation, bunding, road-building, minor, medium and major irrigation works, tree planting, weed eradication, public sanitation etc. where such labour can be continuously employed to common benefit. They cannot be subjected to cost-benefit analysis. This sort of employment-oriented decisions will naturally influence the choice of technology. A large number of people getting a living wage are better than a small number getting much more. Can this be disputed? It is not lack of methods that blur these considerations. The extent to which we can act upon it and radically modify our priorities and preferences in decision making depends on the social and political will and organisation and the conditioning of the persons who are in a position to take decisions, whether it is the private sector or the public sector. In the case of the private sector it is understandable that the decisions will depend on maximising profits.

Techniques like the social discount rate concept are used to express the extent to which consumption now is

more valuable than consumption in the future. A relatively higher rate of social discount will mean choosing projects whose returns will not be delayed for too long. It means preferring quick yielding projects. Here again it is a question of balancing short and long term considerations. One does not need decision filters to make this sort of choices at the macro level. I dare say, that may not be the purpose of this methodology which is more meaningful at the micro level of individual projects and products. More precise evaluation or assessment in terms of such simplified decision filters is possible when deciding on technology and scale of operation best suited to the production of specific products. Here also, as already pointed out, only capital intensive technology may be available or feasible for some products. Merely because steel and atomic energy are capital intensive we cannot leave them out of a desirable product mix for the economy. Hydel, thermal and atomic power supplement each other. They are all needed. At the same time adequate attention must be paid to cheaper renewable sources of energy like the sun, wind, and bio-gas. In any case, at the macro level, there are no alternative sets of inter-related technologies for producing the desired product mix available for choosing.

Productivity and employment

In the case of individual projects the productivity of different factors of production will no doubt be a very relevant consideration. In the case of labour intensive techniques, while the productivity per unit of labour may go down (as compared to capital intensive methods) the total quantity produced goes up as unemployed persons are now being more fully employed and they are contributing to production. Very often the difference between technologies is one of degree and not of kind. Thus a methodology will have to be built up for the development and selection of appropriate technologies with reference to concrete situations.

Any well-conceived plan to set up a network of institution-based projects on environmentally sound and appropriate technologies would be a welcome step and will serve to demonstrate what scope there is to select and develop appropriate technologies, which will take into account the varying socio-economic conditions in different parts of the world in order to minimise human misery and maximise satisfaction. □

Bagasse

O.P. VIMAL

BAGASSE is the fibrous residue left after the extraction of juice from sugarcane in the sugar factories. Indian sugarcane containing about 16 per cent fibre yields about 33 per cent bagasse whilst the yield of sugar and molasses are only about 9.8 per cent and 3.5 per cent respectively. The total quantity of bagasse available during 1972-73 amounted to about 6.7 million tonnes. The availability of bagasse in some of the States varied as (in thousand tonnes): Uttar Pradesh, 23.63; Maharashtra 16.67, Punjab, 8.11; Tamil Nadu, 5.99; Karnataka, 4.78; Andhra Pradesh, 4.56; Bihar, 3.98; Gujarat, 2.36; Haryana, 1.64 and the rest in other States.

Chemical Composition: The Mill Wet Bagasse contains on an average fibre, 48.5 per cent; water, 48 per cent; sugar, 3 per cent; and minor constituents, 0.5 per cent. The average composition of bone dry bagasse is as follows: cellulose, 45.0 per cent; pentosans, 28.0 per cent; lignin, 20.0 per cent; ash 2.0 per cent and sugar, 5.0 per cent.

Potential Uses: Bagasse can be utilized for the following purposes: 1. as fuel, 2. Pulp and paper, 3. Boards, 4. Animal Feed, 5. Furfural, 6. Activated carbon, 7. Resin and plastics, 8. Power Alcohol, and 9. Manure.

As Fuel: Not only in India, but almost all over the world, bagasse is used as fuel in sugar factories for raising steam in the boilers. These are, therefore, equipped with special types of furnaces for drying the wet bagasse and burning the same simultaneously. Actually bagasse is not a good fuel. The average gross calorific value of bagasse with 48 per cent moisture is 400 BTU/lb whereas that of average grade coal is 11,000 BTU/lb and that of furnace oil is 18,000 BTU/lb. Thus the fuel value of bagasse is

only about $\frac{1}{3}$ rd of coal and less than $\frac{1}{4}$ th of oil. The only reason of using bagasse in sugar factories is its ready availability on the spot without incurring any additional expenditure and without depending on external source of fuel.

Pulp and Paper Manufacture: The importance of bagasse as a promising raw material in the manufacture of paper has been realised by almost all the paper technologists in the world. The paper made with high percentage of bagasse has good opacity and printing characteristics; the pulp requires less refining and yields paper with very good bursting strength. Despite these advantages, it was used only for low quality paper. These failures were mainly due to the use of bagasse without removal of pith which is highly absorbent in nature. Its presence would lead to high consumption of chemicals and need drastic cooking and bleaching process. Removal of pith would not only economise but also result in increasing the average length of the fibre which is essential for the manufacture of high quality paper. Pith can find use as fuel after conversion into briquettes or in some other form.

In India there are seven factories which started using bagasse as the raw material for paper manufacture; but most of them are facing difficulties in obtaining bagasse in sizeable quantity. The efforts made to induce the sugar factories for sparing bagasse by substituting alternate fuel like coal did not yield fruitful results. It was mainly owing to technical difficulties arising from the conversion of existing bagasse-fired boilers to coal-fired boilers, heavy expenditure on installing multi-fuel boilers and the risk involved in depending on the external sources for continuous supply of good alternate fuel like Grade I coal at economic prices. But if the sugar factories can improve upon their thermal efficiencies, so as

to save large quantities of bagasse, there is a possibility to instal mini-paper plants based on certain percentage of bagasse and other raw materials like wheat straw, rice straw, sabai grass, jute stalks, gunnies, cotton linters, cotton waste, rags, waste paper etc.

Boards: Investigations have been carried out at the Forest Research Institute, Dehra Dun, on the possibility of making straw and insulating boards from bagasse. Straw boards being crude and coarse can be manufactured from short fibre materials like bagasse. The insulating boards prepared from this waste possessed satisfactory properties such as thermal conductivity, sound absorption coefficients, resistance to moisture and strength which compared favourably well with foreign made boards. Chemical treatment of boards rendered them immune not only to termite and fungal attacks but also made them reasonably fire resistant.

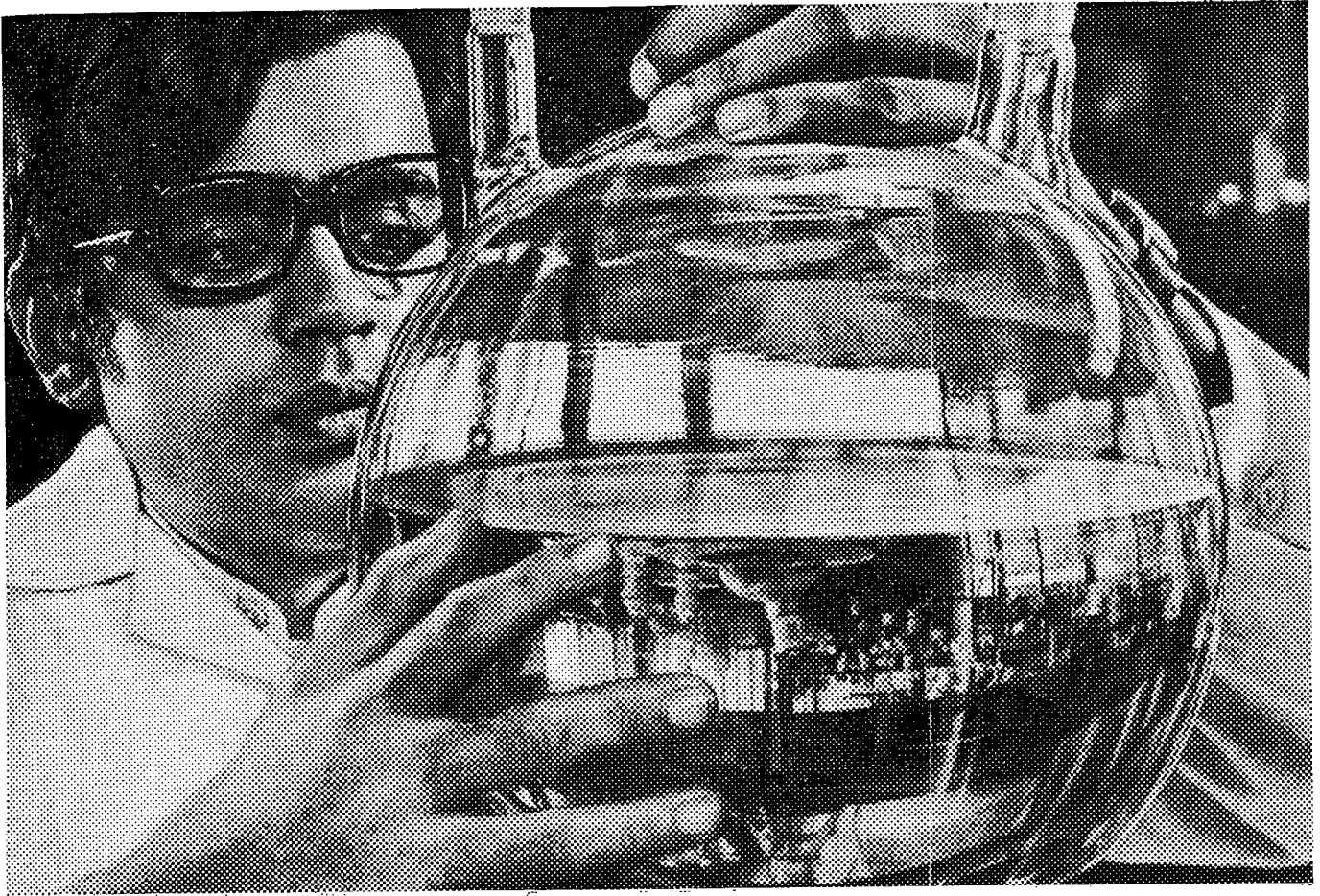
As Animal Feed: Bagasse is a rich source of carbohydrate material. It essentially consists of lignin, cellulose and pentosan material which as such has little nutritive value. Bagasse screenings when mixed with hot molasses and compressed into briquettes can yield a valuable cattle feed on supplementation with some protein. This industry offers a promising scope in the vicinity of sugar mills which can supply both the raw materials—bagasse and molasses. Recently it has also been found that ammoniation can increase the digestibility of the fibre. In this reaction, bagasse absorbs about two per cent nitrogen. Ordinarily pith is not too attractive to cattle because of the sharp fibre content in it. Keeping in view the scarcity of feed for cattle, this aspect needs detailed study.

Furfural: Because of its high pentosan content (24-26 per cent in depithed bagasse), bagasse is a potential source for furfural. Furfural finds extensive uses as an intermediate in the manufacture of hexamethylenediamine (employed in the manufacture of Nylon) and compounds containing furan ring. It is also a very good selective solvent for the petroleum industry.

Activated Carbon: It is used in industry as decolorizer, deodorizer, purifier and absorbent. With the rapid development of the sugar, oil pharmaceutical and chemical industries in India, there is now a substantial demand for activated carbon. The vegetable substances which can be exploited for this purpose are: paddy husk, coconut shell and bagasse. A.N. Rao and S.N.G. Rao

Shri Vimal is Convenor, NCST Planning Group on Agricultural Wastes Utilization.

"Our great step backward."



When we make a product, we take a step back into the science and technology of the industrial raw material.

Take, for instance, soaps. We are not merely soap makers. We manufacture processed triglycerides from several non-edible oils with specific technologies developed by us.

Or Nickel Catalyst for hydrogenation. We not only manufacture a more efficient catalyst but also use, mainly recycled Nickel as raw material!

Or Fine Chemicals used in the Soap and Detergent industry. We make a range of them with technology based on our own R&D.

Or process equipment for Soaps, Detergents and Fine Chemicals. We make all our plant indigenously—most of it engineered by us.

And we are working on many more to come—industrial raw materials and processes based on Research and Technology.

Our great step backward to take more steps forward.

Hindustan Lever Ltd.

Relevant Technology for the Millions

CMHL-3-244

(Ind. Chem. Soc. Ind. & News Ed. 2, 161, 1939) announced the possibility of utilization of bagasse in the manufacture of imported charcoal.

Resin and Plastics: Bagasse offers unparalleled advantages in terms of cost and availability as a source of raw material in the plastic field. The moulding qualities of bagasse are attributed to the presence of a resin which possesses good binding and water proofing properties. The resin obtained from bagasse can be used with advantage for the manufacture of laminated articles, moulding articles, spirit varnish and paints as well as in water proofing (Indian Patent No. 28428).

Power Alcohol: Studies conducted at the Shri Ram Institute of Industrial Research have shown that power alcohol can be manufactured from bagasse but the process has not been found economic under present price level; however, dry distillation of bagasse similar to that of wood provided interesting possibilities in Cuba.

As Manure: Work done at the National Sugar Institute, Kanpur has shown that bagasse, when composted with pressmud or byproduct of sugar industry, yields a valuable manure.

From the above; it is evident that bagasse is an important raw material but its availability is linked up with its substitution by other fuels. Therefore only an integrated scheme can lead to the exploitation of this valuable waste for paper manufacture and other uses. For this purpose, work needs to be taken up on priority basis on the following aspects:

1. Depithing of bagasse and the utilisation of pith for the manufacture of particle boards, furfural, fuel briquettes and other uses.
2. Utilization of water extract from bagasse for the manufacture of furfural and other chemicals;
3. Utilization of whole bagasse, depithed bagasse, residues left after water and acid digestion of bagasse for the manufacture of pulp, paper and board.
4. Utilization of whole bagasse for the manufacture of furfural and other chemicals.

In order to work upon this integrated scheme, there is a need to form a working Group comprising National Sugar Institute, Kanpur; Institute of Paper Technology, Saharanpur; Forest Research Institute, Dehra Dun; the Southern Agrifuror Industries Limited, Madras and other organisations so as to prepare a status report on the problems and scope of utilisation of bagasse for commercial exploitation. □

Yoga and Neurology

B. Ramamurthi

The basis of all mental as well as physical activity in any developed organism, depends on the integrity and efficiency of the nervous system. In the highly developed human being, the brain has evolved to such an extent that it is possible for man to comprehend the universe and to reach out to Mars and the stars. This underlying mechanism of mental activity namely the human brain is the central ganglion or the power house of the entire nervous system. When a person begins to practise Yoga of whatever form or type, he is able to influence his bodily activities through the nervous system. Changes occur in the functional activity of the nervous system in the form of better conduction of stimuli, improved integration of function between the various parts of the brain and the nervous system and a much more efficient control over the lower nerve centres by the higher levels of the brain.

The various chakras and the Kundalini which have been conceived by the yogis cannot be equated directly with any part of the presently known nervous system or the brain. However, the concept that when a yogi begins to achieve mastery over his mind and body, the Kundalini is stimulated and begins to rise and go through the various chakras, can have an analogy in the higher and lower levels of the nervous system. The ordinary bodily activities of digestion, evacuation, sex etc. are controlled by the lowest levels of the nervous system. The slightly higher level, the vital functions like breathing and heart function are controlled. Above these come the centres for emotion—anger, fear, hunger etc. However, these centres are superimposed on the cerebral cortex with its millions of cells that control the lower centres. It is indeed tempting to equate in a physiological sense the various chakras of the yogis with the various levels in the nervous system. The thousand-petalled lotus chakra bears a close analogy to the million celled cerebral cortex.

Recent experiments at the Insti-

tute of Neurology, Madras and elsewhere have shown that in yogic states of relaxation, concentration and meditation, changes occur in the brain which beneficially influence neural activity. This beneficial influence is not only over the nerves, but affects the various peripheral organs like the heart, lungs, digestive organs and the general bio-chemistry of the body and—most important of all the endocrine glands like the thyroid, pituitary etc. Hence there is enough proof to show that yogic practices beneficially influence the entire body. The nervous system shows better integration and efficiency. The body functions are better performed and the glands in the body function more effectively. This naturally helps to keep the body in health. In early diseased states also, yogic practices definitely help the body to recover its balance of function viz. good health.

There is no doubt that all these are achieved through the mediation of the brain and the nervous system. For an organic neurologist and biological scientist like me, mind, consciousness etc. are integral functions of the brain that are explicitly manifest. Thus any change in the mental function or conscious level can only be through effective changes in the functioning of the human brain. Our present day knowledge of the human brain, though vast and rapidly increasing, is still today grossly inadequate to explain even simple processes like memory and intelligence. Thus it will require a much greater knowledge about the functioning of the human brain before we can scientifically explain all the phenomena of yoga including the various supernatural powers or Siddhis.

Today, phenomena like extra sensory perception, telepathy etc. appear abnormal or paranormal. However, there is no doubt that when we know more about the functioning of the brain, these phenomena could be satisfactorily explained.

Yoga, therefore, influences all the aspects of human functions through the nervous system and in yogic states experiments have proved that the brain and the nervous system are functioning at a much more efficient level than in the ordinary human being.

Dr. Ramamurthi is Director, Institute of Neurology, Government General Hospital, MADRAS



WILDLIFE CONSERVATION : Progress

WHAT HAS BEEN achieved in wildlife conservation in India in the last two years is not so much in the field as in country-wide governmental cognizance of the national importance of wildlife. To appreciate this, one must go a little farther back, to 1970.

The almost insuperable difficulty in stimulating any national consciousness of the imperative need to conserve our rapidly dwindling wealth of nature has been that, with the constitutional position what it is, there has been ample and unrestricted scope for the exploitation of wildlife habitats to meet local and political ends. Under the Constitution, practically all wildlife habitats, forests, plains scrub, marshes, rivers and lakes and lagoons, and hills and valleys, are under the sovereign control of the many states. And the State Governments, preoccupied with the narrow consideration of immediate

gain or the implementation of some scheme, have been exploiting wildlife habitats without realising that once destroyed, it is hardly possible to restore a natural environment to its pristine state. This statement can be substantiated with many examples from many States, but two instances of the degradation of promising wildlife habitats (one of them actually a sanctuary) will suffice to make the point here.

Rane Bennur near Harihar in Karnataka is one of the very few preserves with a genuine potential for the wildlife of the open country in India, in spite of its modest size. It features undulating terrain covered with grasses and scrub vegetation typical of that part of the Deccan in which it is situated, and notable among its animals are blackbuck, the plains wolf (now on the verge of extinction) and the Great Indian Bustard (which breeds here). The

sanctuary has been intensively and extensively planted up with the ubiquitous, exotic eucalyptus virtually ensuring the end of the native flora and the exhaustion of the soil, and lack of living space for the fauna of the open country. In the Kanyakumari district of Tamil Nadu, one of the very few natural forests left in the state (and a very fine mixed evergreen forest) has been cut down and planted up with exotic rubber, not even as a governmental commercial enterprise but, as the Chief Minister declared 3 years ago, to provide employment for the local poor!

Nothing is now gained by regretting such shortsighted acts of depletion. In the recent past the Centre has been urging the need to conserve our wildlife and natural environments, and the response from the States has been most encouraging to be fair to them, many States (for instance,

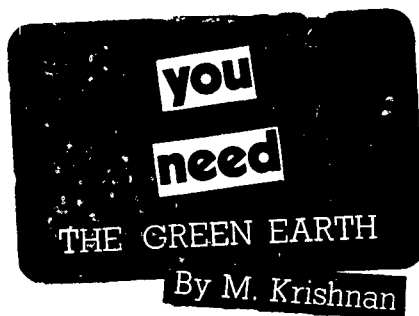


PHOTOGRAPHS BY THE AUTHOR

in the Past Two Years

Maharashtra and Haryana) have appreciated the need to conserve wildlife of their own accord and have taken steps to save what is left. However, what is significant about all this is that within this brief period not at the level of the people but at governmental levels, a national feeling for nature conservation has been developed.

Late in 1970, the Expert Committee appointed by the Indian Board for Wild Life published its report after long deliberations and the study of the wildlife position and of various sanctuaries in the country. Many things that should have been realised much earlier were pointed out in this report—the vast degradation of the natural forest by over-exploitation, how all the wildlife preserves of the country occupied only less than 1 per cent of its total area and about 4 per cent of the forest area and how, still, the forests were being worked in

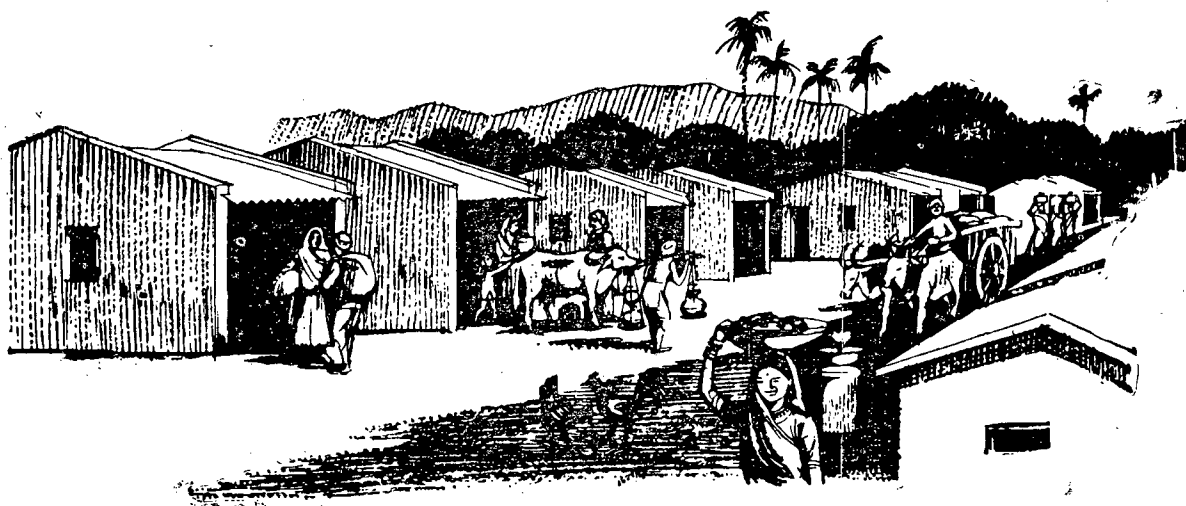


most sanctuaries, and how frequent disturbance by human activities was as depletive in its potential as hunting or poaching it also stressed the precarious position of our wild life and the steep decline in it in recent years and called for the most urgent and efficient protective measures.

This report was widely criticised by the governmental forest authorities when it was published and then,

in a short while and surprisingly, accepted totally by them. About the same time a national commission was formed to study the need to conserve the environment, and from a slightly different standpoint this body too, emphasised the need for urgent conservation measures over a wide area. And in August 1972 the Wildlife (protection) Act was enacted as a national act, replacing the State legislation on wildlife protection in many States to which it was initially extended—now almost all the States have adopted it. This is the first act to treat our wild life as a national asset, and although it is not perfect (no doubt its defects will be rectified soon) and not easy to implement without adequate personnel (even with it, it calls for dedicated protective vigilance), the States are now organising the needed set up, and unquestionably this is a major step in wildlife

As one village died, a new one was born.



Last year, in Orissa, the entire village of Tanupur was wiped out by raging floods.

This year, it was re-created.

Designed, financed and built by us on a 10-hectare site donated by the Orissa Government, today Tanupur is a glowing new haven for all those Harijan families who lost their homes—and hopes—in the floods.

To help and rehabilitate the weaker sections of society—a vital feature of the 24-point programme—has been with us a long tradition. Dedicated to aid the needy after flood, drought and cyclone. Not just with money, time and effort. But with empathy.

Deep inside, we're really a soft-hearted steel company.

TIS.1445(AJ)



TATA STEEL



conservation.

Project Tiger is highly relevant in this context. Though initiated earlier, it is only during the last two years that it has been implemented in the field. It is a quite remarkable project, for unlike other protective schemes right from the days of Asoka, it seeks, not to protect a particular animal or even a set of animals, but the entire environment—it is the first authentic proclamation of faith in the ability of nature to maintain its balance, granted sufficient territory. In the large core areas of the 9 Tiger Reserves selected for the project (these are representative of wild life habitats in widely different regions of the country, and it is possible that another reserve or two may be added to the present number) the attempt has been made to remove all disturbing human activities—entire villages have been successfully shifted out of these core areas to well outside them. This is a long-term project which does not seek to artificially speed up the revival of the tiger and associate animals (and the flora of each reserve) but to provide them with wholly natural habitats in which to revive of their own accord.

Although this is about recent progress in wildlife conservation, I should like to utilise the rest of the brief space available here to a suggestion for the future. My conviction, based not merely on logic and analogy but on actual field experience, is that we are not, as a nation, less sensitive to the spell of wild life than the people of any other country, especially in youth and during schoolhood. Our children are naturally fascinated by the plant and animal life around them, but unfortunately, owing to the kind of education that we, the elders, have had and to the lack of an acute interest in nature in our culture, their curiosity is not informed but suppressed and they are told not to waste time mooning about but to do their homework! There is real scope for informing schoolchildren of the fascinating diversity of wild life in our country—why, I think there is no less scope for adult education in this field. We want attractive, illustrated texts about our plants and animals for use in schools and colleges, right from the primary schools to the under-graduate courses, and we want similar literature for the older

people, too, particularly guide-books to the more popular sanctuaries providing authentic information on their floristic and faunal features, and also detailing the scope they offer for wild life recreation.

However, in planning and producing these books and pamphlets, two considerations are of the utmost importance. There should be no condescending attempt to simplify nature for the children in the literature meant for the young—the writing should be direct, free from jargon and pomposity, and the illustrations really illustrative, and the finished article should be not only attractive but entirely free from any suspicion of meretriciousness and absolutely authentic and trustworthy. Secondly, the information provided should be scientifically acceptable and should be provided by people who have the best and most intimate knowledge of India's wildlife in all its aspects, necessarily, I think, by Indians. It will be no easy task to find the writers and illustrators for such work, especially for the books for the children (for whom only the best is good enough), but then which really worthwhile task was ever easy?□

The Kothas, one of the original inhabitants of the Nilgiris are highly receptive to education and information. Mixed with the plainsmen of Tamilnadu, Kerala or Karnataka they cannot be distinguished. There are many educated among them. There is a Doctor and many post-graduates. They know different arts. They know

what is happening outside; they read newspapers and listen to radio. Yet the community is threatened with extinction. It can be averted by a simple physiological process. But the Kothas will not adopt it. They would rather vanish out of the face of the earth than practice something which they have not done for centuries.



The Kothas of Nilgiris

A Vanishing Tribe

T. G. NALLAMUTHU

THE BLUE mountain hills of the Nilgiris is the abode of many a tribe. The history of each of the tribe is as interesting and revealing as the hills themselves. Each tribe has reacted itself differently to the environment and outside pressures. Some have assimilated education and tried to join the mainstream of national life while some others have preferred to live in isolation. Some tribes have taken advantage of government schemes for their development while some others have shielded away from any outside 'interference'.

The Kothas, whose number was about 1800 a decade ago have dwindled to 1250 in recent times. The population is decreasing by about seven a thousand every year and if this process is not checked, in a decade or two the Kothas will find themselves only in the history and geography books.

Why dwindling?

The Kothas are like the bushmen in South West Africa who have been steadily declining due to close inbreeding. The Kothas are an exclusive community and have remained ethnically segregated for at least 1500 years, according to an official committee which studied their pro-

blems. Because of no outside contact and mixing the Kothas are found to contain only one group of Blood, that is 'B' group. With the same blood mixing over and over again, and that too, through very close marriages, the Kothas have become weak and highly susceptible to disease, and premature death. The infant mortality rate is very high and the Kotha women cannot give birth to three or four children. The solution lies in mixing with other tribes or marrying only distant relatives even among the same tribe. The mixing will produce the mutant and a new blood group. That will improve the stock of the breed and their longievy and number. But the Kothas have flatly refused to accept this idea.

Detailed examination of the blood-groups of the Kothas has revealed that two families possess a different group of blood 'A' group. This is the only ray of hope for the Kothas. If the people with blood group 'A' mix with people of blood group 'B' there is hope for them to survive and expand. Will this happen? To know this one must study closely the life of the Kothas over centuries.

The Kothas of Nilgiris, the aboriginal hill tribes were originally living in the heart of what is now Kothagiri town. The place is often translated as the hills where Kothas lived. But

actually it was *Kotha Keri*. The Kothas had three sub-divisions. *Mel Keir* denoting higher caste, *Nadu keri* meaning middle level caste, and *Kizh keri* to mean lower caste. It was their habit that people belonging to *Mel Keri* and *Kizh Keri* will marry people belonging to *Nadu Keri*. People belonging to *Mel Keri* and *Kizh Keri* cannot marry amongst each other.

In the late 18th century and early 19th century missionaries the world-over opened their branches in Kothagiri—a fertile place for mass conversion of people from Hinduism to Christianity. Some of the tribes changed religion and mixed with other communities and underwent spectacular physiological and sociological changes. But the Kothas resisted all attempts to change and have remained Hindus. This had costed them dearly. In the 19th century, missionaries exercised pressure and persuaded the then British Government to drive the Kothas out of the town. They were sent to different areas and are now living in seven places all over the Nilgiris—*Pudukotagiri*, *Kizhgothagiri*, *Kundah*, *Tiruchikadi*, *Kollimalai*, *Solur* and *Gudalur*.

The tribe though numerically small presents a number of peculiar features. They are highly literate. Among the Kotha men and women

Shri Nallamuthu is Senior Correspondent, AIR, Madras.

there is not one who does not know how to read and write. They are highly skilled. There is perhaps no art which they do not know. They are the best carpenters and can compete even with city carpenters. They are fine black smiths. They make almost all their implements. What is more, until recently they were making their own iron and steel. The Nilgiri hills provide one of the best iron ores for them. Since it is a laborious process, the Kothas get pig iron from the market and make their own implements. The Kothas are perhaps the only tribe to know about steel a few hundred years ago. As early as two/three hundred years ago, the Kothas made their own steel for sharp edges of their tools. The Kothas are also fine masons, they can build economical and beautiful dwellings. They grow foodgrains, tend cattle and can weave their own clothes. Long before cotton was discovered and while other tribesmen were wearing skin and leaves as clothes, the Kothas made yarn out of poppi trees and wove them into clothes. They are very clean. There is not a speck of dust in their houses.

The Kothas are generally guided by the village oracles. They are scared of the *Kurumbas* who are believed to practice black magic. They do not allow outsiders to mix with their youth. If a visitor came to the settlement, he will be confined to a guest house and has to stay alone. He cannot enter any house and cannot come anywhere near the verandah of the house of the priest.

The elderly male members sport tufts and wear ear rings. Both the males and females dress like keralites and speak a Malect which is an admixture of malayalam, Kannada and Tamil. In earlier days polygamy was common among them. But today it is rare due to poor economic conditions. But a man can marry twice if his first wife did not deliver a child. Their marriage and divorce laws are simple. Any man wanting to marry a girl has just to approach the girl's father, pay Rs. 10.50 and fall at his feet. If the girl is agreeable, he marries her. The marriage ceremony is very simple and invitations are confined only to the near and dear ones. If the husband or the wife wanted a divorce, he or she has just to fall at the feet of the father in law. If the woman asks for the divorce she has to repay the money. The amount returned depends upon the duration of cohabitation. Both the man and the woman can remarry after divorce. Children if dependent on

mother's milk will stay with the mother for a while. The Kothas cremate their dead along with the cot in which the body was placed. Some Kothas plan and build a very costly cot even while they are alive. The funeral expenses are generally shared by the entire community.

The Kothas worship the God *Ayyanar* and the Goddess *Ammanar*. The God is also known as *Kambattarayan*. Both the God and his consort have no shape or form. Only the priest is supposed to know the face of the deity. He told some of the devotees that god has the form of a hunter. The priest often gets into a trance and is supposed to be possessed by God at that time. When in a trance the priest foretells the events.

The Kothas are uptodate in politics. Mr. M.Y. Kavundan, once a leader of the tribe and now a priest, said that they were traditionally congress supporters. He and his people attended the Avadi Congress Session in 1954. Mr. Jawaharlal Nehru who heard of their plight and terrible prospect of vanishing gave them Rs. 30,000 for hospital facilities.

low level of Folic acid and Vitamin B₁₂ in blood is also commonly found. But the Kothas do not suffer from Cancer or Venereal diseases as other tribes do. On the other hand the Kothas are the only tribe to show a high incidence of leucoderma.

The Kotha also know that they are fast diminishing. Mr. Kavundan said "we feel that it is not close inbreeding which is responsible for the dwindling population. We have always been marrying within the tribe. Our population had gone down and gone up. In the early days we had a lot to eat. He had plenty of cattle and milk. Today we have very little to eat. That is perhaps the reason if the government generally helped us with land and cattle we may improve and grow".

According to Dr. Narasimhan, Secretary to the Nilgiri Adivasi Welfare Association the tribe cannot survive if it does not mix with others. The present size and longevity can at least be maintained if the Kothas with Blood group 'B' mix with Kothas of 'A' group found in 23 individuals belonging to two family

They used to make their own steel. When other tribes were wearing skins and leaves, they made yarn out of the poppi tree. They are uptodate in politics.

The Kothas know what is happening in the country. They are the only tribe to take advantage of all the government schemes for their development. They were also the only tribe to be given Riyotwari patta—title to lands distributed amongst them. In course of time they have sold away the lands and according to Mr. Kavundan the government has promised to give land and other assistance under the 20-point programme.

These highly developed tribal people are facing extinction. Their birth rate is 23 per thousand and the death rate 30 per thousand. They also die very young. Many people do not live to see forty or fortyfive. Fertility rate is low; susceptibility to infection is high and so is the incidence of infant mortality. More than 65 per cent of the population is invested with tuberculosis. Diseases due to malnutrition are common among both children and adults. Anaemia due to iron deficiency and

trees. It is now proposed to carry out detailed blood examination of the entire tribe and find if there are more people with blood group 'A'. The State Government has made a report on this and the Centre which has expressed concern over the matter has referred the issue to the Indian Council of Medical Research for further detailed examination.

How do the Kothas react to the presence of 'A' group of blood in some and the advice to mix with them? Just at the mention of it Mr. Kavundan goes silent. Then in a hushed voice he says 'don't mention it. Some have been corrupted. They have wrongly mixed with others. Fortunately the doctors have not identified the persons. Otherwise they would have been excommunicated by now'. Well, then how do the Kothas look to the future. Mr. Kavundan's answer is sharp and clear. 'I would rather see my tribe perish than allow its purity destroyed'. □

VOLTAS*Kirloskar®*

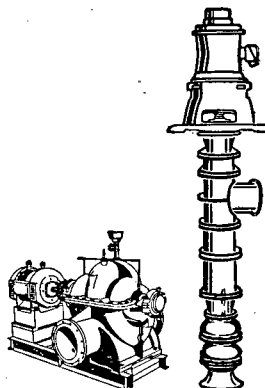
Where it is to where it is needed



Our vast water resources are very seldom located exactly where they are needed. They have to be moved, in enormous quantities, to serve industry, agriculture and the people.

Kirloskar and Voltas have devoted many years to mastering the field of water management, building up a vast reservoir of knowhow on every aspect of water supply, and developing the most advanced pumps available today.

Our water management achievements cover industry, irrigation, water supply and sewage. So it is very likely that we already have answers for your problems.



Manufactured by
KIRLOSKAR BROTHERS LTD.

Sold and Serviced by:
VOLTAS LIMITED
Agro-Industrial Products Division
Bombay 400 033 • Calcutta • Madras
New Delhi • Bangalore • Lucknow
Jamshedpur • Ahmedabad • Secunderabad
Patna • Cochin • Bhopal • Kanpur • Jaipur

© Regd. users of the Trade Mark, Kirloskar Brothers Ltd.

Kirloskar pumps and Voltas engineering for better water management

VT. 1196

Pollution of Oceans from petroleum has attracted increasing attention in the last few years. Until recently, the capacity of this huge body of water to dispose of the wastes was assumed to be almost limitless. However, the poten-

tial threat of environmental degradation of the oceanic ecosystems, due to large scale introduction of various deleterious products has led to a significant awareness of man-made environmental problems, as related to the oceans.

Marine Oil Pollution

Avinash Nafday

MARINE POLLUTION has been defined as "introduction by man, directly or indirectly, of substances or energy into the marine environment (including estuaries) resulting in such deleterious effects as harm to living resources, hazard to human health, hindrance to marine activities including fishing, impairing of quality for use of seawater and reduction of amenities".

Petroleum and over a thousand of its products are perhaps the most important contaminants degrading oceanic environment. These have been responsible for killing thousands of sea-birds, fish, worms and other sea-animals, besides reducing egg viability and reproduction. The surviving creatures take in enough oil to be inedible for the humans. The polluting effects have been noticed as far as the bottom of the high seas. These are only some of the immediate consequences of oceanic oil pollution. The probable long term effects are truly frightening and it might take decades to recover from the lethal action of these, and the possibility of the products ending up in entire food chains cannot be discounted.

Oil can reach the sea in a variety of ways. Most significant source polluting the sea originates in ships. The world consumption of petroleum has increased over thirty-fold since the beginning of this century. Since most of the production is in the countries with low internal demand, bulk of the product figures in the international trade and has to be transported over large distance sea-routes. It has been estimated that almost a billion tonne of crude is transported annually in ships and this

Shri Nafday is Lecturer, Civil Engineering Dept., I.I.T., Bombay.

value represents 55 per cent of the world seaborne trade. Moreover, this keeps on increasing at a fairly high rate of 4 per cent every year.

Tankers used for transportation of oil, while discharging cargoes, ballast tanks with Seawater for ensuring stability, and this is later discharged back into the sea. Estimates based on the knowledge of the number of tankers in operation throughout the world, the average number of operation of ballasting and cleaning and the quantity of oil lost in each operation, indicate that around four to five thousand tonnes of oil enters the ocean during this process. Furthermore, there has been a revolutionary change in the type and size of vessels used for transportation of oil, starting with small wooden barrels, it has now reached the size of giant supertankers of 300,000 dwt and more. Any accident to these due to collision, stranding or foundering can result in a sudden release of large amounts of oil in sea and will disturb the oceanic ecosystem. A notable, and often quoted, example of this is the stranding of the oil tanker 'Torrey Canyon' near the English coast in 1967. This released over a million tonnes of oil which came ashore along the English and the French coasts and wrought havoc with the local ecology. Recently, a small Greek tanker fully loaded with oil split into two around 50 km from our coast and patches of oil were observed on the beaches near Bombay

Offshore Drilling

Offshore oil and gas exploration and production activities present another likely source for marine oil pollution. There has been a worldwide acceleration in this since the

onset of energy crisis. Presently, offshore oil and gas developmental activities are found off the coast of over hundred nations. Offshore crude output now accounts for 20 per cent of world production, mostly from wells in the continental shelf, and is expected to rise to 50 per cent within another decade. This will lead to a large expansion in the number of offshore oil drilling units, with consequently higher chance, statistically speaking, of the blowouts in oil wells or other similar accidents.

Evidence of the likely consequences is clearly provided by the blow-out of an offshore oilwell in the Santa Barbara Channel, off the California coast of U.S.A. The leakage in geological formation near the platform used for drilling, opened up cracks in the Ocean floor and caused the escape of an enormous quantity of oil from the bowls of the earth, variously estimated to be between 10 and 15 million litres.

Offshore activities, envisaged in near future include the construction of undersea pipelines, processing plants and oil refineries in the sea. Oil loading and unloading terminals are already being located offshore because of the use of very large tankers which cannot enter the Ports. The damage to undersea pipeline network, used for transportation of oil from these terminals and from production centres is also a potential threat, still not fully investigated.

Due to rapid urbanisation, increasing cost of land, the threat of pollution of land based environment, shortage of water required for modern industrial processes, limited capacity of streams to carry discharges and political considerations; many multinational firms are thinking of locating processing plants, oil refiner-

ries, nuclear power plants and other industries requiring large water supply or generating huge wastes, in the sea. Similarly, there are many other artefacts in the cities requiring large areas, like airports etc., which can profitably be located in the offshore areas. There have been some feasibility studies regarding these, mainly in the United States, and very soon such plants will be under construction. Waste products discharged from these facilities will eventually find their way in the sea water.

Whatever may be the source of oil on the sea, the problem can be tackled in two ways viz. (i) technical and (ii) legal.

Technical means one use for the control, removal or combat of the spillages of oil, once the disaster has occurred, whereas legal means aim at prevention of such pollution by framing suitable laws (these incidentally lead to the application of technical means of improvement in order to prevent the possibility of spillages) or to take action against the offending party after the disaster.

Technology for Pollution Control

Various approaches, mechanical, chemical and biological, have been tried to combat the menace of oceanic oil pollution but none of them is wholly satisfactory.

The mechanical control measures aim at collection of oil layer by physical or pneumatic brooms, roller towed or pushed devices and various other containment arrangements to prevent its spread. It is sometimes convenient to sprinkle the oil layer with large quantities of absorbants like clays, expanded micas, talcs, straw and similar materials to soak up the oil, thus facilitating its removal to an empty tanker. Besides physical removal, another approach is to allow the resulting oil soaked mass to settle to the bottom of the body of water, to be eventually eliminated by biodegradation. These methods are slow, difficult to perform in high wave conditions and hence cannot be termed as a solution for the problem.

Detergents are often used to separate oil from unstable emulsions. It breaks up oil into smaller parts, which then sink and are left to degrade by biological processes. This approach merely aims at dispersal of oil and not its removal, and it is quite possible that the waves and tides may help in its reappearance at the surface. Detergents used to clean up oil spills have sometimes been found to make the situation worse as these are toxic to marine animals and plants. In fact, by dispersing the

oil into smaller parts, detergents actually help in oil absorption by animals.

Burning of oil is another method, which was tried in Torrey Canyon's case. It was noticed that after the lighter fractions of oil have evaporated, the residues containing heavier fractions form an emulsion with water and become progressively difficult to burn.

Crude oil is a complex substance composed of many different fractions and it has been found that many bacterial strains degrade the oil by biological processes. A particular strain degrades only a few fractions of the crude and thus it is necessary to use various strains to degrade all the constituents of the oil. However, an important recent development in

the biological control process is the creation of a hybrid by combination of genes from different petroleum eating bacteria, which individually digest only a particular hydrocarbon fraction in the oil. (This is due to the efforts of Dr. Chakrabarty, an Indian Scientist working in the U.S.A.) This is done by combining plasmids of different strains of oil digesting bacteria into a single supermicrobe by inducing cross linking of genetic material with the help of ultraviolet light. These supermicrobes can reproduce themselves and do not possess the toxin-producing capability of the parent bacteria. These eat up oil at a much faster rate and consume a very large part of hydrocarbon fractions present in crude oil. In this process, the oil is reduced to

Our Petroleum Resources: HOPEFUL

OIL EXPLORATION in India has been a very live activity in recent years and the country, apart from finding more oil from proven onland areas in Gujarat and Assam, has achieved outstanding success with three distinct oil discoveries under the Sea in the past 30 months.

The last discovery was in a well on the 'fault' structure between Bombay High and Bassein in early August which has further brightened the prospects of finding oil and gas in the country.

After Bombay High, oil had been found on the Bassein North followed by a gas strike on the Bassein South structure. In the words of Petroleum Minister, Shri K.D. Malaviya "now that oil had been found in the 'fault' structure lying East of Bombay High, it was reasonable to assume that pools of oil around Bombay High may be stretching for quite a long distance, opening better prospects, more so because on the South West of Bombay High indications of oil had been obtained earlier."

Significant Feature

The good news of oil discovery in the 'fault' structure came within five months of oil strike in the Bassein structure. Drilling in this area, lying 70 kms. West of Bassein on the West Coast commenced on February 11, 1976. The well was drilled to a depth of 2000 metres and at about 1714 metres, a 71-metre thick limestone section containing oil and gas was encountered.

The first offshore oil discovery was made in Bombay High in February 1974. The most significant feature of Bombay High strike was that oil was found for the first time in limestone layers as distinct from sands in which oil had hitherto been found in onshore areas. Limestone pay-zones have been known to be prolific in West Asia.

Development of Bombay High oil field was taken up on priority basis. Until March 31, 1976, 19 wells had been drilled on this structure. Of these 11 proved to be oil bearing, one was dry and the remaining were under test.

Commercial production from Bombay High commenced on May 21, 1976 initially at a rate of 4,300 barrels per day. It would be gradually stepped up to 30 to 40 thousand barrels per day to produce 1.5 to 2.00 million tonnes of crude annually by the end of 1976.

The Bombay High crude is now being refined by the Bharat Refineries in Bombay.

At present, the Oil & Natural Gas Commission is having four offshore drilling units operating in the Arabian Sea. Of these, one unit known as Samrat is owned by the ONGC and the remaining three 'Haakun Magnus', 'Dalmahoy' and 'Shenandoah' are deployed on charter-hire basis.

The Indian Continental Shelf up to 200 metres isobath has an extent of approximately 390,000 sq. kms. This area has been divided into ten basins. In the Bombay High area, the ONGC is carrying out oil exploration.

basic organic chemical elements that can be used as nutrients by living elements in the sea. However, the environmental safety of these man-made microbes is still to be tested and much work is going on in this field which holds promise for the future.

Laws for Pollution Control

Oil can pollute the oceans (a) during the transportation process, and (b) due to the development of petroleum resources on the continental shelf.

Millions of tonnes of petroleum and its products move up and down our coasts. Large scale development of offshore oil on our continental shelf presents additional difficulties. But, we do not have a set of contingency plans, equipment and techno-

logy to effectively deal with marine oil pollution problems, if unfortunately an accident were to occur off our coast, whether it is due to blow out of an oil well, wrecking of a tanker, bursting of pipe or any other source. There is no machinery for tackling various technical and legal problems involved in an oil spill, such as discovering and reporting of a pollution incident, stopping the spread of oil, cleaning up and disposing off the pollutants and recovery of clean-up costs.

The Merchant Shipping Act, 1958 is the primary legal means presently available for prevention of oil pollution resulting from the maritime activities of the merchant ships. However, the application of this law is confined to the territorial waters

only, except for the Indian ships. Pollution caused by the foreign ships /tankers outside the territorial waters does not become an offence under the Act, even though this discharge might harm the local interests. There is a need to have a uniform law applicable to ships/tankers of all countries, and having jurisdiction over the 'Damage Zone', i.e. the Zone beyond the coast of India in which oil pollution if it occurs, will result in economic losses to the country by having deleterious effect on the fauna & flora of the Indian Economic Zone, as defined in the Law of the Sea Conference. Presently, there is no provision in this Act to deal with pollution problems arising due to the marine casualties.

Water pollution control in India

PROSPECTS EMERGING FROM EXTENSIVE SURVEYS

tion operations itself with limited assistance from foreign agencies on contract basis.

For speeding up the discovery of new oil fields, production sharing contracts for oil exploration and exploitation have been given to foreign firms in respect of Kutch, Bengal-Orissa and Cauvery offshore basins. In Kutch and Bengal-Orissa offshore exploratory wells have been drilled and the information gained as a result of drilling there is being assessed and analysed. In Cauvery basin drilling is expected to be taken up at the end of monsoon.

In addition, a deeper continental shelf project South West of Bombay High has been taken in hand. The first phase of the project involved seismic surveys upto 200 metres water depth over an area of about 20,000 sq.kms. west and north of Bombay High.

The first well drilled in the deeper seas was abandoned after a fierce cyclone early in June hit the region making it impossible to continue operations.

Onshore Operations

Oil exploration onshore also has come a long way since 1867 when oil was first struck at Makum near Margherita in Assam. As a result of the country-wide hunt for oil, oil was discovered onshore at a number of places in Gujarat and Assam.

ONGC struck oil in Cambay in the very first well drilled there in 1958. This was followed by the discovery of oil in Ankleshwar (1960), Kalol (1961)

and Sanand (1962) in Gujarat and Rudrasagar (1961) in Assam. Till now as many as 41 oil and or gas bearing areas both onshore and offshore have been discovered.

Till the end of March 1976, ONGC had geologically surveyed an area of 5,47,805 sq.kms. by detailed mapping, semi-detailed mapping, reconnaissance mapping, special studies and geomorphological mapping and neotectonic surveys. Nearly 28,482 line kms. have been surveyed by traverses.

The Ministry of Petroleum has decided to intensify exploration activities onshore because onshore costs are only 20 per cent of what is spent on oil exploration in offshore areas. In the last three years ONGC has raised its production of oil from onshore from 3.72 million tonnes to 4.15 million tonnes in Gujarat and from 0.39 million tonnes to 1.12 million tonnes in Assam. During this period oil was discovered at Asjol, Sanaokhurd, Siswa, Nandasan and Bhandut in Gujarat and at Charali in Assam. With the discovery of fresh but small oil reservoirs in Gujarat it would be possible in future to maintain the present quantum of oil production from that region despite natural depletion of the Ankleshwar field which is currently producing around 3 million tonnes per annum.

Assam prospects were still better and extensive programme of drilling in the Eastern region has been drawn up. Already oil production from Assam has been increased by 1.3 million tonnes.

Besides Eastern and Western regions of Assam and Gujarat, oil exploration would be resumed in the North Himalayan region. Drilling would be undertaken after monsoon. The locations in the area include Ramshehar (near Kasauli) and Jawalamukhi in Himachal Pradesh and some locations in the Pilibhit District of Uttar Pradesh.

Similarly, search for oil in West Bengal in the Delta region would be intensified. Geologists are agreed that river deltas generally had very good prospects of oil.

Oil India Limited, in which the Government of India and Burma Oil Company of U.K. hold equal shares is producing crude oil at the rate of about 3.08 million tonnes annually from its Assam oil fields. This company is expected to maintain its level of production for a number of years to come.

Narrowing Gap

The total indigenous production of crude oil during 1975-76 was 8.35 million tonnes and it is expected to be raised to 9.3 million tonnes in 1976-77. The estimated demand of petroleum products would be about 23-24 million tonnes. But with an estimated annual production of 10 million tonnes from Bombay High by the end of the Fifth Plan and another 2 to 3 million tonnes from Bassein and the 'Fault' plus increased production from proven on land areas, one can hope that the gap between production and demand will be substantially narrowed. □

is a state subject and the Parliament has no power to make laws for the states. However, two years back, the Parliament enacted Water (Prevention and Control of Pollution) Act, 1974. Resolutions have been passed by the legislatures of 12 states agreeing to be regulated by the Parliamentary Law and hence it applies only to these states and all the Union Territories. Among the states, Maharashtra has passed a Prevention of Water Pollution Act in 1970 and is governed by it. The Factories Act, 1948 and the Industries (Development and Regulation) Act, 1951 are the other control legislations dealing with the subject of industrial pollution.

There are no specific provisions and details in these legislations dealing with problems created by pollution of ocean from oil and other substances which may arise as a result of operation for the exploration and exploitation of the resources of the sea-bed and the sub-soil. Oil pollution of the oceans is a national as well as an international problem since it does not respect national boundaries and involves the interests of more than one State. The need and relevance for international action has been well recognised and the Inter Governmental Maritime Consultative Organisation has been actively involved in this work at the Transnational level. The 1954 international convention on this subject, drafted by ICMO, contains a number of recommendations to be implemented by all nations and India has ratified this convention. However, in this connection, it is necessary for India to arrive at separate agreements with neighbouring countries regarding pollution caused due to the oil spillages in the territorial waters of the other country.

Central Government has an important role in preventing and controlling oil pollution of the sea from various possible sources. It has to formulate necessary and adequate technical legal and administrative mechanisms to cope with normal or massive oil spills near our coast. This function can perhaps be entrusted to the proposed coast Guards Organisation.

Further, it is necessary to develop the capability, to respond rapidly to emergencies, including the means for dealing with very large oil spills. Standards, rules, regulations and codes of practices need to be developed for ensuring safety in offshore drilling and production operations and the movement of tankers in our territorial waters. Appropriate

technological, legal and administrative machinery has to be devised for implementation of these.

All this needs a massive research effort because our present knowledge about the oceanic processes and microbiology of the oil spills is rather limited. Presently, research work is under way in the use of satellites for monitoring large areas continuously at a reasonable cost, predicting and controlling the environmental

The Convenience of Piracy more than anything else, governed the earlier evolution of international law relating to the sea. While

impacts of the oil spills, knowing about the oceanic processes and the effect of contaminants on these and investigating the short and long term effect of pollutants on living and non-living constituents of the oceans. There is very little work being done in this field in India and it is urgently required to organise efforts in this area so that it might be useful in framing suitable legislation for our country. □

piracy is outlawed today, the law of the sea still suits the convenience of exploiters. Indian legislation is a shield against such piracy.

Foreign Rights Over Sea Wealth

ASHOK OGRA

AT PRESENT there is no international legal framework, or machinery, for controlling the exploitation of the wealth of the sea. A few of the advanced countries are of late, taking advantage of the lacuna by rushing to the resources of the oceans in an unholy haste to appropriate them at any cost. The passing of several bills by the Indian Parliament such as the Territorial Waters Bill, the Continental Shelf Bill, the Exclusive Economic Zone and other Maritime Zones Bill is, thus, a significant step this country has taken towards curbing the unchartered freedom of the ocean assumed by the advanced countries of the world to exploit these riches of the seas. The enactments extend Indian territorial waters to 12 nautical miles measured from the appropriate baselines, extend the contiguous zone up to 24 miles and proclaim India's sovereign rights over the resources of its exclusive economic zone to 200 nautical miles. They also seek to specify the limits of historic waters, over which India had enjoyed sovereignty such as those in the Palk Bay and the Gulf of Mannar between India and Sri Lanka.

The first United Nations Conference on the Law of the Sea (UNCOLS-I) took place in 1958; since then there has been considerable improvement in sea technology, rendering much of the old law obsolescent. Some of the assumptions on which the old Law was based

have proved incorrect like the belief that sea resources—both living or non-living—are inexhaustible. Again the problem of sea pollution had not reached today's proportions then. And the military significance of the sea is something which assumes added importance from year to year. Except adopting four conventions relating to Territorial Sea and the contiguous Zone, the High Seas, Fishing and the Continental Shelf, the UNCOLS-I failed to precisely define the limits of national jurisdiction of territorial sea, fisheries zone and the continental shelf. The UNCOLS-II, held in 1960, also met the same fate. To end this uncertainty and evolve an international machinery for the regulation of economic and military use of the sea, UNCOLS-III held its inaugural session in New York in 1973; besides the inaugural one, the conference so far had had three sessions—at Caracas in June-August 1974, Geneva in March-May 1975 and New York in March-May 1976. The fourth session of the conference that started on 2 August ended on 17 September. The conference had before it four important texts. The first related to the creation of an International Sea-Bed Authority with headquarters in Jamaica, to exploit the resources of the international seabed, or corporations; the second dealt with the extension of territorial sea limit upto 12 miles, a contiguous zone upto 24 miles from the

shore, a 200-mile exclusive economic zone and a continental shelf which can extend beyond the economic zone; the third allowed coastal states to limit foreign scientific research in the exclusive economic zone and the fourth provided for compulsory settlement of disputes. But because of the conflict of interests between the developed and developing countries, the conference ended in deadlock.

The main differences between the developed and the developing countries related to the mechanism that would regulate the exploration and exploitation of sea wealth. The developed countries were strongly opposed to any restrictions on their freedom to explore and exploit the resources. On the other hand the developing countries were in favour of some strong machinery with powers to explore and exploit the seabed resources. This according to them was the best way to conserve the resources and ensure their equitable utilization. They wanted the "Common heritage" to be exploited for the benefit of everybody in the interests of all mankind.

While the conflicting interests are unresolved, the advanced countries have gone ahead in exploiting the resources to their own benefit. This is clear from the legislative and other measures these countries have taken in recent years. It is in view of these that India decided not to wait for the next session to be held from 23 May, 1977, for an international solution and go ahead in creating a legal infrastructure for the protection of ocean resources in her economic zone. After all, the United Nations has been wrestling with the issue for over five years now, and a solution is still eluding the world body.

Indian initiative which conforms to the interests of other Afro-Asian nations, also reflects the deep fears of the developing countries namely that by the time some agreement is reached on the legal regime of the seabed, they might be faced with a situation where a large part of the wealth is already exploited and appropriated by those who are in a position to do so. Thus, the Indian move is an attempt to preserve the seabed from actions and uses which might be detrimental to the common interest of mankind. As the Swedish Delegate to UN, Mrs. Myrdal, said: "Mankind has become warned that while negotiations are going on, technological developments are often accelerating and the opportunities to exploit them are grasped with such alacrity by those who have the power to do so, that when we

finally come to the negotiating table, there may not be a great deal to negotiate about."

That the Bill was not moved earlier shows that India has been very late in recognising the economic potential of sea resources. The first successful drilling which has promised good quality crude, was done only in February 1974. The Bill proclaiming India's sovereignty over the exclusive economic zone in the ocean and entitlement to exercise jurisdiction in respect of other matters, would greatly help India to step up her drilling operations and raise the production substantially; at present India produced some eight million tonnes of petroleum only, whereas our consumption exceeds 24 million tonnes. Fishing will also receive a fillip.

Similarly, the continental shelf that has been defined to comprise the seabed and subsoil of submarine areas that extend beyond the limits of territorial waters, would contri-

bute to economic development through exploitation of marine and sub-marine minerals and resources. The Bill would further enable the states in strengthening the freedom of navigation which is being threatened by the invention of new military devices used in the seabed like mine defence, torpedo defence and defensive acoustic warfare.

The Bill is a shield against the oceans becoming a hotbed of new colonialism and militarism until an accepted international law to govern the oceans is evolved. It is a concrete step towards making the oceans "the common heritage of mankind."

It is hoped that other developing countries would follow the Indian example and heed to the Prime Minister, Mrs Gandhi's recent warning: "a new kind of colonialism is emerging in the form of exploitation of the sea and its resources and the race is easier for technologically advanced nations." □

IOC Fares Well

AVINASH GODBOLE

Bombay Correspondent

THE INDIAN OIL CORPORATION (IOC) has recorded a sales turnover of Rs. 24,210 million, an all time high figure, during 1975-76, as against Rs 19,600 million in the preceding year. The net profit, however, is marginally lower at Rs. 299.1 million as against 306.4 million in the previous year. The dividend has been maintained at 8 per cent, absorbing Rs. 56.9 million. Rs. 242.2 million have been transferred to reserves.

The total sale of petroleum products by the IOC went marginally up to 18.51 million kilolitres as against 18.27 million kilolitres in the past year, representing a market share of 63.8 per cent (the industry's total sale stood at 27 million kilolitres). The lower level of profit was owing to the new pricing system based on the Oil Pricing Committee's recommendations, according to the IOC's Chairman.

During the year 1975-76, the four operating refineries of the IOC at Gauhati, Barauni, Gujarat and Haldia processed 9.23 million tonnes of crude oil, registering an increase of 17.4 per cent over the previous year. The work on Mathura refinery is progressing satisfactorily and will be completed by 1979 whereas the Gujarat refinery will be completed by the end

of 1977 and will be commissioned in early 1978. The pipeline project of the Mathura refinery from Salaya to Mathura is progressing well. For the Viramagam-Koyali part of the project, the Rourkela plant of the Hindustan Steel Limited has supplied pipes with a diameter of 45 cms. It is expected that this project together with expansion of Koyali refinery and secondary processing facilities at Koyali will cost about Rs. 5,000 million in the next four years.

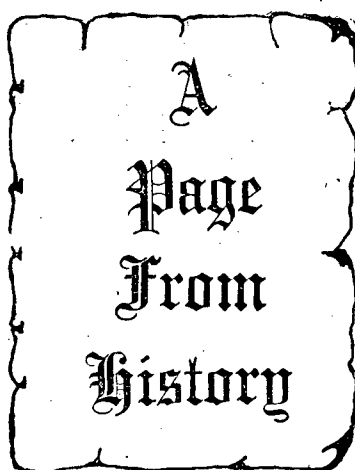
As a part of the 20-Point Programme, the IOC has taken a big lead in opening a number of multi-purpose distribution centres in rural and semi-urban areas for the distribution of essential needs and agricultural inputs at their petrol pumps. By September, 160 such centres had been opened by the IOC.

The IOC imported 7.83 million tonnes of crude oil as against 4.77 million tonnes last year. Besides, Rs. 1,880 million worth other petroleum products and lubricants were also imported. The total value of export of petroleum products amounted to Rs. 290 million. In addition to this, the IOC earned foreign exchange of Rs. 285 million, on account of supplies to International Airlines and foreign flag vessels. □

Liquor in Mughal Delhi

YOU MAY JUDGE from what I have said, whether a lover of good cheer ought to quit Paris for the sake of visiting Delhi. Unquestionably the great are in the enjoyment of everything; but it is by dint of the numbers in their service, by dint of the *Korrah*, and by dint to money. In *Delhi* there is no middle state. A man must either be of the highest rank or live miserably. My pay is considerable, nor am I sparing of money; yet does it often happen that I have not wherewithal to satisfy the cravings of hunger, the *bazars* being so ill supplied, and frequently containing nothing but the refuse of the *grandees*. Wine, that essential part of every entertainment, can be obtained in none of the shops at *Delhi*, although it might be made from the native grape, were not the use of that liquor prohibited equally by the *Gentile* and *Mahometan* law. I drank some at *Amedabad* and *Golkonda*, in Dutch and English houses, which was not ill-tasted. If wine be sometimes found in the *Mogal* empire, it is either *Chiraz* or *Canary*. The former is sent by land from *Persia* to *Bandar Abasy*, where it is embarked for *Sourate*, from which port it reaches *Delhi* in forty-six days. The *Canary* wine is bro-

Travels in the Mogul Empire-
Francois Bernier



ught by the *Dutch* to *Sourate*; but both these wines are so dear that, as we say at home, the taste is destroyed by the cost. A bottle containing about three *Paris* pints cannot be purchased under six or seven crowns. The liquor peculiar to this country is *Arac*, a spirit drawn by distillation from unrefined sugar; the sale of which is also strictly forbidden, and none but *Christians* dare openly to drink it. *Arac* is a spirit as harsh and burning as that

made from corn in Poland, and the use of it to the least excess occasions nervous and incurable disorders. A wise man will accustom himself to the pure and fine water, or to the excellent lemonade, which costs little and may be drank without injury. To say the truth, few persons in these hot climates feel a strong desire for wine, I have no doubt that the happy ignorance which prevails of many distempers is fairly ascribable to the general habits of sobriety among the people, and to the profuse perspiration to which they are perpetually subject. The gout, the stone, complaints in the kidneys, catarrhs and quartan agues are nearly unknown; and persons who arrive in the country afflicted with any of these disorders, as was the case with me, soon experience a complete cure. Even the venereal disease, common as it is in *Hindoustan*, is not of so virulent a character, or attended with such injurious consequences, as in other parts of the world. But although there is a greater enjoyment of health, yet there is less vigour among the people than in our colder climates; and the febleness and languor both of body and mind, consequent upon excessive heat, may be considered a species of unremitting malady, which attacks all persons indiscriminately, and among the rest Europeans not yet inured to the heat. □

PM'S Programme in H. P.

ABOUT 50,000 small land owners in Himachal Pradesh have been given more land to make their holdings of the size of one acre. There is hardly any tiller in Himachal Pradesh now who does not own his land.

Himachal Pradesh was the first State to achieve the target allotment of 100 sq. yds. house-sites free of cost to all houseless persons in rural areas. Most of the Housesites have been developed and the rest would be completed shortly.

The State Government is considering the grant of housesites to Harijans and other weaker sections in urban areas as well. In rural areas the house-sites provided are proposed to be enlarged to enable the people to have kitchen gardens and poultry and dairy units.

Debts of landless agricultural labourers, rural artisans and marginal farmers with an annual income of

Rs. 2,400 and below have been wiped off. The State Government has granted a moratorium on repayment of debts of small farmers for a year. Legislative measures are also being undertaken to scale down debts of small farmers.

Land reforms legislation in Himachal Pradesh has accelerated the pace of implementation of the economic programme of the total 2,687 big landed estates covered under the Land Estate and Land Reforms Act, over 2,580 have been abolished so far. Of the 67,000 acres declared as surplus, 1,438 acres have been distributed to Landless persons and 530 acres to those holding less than one acre of land, while 1,400 acres are with tenants who are also beneficiaries as a result of the implementation of the Land Ceiling Act. Most of these tenants have acquired proprietary rights on tenancy land on payment of nominal compensation.

With a view to expediting work on giving land to landless persons according to a time bound programme, the State Government has a special scheme under which land upto 5 bighas could be granted to landless persons on the spot. Out of the total allottees numbering 17,688, who have been given land, about 12,500 are members of Scheduled Castes and 700 members of the Scheduled Tribes.

In the current year's budget, Rs two lakh have been earmarked for providing supporting services to new allottees of land. Out of this amount, interest free loan is given to allottees of land for purchase of bullocks, fertilisers, seed and for improving the land. This benefit is being extended to all landless allottees.

The State Government has revised the minimum rates of wages of about two lakh un-skilled workers engaged in agriculture, construction and maintenance of roads and buildings, forestry and timber operations. Unskilled workers will benefit to the extent of Rs thirty million per annum. □

QUOTATION BOX

All that is needed is social consciousness that if you see a tap open you close it or get somebody else to close it.

—Indira Gandhi

The Republicans fight like cats and go home and sulk. The Democrats fight like cats and suddenly there are more cats.

—Gilbert W. Fitzhugh
Republican, Former Chairman
of Metropolitan Life
Insurance Co. USA

If I have the power I will ban white bread and force the people to use brown bread which has more nutrition.

—Dr. Karan Singh

A geologist works in solitude and is very much like a horse with its blinkers on.

—Dr. Gerhard Fucks,
Austrian Geologist

India has got into my bones.

—Galal-el Rashidi
Dy. Chief of Arab League

There is no security in oppression and there is no permanency in injustice.

—Dr. Henry Kissinger

Lighting these lamps will not only remove darkness but will light the way to happiness.

—Sushila Rohatgi
Dy. Minister of Finance at the
Lamp-lighting Ceremony of
Nurses at Rajkumari Amrit
Kaur College.

Sporting Jargon is a fertile seedbed for absurd extravagances that nobody could say or write in cold blood, if they considered for a moment what they were saying or writing. That is why the recent Olympic Games were tolerable on television only with the Sound switched off.

—Philip Howard
in The Times, London

Between red tape and opportunism education remains the cinderella she has always been.

—Sisir Kumar Ghose in
The Statesman

I am a human being. I'm not a packaged article that you can put in a little box and say, here's a Southern Baptist, an ignorant Georgia peanut farmer who doesn't have the right to enjoy music, who has no flexibility in his mind, who cannot understand the sensitivities of an inter-personal relationship. He's gotta be predictable.... He's gotta be for war. He's gotta be a liar. He's gotta be a racist... it becomes a curiosity for those who see some mystery about someone of my background being elected President. I'm just a human being like everybody else.

—Jimmy Carter
A Presidential Candidate of USA

Yojana Quiz

1. What does the sign Rx which doctors write at the tops of their prescriptions stands for?
2. What are the rivers on which the following cities are situated?
a) Imphal
b) Durgapur
c) Agra
d) Montreal
e) Cairo
f) Salamanca
3. Why can we see through glass?
4. What is the Sudd on the Nile?
5. What is Red-letter Day?
6. When did newspapers begin?
7. The Bharat Aluminium Company at Korba, a Rs 390 million project, was commissioned on
a) 15 Aug, 1948
b) 26 Jan, 1954
c) 21 April 1973
8. In which States are the following lakes situated?
a) Chilka
b) Dal
c) Logtak
9. Who is the first great Kannada poet?

ANSWERS

1. The superscription which consists of the sign Rx is a relic of the days of astrology. It originally was used to represent the symbol of planet Jupiter. By common consent it is now regarded as representing the imperative mood of the latin verb recipere, to take.
2. a) Imphal b) Damodar c) Yamuna d) St. Lawrence e) Nile f) Tormes 3. Because the molecules of which glass is composed are so spaced and placed in the substance as to allow the rays of light to pass between them. The substances which are not transparent to light rays molecules stop the rays and reflect them. 4. The Sudd, in Arabic means obstacle or barrier, is a strange feature of the Upper Nile. The waters become covered with mass of floating plants, and these, when mixed with trunks of trees, form floating islands, which press together and finally grow into an impenetrable barrier. 5. A red-letter day is one that stands out in our life as a happy and delightful day. In almanacs special days and holidays used to be printed in red ink to mark them off from ordinary days. 6. The newspaper in its modern form is usually regarded as beginning in 1566, when the Venetian Government issued written news-sheets and exhibited them in the streets, any one being allowed to read them on payment of a small coin called *gazetta*. On this account the news-sheets were called *gazettes*. They gradually became so popular that they were printed 7. c) 21 April, 1973 8. a) Orissa b) Jammu & Kashmir c) Manipur 9. Pampa (941 AD) His Bharata or Vikramaditya. Vijaya is narrative of the Mahabharata.

Note to Authors

All weights and measures must be in the Metric System in articles submitted to *Yojana*. Avoid 'lakh' and 'crore' and give all large figures in 'million'

—Editor

Technological Cooperation

Technology and Economic Interdependence by Harry G. Johnson; Published by Macmillan for Trade Policy Research Centre (London), 1975; Pages 187; Price £6.95.

THE DEVELOPMENT and application of technology to foster economic growth is of vital significance for all national endeavours and as such any attempt to rationally analyse and project the basic issues would be of interest. Technology, whether high or low, modern or old, oriented to military or peaceful purposes, has a close relationship with progress in science, especially so in the last 50 years. One cannot wish away from the contemporary world scene, the material wealth, social wellbeing and the improvements in the quality of life, brought about by technological superiority associated with some of the countries like the USA, USSR, Sweden etc.

But whether individually scientific endeavours, technological development, development of the fine arts, economics and other social sciences, have a superior or inferior, larger or smaller role in creating the ideal conditions for a quality of life, thus contributing to a progressive civilization, is a matter for an integrated judgment at a metamacro level. A theme that is emerging in our times is the need to critically analyse and understand the role and importance of each one of these facets in organizing the societal structure and way of life. In the present treatise the author has attempted to draw attention to the questions posed by technology from the economist's angle. One has to admire the comprehensive manner, purely from economic analysis, of dealing with several basic issues such as the values of scientific research, science policies in relation to technology generation and utilization, concepts of international trade and the role of technology, problems of institutions like the multinational enterprises, the economics of brain drain and issues of threat to environment due to continued advance in technology and the author approach to the premises for an economic integration between nations.

But in the attempts to rationalise the economic issues underlying the success of the United States, one is left behind with the impression of his strong bias towards the American approach as he attempts to explain away some of the problems of con-

cern to the other nations. For instance, there could be other equally valid explanations apart from economic considerations alone, against the functioning of multi-national enterprises, the problems of brain drain to the less developed nations, the good and bad effects of pollution and environmental deterioration, the problems of the European nations and Canada vis-a-vis America. Similarly, the book does not deal *prima facie* with the problems of the developing nations but is primarily oriented to problems of economic inter-dependence between the European group, Canada and U.S.A. Another major omission is the absence of any reference or comparison with the Soviet system, East European countries and China which undoub-

tedly have economic systems in operation for several decades now. The entire treatment is based on the conceptual acceptance of a free market economy as a better pattern for economic structures of including international trading.

While we may sympathise with the author's plea for the policies to promote international economic integration, the doubts and uncertainties would continue to exist in an economic system of the last four decades, based on the primary leadership of the American policies and its impact world over. World economy would have to continue on a fragmented basis so long as economic imbalances are continued to be sustained on the myth of superior technological leadership, concepts of economic profits predominating over social and welfare considerations and attitudes, and every issue is to be accepted from benefits of the so-called efficiency and '*prima facie*' considerations of economic behaviour alone.

M.R.Raman

BOOKS

Prosperity Through Panchayati Raj

Strategy for Agricultural Development by Dr. A.U. Danial; Vora & Co., Bombay, 1976; Pages XII+171; Price Rs 25.

IN WHAT is evidently a revised version of a former doctoral dissertation the author has attempted to apply the lessons of modern agricultural development to the State of Bihar with its almost intractable problems. The salient features of the agricultural economy of the State, the structure of production, etc., are covered with statistics called from heterogeneous sources for non-comparable years. If some of the sources cited are extremely tenuous, this has not deterred the author from going full stream ahead with his objective of spelling out the framework of overall strategy for the Bihar State with the help of imposing chapter headings simulated from U.S. publications but without adequate contents. If there is any strategy at all that is implicit here, it is the perspectives of sociology. However, the author has not incorporated these in his study evidently more due to prudence than for want of competence.

According to the author, there is a strong case for adopting cooperative farming for enhancing agricultural production in areas alongside state farming in some others. A concrete

suggestion offered is the constitution of a 'Village Development Board' in each Panchayat with the responsibility for the administration of a Panchayat Cooperative Farm (PCF). The paternity of this idea is rather old although the evocation here is rather timely. This PCF can be organised by pooling together three categories of land, viz. (1) land in each Panchayat area in excess of the ceiling fixed by the Government (2) waste land and other common lands under the control of Village Panchayats and (3) land pooled by the members of the village panchayat. The suggestion has been further elaborated with 'Model Bye Laws of the Panchayat Cooperative Farm' and given in the Appendix. The importance of flood control, improving transport network, credit facilities, the use of power in agricultural development, extension facilities has been briefly stated as also certain proposals for development of industries for better processing and transforming of farm products, those leading to the production of agricultural inputs and providing employment for rural labour.

The author has not evidently quailed at the thought of pursuing a strategy of agricultural development for the Bihar State, a task in which the State Government itself has yet to make bold advances. With all

its flaws in the poor assemblage of facts and in the lack of content in what has been termed as 'analysis' at various stages, the book is, nevertheless, useful to those unfamiliar with the problems of this State

where poverty and floods have been endemic for centuries and where human development requires to be undertaken on a very systematic and planned manner without delay.

—B.N. Nair

Improving Poor Man's Lot

20-Point Economic Programme and Orissa: Edited by Dr K.M. Patnaik; published by Ravenshaw College (Planning Forum), Cuttack; pages 192; Price Rs 10

THE DECLARATION of national emergency and the announcement of the 20-Point Economic Programme by our Prime Minister Mrs. Indira Gandhi to improve the lot of the weaker sections of society came as a ray of hope in an atmosphere of darkness and instability. Over a year has passed since this step was taken. This was a major step forward for the building of a dynamic and just society. Over this period positive gains have been achieved ushering in an era of peace, progress and prosperity for the whole nation.

Due to the 20-Point Economic Programme and its steady implementation there has been a phenomenal growth of awareness and responsibility among the common people, towards the task of socio-economic regeneration of the nation. Production in various spheres of the national

economy is on the increase; inflation has been contained and prices stabilised at an economically desirable level. An average Indian is economically much happier today than he was a couple of years ago.

The book under review covers many aspects of Mrs. Indira Gandhi's 20-Point Economic Programme with special reference to Orissa. All the twelve contributors to the volume are well-known economists and experts. Through their papers, they have highlighted many problems of Orissa and their solutions through 20-Point Economic Programme, a programme which has a direct impact on the welfare of the teeming millions.

The papers have not merely made diagnosis of the problems but also prescription in accordance with the 20-Point Economic Programme, which are thought-provoking and throw ample light on practically all the economic aspects of the State.

—Pritam Lal

A Microscopic View

Marginal Farmers and Agricultural Labours in South-Kanara District—An Economic Analysis, By Dr. N.K. Thingalaya, Economic Research Department, Syndicate Bank, Manipal; Pages 111; Price not to mentioned.

AFTER INDEPENDENCE the Government has been taking steps to reorganise the agricultural sector and improve the living conditions of the economically backward people—especially among the cultivating class. Among the measures taken by the Government in this direction, the major steps have been special schemes to help the small and marginal farmers and agricultural labourers. In its report, the All India Rural Credit Review Committee has recommended setting up of Small Farmers Development Agency. This recommendation was favourably considered by the Government and the scheme was started in 1970. Along with this a separate scheme called Marginal Farmers and Agricultural Labourers Development

Agency was also introduced. The former has been charged with the responsibility of tackling the problems of small farmers namely availability of credit and other farm inputs, which have become bottlenecks in their case and the latter was assigned the problem of marginal farmers and agricultural labourers. It is not simply enough if we make some Plans and Programmes, what is needed is their effective implementation. And also, we must review from time-to-time the progress made in the desired direction.

Recently a number of studies were undertaken to assess the progress of these schemes since their inception and the book under review is one of them. In this an attempt is made by Dr. Thingalaya "to make an analysis of the problems of marginal farmers and agricultural labourers of the South Kanara District". This work of his is quite scientific and gives a microscopic view of the problems of marginal farmers and agri-



IGNORAMAN

*wants to know
when sugar mills start
getting sick, wouldn't
consumers start getting
healthier?*

cultural labourers. The book is divided into eight chapters. In the first one we find a general introduction to the problems of marginal farmers and agricultural labourers. On the basis of numerous surveys conducted with the help of tables and statistics an account of the economic background of the district and sample villages, a detailed description of the problems of marginal farmers and agricultural labourers and a review of the existing programmes and an assessment of their success were given in the subsequent chapters. Lastly the author has put forward a few suggestions for the effective implementation of the programmes and certain guidelines for the reorganisation of the rural economy.

Ever since the declaration of the new economic programme by the Prime Minister, a loud thinking is going on about the ways and means of alleviating the misery of the poor. Dr. Thingalaya has come forward with some very practical suggestions. Some efforts on the lines suggested by him are welcome, if something is to be done to better the conditions of marginal farmers and agricultural labourers.

—A.T. Raju

**DEMOCRACY
DEMANDS
DISCIPLINE**

Development Notes

New Strains of Poultry Developed

New strains of poultry have been developed by the Indian Veterinary Research Institute (IVRI), Izatnagar, which compare well with that of the best foreign birds, both in egg laying and meat production.

A pure line broiler, having a potential of gaining 1.5 kg body weight in just ten weeks, developed at the Institute, is now ready for commercial exploitation. The Institute has also developed some egg-laying strains, which would give about 220-230 eggs per year. Further trials on this are in progress and would soon be released to industry.

The development of these new strains is particularly significant in the wake of the decision of the Union Ministry of Agriculture to stop the import of poultry germplasm from the current financial year.

The Technology Section of the Poultry Research Division of IVRI, has also developed a curing method for preservation of poultry meat (without refrigeration) for more than a week at room temperature.

Indigenous Automobile Batteries

The Central Electro-chemical Research Institute (CEERI) Karaikudi, has developed a process for the manufacture of lead acid batteries from indigenous raw materials. The process has been standardised.

These batteries find application in automobiles for starting, lighting and ignition. The process is of immense importance in Defence also.

The essential raw materials required for the manufacture

of lead acid batteries are lead, antimony, lead oxides, barium sulphate, carbon black, separators and sulphuric acid. All these raw materials and main items of plant and machinery are available indigenously.

The total capital outlay for putting up a plant for producing 3000 batteries per year has been estimated at Rs 212,000.

The Institute, which first imported 163 Japanese Quails, under the UNDP programme, has now more than 5,000 birds. It has plans to raise a stock of 10,000 birds. Quails have been supplied to various agricultural universities to build up a nucleus stock for propagation.

of lead acid batteries are lead, antimony, lead oxides, barium sulphate, carbon black, separators and sulphuric acid. All these raw materials and main items of plant and machinery are available indigenously.

The total capital outlay for putting up a plant for producing 3000 batteries per year has been estimated at Rs 212,000.

Non-Ferrous Metal Deposits in Himalayas

On the basis of the work done by the Geological Survey of India, important non-ferrous minerals like copper, lead and zinc have been located in about hundred different places in both eastern and western Himalayas. Many of these occurrences appear to have been worked on a small scale in the past. Some of the occurrences have been revaluated by modern methods. This has resulted in opening up a mine at Bhotang near Rangpo in Sikkim with a modest production of about 100 tonnes of ore per day. Besides, several potential workable deposits have been located at Dikchu in

Sikkim, Gorubathan in Darjeeling district of West Bengal, Genekha in Bhutan and Askot in Uttar Pradesh.

Many of these base metal deposits are multi-metallic. The ore contains antimony, silver, arsenic, cadmium and bismuth along with the major metals like lead, zinc and copper.

The Geological Survey of India is assessing the economic viability of these deposits keeping in view factors like terrain, market forces and availability of cheap hydel power.

Along with detailed evaluation of the known occurrences,

the Geological Survey of India is carrying out systematic search for the hidden base metal deposits in the entire stretch of the Himalayas by geological, geochemical and geophysical methods.

The base metal deposits

occur in very restricted niches of the geological environment. Therefore, to locate them in a mountain range of such complexity and vastness like the Himalayas is a challenging task.

Increased Marine Products Export

The year 1975-76 witnessed a remarkable growth in the exports of marine products, both in terms of quantity and value. A total quantity of 54,369 tonnes valued at Rs 1241.6 million were exported during the year.

The exports during the previous year were only 45,009 tonnes valued at Rs 684.1 million. This represents an increase of 9,270 tonnes (20.55 per cent) in terms of quantity and Rs 557.5 million (81.49 per cent) in terms of value.

It was in the middle of the year 1972-73 that the Marine Products Export Development Authority was established. The export performance during that year was 38,903 tonnes and the foreign exchange earning Rs 597.2 million.

The major factors contribu-

ting to the export growth during 1975-76 are sharp rise in export prices particularly for frozen shrimp both in Japan and U.S.A., poor shrimp catches in most of the shrimp producing countries, and diversification of exports both in terms of products and markets.

Frozen shrimp continue to be the major export item and also the major contributor to the export growth. Its contribution was 46,385 tonnes valued at Rs 1101.7 million, an increase of 32 per cent in terms of quantity and 87.78 per cent in terms of value. Other items which contributed significantly to the export growth were frozen froglegs, frozen cattle fish, frozen fish, frozen squids, dried fish, sharkfins and fish maws.

Increased Energy Generation by DVC

DVC took a big leap forward in energy generation in August by producing 484 million units of energy. The average target of monthly energy generation in 1976 was 450 million units. In June, DVC produced 460 million units and in July 463.4 million units. In daily energy generation also, August was a month of records.

In terms of megawatt, the normal demand on DVC system is at present 740 while the average daily peak generation is over 850. That is why, DVC could render assistance to the neighbouring systems by providing additional power. In Bihar alone, DVC supplied 21 million units of additional energy during the month to specially meet the requirement

for lift irrigation in absence of rain water. In August this year, the pumping load on DVC was much heavier than ever before.

The industrial demand in the service area of DVC is steadily increasing. About six months ago the demand was between 13 and 14 million units a day as against over 16 million units now. Among the major consumers the two steel plants at Durgapur together need 1.30 million units per day while TISCO requires 1.80 million units. Bokaro Steel reached a consumption level of 0.9 million units. The DVC supply to coal mines and Calcutta at present was 2.9 and 1.8 million units respectively.

Integrated Rural Development

A major study of the integrated rural development in Shahdol district of Madhya Pradesh has been approved by the Environmental Research Committee of the Department of Science and Technology. The study is being undertaken by a team of voluntary youth workers under the guidance of the Environmental Engineering Department of the Indian Institute of Technology, Kanpur. The objective is to study various developmental aspects of the district of Shahdol to enable formulation of an integrated development plan for the entire district which would benefit and organise the poorest sections of the community.

The ERC has as one of its areas of research the study of environmental aspect of rural settlements. Within this broad framework, a number of research proposals have been received by the Committee in the field of rural development. The Shahdol group has already collected a large amount of primary data on agriculture, forestry, mining, industry, health, irrigation and commerce. In addition, some small experiments have been conducted to determine the social and technical levels of communication that are suitable for use in the rural areas. The detailed explorations proposed to be conducted

in various sectors of rural development are expected to lead to a development plan which would be implemented both

through the official and non-official agencies involving the common man, the beneficiary of this project.

Social Security Schemes for Workers

Several welfare schemes have been introduced with a view to provide long term financial security to the families of industrial and other workers, outstanding amongst which have been the social security schemes for the benefit of industrial workers. The Health Insurance Scheme, Maternity Benefit Scheme, Gratuity Scheme, and Contributory Provident Fund Scheme are some of them.

Five years ago, a new scheme for the benefit of the families of the deceased provident fund members was introduced. Under the scheme, the widow of the deceased provident fund subscriber is entitled to get family pension ranging between Rs 40 and Rs 150 per month. In this scheme, there were equal contributions by the employees, the employer and the Government.

Aerial Surveys for Better Highways

The Central Road Research Institute, Delhi, has developed new air photo patterns for identifying the location of materials for road construction. The technique helps to make rapid surveys of road materials and reduces construction costs.

For achieving economy in the road development programmes and to conserve hard stone to the maximum possible extent, emphasis has to be laid on the judicious utilisation of locally available materials such as *kankar*, gravels and laterite which have adequate mechanical strength but are not being used freely as conventional materials.

As a result of extensive ground survey and comparative study of aerial photographs of about 12,000 sq. kilometres in the alluvial plains of U.P. and 13,000 sq. kilometres in Western Rajasthan, well defined and distinct air photo patterns for the location of hidden *kankar* deposits have been developed and established by field checking.

The accuracy of interpreta-

tion has been found to be of the order of 75 to 80 per cent. Air photo patterns for the identification of hidden gravel deposits have also been confirmed by carrying out interpretation and survey in an area of about 800 sq. kilometres around Chandigarh.

With the establishment of these air photo patterns expeditious and economical survey of material resources can be conducted, even if the region is inaccessible.

The Geological Survey of India has also utilised the air photo patterns developed at the Central Road Research Institute, for large-scale survey of *kankar* deposits both in the alluvial plains of U.P. and desert areas of Rajasthan. Their experience has also confirmed the high degree of reliability of these patterns for the location of hidden *kankar* deposits.

The Institute has also been recognised as a training centre for imparting training in the subject of air-photo interpretation for ESCAP region countries.

Hybrid Varieties Of Eucalyptus

At the Forest Research Institute, Dehra Dun two promising Hybrid varieties of very fast growing eucalyptus have been developed by intercrossing two distinct species of these exotics. Designated as FRI-4 and FRI-5 these new varieties are expected to at least double the per hectare output of future fuelwood or pulpwood planta-

tions in the country. This is also the first time in the 115 year long history of Indian Forestry that pedigreed forest tree material has been developed for plantation purposes.

Eucalyptus, which has more than 500 named species and natural varieties, is almost exclusively Australian in origin. However, many of its species

have been successfully grown as fast growing exotics in several tropical and subtropical parts of the world. The earliest eucalypt introduction in India was that of *E. globulus*, the Blue Gum, in the Nilgiris, more than a hundred years ago. Lately, another species *E. grandis* has been successfully grown in parts of Kerala for pulpwood. However, the eucalypt which is currently the most widely planted in the country, in the plains of both South and North India, is *E. tereticornis*. The new varieties mentioned above have been developed by hybridizing this

species with *E. camaldulensis*, another closely related, fast growing and more adaptable species. In preliminary trials at Dehra Dun, first generation (F1) hybrids of these two crosses displayed striking degrees of Hybrid Vigour in both height and diameter growth. In a short duration of 4 years it produced nearly three times more volume of wood than *E. tereticornis*. F2 breeder seed of these two new varieties now awaits multilocation testing in the states. In the meantime, work on breeding even better hybrid varieties continues.

Punjab Khadi Board's Job Scheme

The Punjab Khadi and Village Industries Board has earmarked a sum of Rs 10 million for its "employment promotion programme" for the current year.

The board had selected 23 cottage type of industries and the educated unemployed willing to set up their units in these industries will be provided financial assistance for this purpose.

The Board will supply 10 per cent of estimated amount needed for starting the said units, at four per cent interest. Another 10 per cent will have to be contributed by the persons concerned themselves, while the remaining 80 per cent will have to be arranged from a nationalised bank for which it will charge interest at the rate of 11 per cent.

Matriculates turned out from industrial training institute or similar institute will be trained by the Khadi Board.

The State Industries Department proposes to set up by the

end of the current plan period eight more "floating carcasses utilisation" centres and for this purpose Rs 2 million had been sanctioned.

At present there are only four such centres—one each in Jullundur, Amritsar, Bhatinda and Malerkotla. With the setting up of these centres every district in the state will have at least one such centre.

The purpose of the government in expanding these facilities is to fully utilise the cattle wealth of the state and make Panjab not only self-sufficient in its requirements of leather but also to start exporting sophisticated varieties of leather.

The government has also taken steps to introduce sophisticated methods of tanning hides in the three tanning centres of Malerkotla, Kotkapura and Banga in Jullundur district. A sum of Rs 300,000 had been sanctioned for this purpose.

Durgapur Steel Maintains Production

Production in almost all the major units of the Durgapur Steel (DSP) in the month of August was in tune with the trend set up by the Plant in the earlier months. In the Coke Ovens, an output of 1,20,196 tonnes of total coke (dry) was 102.7 per cent fulfilment of monthly production target. An output of 45,965 tonnes of sinter in the Sintering Plant during the month was an all-time best monthly production record. It overtook the previous best of 43,145 tonnes achieved in March, 1976. The production of 19,190 tonnes of pig iron for sale was quite impressive as it was 182.8 per cent fulfilment of the target fixed for the month.

Performance of the Rolling Mills of the Plant was also impressive. Specially, the Merchant Mill maintained the production tempo by fulfilling 107.8 per cent of the monthly target. An output of 74,257 tonnes of saleable steel was just marginally short of the production plan for the month.

The Sleeper Plant, which was closed for some time, was put back to production again from August 16.

Apart from the monthly record established by Sintering Plant, a few shift and day records were established by Skelp Mill, Section Mill and Fish Plate Plant.

During the month, the Plant was able to despatch a quantum of 70,619 tonnes of saleable steel and 17,674 tonnes of pig iron. Despatches for export included 11,997 tonnes of billets and square bars, 7,613 tonnes of rounds, and 7,157 tonnes of scrap comprising IMBP, C.I. Scrap (G-grade) and Mill Scale.

The Plant continued its efforts for production of special quality steel and high valued structurals. There was a production of 1510 tonnes of hyten 31/36 structurals, 120 tonnes of DDQ/EDDQ skelp, 2300 tonnes of forging quality steel & 1807 tonnes of 100 x 100 x 8 mm angles during August 76.

LIC's 'Money Back' Policy

Money when needed

Quick returns

Life Cover

Here's an amazing Life Insurance Policy which provides you money back at regular intervals before the expiry of the policy. These timely payments come in handy when you need lump sums for your children's education and marriage, down-payment for a house or additional finance for your business.

Regularly, every few years before the policy matures, instalment sums are paid back to you. For example—you could take a 12-year policy. After 4 years you get 20% of sum assured. Four years later, another 20% comes to you. The balance 60% is paid at the end of 12 years. Should death occur during the 12 years, the full sum assured is paid, irrespective of payments already made.

In addition, bonus also accrues on the full sum assured, year after year.

The Money Back Policy is available for terms of 12 and 15 years.

This is a unique policy which gives you money in hand plus full insurance cover. This is a policy designed to serve you better.



**Looking ahead
for you!**



**Life Insurance
Corporation of India**

daCunha/LIC/21

When Mothers Mark Their

Babies' Graves

With

Feeding Bottles

THE CUDDLING ARMS transmit warmth, love and a sense of security needed for the child's well-being as much as all those life-giving constituents in the pap. But it is not a one-way traffic; the mother too benefits from the giving: hormones secreted during nursing help the muscles of the womb contract and regain its original shape distended during childbearing.

But all this knowledge is esoteric mumbo-jumbo to the mother who is told by relentless advertising that the stuff that comes in the can is highly nutritious, untouched by human hands, roller or sprayer dried, packed in inert nitrogen and fortified with Vitamins A and D. She believes that the stuff is far superior to the supply that comes from her own breasts, a couple of glands good enough for attracting ever-larger sales for almost everything, but not good enough for her baby.

And the results can be tragic, as these pictures show. In many poor countries perfectly healthy mothers well capable of breastfeeding their babies take to dried-and-canned milk products and deprive their babies of natural nutrition. Some mothers convinced that the bottle is superior to the breasts even fill the bottle with ordinary water, and watch their babies die of starvation (see *Nature Gave the Baby the Best Food in Mother's Milk* by Dr Adewale Omololu, *Yojana*, 1 April 1974).

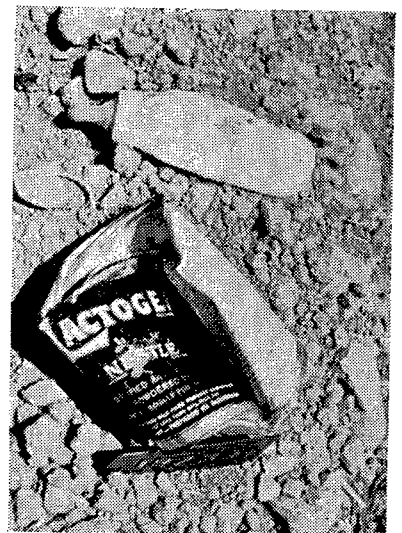
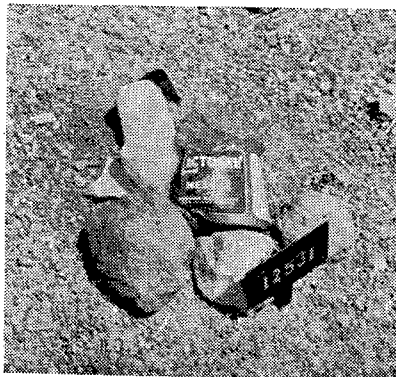
It is true that the technology of drying and preserving surplus milk in tins and marketing it in areas where it is in short supply is contributing to the well-being of countless children around the world; what is equally true, however, is that the miscarriage of the same technology can be the point of no return to many other children. □

—Dadri

A baby's grave in Zambia marked by a feeding bottle. Reproduced from Development Forum, published by the Centre for Economic and Social Information, the United Nations Office at Geneva. Original by the National Food and Nutrition Commission, Lusaka, Zambia.



Two more explicit pictures supplied by SAFEP, Arbeitsgruppe Dritte Welt, Bern, Switzerland (see also Yojana, 15-30 September 1976).



A challenge only **KIRLOSKAR-CUMMINS** dared accept

The challenge: making high HP engines with maximum indigenous content.

Only KIRLOSKAR CUMMINS accepted it, and, in ten years of toil and tribulation, accomplished the task: making engines of 60-400 HP, indigenous content: 90% average; lower range: 98%.

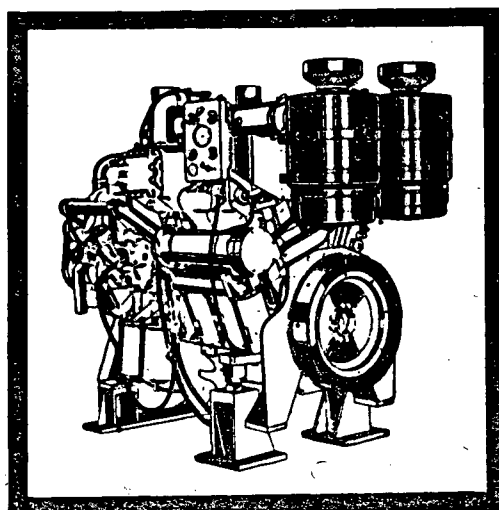
Many other manufacturers hold similar licences, but...

... KIRLOSKAR CUMMINS' has started production of 800 HP VT-12 engine, India's most sophisticated and versatile engine.

KIRLOSKAR CUMMINS are one of the first to establish continuous production, covering the entire licensed high horsepower range.

Fully indigenous engines...giant power units... were just a philosophy only ten years ago. To KIRLOSKAR CUMMINS it was a challenge...now an accomplished fact.

KIRLOSKAR CUMMINS LTD.
KOTHRUD, POONA-29



**800 HP
VT-12 engine.**

Pratibha 724