

Yojana

November - 1968



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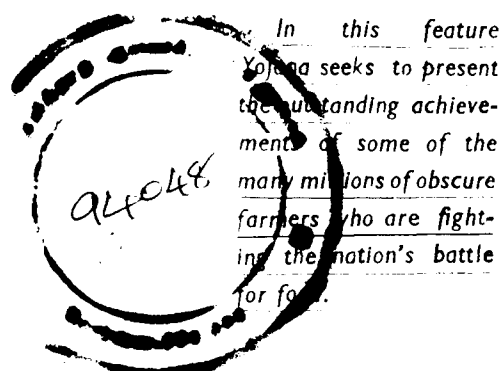
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YOJANA



BIG DEEDS HUMBLE MEN



PIONEER OF HIS BLOCK

Krishnapada Singha Roy of Kenna Village in West Bengal has been a pioneer of his Block, Memori, in cultivating high-yielding varieties. He adopted the varieties in 1966-67 and achieved modest results. In the next year he harvested 120 maunds (44.3 quintals) of IR-8 paddy. The expenditure on farm operations came to Rs 525 per acre. He was left with a profit of Rs 4,125 per acre.

Singha Roy's spectacular achievements inspired other farmers to try IR-8. More than 30 acres of land in the village were brought under IR-8 during the following rabi season.

In Bijra, another village in the same block, Mrityunjoy Dutta obtained a yield of 111.5 maunds (41.3 quintals) by adopting TN-1 boro paddy.

IMPRESSIVE REWARD

Chelladurai is an ordinary farmer of Sirugudi village in Madras State. He learnt about IR-8 paddy through different publicity media and decided to cultivate it in his 1.50 acre land.

He contacted the Gramsevak and the Extension Officer of the area and a farm plan was drawn up for a 70 cent plot which he followed meticulously. Chelladurai was rewarded.

The harvest worked out to 3,853 per acre.

The money spent by him on seeds, ploughing, manure, fertiliser, irrigation, weeding and wages amounted to Rs 837.63 per acre, leaving him a profit of Rs 1,957.37 per acre.

HINJLIKATU SHOWS THE WAY

High-yielding varieties of paddy, including IR-8 and Taichung Native-1 were grown in the current Rabi season in about 120 acres in 12 Gram Panchayat areas of Hinjlikatu Block of Ganjam district in Orissa. Narasinha Sahu, a progressive agriculturist of Durbandh Panchayat, stood first with a per-acre yield of 182 maunds 25 seers. The second place went to Ranka Sahu of Bhabundh Panchayat who got 152 maunds 20 seers and the third place to Yudhishtir Sahu of Gandala Panchayat whose yield was 124 maunds 25 seers of Taichung Native I. The yields would have been still higher if full irrigation facilities were available to the area.

Trinath Palai, Sarpanch of Bhatkumra Gram Panchayat of Purusottampur Block in the same district, stood first in the Block level crop competition in the last Rabi season with his yield of 132 maunds per acre of IR-8 paddy.

Against the target of 1,500 acres to be brought under the high-yielding varieties of Taichung Native I and IR-8 in the Rabi season in Kujang Block of Cuttack district, the area covered was 2,980 acres. The average yield was 60-70 maunds per acre. A progressive farmer of village Balidiha in Paradeep Gram Panchayat got the first prize for a yield of 153 maunds per acre, and another farmer from village Badapal in Rahkasala Gram Panchayat got the second prize with a yield of 113 maunds per acre.

MADRAS'S BEST MAN IN THE VILLAGE

"He is one among us. But without him, our village would not have been what it is today"—the villagers of Thirumazhisai said

about Mr. A. Swaminathan (26) their Gramsevak in Poonamallee Block in Madras.

"No. It is too big a praise! I was only implementing the techniques which I learnt at my Rural Extension Training Centre", said Mr. Swaminathan in all humility.

Mr. Swaminathan has won the first award of Rs 1,000 instituted by the Government of Madras for the best Gramsevak of the State. He has been adjudged as the best Gramsevak for the year 1965-66.

The young Gramsevak has to his credit only a short service of four years. During this period, his record of achievements has been highly commendable. He devoted his foremost attention to the improvement of agriculture and food production. In Thirumazhisai, the village he is serving, there are 1,414 acres of wet lands and 1,030 acres of dry lands.

He inspired the farmers to bring 200 acres of wet lands in the village under ADT-27. When the village saw the success of the crop, he organised a function to congratulate the farmers who had grown that variety of paddy. This, incidentally, enthused the rest of the farmers, who still hesitated to raise hybrid varieties and march with the times.

When asked about the secret of his success as a Gramsevak, he unhesitatingly said, "It lies in the organisation of the 'Young Farmers' Club' in the village. The members of the clubs listened to me and introduced improved varieties of seeds and agricultural implements. I trained the villagers in handling power and hand-sprayers and dusters. I showed them how to mix pesticides before spraying and dusting".

He made farmers realise that high-yielding varieties programme should go hand-in-hand with augmentation of facilities for irrigation. About 200 acres of land got the much-needed facility.

Mr. Swaminathan also succeeded in organising two co-operative societies, one of which was entirely managed by women. Both the societies are functioning very well.

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

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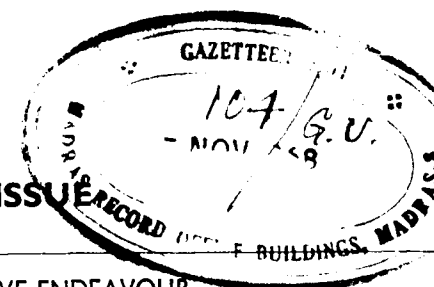
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LEST WE FORGET

It is only when India has acquired the ability to design, fabricate and erect its own plants without foreign assistance that it will have become a truly advanced and industrialised country.

Nehru



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THE CO-OPERATIVE WAY

THE observance of "Co-operative Week" (November 2-8), is an occasion for reiterating our faith in the Cooperative Movement as "a way of life", and as an instrument for promoting the collective prosperity of the small man. This time-honoured custom throughout the world helps to focus attention on the importance of cooperative endeavour as an integral part of planned economic development of the country. In this context the celebration of the "Week" this year is of special significance as the nation stands on the threshold of the Fourth Plan.

The Cooperative Movement in India is 66 years old, and it has made considerable progress, particularly after the attainment of Independence. The principle of cooperation has been applied to a wide range of economic activities covering agriculture, industry, trade, transport, and housing. Its progress, judged in terms of the number of societies, membership and capital, is impressive by any standards. These are significant gains, no doubt; but the Cooperative Movement has still to become a really pervasive and vital force in the national economy. This can only be achieved when we have an integrated cooperative system in which the cooperative organisations in various sectors function in coordination.

Another aspect of the Cooperative Movement that needs to be corrected is the great unevenness of development in different States and in the types of activities. There is no doubt that the Cooperative Movement does not have the same force in all States, some of which are way behind the others, both in terms of coverage and efficiency of organisation and management. This imbalance cannot be allowed to continue, if the aim is to make the nation's progress and prosperity indivisible.

The Cooperative Movement is essentially a "People's Movement" and its voluntary character is at once its strength and weakness. Compulsion, in any shape or form, is the very negation of cooperation. The Cooperative Movement in India, however, owes its birth to the initiative of the Government, and to that extent may be a super-imposition. But in course of time, the role of Government as chief "promoter" is becoming less and, at the same time, there is decreasing dependence on official assistance. This is a healthy sign and an unmistakable evidence of the growing maturity of the Movement.

In all developing countries, and India is no exception, the Governments exercise a degree of control even in the internal affairs of cooperatives. Much of this is, of course, indirect. Nevertheless, it is necessary in order to help the societies find their feet. Governments are also depending more and more on cooperative societies for implementing schemes of national development, especially in the field of agriculture. This, too, is a good thing; but it is essential that cooperatives should function as equal and willing partners in a common effort and not perform a subservient role.

The effectiveness of the Cooperative Sector in national development must necessarily depend on the quality and calibre of the men behind it. By their very nature cooperatives are self-governing, autonomous organisations, which have to be sustained and supported by men with the necessary managerial skill, as well as deep emotional involvement with the Movement itself. The need for an effective and trained cadre of cooperative officials is thus imperative if the Movement is to make its contribution to national development. A small self-contained cooperative, with limited operations, cannot possibly attract good men; and it will, perforce, have to be satisfied with the leftovers. It is, therefore, essential to sacrifice, to some extent, the autonomy of small units in choosing staff, and to maintain State-wise cadres on which the societies can draw to meet their needs. This is an important, perhaps vital, aspect of the matter which has to be kept in mind in determining the future role of the Cooperative Movement.

THE PATTERN OF INDEPENDENCE

ECONOMIC PROBLEMS OF Developing Countries

The Rt. Hon. John Freeman

IT is a fairly safe generalisation that a newly independent country is likely to be relatively backward in industrial investment as compared with the development of its agricultural or possibly mineral industries. Apart from that, its economy through the years before independence is likely to have been linked with the economy of the Imperial Power more closely than will seem necessary or desirable to its post-independence rulers. Once more there is a built-in drive towards massive change—normally in the direction of industrialisation. At the same time, its people will demand higher day-to-day living standards from their elected rulers...

Moreover, for obvious reasons, the independence movement which will have formed the party of take-over is likely to be "socialistically" inclined. And since it will have little experience of full governmental responsibility and still less of the practical problems of constructing its pattern of independence, its socialism is likely to be of a theoretical and perhaps traditional variety. In this situation, it will face immediate pressures to attempt far more than it can quickly complete and, if it does not judge its dilemma with remarkable skill, it will end by failing to achieve any of its targets quickly enough to satisfy the pressures which have served to establish them. The bill has to be paid not only in money, from both budgetary and external resources, but in administrative manpower.

Put more concretely, a newly independent government is likely to see an urgent need to raise the consumption standards of its electorate, to begin or to speed up its progress towards full industrialisation... If it fails to calculate its priorities and spreads its effort too wide, will it not pass through a period when it cannot meet the increasingly importunate demands of its people (whose living standards may even fall)? Will it not hamper the natural progress of industrialisation by under-utilisation and under-maintenance of the investment it does make? Furthermore, if it makes its unselective effort (as it is on the whole likely to) on the basis of substantially governmental enterprise, will it not make inordinate demands on the ingenuity and objectivity of a public bureaucracy which will be by definition untrained in this massive new burden?

Now these are problems which confront countries at all stages of development, and few countries are wholly successful in overcoming them. They are, I believe, particularly relevant to the patterns of independence in a developing country, because the pressures for quick results will be greater and because, by definition, the resources, including the resources of trained and experienced manpower, will be smaller. The price of miscalculating

The Rt. Hon. Freeman, is a former British High Commissioner in New Delhi and Ambassador-designate to the United States.

or failing to calculate the priorities may be catastrophic. Calculating priorities is a political judgment, and I believe that a cool examination of this superficially baffling responsibility of choice may lead to some relatively simple political conclusions.

IMMEDIATE NEED

The first and the overriding one that suggests itself to me is that long-term desirability must give way to immediate need. This is not a momentous judgment about the philosophy of politics. It is simply a recognition that in most cases the political credit of the 'independence' party will be a most important influence for construction, stability and freedom in a newly independent country. If it fails to provide food and work for its people, it may quickly lose its credit, with consequences which may be disastrous to the long-term work of building the economic and political infrastructure of a newly independent country and to the freedom of its people. Agriculture, the agro-based industries and population control suggest themselves, therefore, as the first priority.

I am compelled to say in honesty—though with regret—that national defence will usually come next, or even alongside. After all, national security is of paramount importance to every sovereign people, and newly independent countries can on occasions be

particularly vulnerable to predatory neighbours. But if defence is an obligatory priority, it must be recognised that it is a voracious consumer of resources and an unproductive one.

Only after the priorities are established, can a place be found (on my assumptions) for the highly desirable long-term objective of industrialisation as the means to affluence. I do not, of course, imply that at any given moment the top priorities should altogether exclude the lesser ones. Selecting priorities is the means of determining the weight of effort which can be put into achieving a desirable objective at a given time. Industrialisation is a major objective. To say that, *per se*, it should in the early stages take second place to food production means, in effect, that the early stages of industrialisation should be geared as closely as possible to the needs of food production and distribution.

If this is accepted, there is a reasonable chance—as the Government and people of India have proved—that the disaster of famine can be avoided and at the same time that economic plans can be related to a realistic assessment of available resources. Thus the first great crisis of many developing countries may be avoided and the foundations of a sound, affluent industrial economy in the future may be well and truly laid.

SOCIAL SERVICES

The other great limiting factor in the early progress of a developing country is often the inadequacy of the administrative infrastructure; and it seems to me that much more thought can usefully be given to methods which reduce the administrative burden. Here, with diffidence I pose some questions which may be painful as well as crucial. May not the developing countries pay too high a price—perhaps a prohibitive one—for giving too much priority in the early stages to social welfare programmes and to generalised attempts to redistribute wealth to the disadvantage of the capitalist? I hope I shall not be thought to underestimate the value—both political and moral—of such social objectives. But the truth is that at the economic level of most developing countries, most social welfare schemes are

meaningless without economic growth.

Fast growth is the prerequisite of effective redistribution. Must it not then be sought, if necessary, at some social cost? It is here that the capitalist entrepreneur may be able to play his classic role with long-term benefit to society. Indeed it is possible that, if he is not encouraged to do so, many developing countries may find themselves facing a particularly hellish choice—the choice between stagnation of growth which means, at best, a failure to develop and, at worst, starvation for their peoples, and the loss of political freedom.

The countries which have sought to develop their economies without the incentives of capitalism are the Communist countries. They have of course been fairly successful, though there is not the slightest reason to suppose that they might not have been even more successful if they had followed the more sophisticated methods of the modern industrial democracies.

Let no one take this as being an argument for the permanent value of unrestrained capitalism. It is a plea that careful and fresh thought should be given to achieving the delicate balance between the requirements of growth and the socially desirable objectives of redistribution. Both are necessary. But if growth is not achieved in the quickest and least expensive way, redistribution may remain an illusion or be achieved only at the cost of political liberty.

Once the national product begins to surge and the economy approaches take-off point, the redistribution becomes a practical priority, and restraints on the social power of capital become desirable or necessary. They may, of course, not be achieved without political conflict. But the lessons of the Western countries suggest to me that political battles for social welfare and against the unrestrained power of capital can be won at all stages of development. On the other hand, is it not true that they can be joined too soon? The victory will be a Pyrrhic one if it is gained at the cost of inhibiting growth or abandoning political freedom.

FOREIGN AID

How far should the newly independent country depend on help from outside? In what conditions and on what terms are the developing countries wise to encourage the assistance of the more developed in creating their economic infrastructure whether by Government-to-Government assistance or by private investment. As far as governmental assistance is concerned, there seems to be a consensus that the test is whether or not political strings are attached by the donor Government to the assistance offered. In the area of private investment, the definitive statement seems to have been made by the Deputy Prime Minister of India, Mr. Morarji Desai, when he said last year that India welcomed foreign investment provided that it benefited India equally with the foreign investor.

Now that definition is scarcely open to challenge except by those fundamentalists—and there are some—who believe that a developing country ought to struggle through its creation of capital without the obligations attaching to any foreign involvement, whether private or public. I fear that this is a romantic view which, in most cases, does not bear close scrutiny. In many smaller countries the creation of a viable economy without outside help would be literally impossible. Among the large countries—again India is the prime and obvious example—it is probably possible in theory but perhaps not in practice, because of the need to balance the requirements of growth and redistribution of wealth.

KEY FACTOR

The key factor is time. If the struggle is too long-drawn-out, the post-independence government will be unable to honour its political cheques and there must then be a danger that it could be replaced by chaos or authoritarianism. So that, just as the developed countries (and particularly the ex-Colonial Powers) have both an interest and an obligation to contribute to the economic development of the developing countries, have not the developing countries a similar obligation to their own people to make what use they can of the resources that are made available to them? Whether those resources are more easily and

fully absorbed from private or from public sources is an argument which I do not propose to pursue—if only because, in realistic terms, they are likely in most cases to come from both.

I believe it is now almost universally accepted, at least among the Democratic Powers, that it is usually both inappropriate and wrong to make development assistance dependent on political conditions. There are many obvious reasons for this, not the least important of which is that the use of aid as a political lever will normally be counter-productive and self-defeating. But, that said, the developing countries can help by trying to understand and acknowledge the complex motives (and sometimes emotions) which lead the more developed to offer assistance. There are inevitably two separate strands of thought behind the decision. The first is concerned with a series of moral judgments; we believe it right to foster freedom and attack poverty as a good thing in itself—or at least as an indivisible objective which is essential to the well-being of the world community as a whole. The second is concerned with self-interest, however long-range and enlightened; we believe that we benefit from trying to bridge the gap between haves and have-nots, from investing in and later trading with newly developed independent countries, to our mutual advantage. This element of self-interest is not dishonourable and should be acknowledged frankly; it is inevitably an important factor in the decision-making of the donor countries, and to sweep it under the carpet is to create misunderstanding and confusion.

But insofar as governmental development assistance is partly a process of “investing” in the success of development plans (and it is partly so, though, I repeat, not wholly), it follows that the donor country will inevitably (and I believe reasonably) scrutinise the prospects of the investment it contemplates. It will consider whether the investment seems likely to harmonise with or to conflict with its other direct interests; whether it looks like achieving its purposes within a reasonable time; whether it appears economical or

wasteful; and so on. And if the decision whether or not in the end to make this “public investment” will probably be taken on rather more general and “moral” grounds than would be likely with a private investment, the process of scrutiny will inevitably be very similar.

It is perhaps worth asking those who, quite properly, watch with a jealous eye over a country's newly acquired independence to distinguish between what can properly be called “political strings”, which are obnoxious, and the hard-headed economic scrutiny which inevitably precedes a massive investment, even when it is in the form of government-to-government assistance. This

is all a matter of balance and judgment.

The important point here is for both sides to recognise with candour the balance of motive in each other's position—on the recipient side, the need for assistance, coupled with the need to safeguard the frontiers of economic independence; on the donor side, the requirement of morality or duty to the world community, coupled with the self-interest of making an investment which will be fruitful in the long term. Candour and realism are essential if the relation is to be healthy.

Excerpts from the “Tagore Lecture” delivered at the Britain-India Forum in London on October 28.

Letters

DIGNITY HOLDERS

Planning without people's participation is mere paper planning. It is specially true in a populous country like ours. The process of ‘paper’ planning in our country is eighteen years old. Real ‘practical’ planning is starting only now after the framers of the Fourth Plan have realised the importance of the people's views and sought their co-operation. For this, my three cheers to the Planning Commission.

I would like to suggest two things in this regard. First, the Fourth Plan must pay special attention to education, particularly of girls. The Plan should also insist on the universities producing dignity-holders rather than degree-holders, so that those who pass out would shed their false sense of dignity and take to work. It should also enable the University campuses to become character-and career-building workshops.

All the comments given by the people on the “Approach” should be included in the final draft of the Plan. This will enable the people to watch the march of Yojana and see if it is in keeping with people's aspirations.

Bombay (Miss) Prem Lata Chaudhary

PRE-PRIMARY SCHOOLS

The role of education bringing about social change in a developing

country like ours has been rightly stressed in the Plan Approach. In this regard may I point out that pre-primary education has to be given due attention in the entire plan of educational development.

Age 3-5 is the stage at which cultivation of good habits has to begin. Pre-primary schools conducted on scientific lines will help largely in this work. A large number of pre-primary schools spread all over the country, specially in rural and tribal areas, will go a long way in preventing the extent of wastage and stagnation in primary education.

Promotion of pre-primary education need not be the sole responsibility of the State Government. In fact it should be the co-operative endeavour of the State, voluntary organisations and the community.

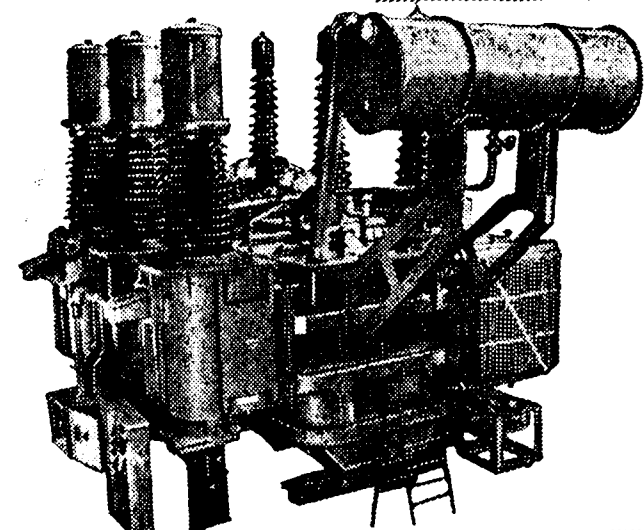
Bombay J.S. Apte

Science Journal In Assam

This is in reference to the article entitled “Science Journals too few in India” by Balkrishna Karunakar Nayar in Yojana of September 1. Perhaps the author is not aware that there is a science periodical in Assamese, ‘Vigyan Jeuti’. The credit goes to the Assam Science Society for bringing out the journal regularly and popularising science, particularly among school-going children. “Vigyan Jeuti” has now entered into the eighth year of its publication.

Gauhati. Dilip Kumar Barua
Lecturer, Cotton College

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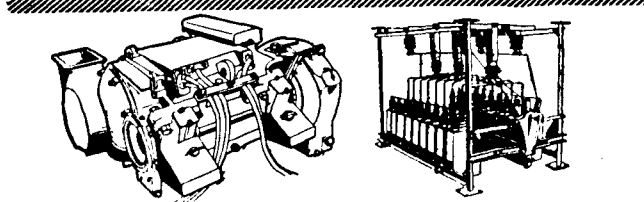
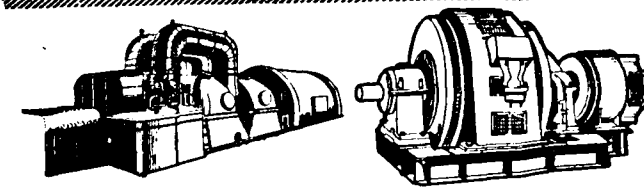


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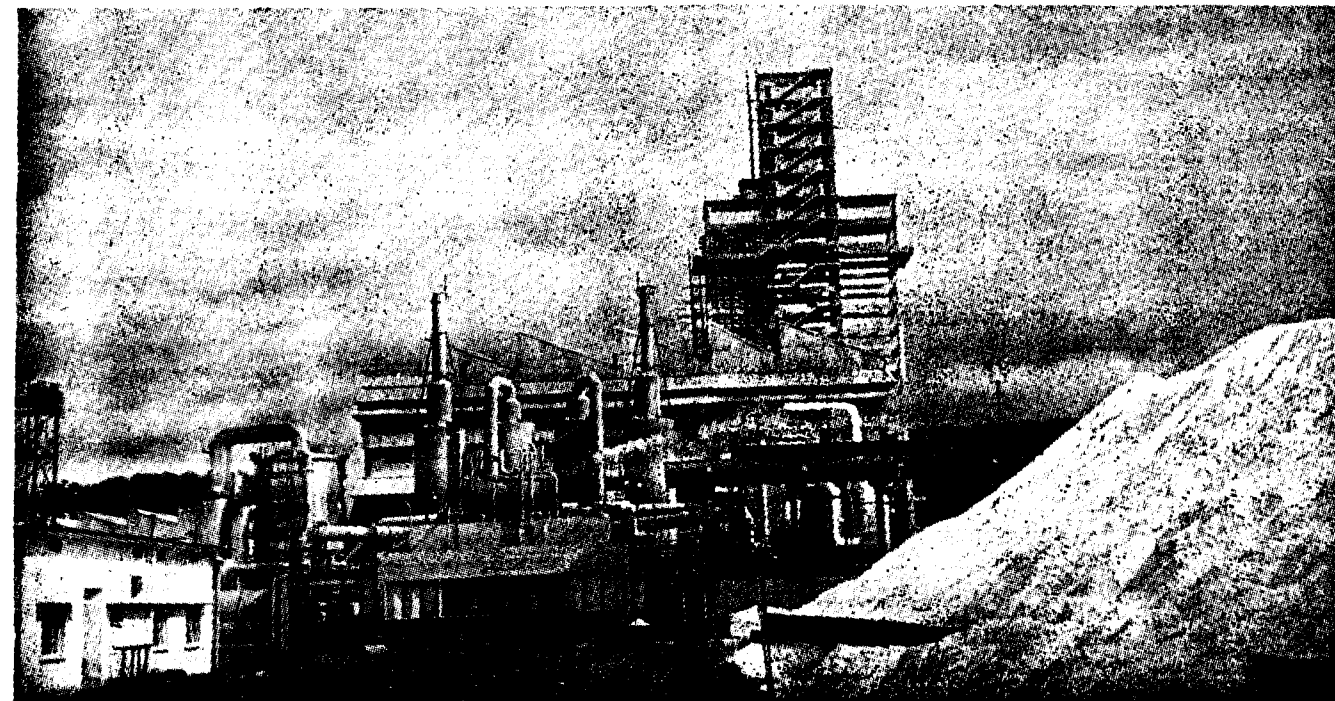


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NAMRUP: CENTRE OF CHANGE IN ASSAM



The First Indian Plant Using Natural Gas to Make Fertiliser

M. SUNDARA RAJAN

AGAINST the picturesque backdrop of the Naga Hills on the banks of the river Dilli in Upper Assam stands a new landmark in the State's progress, the Namrup fertiliser factory. This is the first of its kind in the eastern region of the country, bringing chemical fertilisers right into the midst of its tea gardens and rice fields. It is also the first Indian fertiliser plant to use natural gas as basic raw material. This is fifty per cent cheaper than naphtha and is abundantly available in the nearby oil fields. The project marks a milestone in the progress made by the Fertiliser Corporation of India as the first plant in which the entire erection work was handled departmentally.

This has given our engineers valuable experience which would pay good dividend in their future attempts beginning with the expansion work of the Namrup project itself.

The factory is producing two fertilisers, urea and ammonium sulphate. Trial production has already started and commercial production will begin in January next. It is designed to produce 45,000 tonnes in terms of nitrogen. This would mean one lakh tonnes of ammonium sulphate and 55,000 tonnes of urea a year. Sulphuric acid is also made by using urea and imported sulphur. The plant has a capacity of 250 tonnes a day.

The layout of the factory, prepared by the Corporation's engineers has been so planned that it has occupied the minimum space compared to similar plants elsewhere. It has taken about 40 months to

construct the factory—the normal time required for a project of such magnitude. The monsoon, the poor communication facilities and the difficult terrain created numerous problems. Most of the imported equipment was unloaded at Kandla Fort and had to be transported over a distance of more than 2,000 miles by rail. Use of Calcutta port involved problems in changing the railway gauge during the transportation of the equipment.

The entire ammonium sulphate plant, including the conveyor systems to the silos and the bagging plant with the ancillaries is designed, engineered and procured by the Fertiliser Corporation's Planning and Development Division, Sindri. The ammonia, urea and sulphuric acid plants were designed, engineered and procured by a British firm. However the erection work was done by the Namrup division of the Corporation. A number of Indian firms gained experience while executing the civil works allotted to them.

SOME CRITICISM

There has been some criticism that the Namrup project has been

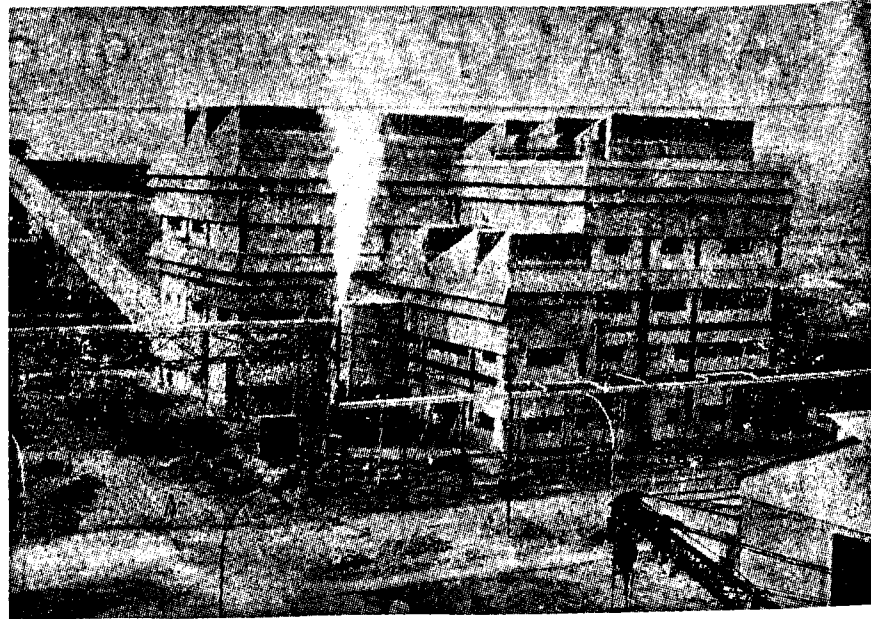
delayed. It was sanctioned in 1961-62, but civil works could begin only in March 1965. This is due to various reasons beyond the Corporation's control. Firstly, work stopped, following a Supreme Court ruling in 1962 about land acquisition. Following this, the Assam High Court, directed the Corporation not to proceed with any construction activity at site. It was only in November 1962, after an Ordinance by the President was issued to amend the land Acquisition Act that possession of land could be taken.

Then came the Chinese aggression and work stopped again. Another reason for delay is the poor quality of the site earlier selected for the factory. When the sub-soil investigation report was made, gas pockets at a depth of 80 feet and decomposed vegetable matter were found. This would have involved redesigning the plant and costly foundation piles. Hence search for an alternative site began. Luckily, Oil India started drilling for oil at a place nearby but found only boulders and abandoned it. After some further independent investigations, what was found unsuitable for oil prospecting, became the best available place for the fertiliser plant. Once the work started in March 1965, all other difficulties were overcome in keeping to a normal time-schedule of construction.

EXPANSION PLAN

The project is being expanded in view of the importance of its products in the uplift of the economy. The expansion project will have over three times the production capacity of the first plant. As against, 45,000 tonnes, the nitrogen production capacity would be 1,96,800 tonnes, the end products being 3,85,000 tonnes of urea and one lakh tonnes of ammonium sulphate. Two lakh tonnes of nitrogen production would be about half the present production capacity of all the factories of the Corporation.

The expansion plan will utilise the Corporation's know-how and engineering and technological skills. The confidence with which the engineers envisage better workmanship and shorter time, is infectious. A group of technical experts from



Ammonium Sulphate Plant designed and erected by the Fertiliser Corporation

the Durgapur Project has now returned after gaining valuable experience during their association with the setting up of the Namrup plant.

A noteworthy feature of the project is the use of catalysts developed by the Corporation itself. Apart from saving foreign exchange, it marks a significant breakthrough in the country's technical know-how in a field which has been the close preserve of foreign monopolies. What is more, there has not been any case of failure and, as emphasised by Mr S.P. Sen, Deputy Superintendent of the Planning and Development Division, the know-how developed can make the country self-sufficient in the field of catalysts.

However, there are certain other items of equipment that have to be imported. First supplies from Italy are expected to reach the site early next year and the Plant is expected to go on stream in 1971.

GAS PRICE

And now a word about the costs, the first stage has cost Rs 24 crore, the foreign exchange component being about Rs 6½ crore, met from a credit from U.K. Since the process is based on natural gas, the cost is less. The plant based on naphtha in Barauni has cost Rs 48

crore. The cost of gas, however, is considered high. If it is made cheaper, than the price of fertiliser also could be reduced. Oil India which supplies gas to other consumers at 25 paise per 1000 cft charges the fertiliser factory Rs 1.20. The reasonable rate is said to be about 80 paise. Efforts are under way to find some way of reducing the supply price of gas. As against the present requirement of 8 million cft, an additional supply of 27 million cft would be needed for the Expansion Project. With all the emphasis of indigenous know-how and equipment, one would expect a reduction in the proportion of foreign exchange component in the cost of the Expansion Project. But it remains about 50 per cent. Perhaps this is inevitable out of the total cost of Rs 37 crore, about Rs 15 crore have to be in foreign exchange provided as credit by the Italians. The know-how for ammonia and urea has been secured under a licence from M/s Montecatini Edison of Italy. Design and engineering, besides procurement of plant and equipment, will be done by the Planning and Development Division.

IMPACT ON THE REGION

Already Namrup has become the centre of a new change in

Assam. The tallest structure in Assam is in this factory. Mr. Manoharlal Leekha, the General Manager of the Namrup Factory, envisaged that the yield would go up not only in the paddy fields but in the foreign exchange earning tea gardens as well. Already some of the tea gardens have reported five to seven per cent higher yield following the foliage application of urea, which is being tried for the first time in that part of the country. They are also using ammonium sulphate which they have hitherto been getting from outside at great transport costs. In order to propagate the urea application to paddy fields, an intensive drive has been started. A farmer's festival in each district would be held and a mobile soil testing laboratory would be in action shortly analysing 100 samples a day.

There is also scope for jute bag making units as transport of fertiliser has to be prompt. A petrochemical complex can also come up when PVC packing material industries could be started.

Equally significant is the effort to build up the human material. A well-thought-out training programme is being implemented at Namrup. The Training Unit is now in a position to meet the requirements of not only the Namrup Division but also of the other units of the Corporation. The training ranges from craftsmen to graduate engineers and the stipends are quite attractive.

However, in certain categories, it is difficult to find local candidates, while wherever it is open for all, there is a flood of applications from different parts of India. This underlines the urgent need to encourage more Assamese boys to study and take up careers which are now open to them.

No account of Namrup will be complete without a reference to its integrating role. In this budding industrial township, people from different parts of India are settled and the distance from their home towns unites them all the more. Their cultural shows and common meeting places are perhaps the best safeguards of national integration.

QUOTATION BOX

Are all politicians sinners? Andhra Chief Minister Brahmananda Reddy believes so. No one taking part in politics can escape sharing sin, according to him. Speaking at a function in Vijayawada today, Mr Reddy said he would have a dip in the River Krishna today and wash off all the sins of the past.

—A U.N.I. Report

Whatever the reason, it remains true that a great preponderance of the important poets and novelists and painters in the modern tradition have been hostile to this world, regardless of whether or not this world was hostile to them.

—Irving Kristol in "Fortune", Chicago

As Dr. Cohn of Salk Institute of Bio-chemical Research, California, put it: "If you ask any American student of elementary biochemistry, he would tell you who Dr. Khorana is." How many even of Indian scientists knew till October 16 that a genius like Dr. Hargobind Khorana existed on the face of the earth?

—"Organiser"

Kamrup, as Assam was originally known, has been famous for its elephants since the dawn of Indian history. Appropriately enough, the "discovery" of oil in this thickly-forested State was made by an elephant. According to a popular belief, while the A.R.S.&T. Company's engineers were laying the railway line from Dibrugarh to Margherita in 1880, an elephant used as a beast of burden came with the camp work oil on its feet.

—Satindra Singh in "The Economic Times"

...it is not surprising that the Negro victors felt that they should use their position of vantage to make a protest against racialism in America. Even as pampered athletes, they are not allowed to forget that they are black; earlier this year it was brought out that the New York Athletic Club, the most powerful organisation of its kind in America and perhaps in the world, accepts no Negro members.

—"The Economist", London

In Kathmandu, he (the Indian Ambassador to Nepal, Mr. Raj Bahadur) lives in a splendid house that once belonged to the British Resident. Asked whether he felt uncomfortable at living in such a relic of the British Imperial past,

particularly in view of his record in the struggle for Indian independence, Ambassador Bahadur said: "Certainly not. My enjoyment is heightened because of it."

—"Eastern Economic Review"

What's ruining the world? The older generation (in the U.S.A.) holds the following phenomena chiefly responsible for the imminent ruin of the world: drugs, dirty books, Charles de Gaulle, young generation's lack of memory of the Depression, rising taxes, riots, Mao Tse-tung, television, crime, pop music, younger generation's failure to respect cleanliness, Fidel Castro, traffic congestion, campus rebellions, protest demonstrations, 7½ per cent housing mortgages.

The younger generation ascribes the imminent ruin of the world to the following: Vietnam war, the draft, policemen, Democratic and Republican parties, the race, older generation's hypocrisy, death of Che Guevara, failure to love everybody, college presidents, Gen. Hershey, older generations' memory of the Depression.

—Russel Baker in the "International Herald Tribune", Paris

I have sometimes been guilty of curtailing a difficult telephone conversation by replacing the receiver in mid-sentence, but so far I have escaped odium because everyone knows that telephone operators (in the U.K.) blithely pull out the plugs whenever the wires get in the way of their knitting.

—Harry Whewell in "Guardian Weekly", London

If biographies depended upon an identity of likes and dislikes between writer and sitter, one of two things would certainly happen. Either none would come out, or nobody would read them if they did.

—Charles Reid in "Malcolm Sargent": A biography

That the people of the United States were stunned by Mrs Kennedy's decision to marry the 62-year old Greek millionaire Aristotle Onassis is indicated by a comment that "it is the worst insult to American manhood since Pearl Harbour."

—Editor's Notebook in "Commerce"

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Price Rise Not a Condition of Economic Development

O.P. MAHAJAN

AN outstanding feature of our economy during the Third Plan has been the phenomenon of galloping prices. This has brought home to the Centre the need to avoid a spiralling of costs, prices and money incomes through mutual interaction. Prior to this the official view was that "up to a point", a price rise was not only inevitable, but was "the very condition of economic advance". Considerations of rapid economic growth are still put forth to cover the failure of Government steps to check rapid erosion in the meagre earnings of the people. It is, therefore, proposed to examine here how far the persistent rise in price level, as witnessed in India in recent years, is conducive to her economic growth.

It may be accepted that certain upward pressures on prices are implicit in development. There are lags between the stepping up of investment and the creation of money incomes on the one hand and the availability of goods and services on the other. The pressure on prices will depend on the volume of investment and the gestation-period of the projects undertaken.

However, controversy rages round the thesis that rising prices are necessary to promote economic growth, particularly in a developing economy. The growth of an underdeveloped country is hindered by an acute deficiency of saving. In the absence of large scale capital inflow from abroad economic surplus has to be extracted from the backward economy by resort to forced savings, because of low margin over the minimum consumption. Rising prices seek to do this by redistribu-

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ting income in favour of the high income groups which have a high marginal propensity to save. Even if the high income groups do not save to the full extent of the increases in their real income, the increase in their consumption is unlikely to be high enough to offset the decrease in the consumption of the low income groups. As a result, resources will be released for development. Besides, even if money incomes are rising just in proportion to the increase in prices, a larger proportion of the current money income is likely to be saved due to the "money illusion". However, the money illusion works only in the early stages of inflation.

Rising prices, it is contended, tend to promote economic growth by also favourably influencing the climate for private investment. In this connection, much will depend on the character of inflation. If the prices have been rising very fast and hyperinflation is feared, investors will be discouraged; at least socially useful projects will not be undertaken. Expectations of a moderate rise in price level, on the other hand, will be conducive to economic growth.

It is further argued that inflation creates money incomes where none or little existed previously. This will help mobilise idle resources, particularly manpower, into productive channels and thus stimulate rapid growth.

That is one side of the picture. The other side of it, however, is very disconcerting. Take savings first. Persistently rising prices may adversely affect the willingness and the capacity of most of the people to save. Rising prices shatter the confidence of the people in the currency. Most small savers keep their savings in the form of bank deposits, insurance policies and

Government securities. When the value of their money is being rapidly eroded, they begin to prefer spending to saving or seek to protect their future by holding such assets as appreciate in the inflationary periods, namely, gold, real estate, or foreign currencies. In either case genuine capital formation receives a setback. In its Annual Report for 1962, the I.M.F. said, "A particularly unfortunate feature of the international scene in the last decade has been the large flow of private capital from those less developed countries which have tolerated inflation to countries, frequently wealthy, which have maintained price stability".

Rising prices will have an equally adverse effect on the capacity of the vast majority of people to save. Inflation causes a severe erosion in the incomes of peasants, industrial workers, small traders and middle class employees and they are forced to dissave. According to a Survey by NCAER, about 86 per cent of the urban households with an income up to Rs 3000 per annum did not save at all; rather they dissaved. Thus the entire contribution to urban savings comes from 14 per cent of the urban households only, particularly those earning above Rs 4000. Price stability, therefore, will tend to increase the volume of savings, at least by eliminating or reducing the dissavings of a vast majority of the people.

Statistics have established the fact that in periods of rising prices the household sector savings as a proportion of national income decline significantly, while in the period of comparative price stability the savings show a phenomenal increase.

Rising prices also affect profits. Generally, profits increase if the annual percentage change in prices is greater than that in the wage-costs as measured by the difference between the annual percentage changes in money wages and in productivity, while they decline if the annual percentage change in prices

is smaller than that in the wage-costs. So inflation may be expected to give a stimulus to private investment.

However, it is more likely that in the climate of rising prices investors in the developing countries will have little incentive to take rational, long-term investment decisions. Quick-yielding investment projects will be generally preferred. Moreover, investments will be made with an eye on capital appreciation rather than on good return over the long run. Such misdirected investment retards economic growth. On the other hand, if investment projects are wisely chosen, inflation will become self-destructive after a time. The experience of Chile illustrates that while prices rose ten times between 1950 and 1957, investment in fixed capital declined sharply over the same period.

Inflation retards economic development in another way also. In the early stages, economic development is determined, to a great extent by the foreign exchange resources a country can command either through export surpluses or through import of foreign capital. Both these prospects are dimmed by rising prices. Given a reasonably stable exchange rate, rising costs at home discourage exports unless inflation is a worldwide phenomenon. The inflow of private foreign capital is also discouraged by exchange restrictions, speculation in exchange, depreciation of exchange rate, etc., which often go with tight exchange position. Rather, in such a climate flight of money abroad occurs in devious ways. Persistent balance of payments difficulties confronting India for over a decade have been of this nature. Vigorous measures to promote exports, stringent import controls and severe exchange restrictions failed to improve the situation. Speculation in exchange and clandestine flight of money abroad went on unchecked and India was forced to devalue the rupee in June, 1966, but devaluation is no cure for the distortions caused by inflation. The effects of inflation, therefore, are equally disastrous at home and abroad.

Besides, persistently rising prices accentuate economic inequality. The process of inflation "impoverishes many, it actually enriches some brings them windfalls beyond their deserts, or even beyond their expectations or desires...in a period of ris-

ing prices profiteers cannot but get rich quick whether they wish it or not." The inflationary method of financing economic development, therefore, generates much social tension and friction which can be anything but conducive to economic development. The social cost of inflation alone, therefore, is a sufficient indictment of this method of promoting development.

Inflation is incompatible with economic growth if the latter means an absolute decrease in the number of those living at some minimum level of income, and is sure to cut at the roots of any progressive democratic society. Keynes warns: "There is no subtler, nor surer means of overturning the existing basis of society than to debauch the currency..."

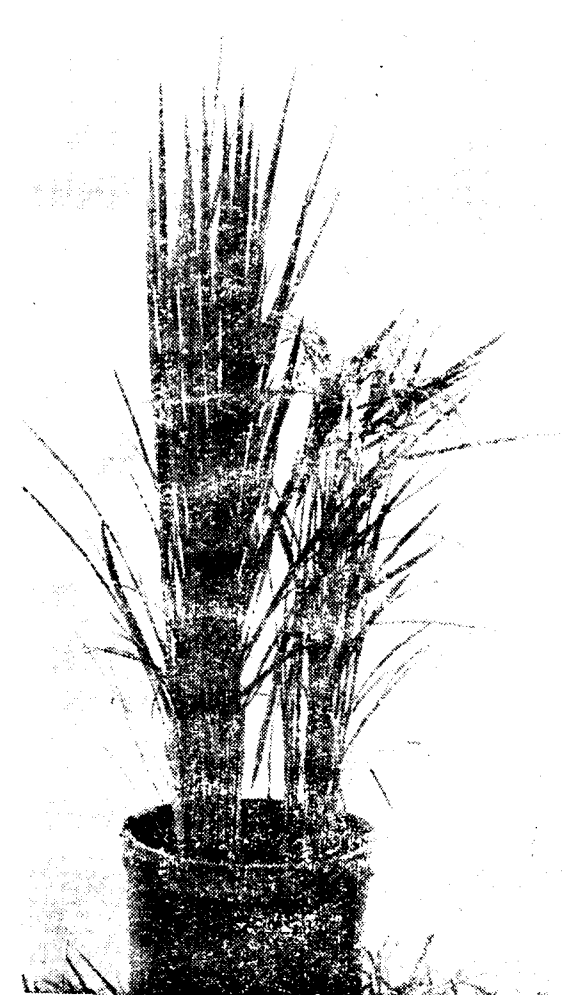
Nor are rising prices necessarily conducive to economic growth of which national income is the main index. For instance, during the First Five Year Plan the consumer prices fell by 5 per cent, but national income increased by 18.4 per cent. During the Second Plan consumer prices rose by 29.2 per cent and national income rose by 21.5 per cent. During the Third Plan prices rose by 36 per cent and national income increased by 14 per cent only. So there is no consistent pattern. Similarly, there is no set formula to determine the relationship of price with either cereal production or industrial production. At any rate, there is no unequivocal theoretical basis to support the thesis that increase in price is the condition of economic growth.

Recent experience of a number of countries—West Germany, Italy, Japan and Canada—also does not support the view that inflation is the very condition of economic growth. During 1953-59 the West German income rose at an annual rate of over 12 per cent, but prices rose by 1 per cent per annum only during the same period. The Japanese record is more striking. During the same period Japanese income increased at an annual rate of 12.3 per cent, but the prices rose only by 2 per cent over the whole period. In Italy national income, over this period, increased by 40 per cent while prices fell by 1 per cent. In U.S.A. the C.E.D. Commission on Money and Credit remarks that the evidence covering

a wide range of periods and many countries shows that with price increases from zero to six per cent per annum, there is no appreciable association between the rate of growth and the rate of price change. As a broad generality, countries with declining prices or with rates of price increase greater than 6 per cent appear to have lower growth rates than those operating within those limits.

As regards the developing countries, a recent report by the I.M.F. concludes "that in the post-war years the less highly developed countries, on the average, have enjoyed annual increases in per capita output of approximately 4 per cent during those periods when they maintained monetary stability. During periods of mild inflation the increase in output in these countries was only half as great. During periods of strong inflation, the increases in output tended to be even smaller". Thus, a price rise cannot be regarded as the very condition of economic development.

While there is now an increasing awareness of the dangers of inflation to economic growth, many economists are still in favour of "moderately" or "gently" rising prices to promote economic development. An annual increase of one or two per cent is considered to be very essential—the creeping inflation thesis. But the snag in this argument is that forces are always at work to "convert a creep into a gallop", and once hyperinflation develops all economic progress will come to a stop. The danger is all the greater in the developing economies like India which are following the strategy of unbalanced growth under which the manufacturing industry, particularly the heavy industry, is growing at a much faster rate than agriculture. Under these conditions an acute shortage of food and raw materials will develop, wage-price spiral will be accentuated and the prospects of development will be dimmed. Unfortunately, such has been the experience of India since the Second Five Year Plan. It is high time that the developing countries get rid of the illusion that "we can get more out of the economy than we put into it, that we can consume more than we produce."



HIGH PROTEIN RICE

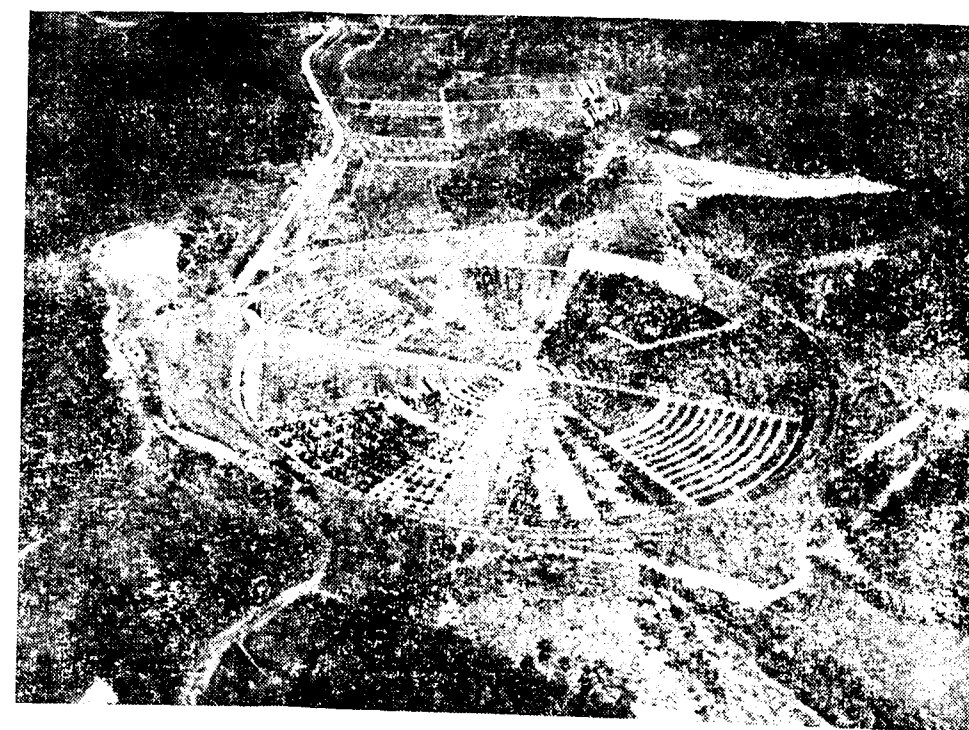
Successful
Japanese
Experiment

A "high protein rice" has been developed at the Japanese Agriculture-Forestry Ministry's Radiation-Plant Breeding Farm in Omiya about 120 kilometers from Tokyo. The farm has a gamma field to study plant breeding by means of irradiation. The gamma field is a circular farm with a diameter of 200 meters. At the centre is the irradiation tower containing cobalt-60 emitting gamma rays, which is placed in a lead receptacle. Around the tower there is a farm divided into various partitions, and all kinds of plants, such as fruit trees, vegetables, rice plants and flowering plants, are grown on the farm.

These plants are irradiated with gamma rays night and day, except for four hours set apart for weeding and fertilising in the morning. The cobalt-60 in the irradiation tower, emitting 3,000 curies of radio activity is remote-controlled from a room about 100 meters away to prevent the radiation from endangering the health of human beings. To keep gamma rays from leaking out of the farm, the gamma field is surrounded by an 8-meter-high bank. In addition, off-limit zones and non-habitation areas have been set up outside the bank.

Sometimes, an animal or plant suddenly acquires a new form or nature unknown before. This is called a mutation. In the past,

Left: The high protein rice plants are on the right and the original "Norine No. 8" rice on the left. Below: Aerial view of the Omiya Gamma Field.



plant breeding had depended primarily upon natural mutation. But natural mutation seldom occurs. Therefore, a new method has been adopted to create mutations artificially by means of atomic energy. This is the basic principle of the working of the gamma field.

The Omiya Gamma Field, built in 1960, has had some remarkable achievements. Among typical examples are rice plants with a short stem, which do not fall even in strong wind; rice plants which produce a larger amount of rice grains; and mulberry trees with leaves 30 per cent broader than those of conventional varieties. The radioactive farm has also successfully developed peach trees with the fruit ripening a week earlier than in normal trees.

"High protein rice" growing at the farm began in 1962, when several hundred varieties were planted. These plants were ex-

posed to gamma rays for 20 hours a day during the whole period of their growth. This produced diverse mutations, such as short-stem rice plants and circular rice grains. The experiment even evolved rice plants which grew in a prostrate condition. About 70 varieties of rice, harvested from these mutants, were tested by the amino acid analyser at the Food Research Institute of the Ministry in February this year to measure their protein content.

This confirmed that the 4th, 5th and 177th rice planted since the start of the experiment in 1962—all of the "Norin No. 8" variety—contained unusually high percentages of protein. The original "Norin No. 8" rice contains 5.5 grams of protein per 100 grams. By contrast, No. 4 rice contained 10.2 grams, No. 5 rice 9.5 to 11.3 grams, and No. 117 rice 8.9 grams. Moreover, of the three mutants, No. 4 rice and No. 5 rice were found to ripen earlier than usual. The ears formed

as many as about two months earlier than the original "Norin No. 8". The two mutants, therefore, are fit for double-cropping.

Five or six years hence, these mutant rice plants will be improved and will become fixed varieties, and their seeds will be distributed to farmers in the country under the Government's rice-improving programme. The day is not too distant, therefore, when "high protein rice" will be used for the daily meals of the Japanese, who are a predominantly rice-eating people.

At present, the average daily per capita intake of protein among the Japanese is placed at 74 grams. Of this, vegetable protein accounts for 47 grams, one-third of which is taken from rice. If the present rice meals are replaced with "high protein rice", the per capita protein intake will rise to about 90 grams even if the present dietary pattern remains unchanged.

MARKETING FOODGRAINS

Strict Enforcement of Regulatory Powers Very Essential

O.P. KALRA

THE marketing of foodgrains is one of the most important problems faced by planners today. While efforts to increase agricultural production have started bearing fruit, it is equally important to ensure the equitable distribution and efficient marketing. In the context of plenty, this problem will have to be looked into from a different angle and will call for new solutions. On the subject of marketing, a former American Secretary of Agriculture, said: "The obligation to get the food products to the consumer with the least possible waste and at the least possible cost, consistent with fairness to those who handle them, is just as sacred as the obligation to produce these crops in the first place." An efficient and reliable marketing system by itself can stimulate increased agricultural production, while without it any number of production measures can become useless.

COST OF DISTRIBUTION

It is generally believed that the distribution costs of foodgrains the world over are rather on the high side. In the United States, for example, a farmer hardly gets 40 per cent of the price of his produce, the rest being pocketed by middlemen. Surprisingly, the farmer's share is being reduced further as the marketing mechanism gets more complex. In England, the Linlithgow Committee observed, as far back as 1922-23, that "the spread between producers' and

Mr Kalra is a New Delhi journalist.

consumers' prices is unjustifiably wide. Taken as a whole, distributive costs are a far heavier burden than society will permanently consent to bear."

To a certain extent high distribution costs in agriculture as compared to industry are inevitable. This is because the marketing of farm products is more complex, and the position of growers weaker. These factors are:

- 1) Farm products are grown in small quantities on scattered farms.
- 2) Most farm products are produced seasonally, but consumers must be supplied throughout the year. Seasonal marketing also means that farmers can sell their products during certain times of the year, as a result of which prices at harvest time are depressed.
- 3) While in industry, production can often be adjusted to current sales, it is not possible to do so in agriculture.
- 4) It is difficult to control the quality of farm products and to regulate the exact timing of their marketing.
- 5) Many farm products are perishable, which adds to the

cost of handling and makes it difficult for the farmer to negotiate a satisfactory price.

6) Farms are small economic enterprises, managed by people who do not have specialised skills in marketing or the financial capacity to exercise much bargaining power.

7) Farm products are invariably grown far from the ultimate consumers, which puts a heavy strain on the marketing system.

Ironically, the difficulties of distribution are more in developed economies than in under-developed countries, where farmers sell most of their produce directly to local consumers. In large industrial countries, on the other hand, the farmer never sees the final consumer, who is several steps removed from him in the marketing-and-distribution sequence.

INDIAN PROBLEM

In India, the problem of marketing and storage has been heightened by the fact that, as a chronically deficit country, the Government has been forced to import large quantities of foodgrains from abroad. To distribute the foodgrains equitably, specially to consumers in the cities, is a massive task. Several committees have gone into the problem of distribution, more staff has been engaged in the handling of foodgrains, and more time has been spent on distribution problems than on agricultural production itself.

Since 1946, India has been importing huge quantities of foodgrains, especially from the United States under PL-480. Imported cereals constituted nearly 2½ per cent of the net availability of food

Control over traders, buffer stocks, regulated markets and increased production will prove more useful than all the designs for a national food policy.

PLANNING FORUM SURVEYS AN M.P. VILLAGE

NO HOSPITAL BUT HEALTHY PEOPLE

ALTHOUGH there was no hospital or dispensary in the village of Badafara in Ambah, Madhya Pradesh, the people there were healthy. This was one of the findings of the Planning Forum of the Degree College, Ambah, which recently studied the socio-economic conditions of the village.

Badafara is situated along the Ambah—Morena Road to the west of Ambah town. According to the 1961 census, the population of this village was 970. The Forum selected for study 75 families consisting of 332 men and 250 women.

Among the 75 families, nine families possessed no land. The maximum that a family earned a month was Rs 150 and the minimum was Rs 40. All the other families were engaged in agriculture. Some among them also had other occupations. Only 25 people were in service. Nobody was totally unemployed.

The total acreage of the village land is 1576. The crop sharing system existed there. Land being very fertile, the millet crop was flourishing.

Jowar, Bajra, oilseeds, barley, gram and wheat were among the

other important crops grown here. Although some kind of irrigation facility was available, most people were not interested in growing wheat. Last year only seven families grew wheat. The villagers generally ate barley, gram and Bajra. The per bigha production of gram was 2.5 quintals, of Bajra 2 quintals and of oil-seed 2 quintals. The village was aware of high-yielding seeds. Hybrid bajra was cultivated.

In the village, none used modern ploughs. Although education was spreading, the farmers had no urge to modernise agriculture.

According to the census of 1961, the number of literate men in the village was 145 and women 11. There were 20 men who had passed the higher secondary and two women. There were seven men and three women who had university degrees. There was only one primary school

in the village. There were a Balbani centre, a tailoring centre and an adult education centre for teaching women.

Most of the houses were *kutchas*. Only three families had *pucca* houses. On an average, the 75 families had one room for every 3 members. The whole village is divided into three sections. They are situated about one furlong away from each other. In two sections, there were Harijans or low caste people and in the third locality were Brahmins and Thakurs.

In the households surveyed, there were 42 cycles. There were only 25 bullock carts, mostly used for transporting the agricultural produce and manure. On occasions they were used for *barats* also. Some families used bullocks for transportation. A good road is essential to link the village-blocks with the main village. The lanes were not in proper shape and were *kutchas*.

The village lacked in any means of entertainment. There were eight radio sets or transistors in the village. No market or fair was being held in the village. There was no reported case of litigation.

in 1956, 5 per cent in 1961 and over 10 per cent in 1965. In the case of wheat, the import content was as high as 41 per cent in 1965. Apart from imports, foodgrains are procured by the Government through levy on producers, millers and traders, and, in some cases, through monopoly purchases.

ZONAL SYSTEM

Zonal restrictions on the movement of foodgrains have given rise to various complications. The ostensible idea is to cordon off surplus States from the deficit ones. As the zonal system tends to depress the prices of foodgrains in the surplus States, the producers lose the incentives to produce more. The zonal system does not help the consumer either, as is generally presumed. The consumers in deficit States pay higher prices for foodgrains than those prevailing in surplus States. At the same time, the higher prices affect the general price index and ultimately tend to push up the prices of other commodities. It is said that the zonal system helps the Government to mop up surplus foodgrains in the surplus States. While theoretically the argument may be valid, the actual position is that far from helping the deficit States, the surplus States start crying famine.

AGRICULTURAL PRICES COMMISSION

The Government of India set up an Agricultural Prices Commission to ensure incentive prices to the farmer. Although it is now four years since the Commission was appointed, it has arrived at no scientific basis to determine minimum or incentive prices. The result is that, while some economists feel that the Commission has been giving higher prices than justified, farmers have been sore about the level of prices. The Food Corporation, set up in 1964 to purchase foodgrains on behalf of the Government, has stepped up its activities in almost all the States. Its recent purchases of wheat in Punjab and Haryana alone are reported to be of the order of Rs 140 crore. But, the major snag is that very few of its officials have a commercial background.

To regulate marketing operations of agricultural products and

to protect farmers from the machinations of traders, various State Governments have enacted and enforced the Agricultural Produce Markets Act and established regulated markets. There are 3,405 agricultural markets in the country, of which about 2,500 markets are suitable for regulation. Of these, 1,788 markets were regulated up to the end of March last year. The total value of arrivals in all the markets, both regulated and unregulated, is about Rs 2,853 crore annually.

There are, however, several shortcomings in the regulated markets. Some States regulate only commercial crops, which does not include foodgrains. The extension of the Market Acts to special commodities, such as fruits and vegetables, livestock and even tobacco, has been limited. Ahmedabad and Surat in Gujarat State and Hyderabad in Andhra Pradesh are the only places where vegetables have been regulated. Potatoes and onions and some varieties of beans have been regulated in a few markets in Mysore State.

CO-OPERATIVE MARKETING

It has been the policy of the Government to encourage co-operative marketing, and there has been some significant progress in this direction, as far as agricultural products are concerned. The level of operations was nearly Rs 360 crore in 1965-66, which works out to roughly 10 per cent of the total market arrivals. These co-operatives mostly act as commission agents for farmers. To a limited extent, storage facilities, fair weightment and measurement facilities are available in these societies. There is, however, great need to improve the working of marketing societies if they are to serve the real interests of farmers.

The Central Government has been assuming the dual responsibility of regulating marketing as well as acting as the trader. For the regulating functions, a Directorate of Marketing and Inspection, with headquarters at Nagpur, has been set up to carry out market research and service and to advise the State Governments on regulated markets. Also, the Directorate is responsible for fixing standards and grades of agricultural produce, pro-

moting grading at the producers' and consumers' stages, administering laboratories for carrying out analysis of agricultural produce to be graded, enforcing the Fruit Products and Cold Storage Orders and training personnel dealing with agricultural marketing.

The marketing administration is combined with the Co-operative Departments in some States like Mysore, Maharashtra, Gujarat and Orissa, and with the Agricultural Departments in Uttar Pradesh, Madhya Pradesh and Madras; while in Andhra Pradesh there is a separate Department of Agricultural Marketing. When it is combined with the Co-operative Department, the marketing wing is almost separate and independent of the co-operative wing, except for the Registrar of Co-operative Societies, who is also the Chief Marketing Officer. There are, apart from the Chief Marketing Officer, officers of Marketing Departments working at the divisional and district levels, assisted by a large number of supporting staff. The main functions of the Marketing Departments are to implement the marketing acts, to promote regulated markets and inspect grading of agricultural produce. Generally, there is also a separate wing for standardisation and inspection of weights and measures with its own hierarchy of officers at the divisional and district levels.

DUPLICATION OF FUNCTIONS

There is considerable amount of duplication of functions of the State and Central agencies. Even at the Central level, there is a lot of duplication in functions. For instance, while the Directorate of Marketing Inspection (DMI) is responsible for market research and service, the Directorate of Economics and Statistics in the Ministry of Food and Agriculture is in charge of market intelligence. While the DMI is the agency for implementing the Agricultural Produce Markets Act, including the grading of commodities, there are other agencies, such as the Indian Standards Institute and the Export Inspection Council, performing the same functions. The Health Ministry administers the Prevention of Food Adulteration Act. Crops

and livestock production surveys are conducted by the Indian Council of Agricultural Research, while the DMI conducts market surveys. This has resulted in avoidable waste of efforts, financial resources and scarce technical manpower.

STATE TRADING

Because of the peculiar difficulties of marketing of agricultural products, farmers have always been in a weak position *vis-a-vis* the trading community. To protect them from being exploited a wide variety of regulatory laws are in vogue for ensuring orderly marketing and free and healthy competition.

State intervention, however, must be distinguished from State trading, which means that the State itself undertakes the job usually done by private traders. Most of the countries aim only at the regulation of trade. There are some countries, however, notably Australia, Canada and the United States, which do state trading to regulate the market and at the instance of the farming sector itself, but not with a commercial motive. Thus, the Wheat Board in Australia undertakes to buy wheat and arrange for its sale to foreign countries. Similarly, the U.S. Commodity Credit Corporation undertakes the purchase and storage of several commodities to prevent over-production and to check a sharp drop in prices and to strengthen the position of farmers. Another distinguishing feature is that these regulatory bodies are staffed either by farmers' representatives or by those in sympathy with the farmers' interests.

In India, on the other hand, no distinction is made between regulatory functions and trading functions, with the result that, while it has neglected its true function of regulating foodgrain trade, it has assumed more and more responsibility for trading. This policy is not in the interest of consumers, farmers and the country.

State trading of food involves several operations: procurement, grading, packing, moving by rail and road, storage, timely and regular supply to retailers, insurance, and business risks. The capital and operating costs are colossal, and

the need for a large staff with necessary experience is inescapable. For example, the capital needed to mop up the surplus grains in the district of Tanjore alone will amount to nearly Rs. 85 crore. To maintain a buffer stock of about seven million tonnes by the Food Corporation or State Governments will need an investment of Rs. 750 crore as well as additional expenditure on godowns.

In undertaking trading in foodgrains the Government has ignored the magnitude of the job. The Food Department has proliferated, not only at the Centre but also in the States. There are over 18,000 persons employed in the Central Food Department, on account of which the expenditure on administration alone is colossal. The losses incurred by the Government on State trading in foodgrains are also staggering. According to the Audit Report (Civil) and the related Appropriation Accounts for 1966-67, state trading in foodgrains over a 24-year period, from 1943-44 to 1966-67, resulted in a cumulative loss of Rs. 235.9 crore. The losses incurred by the State Governments will also have been equally big.

STORAGE PROBLEMS

Imported cereals have so far been moved through a few ports at the rate of four to eight million tonnes a year, mostly to urban consumers. The flow has been spread out over the year, requiring the minimum of storage facilities in relation to the total supply handled. The present situation created by a bumper harvest is different. Storage will be needed throughout the year, but pressure will be at harvest time, specially during April-May and November-December. Also, instead of flowing in through a few ports under the management of a few skilled individuals, the marketable surplus will have to be collected from scores of districts.

Farm products have to be stored to make them available all the year round, to balance periods of plenty with those of scarcity. In a country like India where the monsoon is unpredictable and agricultural production erratic, the need to store agricultural commodities during favourable years to ward off periods of scarcity is of paramount importance. The term "storage" in

India is used very loosely to include any kind of covered accommodation including schools. Private traders usually use their houses as godowns where they heap bags of foodgrains. Such storage is far from satisfactory resulting in extensive damage and loss. As traders cannot be expected to bear such losses, they make these up by increasing prices and the consumers have to foot the bill.

In recent years, however, organisations like the Central and State Warehousing Corporations, Co-operative Marketing Societies and the Food Department, including the Food Corporation of India, have taken steps to provide proper storage facilities. A breakdown of storage accommodation available at the end of the Third Five Year Plan and the target for the Fourth Plan is given below.

PRIVATE FACILITIES

A random survey conducted in various foodgrain markets to assess the storage available with private agencies revealed that private storage facilities amount to 21 million tonnes. All this space is not, however, exclusively used for storage of agricultural commodities. Often it is utilised for storage of seeds, manures and fertilisers. Even so, private storage accommodation can hardly meet the requirements of scientific storage. Most of the structures are defective, which do not conform to the minimum standards laid down by the Indian Standards Institution.

Additional warehouses are being built by the Central and State Warehousing Corporations. Up to November 1966, the Central Warehousing Corporation had 82 general warehouses with a total capacity of over 3 million tonnes, and 20 special warehouses in Madras and Andhra Pradesh with a total capacity of over 40,000 tonnes. This accommodation was for use by the Food Corporation and the State Governments.

The fact is that the Warehousing Corporation is not working satisfactorily. For one thing, co-operatives are not making use of the facilities available in spite of the concessions offered. This is because co-operatives themselves have not developed much. Since the proce-

Name of institution	No. of centres where godowns have been built	Total storage capacity	
		At the end of 3rd Plan	Proposed during 4th Plan
1. Food Department and Food Corporation of India	—	25 lakh tonnes	35 lakh tonnes
2. Central and State Warehousing Corporations	281	1.69 lakh tonnes	2 lakh tonnes
3. Co-operatives	15,400	20.35 lakh tonnes	18.75 lakh tonnes
TOTAL		47.04 lakh tonnes	55.75 lakh tonnes

dures are cumbersome and warehouses are located far from production centres, individual farmers are also not utilising them. Moreover, the procedure for getting loans against warehouse receipts is complicated. However, with the bumper production this year the situation has radically changed and the whole question of storage will have to be given serious consideration if the production effort is not to be muzzled up.

PLAN TARGET

The Fourth Five Year Plan has a target of 120 million tonnes of foodgrains, about 35 per cent of which is estimated to be the marketable surplus. Approximately 80 per cent of the marketable surplus comes to *mandies* in urban areas. Out of this 10 per cent is lifted by retailers and 70 per cent has to be stored and/or marketed in consumer markets. It is estimated that about 30 to 35 per cent of agricultural produce is still collected by village merchants, traders and others, while co-operative marketing societies are able to handle only about 10 per cent of the total market arrivals. This means that instead of 25 to 28 million tonnes, we now have to handle 40 to 45 million tonnes of foodgrains. This will involve several problems, including those of storage, finance, transportation and insurance.

The one conclusion that emerges clearly is that the Government should be more actively concerned with enforcing its regulatory powers and not be satisfied by merely administering business or commercial operations. Buffer stocks, regulated markets, stricter control over traders and increased production will, in the ultimate analysis, prove more useful than all the

designs for evolving a national food policy or building up national food reserves.

World's First Electronic Car

THE experimental prototype of a two-seater three-wheeled car, electrically powered and electronically steered, has been shown in the annual Paris car show.

Designed by two French engineers, the brothers Jean and Jacques Jarret, the electronic car makes use of many conventional solutions for a small electric car. Its main innovation is a new type of electric engine with electronic switching that is three times as light as a conventional engine. Each of the rear wheels of the prototype has its own engine 10 inches in diameter. Electric power is supplied by ordinary lead storage batteries, but the vehicle can be hooked up to various types of power sources for recharging. It can be recharged by a thermal generator, by other batteries or by fuel cells.

There are no pedals or steering wheel. All the driver has is a small joy stick. When he pushes it forward he accelerates, and in pulling it back he brakes. By pushing the stick to the right or left he makes the car turn. Braking is done by the engines.

The prototype weighs 397 lb and can carry an equivalent load at a speed of 18 mph, with a range of 20 to 50 miles. The prototype can be used as a light service vehicle for short trips in airports, factories or hospitals.

Indian nuclear scientists and engineers are to set up the country's first cyclotron project in Calcutta. Construction work on the project will begin soon.

The project will serve as a nucleus for an inter-university centre in nuclear physics, nuclear chemistry and in radiation of biological and agricultural products. It will provide basic stimulation to industrial technology. Expected to cost Rs. 5 crore, the project will make the maximum use of indigenous components and industrial facility.

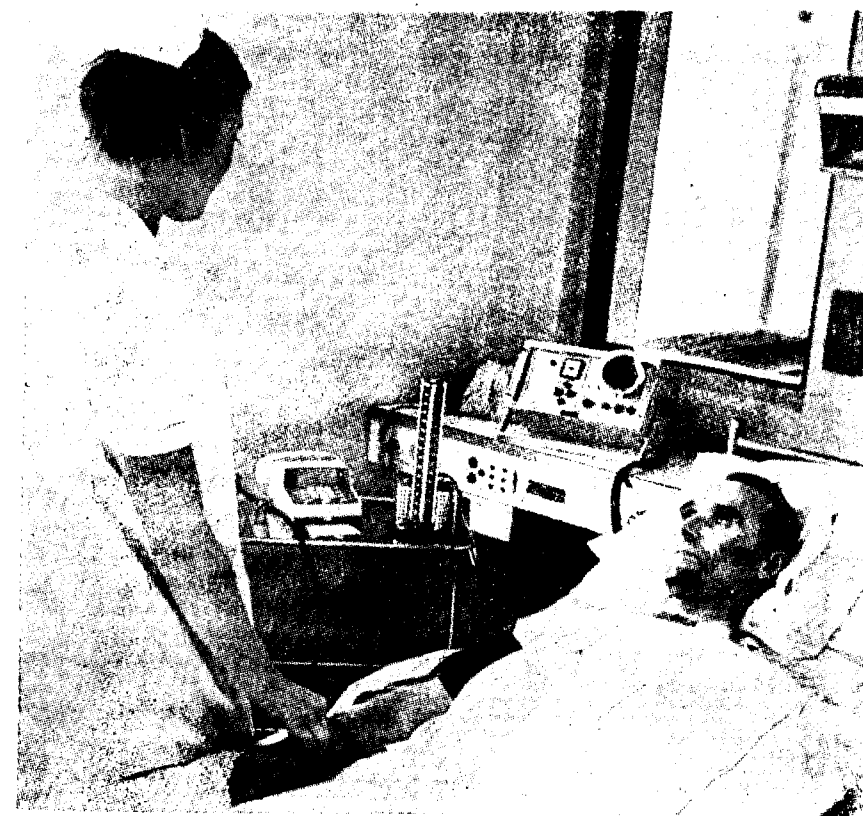
Production of power generating equipment in the country increased three times last year. Heavy electrical equipment valued at Rs. 21 crore was produced in 1967-68, as compared to Rs. 7 crore in the previous year.

Fifty per cent of the machinery produced by the Bharat Heavy Electricals included high-pressure boilers made at the Tiruchirapally unit for power stations in Delhi, Madras and Harduaganj (Uttar Pradesh).

The Central Engineering and Design Bureau of the Hindustan Steel has saved more than Rs. 6 crore in foreign exchange by designing the expansion plan of steel projects. The Bureau designed the third expansion of the Rourkela Steel Plant from one million to 1.8 million tonnes of ingot steel. It also designed the expansion plan of the Durgapur steel project from one million to 1.6 million tonnes.

Uttar Pradesh has achieved this year's rabi foodgrain procurement target. It has purchased 5 lakh tonnes of wheat, in addition to 10,000 tonnes of gram and barley.

Varanasi District has topped in Uttar Pradesh in producing Mexican variety of wheat during the last financial year. The district has been awarded a special Governor's prize, along with an individual award to Mr. Ram Murat Singh, a farmer of Dandya Village in the district. The per acre production of wheat has increased by three times as a result of the introduction of the Mexican variety, the acreage under which has doubled.

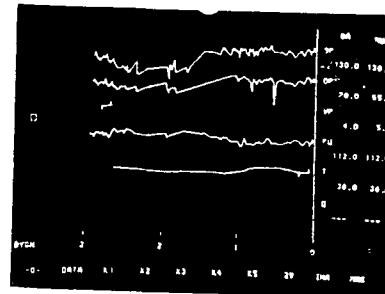


A. MARCUS

A DOCTOR's judgment is no better than the information available to him.

Information should be efficiently organised so that the doctor will not be overwhelmed by sheer weight of facts. It must be reliable so that he can draw conclusions with assurance. It has to be speedily available so that whatever action he takes will be closely related to need at the moment of decision. The importance of the computer in medicine stems from the fact that it provides better information in all these ways—for the doctor dealing with seriously-ill patients or for the planner trying to arrange more effective services.

In Sweden, both in patient care and in health administration, the computer is used more widely than anywhere else in Europe. The



THE COMPUTER COMES TO THE PATIENT'S BEDSIDE

The computer provides better information than any human being can do to the doctors dealing with seriously-ill patients in an organised, reliable and speedy way. In Sweden today the computer is used quite widely for this purpose. The picture (top) shows a sister taking a patient's blood pressure and (right) putting the result into the computer. Picture (above) is what the doctor sees on the graphoscope.



Swedish cancer registry has been put on a computer file and only four people are needed to maintain it. Every year 20,000 new cases are added. The old manual system would have required a staff of up to thirty.

An extensive trial, covering one-fifth of the population, will result soon in producing hospital patient statistics for the whole country by computer. All patients discharged or dying in the trial area, about 200,000 annually, are entered on a computer file. Sex, age, diagnosis, surgical operations and pathological investigations are recorded. A diagnosis file records all discharges from the mental hospitals, almost 50,000 patients a annually.

For the administrator, this computer method proves invaluable principally because information becomes available so much sooner. The report for 1967 was ready last May. For 1968, reports are being provided quarterly only two months in arrears. In the old system it took up to two or three years to make such reports available to planners and research workers and to achieve even this modest speed the scope and nature of data had to be severely restricted. The computer transforms the situation by its greater flexibility in the production of tables, its high speed and accuracy in calculation and its ability to perform complex chains of logical operations. Health planners in Sweden now possess a highly effective tool. They can make better decisions on such problems as the deployment of hospital beds because they have more up-to-date information about the patterns of disease in different parts of the country and how these are influenced by the age-distribution of patients; the population is getting older in Sweden as in many other countries.

The central theme of medical care, how to ascertain need and match resources to it, can be realised on this level, at least, with far greater efficiency through the computer. In the field of health statistics it confers the ability to do things routinely which were previously done only occasionally as a technical *tour de force*.

Drawbacks

The Swedes possess one great advantage in adapting the computer for statistical purposes. Every Swede has a national identity number incorporating his date and place of birth, each district having its own code number. The national number identifies him for a great many purposes including insurance, taxation and medical care. All facts relating to these and other matters go into data banks, that is, collections of computer files. Through the unique identity number it would be possible to collect data relating to any individual from all these banks and to construct an intimate biography. This disturbs some people and the problem of confidentiality, especially for medical information, is causing some concern in Sweden. It has been suggested that the medical data bank

should be protected in some special way, perhaps by putting the identity numbers in code. A more radical proposal would place the banks under the care of a special institute independent of the Government. In the computer age it should be impossible, as it is now, to obtain access to a medical record unless the person concerned has given permission.

Disease Incidence

In Sweden, the computer helps to monitor the incidence of disease in a number of special circumstances. A register of congenital defects will give early warning of any undue increase in their occurrence. A programme has been put on computer this year to trace any connection that may exist between taking the contraceptive pill and thrombosis of blood-vessels in women. This forms part of a continuing health survey of all women aged twenty-five years and over, who will be investigated every fourth year.

A more ambitious scheme is likely to be undertaken as a result of the county of Varmland screening study, conducted between 1962 and 1965, which tested the uses and feasibility of a routine health check. It included 90,000 people over twenty-five years and recorded a short medical history, height and weight, blood pressure, chest X-ray, sugar and porphyrin in urine, and twelve blood tests. The computer made calculations on the data, finding age from birth date grading for obesity from height and weight, and added information from other records kept centrally on computer files.

The computer was programmed to provide its own values for normal ranges in the tests applied; anyone lying outside these ranges could be identified. Other pertinent information on abnormal individuals could be provided and suggestions made for appropriate action. Plans are now being prepared to apply this system more generally. It would be impossible to embark on a project of this kind even on the limited scale of the original Varmland study without a computer.

In using computers with reference to the seriously-ill patients, the element of time takes on a special importance. Unless the doctor can obtain comprehensive

information about his patient on demand, he is little better off. He needs a computer that will function in "real time" as does the officer in command of fighter planes in an air defence plan who must make quick decisions in a rapidly changing situation. In fact, the computer installation now under test in an intensive care unit of the Karolinska Hospital in Stockholm was adapted from the Swedish communication and display system developed for the Swedish air force. It is probably the most advanced of its kind in the world.

Its main objectives are to simplify the flow of information and to help the doctor in evaluating data about his patients. Paper work is eliminated; time is saved and more reliable information is produced. The system consists of two types of terminals connected to a central installation for recording, storing and processing of patient data. There is a keyboard for input of data—it is part of the intercom telephone system and looks very like a telephone. The principal output terminal is the graphoscope—like a television set with a keyboard in front. On pressing the right keys, data of any patient under care can be shown on the screen in graphs, in figures or in words.

Chest Surgery

The Karolinska system serves the ten-bed intensive care unit of the thoracic clinic which is under the supervision of Professor V.O. Björk. It cares for patients who have had major chest surgery including open heart operations and removal of lungs. Five nurses and ten assistant nurses look after the patients. In each of the ten rooms is an input terminal. When a nurse takes the blood pressure, for example, she need no longer enter it on the ordinary case-record—she does so for the present because the system is still under trial—but instead sends the information straight to the computer through the keys on the input terminal. In the same way measurements of up to sixty separate functions of the patient's body that might be affected in illness, ranging from the simple temperature, pulse and respiration to complex biochemical estimations, can be fed into the computer as

often as thought necessary day and night. The biochemical and other tests are ordered from the laboratory over this unique communications system and reported direct to the computer to be read on the screen by the doctor. Compared with the conventional system of ordering and reporting tests, the number of links in the communications chain is reduced by two-thirds and all the paper work eliminated.

How it Relieves the doctor

The output terminals, the graphoscopes, are located in the doctors' offices, in the intensive care area, in the laboratories and in the operating theatres to help in supervising anaesthesia. If desired, they can be placed in the doctors' homes as well. From his office the doctor can supervise all the patients under his care. By pressing the right keys he can select the data of each patient in turn, displaying all the measurements relating to the patient's condition. He can see the most recent of any of the measurements and compare it with the previous reading or he can have displayed any set of measurements as a graph on any time-scale he chooses—minutes, hours, days or weeks. He can obtain all recorded values of a particular measurement as a table. He can get information in words such as the night nurse's report on going off duty: "Monday 6 Aug., slept well, no fever, no rigors, pulse irregular." And he can leave instructions about a patient, what to do under certain circumstances or what drugs to give.

If the unit is working to full capacity, as many as 6,000 pieces of data might be collected in a day and put through the computer. It separates the different categories of data from one another, tests the plausibility of the information by comparing it with previously set limits and accepts reasonable values which it records and stores, providing the record with a time marking. If measurements fall outside previously set critical limits, an alarm is given.

Urgency Abolished

What advantages does this system offer? Dr O. Norlander, in

charge of anaesthesia in the clinic and a member of the project team, sums them up—"It means safer patient care".

When a patient is seriously ill his condition may change rapidly, and during a single day the doctor may have to make many important, sometimes vital, decisions without delay. Better decision-making results from better and quicker information—often the information is better only because it is quicker. Ideally the doctor wants all possible information immediately the patient's situation changes so that counter measures can be taken speedily, but not hastily, in full knowledge of all the facts. The objective, really, is to abolish urgency. Though not completely attainable one knows, the Karolinska project is a step forward. The most effective way to diminish urgency is by being able to anticipate unfavourable changes. This system does help the doctor to anticipate by collating information in graphs and tables, and making fluctuations and trends immediately demonstrable against the appropriate time-scale.

On a more mundane level the most enticing prospect consists in the elimination of paper work and the saving of time on the ward for nurse and doctor. The communication and display system can be extended throughout a hospital to achieve these ends.

In the Karolinska special department Dr P. Hall examines the whole field of medical information. Already a large proportion of the doctor's activity can be taken over by the computer. The doctor's province remains the physical examination. The medical history, best obtained through a comprehensive questionnaire filled in by the patient, should alert the doctor more effectively because it is less likely to have omissions than a history taken directly from the patient. The patient receives it before seeing the doctor in the out-patient department.

No loss of Humanity

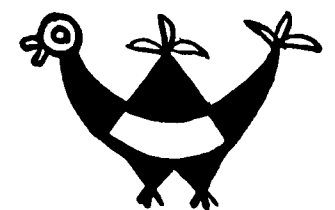
Since August last year, details of 11,000 patients who filled in the questionnaire have been put on computer. And fifty new patients are added daily. When the

questionnaire is returned, the doctor studies it and orders tests. Results of these are also put on the file and a full record is printed out for the doctor. Then he sees the patient. Every year in Sweden twelve and a half miles of additional shelving are added to store the new medical records received from in-patient and out-patient departments, laboratories and other sources all over the country. It is impossible to estimate how many miles there must be all over the world. One can imagine every country surrounded and criss-crossed by endless lines of these shelves. This nightmare has a very firm basis in reality. Only the computer file with thousands of records in a few inches of storage space can shrink this vista to manageable proportions.

All these new possibilities bring a gnawing doubt to many people who fear that the doctor of the future may be more remote from the patient because of his reliance on the computer. This could happen. Whether it does will depend largely on the doctor himself and on the way he is educated to use this powerful new device. It can bring him closer to the patient by teaching him more about illness in the individual as opposed to the text-book stereotype of disease and by helping him to use his time more economically. For the seriously ill it can only be beneficial; anything that improves treatment is a boon to those in danger of death.

I saw nothing at the Karolinska that suggested any loss of humanity in the doctors working on this project. On the contrary, there seemed to be a deeper sense of that intimacy, a tenderness even, that doctor and patient share who have been through danger together. The stethoscope is still used in the thoracic clinic of the Karolinska and doctors and patients still smile at one another and make jokes.

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POPULATION GROWTH AND DENSITY

S.R. GROVER

The purpose of this paper is to highlight the growth trends of population and its density per square mile and the factors responsible for the density in the world and in India.

famines and epidemics. Our death rate declined from 27 per 1000 in 1951 to 16 per 1000 in 1966.

THE growth of world population since 1650 is a remarkable event in human experience. Man has demonstrated his ability to more than double his numbers within a generation. The population of the world has quadrupled in the 285 years ending 1935. According to Durand's estimates, the population of the world might have been 2,515 million in 1950 and 3,281 million in 1965. The world population is at present placed at about 2,378 million. The United Nations "Demographic Yearbook" estimates that the rate of increase of the world population is almost one per cent a year, which, if maintained, would double the world population in less than 100 years.

India's Population Growth

The population of undivided India was about 130 million in 1600 A.D. During the next two and a half centuries (1850) the number increased to about 150 million. This was the period during which high birth rate almost matched with high death rate due to various socio-economic reasons and political instabilities within the country. By 1961, the population had risen to 439.2 million.

During 1951-61, India's population increased by 78 million, which is more than the entire population of any country in Europe or in Latin America. An explanation of the country's population growth is to be found in our rapidly declining death rate due to improved sanitary conditions, better health services, and relatively more efficient control of

In India, the population growth rate is about 2.5 per cent per annum. This is not a very high growth rate since in various other Asian countries it is 3 per cent to 3.5 per cent, but in terms of the large number of couples in reproductive age groups (approximately 90 million), the rate is quite high. By the year 1994, the population of India may be somewhere near 1,000 million persons.

Uneven Distribution

The population of the world is unevenly distributed over its surface. An area equal to about one-fourth of the approximately 55 million square miles of land space holds nearly 90 per cent of the total population of the world. The remaining 10 per cent population is very thinly scattered over the other three-fourth or roughly 42 million square miles of land. Most of this land is not fit for agriculture. Three large blocks of population may be identified—one is that of Eastern and Southern Asia including India, China and Japan, which contains over half the world's population. These 1,100 million and over people occupy nearly 10 per cent of the world's land area, or a little over 5 million square miles. A second large segment is the population of Europe. In Europe, a fourth of all population, roughly 500 million, inhabits an area which is approximately 6 per cent of all land. The third concentration, equal to one-tenth of the total or 200 million, is found in the Great Lakes and Atlantic Coastal areas of North-South America.

India has an area of 1.2 million square miles (about a third of the

area of the continental United States excluding Alaska), a population of over 500 million people. With 2.4 per cent of the world's land, she is accommodating 15 per cent of the world's population. In other words, although India is just about two-fifths the size of the continental United States, she shelters about two and a half times more the population of United States.

Population Densities

On an average, 58 persons per square mile inhabit this planet today. Asia and Europe stood out as the areas of exceptional densities (61.5 and 170 per sq. mile respectively in 1935), while the remaining continents had densities quite below the average for the world as a whole (35.2 per square mile in 1935).

Population density of the world by various estimates has shown an increase in different years. For instance, density per square mile for the world as a whole was 44 persons in 1950, 58 persons in 1965 and is estimated to be 77 persons in 1970.

Factors Determining Density

In India, the fertile land adjoining the Ganga and other rivers contains most of the population. The interior regions (Rajasthan, for instance) are rather sparsely populated. As a result of rapid population increase during the 1951-61 decade, the density of population per square mile for the country as a whole (including Jammu and Kashmir) increased from 312 persons in 1951 to 370 persons in 1961. The corresponding figure for the 1961-71 decade was about 470 persons and that for 1971-81, 580 persons. According to the 1961 census the density of population for Delhi is 4,614 persons per square mile.

Density is high at certain points and declines with distance away from these points. In general, the points of concentration are zones of fertile soil, as in agricultural areas, and locations of easy accessibility, as in industrial areas.

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Throughout Asia and other areas of predominantly agricultural settlement, soil fertility is the decisive factor in determining the distribution of population. It is usual to see that the densities are the greatest in the river valleys and deltas. In industrialised nations, peak densities occur at points of maximum availability with respect to inter-regional exchange. It is at those points that huge metropolitan cities appear.

Many a time the two kinds of locations at which maximum densities are found—on fertile lands and urban sites—occur in the same regions. Delhi, for instance, is located on the banks of river Jamuna. Technological improvements, however, permit people to live at greater distances from their sources of supply.

Density is sometimes influenced by certain other factors as well. Kerala has always been a crowded region and it maintains its status despite a slow rate of natural increase in comparison with other States of India, and, relatively speaking, heavier migration from this State to other parts of the country. West Bengal's difficulties are traceable both to a large natural increase and an almost daily influx of displaced persons from East Pakistan, Nepal and Tibet as well as immigrants from other parts of the country, particularly Bihar and Assam.

The population concentration is affected by resources, climate and other physical conditions and also the type of economy obtaining in a society. It varies from 1-8 persons per square mile in the case of a hunting and fishing economy to 381 and over in an industrialised one.

As the societies of the world advance from hunting to agriculture and then to industry, the cities are born, and the growth of cities produce unusually heavy concentrations of populations. As urbanisation progresses, the densities in the various continents will increase and land for cultivation will reduce. To overcome this situation it is essential to concentrate on intensive farming to grow more food, international migration to ease regional pressures and birth control to lower the birth rates.

Development Diary

The State-owned Heavy Electricals Factory at Bhopal has manufactured, for the first time in India, a 15,000 kw vertical water wheel generator, which will be installed at the Basi Power House at Himachal Pradesh. The factory has also undertaken to supply such generators of 5,000 kw to 1,65,000 kw to 14 other hydro-electric projects in the country.

A 200-KVA Sine-Wave Generator, designed and manufactured by HEL has been successfully tested. Completed within a period of one year, the Generator has made maximum possible use of stocked materials and components.

The first indigenous 125 MVA transformer in the 220 kv class designed and built by the Heavy Electricals Limited has been successfully tested. This is the first of five such transformers being supplied to the Maharashtra State Electricity Board.

The Mechanical Engineering Research and Development Organisation, Madras, has developed a new type of water jet oscillator. Without any moving parts the oscillator works on water pressure. The main flow jet is controlled and deflected by two control jets, which are self-generating.

India has signed a trade agreement with Hungary under which the volume of trade both ways in 1969 will be of the order of Rs 54 crore.

India has signed a new five-year trade and payments agreement, as well as a trade plan with Bulgaria for the exchange of goods between the two countries during the next year. The agreement envisages increased trade between two countries and India will sell new items, including a wide range of engineering goods to Bulgaria. It is expected that this will increase the turnover of goods, both ways, next year to Rs 38 crore.

A trade protocol for 1969 between Rumania and India has been signed in Bucharest. The protocol, a part of the long-term trade and payments agreement between the two countries, stipulates an increase in the volume of Indo-Rumanian trade both ways to Rs 35 crore in 1969.

The second lift irrigation scheme of Dungarpur district in Rajasthan has been inaugurated. Water will be lifted at a height of 85 ft. from the Mahi River under the Rs 85,000 scheme, which will irrigate 800 additional bighas of land in the hilly areas of the district.

The Mysore Government has launched a massive programme of agricultural development in Raichur district, involving a cost of Rs 7 crore.

The Agricultural Refinance Corporation has agreed to provide a loan of Rs 1.52 crore for the development of pine-apple cultivation in Mysore State.

The Rs 23-crore Bailadila Iron Ore Project in Madhya Pradesh has despatched to Japan one million tonnes of iron ore against the current financial year's target of 1.8 million tonnes.

India's first home-made frigate 'Nilgiri' has been launched at the Mazagaon dock by the Prime Minister. This anti-submarine and all-purpose Leander-class frigate has a maximum speed of thirty knots, and is armed with anti-aircraft missile, "SEACAT", highly developed radar and sonar systems and its own submarine hunter-killer helicopter.

Sixty-five per cent of the steel plates used in the first frigate are of indigenous production.

The Mazagaon Dock has already undertaken construction of another frigate.

An intensive agricultural campaign for rabi sowing has been launched in the Kangra Valley of Himachal Pradesh, covering 50,000 acres of irrigated land under high-yielding varieties of wheat. Arrangements have also been made for the adequate supply of fertilisers to the farmers during the season.

The Central Drug Research Institute, Lucknow, has developed three new potential drugs—psoralen, hayatin methiodide and 1-isopropyl-imidazolidine-2-thione, which have had successful trials.

A 112-metre long reinforced concrete bridge, named after Netaji Subhas Chandra Bose, over the Gumti at Udaipur, about forty-five kilometres from Agartala, has been opened to traffic. The bridge, constructed at a cost of Rs 19 lakh, is the fifth of its kind in the State and will play a vital role in the road transport system in southern Tripura. Two more such bridges are now being built in the State.

The State Trading Corporation has entered into contracts for the export of about two and a half lakh tonnes of cement, which will fetch about Rs 3.5 crore in foreign exchange.



JAPANESE ECONOMY

Achievements and Forecasts

JAPAN'S economic recovery after the Second World War and her emergence as one of the leading industrial nations of the world has been the wonder of all those who have seen the country's fantastic progress. This marvel has been achieved largely because of the work of the "Economic Planning Agency", which is responsible for looking after and promoting the country's economic health. In this context, the Agency's "Annual Report", discussed in this article, is of interest.

In the economic life of Japan the current financial year, which covers the period April 1968 to March 1969, is of great significance. From the short-term point of view, it is a year for the adjustment of the unexpectedly rapid economic growth during the 1967 financial year. It is also important because it marks the completion of a hundred years in the life of the nation since the 'Meiji Restoration' which saw Japan's emergence from self-imposed seclusion, the end of feudal rule, and the beginning of the country's economic prosperity.

Reviewing the country's economy in the 1967 financial year, the Economic Planning Agency points out that the gross national product (GNP) recorded an increase of a little over 13 per cent in real terms. This was well above a relatively stable growth ratio of 9 per cent originally forecast by the Govern-

ment. This sharp expansion of the economy brought about a steep rise in imports. Meanwhile, Japan's exports tended to mark time because of the unexpected sluggishness of the world economy. As a result, the nation's balance of payments position deteriorated to a great extent. This led to the enforcement of fiscal and monetary measures for business adjustment as from September last year.

As the Table shows, private investments in plant, machinery and equipment, which played a leading part in the expansion of the Japanese economy, registered the highest growth rate of 33 per cent since 1960. From 1962, equipment investments quietened down, while the dismantling of over-age equipment made smooth headway, eliminating superfluous equipment. Then, in 1966, the Japanese economy started to pick up swiftly, and this sparked off a rush of new investments in plants and equipment.

That is why equipment investments shot up in the 1967 financial year. Other major factors were the installation of machinery and equipment to cope with an acute shortage of labour and stepped-up capital investments by the tertiary industry, under the impetus of soaring personal consumption. The lowest growth rate (6.8 per cent) of the nation's exports since 1961 was also due partly to a decline in Japan's export capacity, resulting from the domestic business pick-up.

A set of tight-money measures, launched in September 1967, turned out to be very effective. That is, the adjustment of inventories made progress, while with the advent of 1968, production activities started to slacken. In May this year, the nation's balance of payments became favourable at last.

Nevertheless, no signs of slackening have yet appeared in the field of equipment investments. Moreover, despite the credit squeeze, corporations generally have not apparently experienced a serious shortage of money. These are characteristic phenomena, never before observed in periods of economic adjustment.

WARNING INDICATORS OF BUSINESS CYCLES

A review of Japan's past economic developments reveals that the balance of payments position started to worsen gradually late in 1966. And, early in 1967 various dangerous trends began to crop up, such as a wholesale price spiral and the establishment of a new record in the ratio of job offers to job seekers. Yet these were not accepted as decisive caution signals. As a result, the enforcement of business adjustment measures came rather belatedly.

Fortunately, however, the overseas economic climate later improved markedly. Without this favourable factor, a restoration of equilibrium in the nation's external economy would have been delayed considerably.

After 1955, when the postwar reconstruction period was about over, the Japanese economy started to show a fairly clear cycle of business. Since then, Japan has gone through several periods of business adjustment. To ensure the proper timing of business adjusting measures, the Economic Planning Agency is now considering setting up a "system of early warning indicators of business cycles" by making full use of past experience.

The idea is to provide supplemental data for judging the right

time for a policy switchover on the basis of the moves of 12 economic indicators highly sensitive to business ups and downs, such as export letters of credit, new job offers, receipts of orders for machinery, and inventory ratio index. It has become clear that if a model early warning system, now being developed, had been applied to past business patterns, the enforcement of business adjusting measures could have been moved up by about three months.

Meanwhile, the present business adjustment periods is also marked by the first full-scale co-ordination of fiscal and monetary policies or a "policy mix" as it is generally called in Japan. As the Japanese economy becomes more and more internationalised, the proportion of capital transactions in the nation's external economic activity will rise, and short-term capital, which moves from nation to nation to seek higher interest rates, will flow into Japan more briskly. In that event it will become still more important to ensure a proper harmony between internal equilibrium and external equilibrium through a ready, flexible operation of the "policy mix" system.

Meanwhile, in the current period of business adjustment, the credit squeeze has scarcely produced the desired result in some sectors depending on the financial position of corporations. It is necessary, therefore, to diversify the means of monetary control by expanding the scope of banking institutions subject to the Bank of Japan's "window guidance" (control of bank loans), for instance.

Japan's GNP, which stood at only a little more than 30,000 million dollars in 1957, has since kept on growing by slightly less than 15 per cent (10 per cent in real terms) every year, reaching 100,000 million dollars in 1966 and 115,700 million dollars (provisional figure) in 1967. In 1968 Japan is expected to climb to the No. 3 position after the United States and the Soviet Union in terms of GNP.

Nevertheless, Japan's per capita national income is still low compared to the advanced nations in Europe and North America. In 1966, it stood at only 798 dollars as against 3,153 dollars in the United

Official Forecast and Actual Result of Japan's Economic Activity in the 1967 financial year.

In hundreds of millions of yen
(Figures in brackets denote growth ratios against previous fiscal year)

	Official Forecast	Actual Result
Personal consumption expenditures	224,500 (13.1)	225,593 (14.0)*
Gross domestic private capital formation	97,500 (16.1)	121,823 (34.6)*
Machinery and equipment	62,000 (14.8)	75,097 (33.0)*
Inventory increase	11,000 (15.8)	18,074 (44.0)*
Private dwellings	24,500 (19.5)	28,652 (33.4)*
General Government consumption expenditures	83,500 (12.8)	86,375 (16.6)*
International balance of payments (overall)	(in millions of dollars)	
Exports	10,950 (11.1)	10,573 (8.0)
Imports	8,900 (14.8)	9,447 (22.1)
Gross national expenditures (nominal)	409,500 (13.4)	433,325 (18.2)*
" (real)	(9.0)	(13.3)*
Production index of mining and manufacturing industries '60=100	233.1 (14.0)	242.7 (18.7)
Wholesale price index '60=100	108.2 (1.2)	108.5 (1.5)
Consumer price index '65=100	111.3 (4.5)	110.7 (4.2)

*Provisional figures.

States, 1,550 dollars in France, 1,520 dollars in the Federal Republic of Germany and 1,509 dollars in Britain.

PROCESS OF GROWTH

In the postwar process of economic growth, Japan has gradually deepened its contacts with world economy. In July last year, it took the first important step towards the liberalisation of capital transactions. Meanwhile, the Kennedy Round tariff cuts will no doubt strengthen the ties between the Japanese and world economies in the sphere of trade. Furthermore, if the Special Drawing Rights (SDR) system of the International Monetary Fund (IMF) succeeds in increasing international liquidity, world trade will obtain a new international monetary system suitable for its stable and sustained expansion. This, it is hoped, will also help to enlarge the basis for Japan's export growth.

The growth and internationalisation of the Japanese economy have brought about marked changes in the nation's balance of payments pattern. From the end of the war to 1950, Japan's balance of payments position was shored up by

foreign assistance. From 1951 to 1955, income from American military procurements for the Korean War played no small role in the nation's external economy; and from 1956, an equilibrium was almost achieved in Japan's external trade.

In the past three years, however, the country's balance of payments pattern has undergone a momentous change. That is to say, the expansion of exports has produced a big enough surplus in the foreign trade balance to offset red-ink figures in the balance of invisible trade and long-term capital transactions.

The favourable balance of Japan's external trade for the past several years is due largely to the smooth expansion of world trade, the strengthened competitive position of Japanese-made commodities, a rise in the technical standards of export industries and the relatively slackened pace of imports.

Especially, there has been an increase in the ratio of commodities requiring highly advanced manufacturing techniques to the nation's total exports. By market, exports to advanced nations have been on the

upgrade, exceeding 50 per cent of the nations's export total in 1966.

CORPORATE MERGERS

Against the background of progress in the liberalisation of international capital investments, there has been a steep rise in the number of mergers and business affiliations among West European corporations for the purpose of strengthening their competitive capacity on the world market by making full use of the advantages of large scale operations. A similar tendency has also started to gather momentum in Japan in recent years. The number of corporate mergers in Japan averaged 400 a year in the latter half of the 1950's. But the number began to increase sharply in the mid-1950's. In 1967, it soared to 995. In the case of large-scale mergers and affiliations in Europe and North America, however, not all of them have proved effective. In some cases, a merger has failed to maintain its market share of profit ratio. Similar cases are also noticeable in Japan, where the degree of production concentration among corporation has been on the rise generally since hitting the bottom in 1959. In the past year or so, in particular, the degree of production concentration among the "Big Three" companies in each industry has shown a sharp upward trend.

There are, however, reasonable grounds for the apprehensions that a rise in the concentration of production might also tend to prevent prices from dipping to the detriment of Japan's competitive capability in the world market. This difficulty of price drop or "price rigidity in the downward direction", as economists call it, is of course attributable not merely to the concentration of production, but also largely to the state of competition in the market and the character of commodities involved. Moreover, the shortage of labour tends to increase wage costs, particularly in low-productivity sectors, and to increase the difficulty of price drop in certain industries by causing a partial excess of demand over supply.

The shortage of labour, starting in the 1960's, has worsened further in recent years, and is

specially serious in the field of manual labour. By contrast, there is still a relatively adequate supply of labour in the sphere of clerical work. That is, two contradictory phenomena—surplus and shortage—coexist in the nation's labour market. Considering the growth ratio of the labour force and the proportion of workers in the primary industries in Japan, the shortage of labour in the country does not appear to be as acute as it is in West Europe.

The recent labour shortage in Japan cannot also be attributed to the deficiency of the absolute amount of labour. Rather, the main reason is that the pattern of labour supply does not smoothly dovetail into that of demand. For instance, labour mobility is low in Japan. Although the proportion of highly educated people is high, job offers tend to concentrate upon persons without advanced education. The ratio of secondary school graduates advancing to high schools climbed from about 50 per cent in 1955 to about 70 per cent in 1967.

PROGRESSIVE INTERNATIONALISATION

If the Japanese economy is to make further strides against a background of progressive internationalisation, three important conditions must be fulfilled. These are: the settlement of the labour shortage problem, the stabilisation of both consumer prices and wholesale prices, and the more efficient operation of fiscal and monetary policies. Since money rates in Japan are rather inflexible compared to those in other countries, it is necessary to establish a proper system of manipulating money rates flexibly so that the availability of money may be better regulated.

In the field of fiscal policy, the main problem will be to control revenue sources as a means of adjusting economic activity—for instance, tax increase for checking excessive private demand—without placing primary emphasis upon controlling fiscal expenditures alone.

SOYABEAN CULTIVATION

A scheme for intensive cultivation of soyabeans has been launched in Himachal Pradesh. Eight thousand hectares of land are to be brought under high-yielding strains of soyabeans so as to make their cultivation popular among farmers of Kulu, Kangra and other districts having ideal agro-climatic conditions for it.

U.P.'s TRANSMISSION LINES

Twelve highvoltage power transmission lines are to be laid and commissioned in Uttar Pradesh during the next six months at a cost of Rs 6.87 crore. The lines with a length of more than 800 kms will help build an inter-connected network of transmission and exchange of power from any part of the U.P. power grid. Four of the lines have already been completed and energised.

PRISON INMATES EARN PROFIT

The inmates of the Sampurnanand Open Air Prison at Sitarganj in Nainital district of U.P. earned a profit of more than Rs 14.5 lakh during the last financial year by taking to agriculture and some agro-industries. Agricultural production at the site doubled during the year and so did the profits.

The open air prisons were started in U.P. more than a decade ago in order to rehabilitate prisoners by giving them work in the open and thus reclaiming them for society.

INDIAN LITERATURE DICTIONARY

The Sahitya Akademy has sponsored compiling of a dictionary of Indian literature covering all the major languages of the country. The dictionary will contain basic informative data about literary classics, Indian authors and their principal works, besides famous characters in epics, dramas, and novels. The compilation is being done by Dr. Sunitikumar Chatterji, National Professor, and other well-known linguists.

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DUNLOP LEADS THE WAY

BOOKS

Gandhi in Focus

Mahatma Gandhi 100 years, edited by S. Radhakrishnan published by Gandhi Peace Foundation, New Delhi, 401 pages. Rs. 17.50. Sole distributors : Orient Longmans Ltd.

P. C. Roy

THE beginning of the Gandhi Centenary year has brought forth a spate of tributes to the Mahatma from innumerable men and women in India and abroad. The volume under review, sponsored by the National Committee for the Gandhi Centenary, offers a rich collection of essays and reflections on Gandhi by some of his close associates and eminent thinkers of our time. Dr. Radhakrishnan, who edited it, makes an analysis of the current world imbalance between what man is and what he wishes to be and postulates that one will have to follow Gandhi's ideals if a new social order is to be brought into being. In a world torn by hatred and misunderstanding, Gandhi will remain an immortal symbol of love and understanding.

About the achievements and legacy of Gandhi, there is a good deal of unanimity among the contributors although they belong to different schools of thought. Gandhi, the liberator, lifted a nation in bondage to the pedestal of liberty. Non-violence and love were the only weapons he used in a struggle for a just cause.

A firm believer in satyagraha, Gandhi was emphatic in his declaration that the end did not justify the means. His message was not for India alone but for the world. One of the most remarkable embodiments of Gandhian legacy had been in the person of Dr. Martin Luther King Jr., whose life like Gandhi's was cut down by an assassin's bullet. King saw clearly that "the Christian doctrine of love operating through Gandhian method of non-violence was one of the most potent weapons available to the Negro in his struggle for freedom".

Civil disobedience, almost in Gandhi style, is now being practised in many parts of the world professing widely different political faiths and beliefs. Gandhi was a man of peace. He held the view that violent solution injures everyone—aggressors, victims, and bystanders. Short of extermination there is no other escape from a nuclear war.

Many of the contributors have been intrigued by the fall of Gandhian standards in India's public life. Recalling Gopal Krishna Gokhale who said that Gandhi made heroes out of clay, Indira Gandhi wonders whether we have not become clay again. Morarji Desai regrets that within two decades of Gandhi's death, most men are seized with fatigue towards idealism in life and do not attach the same value and validity to his teaching. If Gandhi could return to India, Gunnar Myrdal writes, he would have had to

confess that he and most of his associates had been grossly over-optimistic. Louis Fischer is reminded of the Buddha who is followed by millions outside India and only a handful inside. He pertinently asks: "How many Gandhians can be counted in his native country? How much influence do those Gandhians exercise? Is Gandhiji to become the lost Mahatma? Is the prophet to be without honour in his homeland?"

From the Indian side, this eventuality has to be avoided for the good of the nation at large. If Indian planning has failed to bear fruit so far, it is merely because of the neglect of its villages. Public honesty on which Gandhi put the maximum premium is no longer a distinguishing characteristic of Indian current scene. Ideals have given way to office. Hence arises the need to have a better understanding of the philosophy of the Mahatma which alone can reinvigorate the country.

By its nature, the book is not expected to be a serious study. But it stimulates thoughts on Gandhism and puts Gandhi in focus from different angles.

THE INDIAN STRUGGLE

The Struggle of Modern India: Indian Institute of Asian Studies, edited by M.R. Sinha. 93 pages. Rs. 30.

M. M. Bhalla

THIS is a collection of papers on the current struggles of modern India in social, economic and rural fields contributed by different scholars and edited by Mr. M.R. Sinha. Dr. Gyan Chand has contributed a foreward. Suitably arranged according to the subject, they seek to analyse the different problems.

Dr. Gyan Chand thinks that planning has failed to deliver the goods because "it has been seriously at fault from the conceptual standpoint and in its implementation". The whole economy has lacked a direction. "Indian economy", he says, "is a mixed economy because it is a grossly distorted economy." Regulation and controls are completely

unconnected with one another and administered in an inept and corrupt manner. The solution, according to him, lies in understanding the essentials of planning, creating the necessary apparatus at all levels and radically changing the administration. Mr. S.S. Khare strikes a similar note and points out inconsistencies in the planning process in his paper "Economic Plans & Planning" and stresses the need for "a practical touch with the field situation of those who sit to plan for the whole nation."

Self-sufficiency in food through material management is discussed at length by Mr. P.G. Menon. Material management as an integrated approach to the problems of materials is being used successfully in the industries and could be utilised in agriculture as well. Applied to the problem of food, it shows that the reduction of wastage should get top priority. There are no reliable data about the quantities of food wasted in India. But Mr. Menon points out that 50

per cent of the food produced in India may be wasted because of pests, poor storage and lack of transport facility.

Mr. P.N. Mittal analyses political problems and highlights the impact of illiteracy, poverty, local and regional loyalties which hamper the emergence of successful democratic society, but he thinks that India has shown the will to exist as free democratic society and rules out any possible danger to it.

Rural works programme has been making efforts to solve an important rural problem. Mr. B.M. Pandey points out its inadequacies and the need to strengthen this programme. An attempt has also been made to highlight the demographic problems of India through a study of Chhamb and Jaurian included in the present volume. The problems of family planning include discussion on the attitudes of women and an investigation into certain aspects like spacing of births, norms for children and sex education. Though all these papers are based on field studies, supported by statistical data, and may be important in their own place, they do not present a comprehensive picture of the entire country.

The book also includes a section on sociological and cultural problems but here the analysis does not bear much relation to the major part of the book. But all in all, it provides a mixed fare, touching a wide range of subjects and providing stimulating material.

AID, MONOPOLY AND GROWTH

(1) *Impact of Foreign Aid on Indian Economic Development*; (2) *Monopolies and their Regulations in India, and (3) Theory of interest.* (Papers read at the Indian Economic Conference, Calcutta, 1966), Popular Prakashan, Bombay. Pages 95+46+59. Price Rs. 7.50 each.

M. Sundara Rajan

WHERE there are two economists, generally three opinions prevail on any issue! But they deserve a hearing, especially when they happen to be from the cream of the country's intellectuals, all the more when

the issues they have raised are relevant to India's economic growth.

The Papers on the impact of foreign aid are outspoken and expose the drawbacks in the whole exercise. It is pointed out that our objectives were not clear enough while concluding many agreements with foreign enterprises. For example, conditions restricting exports by the projects were accepted, as the objective of self-sustaining growth became secondary to that of adding to the national income in the short run. It is stated that the public sector steel plants were developed on a turn-key type, and the terms of assistance, to quote the Estimates Committee, could have been better. Substantial economies of scale could have been realised by bold expansion plans. In some of the public sector fertiliser units, Indian technicians complain, their talents have not been adequately used. Our ignorance of the world market conditions, it is said, was responsible for the unduly favourable agreements with foreign oil refinery firms in the beginning.

Even when external assistance was available, aid was under-utilised. Have we built up the structural changes necessary for a take-off, in the breathing space made available by foreign aid? The answer is not encouraging. The percentage of aid utilised was 46.44, 56.74 and 71.64 in the First, Second and Third Plans respectively. One explanation for not utilising the aid fully is that aid is tied to projects which provide initial capital formation and not the requisite raw materials and components. Where there is non-project aid, the utilisation has been higher. Over-estimate of our capacity to absorb aid has created excess capacity in some industries. Once the capacity in the form of capital goods is installed, producers scramble for scarce inputs and bid up prices. Thus a structural imbalance results, followed by an inflationary impact. Moreover, it is stated that 30 per cent of the total U.S. aid and 71.3 per cent of the total World Bank and IDA loans to India have been devoted for the development of basic overhead services. In the short-run, this process is inflationary. It is also argued that agriculture in India, with its small holdings and over-manned character, could not have generated the surplus needed

for industrial development. Hence the charge of an undesirable diversion of allocation of resources towards industry at the expense of agriculture is sought to be refuted. It is stated that the contribution of agricultural saving for financing non-agricultural investment has declined.

Nor did the counter-part finance to projects, started with foreign aid, come entirely from domestic savings. Deficit financing of part of the public sector outlay was resorted to. And what is more, domestic savings as a percentage of national income began to limp just after large doses of foreign aid arrived. This seems to have freed domestic resources for unproductive and wasteful applications. Though all this needs much more empirical confirmation, the lesson of *Swadeshi* conveyed by these agreements cannot be ignored.

The role of foreign private capital has been discussed with equal frankness. A.U.S. survey in 1965 said India ranks amongst the high profitability areas for American investments. It said: it is more paying to invest in India than in the Philippines, Australia, Switzerland, United Kingdom or Norway. Much of the recent influx of private capital has gone to patent-protected chemical and pharmaceutical industry or light electrical and engineering goods. A U.S. Senate Committee Report of June 1961 said prices in India for antibiotics are among the highest in the World.

It is pointed out that foreign firms cater for the protected internal market and are of little help in the country's export drive. They might have brought new skills and benefits of foreign research. But they are yet to percolate down the native fabric. Moreover, as one Paper points out, additional investment from the foreign firms comes in the form of ploughed-back profits rather than as fresh inflow. Less than 40 per cent of the profits are reported retained. Thus, notwithstanding the encouragement given for re-investment of profits, remittances are likely to be considerable. The problem of repayment of official loans is also dealt with in a separate paper. The familiar idea of getting more aid in the short period, to avoid aid altogether, has been reiterated.

But how to attract more capital? One paper points out that relax-

ation and exceptions have been made to the Industrial Policy Resolution. The Administrative Reforms Commission, it may be recalled, has also recommended that a Resolution on foreign investment should be issued stating beyond doubt the conditions for allowing foreign collaboration.

Equally revealing are the papers on monopoly and its regulation.

The Monopolies Inquiry Commission (1965) revealed two types of concentration or monopolies, namely (i) industry-wise and (ii) country-wise. In the former, a study of 100 selected products revealed that nearly 65 of them were under very high monopoly. In the latter, it was found that 75 dominant groups control nearly 47 per cent of the assets of all non-government and non-banking companies. One of the papers repudiates the Commission's idea that monopolies bring about the growth of developing economies. It has been pointed out that Big Business retards the rate of capital formation, crush the small firms, derive profits from superior bargaining power, and fleece the maximum from the vantage position of operating in a sheltered market. In the absence of competition the giant corporations, even the larger ones, have spent pretty little on research and development. The so-called industrial diversification is often a respectable name for misdirected investment. Monopoly leads to under-utilisation of the factors of production and reduces national income, besides widening social disparities.

What is perhaps a unique feature of the Indian economy is that the Government itself is part of a vicious circle of monopoly formed in the private sector. The Government has played, it is stated, a positive role in the growth of monopolies by its control and licensing policies. There cannot be competition when there is an acute scarcity of foreign exchange and domestic resources. While a few at the Conference wanted an end to licenses to large groups at any cost, the general feeling was that it was neither worthwhile nor feasible. If the choice is something or nothing, it was argued that monopoly in specific areas can be justified. Mr. R.K. Hazari, the Rapporteur, says that in a certain context,

"concentration of economic power may have to be tolerated in the interests of economic growth as an evil lesser than the economic sin of self-denial."

What is the way out? One paper suggests that existing monopolies should not be allowed to expand, even if they cannot be eliminated due to historical reasons. And, countervailing powers should be made effective. More harmful than monopolies are the restrictive trade practices. One of the papers makes copious references to the experience in U.K. of the Restrictive Practices Count, with several case studies and says it has a lesson for India. Instead of registering all restrictive trade agreements, and leaving it to the Monopolies Commission to question their ill-effects, the Paper suggests that all restrictive practices should be declared illegal *per se*. Only such business agreements as are considered by the proposed Commission to be in public interest may be allowed.

Certain broad policy indications are given. One suggestion is to have import controls in the form of duties instead of quotas. Another is that new articles could be made with available plants. However, the implications of these policies are not brought out fully.

Again, it is not clarified whether the public sector could prove an antidote to private monopoly. Of course, one is reminded that the public sector is no magic wand and that many other steps are needed, such as strict control over prices, establishment of consumers' co-operative stores, social boycott of products of monopolists, and tax on advertisement. It is also pointed out that taxation is not a sure anti-monopoly exercise, as the tax burden can and has been shifted. Then there is the problem of contribution of funds to political parties by Big Business. Who will kill the goose that lays the golden egg?

The papers pointed out that control of monopolies in India would be a unique experiment, as planning in this country endeavours to reconcile the conflicting demands posed by the objectives of growth as well as equality.

The papers on the Theory of Interest, though not meant for the layman, would be found useful by students of economics. The discus-

sions cover a wide range of interest theories, Classical, the Neo-classical, the Keynesian and the later growth models. The rate of interest for development planning has also been analysed. It has been pointed out that additional special finance has not led to lower interest rates in the organised financial sector in a developing country, but rather resulted in upward shifts in the supply and demand curves of finance. The effect of a change in the price level on the level of employment and the liquidity preference and the problem of selecting rates of interest for development planning are discussed. There is also an attempt to reconcile the Loanable Fund Theory and the Liquidity Preference Theory beside an examination of the relevance of the expected profitability of investment in determining the rate of interest.

OTHER BOOKS RECEIVED

UNCTAD-II A Step Forward by H.D. Shourie. Published by Indian Institute of Foreign Trade, New Delhi. 407 pages. Rs. 14.50.

A Comparative Study of the Economics of Minor Sources of Irrigation in Uttar Pradesh by Dr. Shridhar Misra. Published by Oxford and IBH Publishing Co., Calcutta. 269 pages. Rs. 20.

Production and Consumption of Fertilisers. Annual Review: 1967-68. Published by The Fertiliser Association of India. New Delhi. 81 pages. Rs. 3.

Formulation and Execution of Block Plans by R.B. Das & D.P. Singh. Published by Institute of Public Administration, Lucknow University. 154 pages. Rs. 12.

The Brahmanical Culture and Modernity by A. D. Moddie. Published by Asia Publishing House, Bombay. 143 pages. Rs. 16.

Peaceful Co-existence and Intellectual Freedom by A.D. Sakharov. Published by Siddhartha Publications (P) Ltd., Delhi. 44 pages Rs. 2.

A Study on the Match Industry in Kerala by John Thomas Chirayath. Published by Labour & Industrial Bureau, Trivandrum. 166 pages.

Evaluation of Benefits of Irrigation—Gang Canal (Rajasthan). Published by Research Programmes Committee, Planning Commission, New Delhi.



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ANATOMY OF DEFEAT

DEFEAT is always dismal, especially when the expectations of victory are high. This is particularly true when winning becomes a matter of prestige, and not an accepted hazard of competitive sport. It is, therefore, understandable that a sense of sorrow and disbelief overtook the entire country, following India's defeat in the semifinals of the Olympic hockey tournament in Mexico City last month.

In one shattering moment, all our hopes so fondly cherished were deflated. And, let us admit, it is difficult for us to be reconciled to the fact that we have never been pushed so low down the world hockey ladder as now. To be sure, we have had our reverses before: when we lost the Asian Games gold medal to Pakistan in 1958 and 1962, and the Olympic crown to the same country in 1960. To us Indians, who have literally lived with the old medal in Olympic hockey from 1928 to 1960, and regained it in 1964, it is a big wrench indeed; and will hardly be human if we do not feel the pang.

As far as hockey is concerned, we have always known that Pakistan were our only challengers. It has been the same with our friends on the other side of the fence. We have accepted this as an inescapable reality and conditioned our thinking accordingly.

In Mexico City things turned out differently. After stumbling through the preliminary matches, it seemed that history could repeat itself, and we would have to fight it out with Pakistan in the final. But, we crashed almost within sight of the (coveted) gold medal, and failed for the first time in 40 years to enter the final. But, the unkindest cut of all was that the conquerors were not our erstwhile team-mates, but Australia, the 'babes' of Olympic hockey! Who could believe that a side we have ever considered worth our strife

would deny us a privilege we had enjoyed in eight successive Olympics?

The unbelievable has become true and the unthinkable has happened; and shock has been succeeded by bewilderment. Is this possible? The "bronze" medal, we have got for our pains, gives the mocking answer. As it happens in all such cases, our feeling of humiliation is finding expression in recrimination and fault-finding. This is only to be expected.

The late President John F. Kennedy said in a different context, "Victory has a thousand fathers, defeat is an orphan". How true. Where are the men who claimed "Victory" even before it had been won? Where are the prophets who promised the "gold medal" even before a single match had been played? Where, are those who swore by our invincibility? Naturally, they are all silent. Also, the price of ignominy is being paid by the men who battled on the field of play and lost. They returned home to oblivion, for, after all, they are "merely players, who have their exits and their entrances". Such is life, such indeed is today's sport.

PROBLEM DOLLARS

The U.S. Treasury Department is faced with a problem. It has three million silver dollars stashed away in its basement vault, and, believe it or not, it doesn't know what to do with them! It has been working on the problem for the past four years, but has not been able to find a solution. Of course, most of us could find one in less than four seconds!

The problem, of course, isn't quite simple. The silver dollars have become collectors' items. They are worth much more than a mere dollar. One treasury official estimates that the three million silver dollars are worth seventy-five million dollars today.

Most of these silver dollars were minted in Carson City, Nevada, in the late 1880s. No more have been

Side Track



IGNORAMAN
Wants to Know

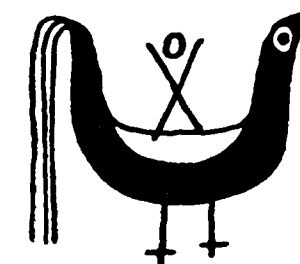
If

"Gold Control" scared
our Hockey Olympians

minted since 1935, and there are not plans to make any more of them.

A couple of years ago Congress considered a bill to have the Treasury sell the coins for a dollar to the heart and cancer societies, which could sell them to dealers and collectors at their present value and use the profits for further research. The Treasury didn't go for the plan because that would have discriminated against other groups doing similar work in other fields.

And so it appears that even getting rid of money can become a problem, although who would have thought that getting rid of money would ever become a problem in today's spendthrift world!



WORDS THAT INSPIRE

If I was born a woman, I would rise in rebellion against any pretension on the part of man that woman is born to be his plaything.

A woman must cease to consider herself the object of man's lust. The remedy is more in her hands than man's. She must refuse to adorn herself for men, including her husband, if she will be an equal partner with man. I cannot imagine Sita ever wasting a single moment on pleasing Rama through physical charm.

The saying attributed to Manu that "for woman there can be no freedom" is not to me sacrosanct. It only shows that probably, at the time when it was promulgated, women were kept in a state of subjection. The epithets used in our literature to describe a wife are *Ardhangana*, 'the better half', and *Sahadharmini*, 'the helpmate'.

Man and woman are equal in status, but are not identical. They are a peerless pair being complementary to one another; each helps the other, so that without the one the existence of the other cannot be conceived; and therefore it follows as a necessary corollary from these facts that anything that will impair the status of either of them will involve the equal ruin of both.

I should treat daughters and sons on a footing of perfect equality.

I have pointed out from time to time that there is no justification for men to deprive women of, or to deny to them, equal rights on the ground of their illiteracy. But education is essential for enabling women to assert these natural rights, to exercise them wisely, and to work for their expansion.

It is no exaggeration to say that a human being without education is not far removed from an animal. Education, therefore, is necessary for women as it is for men. Not that the methods of education should be identical in both cases.

The future of India lies on your (mothers') knees, for you will nurture the future generation. You can bring up the children of India to become simple, God-fearing and brave men and women, or you can coddle them to be weaklings, unfit to brave the storms of life and used to foreign fineries which they would find it difficult in after-life to discard.

They may not ape the manner of the West, which may be suited to its environment. They must apply methods suited to the Indian genius and Indian environment. Theirs must be the strong, controlling, purifying, steadying hand, conserving what is best in our culture and rejecting what is base and degrading. This is the work of Sitas, Draupadis, Savitris and Damayantis, not of amazons and pruders.

To call woman the weaker sex is a libel; it is man's injustice to woman. If by strength is meant brute strength then, indeed, is woman less brute than man.

Any young man who makes dowry a condition of marriage discredits his education and his country and dishonours womanhood.

The system has to go. Marriage must cease to be a matter of arrangement made by parents for money. The system is intimately connected with caste. So long as the choice is restricted to a few hundred young men or young women of a particular caste, the system will persist no matter what is said against it.

All this means education of a character that will revolutionise the mentality of the youth of the nation.

Voluntary widowhood consciously adopted by a woman who has felt the affection of a partner adds grace and dignity to life, sanctifies the home and uplifts religion itself.

Widowhood imposed by religion or custom is an unbearable yoke. It defiles the home by secret vice and degrades religion.

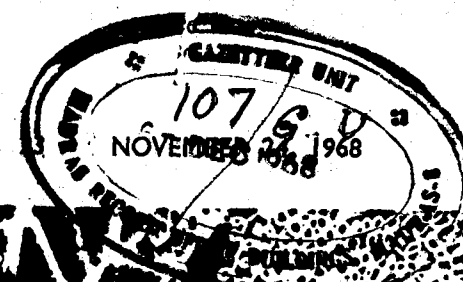
If I can say so without arrogance and with due humility, my message and methods are, indeed, in their essentials for the whole world and it gives me keen satisfaction to know that it has already received a wonderful response in the hearts of a large and daily-growing number of men and women in the West.

I feel in the inmost recesses of my heart..... that the world is sick up to death of blood-spilling. The world is seeking a way out, and I flatter myself with the belief that perhaps it will be the privilege of the ancient land of India to show that way out to the hungering world.

The better mind of the world desires today not absolutely independent States warring one against another, but a federation of friendly interdependent States. The consummation of that event may be far off. I want to make no grand claim for our country. But I see nothing grand or impossible about our expressing our readiness for universal interdependence rather than independence.

I want co-operation between nations for the salvaging of civilization, but co-operation presupposes free nations worthy of co-operation.

TWELFTH YEAR



BIG DEEDS

HUMBLE MEN

In this feature Yojana seeks to present the outstanding achievements of some of the many millions of obscure men and women who are working to build tomorrow's India.

BOLANGIR'S BREAKTHROUGH

The farmers of Bolangir district in Orissa have a sense of fulfilment today. Through their efforts and determination, the district has been turned from one of scarcity to that of plenty in agriculture.

Till 1966-67, Taichung was comparatively unknown to these farmers. A spectacular breakthrough in agriculture came in 1967-68 Kharif, when, for the first time, 5,494 acres were brought under the high-yielding variety—Taichung Native-I.

The capping success of this first experiment in the high-yielding programme came when Laxman Kumar Dharua of Kutenpali of Loisingha Block produced a record yield of 195 maunds of grain per acre.

In recognition of his achievement, the State Government presented him with a pumping set and Loisingha Panchayat Samiti gave him a power sprayer. The State Chief Minister's New Year Greeting Card featured him along with another farmer.

A sense of competition has developed amongst the farmers of the district. The encouraging results of high-yielding programme in the Kharif of 1967-68 had its impact on the Rabi prospects. Bereft of irrigation facilities in the district, the people took up the challenge and impounded water wherever available. Small cross-bunds were put up across streams

and rivers. New lands were reclaimed. Water was pumped from these small reservoirs. Youth clubs took the initiative of reclaiming lands.

During the Rabi season of 1967-68, an ambitious target of 20,690 acres for growing Taichung was fixed. Of this, 20,000 acres were in two blocks and 690 acres were spread over various Blocks in the district. The farmers' will and courage, and assistance and guidance from governmental agencies have made it a success.

The target was exceeded and Taichung was grown over 22,800 acres of land.

Today, in many areas of Bolangir, one can see lush green Taichung fields and the farmers' smiling faces. And a new confidence has developed. Already, the change has had its impact on paddy procurement. As much as 25,000 tonnes have been procured by June 1968, as against 7,000 tonnes procured in 1964-65, which was the highest since 1959.

RICE FOLLOWS WHEAT IN SAME FIELD

Kashmir Valley, which has been a single cereal crop area through the ages, is undergoing a silent transformation in agricultural production with the successful introduction of Sonora-64 wheat. This high-yielding variety of wheat, which was sown in some parts of Anantnag district in October/November last year after the year's bumper paddy crop had been gathered has just been harvested with encouraging results. According to first reports, the yield from about 5,000 acres in Anantnag District is about 120,000 maunds. The average yield per acre is reported to be from 14 maunds to 27 maunds as against the average of 7 maunds per acre from the local variety of wheat, which, however, could not be grown in paddy land. Agricultural experts expect the yield from Sonora-64 to go up to 40 maunds per acre in due course.

Nila Kanth Razdan of Lariyar in Tral block is one of the many

farmers who have cultivated Sonora 64 as a second cereal crop in the Rabi season in place of the usual crop of oil seeds. He reaped about 25 maunds of wheat from his irrigated plot of 7 kanals in place of about 2 maunds of oil seeds worth about Rs 100. He earned an income of Rs 900 by cultivating wheat.

Razdan reaped his wheat crop on June 16 this year and sowed paddy ten days later in the same plot. This experiment has made other farmers inquisitive because two cereal crops in the same plot in the course of a year are unheard of in this part of the country.

HIGH-YIELDING GRAINS AT A HEIGHT

From Pamakhar village in the Tawang Sub-Division of NEFA comes the story of an enterprising cultivator. Sang Khandu, the village headman, gave the lead to his fellow tribesmen in the cultivation of a high-yielding variety of wheat.

The local administration tried to introduce this year VLI-401, the high-yielding variety of wheat, but found the peasantry unwilling to adopt it. All the efforts of the Gram Sevak were in vain. Growing any kind of foodgrains above an altitude of 7,000 ft. is a very difficult task. The height of Pamakhar is 7,500 ft. The tribesmen normally obtain a yield of 8 to 10 maunds of the local variety of wheat which is meagre when compared with the amount of labour they put in.

In spite of discouragement from his friends, Khandu volunteered to try the new variety of wheat in a plot measuring one third of an acre and following the instructions of the Gram Sevak to the minutest detail produced 5 maunds of glistening grains, which works out to one and a half times the average yield.

Following Khandu's success, other farmers are now eager to grow the new variety of wheat.

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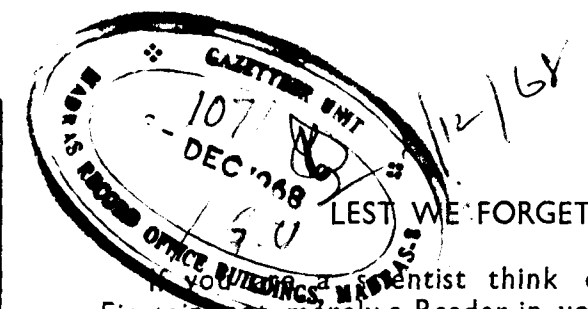
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...scientist think of becoming an Einstein, not merely a Reader in your university. If you are a medical man, think of some discovery which will bring healing to the human race. If you are an engineer, think of some new invention. The mere act of aiming at something big makes you big

— Jawaharlal Nehru

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RAILWAYS RECOVERY

For the Indian Railways, the largest single undertaking in India, the year 1966-67 was a dismal one. For the first time in 25 years, the year closed with a budget deficit which amounted to Rs 182.7 million. This, despite the fact that gross traffic receipts during the year came to Rs 7,687.8 million, representing an increase of Rs 352.1 million (4.8 per cent) over the previous year. But this was more than offset by a sudden spurt in working expenses, which shot up by Rs 562.1 million to Rs 6,392.5 million (an increase of 9.6 per cent). After paying Rs 1,323.9 millions to the Central Revenues, including payments to States in lieu of tax on passenger fares and meeting other expenses, the Railways found themselves in the red.

While steps were taken to introduce economy without impairing operational efficiency, it became abundantly clear that promotion of traffic through a customer-oriented campaign was the only dependable way of increasing earnings. It was obvious that freight traffic, which accounts for about 63 per cent of the gross traffic receipts, should be given special attention.

In June 1967 Marketing and Sales Organisations were set up on all zonal railways for, among other things, obtaining new traffic and winning back traffic lost to other modes of transport in the last few years.

Officers specially selected to head these organisations were given intensive training in Railway establishments and with important private sector concerns to gain first-hand knowledge and experience of business methods and commercial practices. Working mostly on the basis of personal contacts, these officers acquaint themselves with the requirements and transport problems of existing and prospective customers, locate and remove irritants and bottlenecks and ensure that goods are transported and delivered within the agreed time. Through intensive and extensive market research they find out what additional traffic, specially high-rated traffic, which normally tends to move by road or other means of transport, could be attracted by the Railways. Clearance of traffic, specially from areas where there are occasional shortages of wagons and in commodities that are either high-rated or vulnerable to competition by alternative means of transport, is kept under a very close watch.

The drive has already started to pay dividends. In the Central Railway, considerable quantities of petroleum products which were moving by road between Bombay and Poona are now carried by rail. The Eastern and South Eastern Railways have won traffic in motor cars and are running four to five special trains a month to move these cars to Delhi and points beyond. Special arrangements have been made for moving tea from Assam and Dooars to Calcutta and for the delivery of the consignments at the customers' godowns.

Typifying the orientation of the Railways' service to customer needs and customers' satisfaction are the container services started on an experimental basis between Bombay and Ahmedabad in January 1966. The container service marks a revolutionary development in the history of Indian Railways and has been hailed as a miniature revolution in the field of transportation. It is opening new traffic horizons and gearing up the Railways to offer a complete, comprehensive and door-to-door rail-cum-road service free from delays, damages and compensation claims. The service is completely new, both in concept and in equipment used. Three types of containers are now in use. One of these has a 4.5 tonne capacity. There is another which is collapsible and has a payload of 62 kg, while a third variety has a one tonne capacity.

The Railway Designs and Standards Organisation has designed a new 5-tonne container capable of moving on both broad gauge and metre gauge services.

Fourth Plan framework not materially affected by Reduced Foreign Aid . . . says Gadgil

What has come out of the Planning

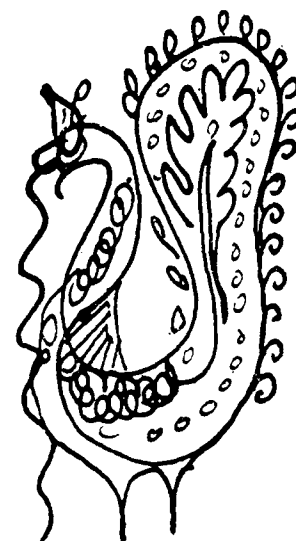
Delegation's visit to the Soviet Union ?

It was the main endeavour of the delegation to convince the Russians that because of the progress made in the industrialisation of India, it was no longer necessary for us to import to the same extent plant and machinery from the Soviet Union and that our requirements of imports in the Fourth Plan were wider, including components and raw materials and things such as ships, fertilisers and so forth. Also, it would be necessary in the changed circumstances (if we have to keep up a larger volume of trade with that country) that the Russians should think in terms of making available to us some other types of goods which we require in the Plan. We were satisfied largely because we thought there was a fair appreciation of this changed circumstance among the Russian leaders and officials with whom we talked.

With lesser aid coming in, will

Fourth Plan Approach be changed ?

The framework, I do not think, will be materially affected because it was prepared to suit the changing circumstances of which less reliance on aid was already



Prof. D.R. Gadgil, Deputy Chairman, Planning Commission, was answering questions put to him by Mr Dilip Mukerjee of the Statesman and Prof. Gyan Chand, economist, at the India International Centre in New Delhi last month. This is an abridged version of the questions and Prof. Gadgil's replies.

an important component. Maybe, because we are not yet sure, we are working out the details. The lesser aid component may affect the size of the Plan; but here I should like to draw the attention to one factor, that is in this sphere of foreign aid the climate changes so often and so quickly that we need not necessarily make a very firm five-year projection now. I would give an illustration. At the beginning of this year when we, within the Planning Commission, were thinking of the Approach, knowledgeable persons, knowledgeable in foreign aid, thought that our aim of reducing foreign aid to about half by the end of five years was too drastic. They thought, much more aid could be available and it was not good of us to deny ourselves this possibility. Today the same experts say that much less aid would be there and, therefore, this is obviously an area in which firm projections for a five-year period seem to be dangerous. We would therefore proceed naturally, so far as the annual Plans are concerned, more or less on the basis of what is immediately available. But on the five-year basis I think it would be safe to go on the broad expectations that we had made earlier.

Has planning largely failed ?

Self-criticism is always necessary and, in a country like ours going through a new experiment in conditions which are very difficult, continuous self-criticism, I think, should be exercised, specially by those in authority. There is no doubt about that. There is no doubt again that planning continuously should take full account of the analysis of past experience and that if there have been failures, a proper accounting for the reasons of the failures. And it is most essential to allow for them in the future Plans to the extent that you can.

Can work on the Plans be the same in the changed political structure ?

I am not in a position to appreciate the emphasis on the altered political structure, in the sense that I have not seen any considerable difference between the Chief Ministers belonging to various parties as regards their readiness to tax. It is not because, it appears to me, in the post-'67 structure the State Governments do not all belong to one party that the resource mobilisation has become specially difficult.

Resource mobilisation is difficult on two counts. Firstly, when the country has been passing through an agricultural crisis and an industrial recession, resource mobilisation is difficult *per se*. Secondly, when it happens, as it is happening now, that there is a certain shift in income and the classes from whom resources are likely to be raised are classes who are, politically speaking, more important, more influential, such as the substantial farmer class, the resource raising does become difficult. But that has not anything to do with the situations of the various political parties in the country.

I am merely suggesting that the political problem is the problem of raising resources, that the political leadership may find it difficult; but the way the situation and the general attitudes have changed during the last

six or nine months makes me think that once the problem is put squarely, there will be a greater readiness to raise resources than appears at present.

Are not vested interests in a stronger position now ?

I find it quite difficult to agree that during the last nine months in particular the vested interests have become stronger necessarily. If there has been that general tendency or trend, I think it has been over a much longer period, over a five-year or a ten-year period. When we talk of the vested interests becoming stronger, in the political sense, and influencing planning, I believe we are apt to neglect one aspect of the situation, maybe because this country never had a monolithic party. We have no necessary guarantee of a particular interest or interests holding the field absolutely.

If the vested interests are in political power, then those in political power are finding it more and more difficult to restrain a great many exhibitions of resistance to existing policies and a general trend towards, what you may call, the lowering of order in the country. Now, that does not seem to me to be a sign of the vested interests being so entrenched that they can carry with them everything.

I believe, therefore, that it is particularly in times like these that it is possible to put a programme before the country, which is better balanced, which does not give in all the way to vested interests, which tries to the extent possible in that situation to look to the interests of others, as we have said in the Plan Approach, to the smaller farmer, to the weaker sections, to the employment of the landless labourer, to the dispersal of industry. If such a programme is meaningfully put forward, there would be a greater pressure in the circumstances on those in power to accept such a programme than would be otherwise. So that my own analysis would be that though the vested interests are important, their power is really not absolute and there is nothing to prevent, quite apart from intellectuals outside, even the specialists to put forth ideas that would, so to say, match the situation more evenly.

How can imbalance between States be set right ?

Regarding the imbalance between the States, there have already been two meetings of a Committee of Chief Ministers of the National Development Council. One result already established is that in distributing Central assistance to the States, special consideration should be given to the fact of the income of a State—the per capita income of the State being less than the national average.

All the Chief Ministers have agreed that a given proportion of the total Central assistance in the next Five Year Plan, defined as 10 per cent, should be specially distributed to such States. Maybe, that by itself will not cure the imbalance. That is quite obvious; but the recognition by all the Chief Ministers unanimously is an important step forward.

In the second of these meetings, considerable attention was given to the problem of other factors making for imbalance, such as the location of the Central projects, the help given by financial institutions to private or public or co-operative industry and so forth in various areas. The very detailed data that the Planning Commission compiled in this regard showed an extremely disparate distribution between States.

Now, on an analysis, it would seem that this was only in part due to outside action. In part, the infrastructure development within the States in terms of communication development, power development, even more importantly, the institutional development, such as of the co-operative structure, was rather an extremely important factor in getting private or co-operative industry established.

And if a private or co-operative industry were not so established, it is quite obvious that financial help from outside the national institutions will not be forthcoming. It is, therefore, definitely recognised by all the Chief Ministers that this was part of their own responsibility.

At the same time, it was recognised by the financial institutions—the Governor of the Reserve Bank taking a lead in this matter—that, looking at the retarded development in some areas and in some States, it was necessary for them to make some adjustments in their policies, in procedures, in terms of repayment of charges, of a sort of yardstick they apply of viability and so forth. The Bank would not give up in entirety the general banking view. But all these concessions in terms of procedures and charges, could be made and should be made. In fact, the Planning Commission is appointing a Working Group to go into the details of these matters with the help of financial institutions. I do not expect a great change to come about immediately, but I do feel that following these two meetings of the Chief Ministers there is sufficient change in the climate of opinion to hope for some concrete steps being taken so that slowly, at least, the widening of imbalance will be stopped.

What are the steps taken to prevent price rise ?

In September last year I said the immediate objective was maintaining price stability. Then I said that if the harvest was at all good, prices would maintain by themselves a downward pressure from about October to March and the real problem was to see that they were kept from rising rapidly from May to September. In fact, prices went down from something like 222 in terms of the wholesale index in September to roughly 202 in February and they have not risen above 209. So, the policy has more or less succeeded. We have to take account of the fact that failures of rains in August pushed up prices immediately so that the great sensitivity of the Indian economy and the Indian price structure to the monsoon was again exemplified and today we are back at the September 1967 level. We are not above it. I reckon that during the next month (November) a downward trend will again begin. If a programme of building a buffer

stock of three to five million tonnes succeeds, then it would certainly curb the tendency to a rise in prices on the slightest flimsiness of the weather or a bad monsoon as was exemplified this year. The Planning Commission programme, which is being fully endorsed by the Government, is, to begin with, to build up a two or three million tonne-buffer stock within two or three years, and operate it over a period so that the Government is in a position (a) to even out physical supplies between years and (b) to see that the crucial foodgrain cereals prices are not fluctuating widely.

The other aspect of inflation is deficit financing. Now here the calculations are rather difficult to make. During the last year deficit financing possible has been of the order of Rs 100 crore and yet the inflationary pressure has not been greatly visible. Now this does not mean that I am subscribing to the proposition that you can live with deficit financing of that order. But it is obvious that some amount of deficit financing is permissible. How much of it is permissible is a matter for calculation. But I do believe this also that the more the Government has instruments, such as buffer stock of cereal foodgrains, buffer stock of other agricultural commodities, by which to control the economy, the greater the risks it can take in times of emergency with deficit financing. But I entirely agree that the stability condition is important and that without paying a great deal of attention to stability, you cannot think in terms of continuous economic development.

What are the steps contemplated to reduce class disparities ?

In the circumstances in which we find ourselves, the ordinary way—through physical devices or through insurance measures—of greatly increasing the standard of living of the lower classes is denied to us. We just do not have the resources. Therefore, given a structure that the planning has today, what the Government has to do is to concentrate attention on broadening the base of economic activity, the resource base and the base of the weaker sections in the community. The only programmes that the Approach to the Plan incorporates are therefore plans of economic development of these classes. What we are concerned with is, for example, how to help the small holders to broaden his base. What are the supplementary things that we can give to the landless labour? How can you link the period of employment of the labour during the year? What can you do to the artisans, to the forest labourers, to those various classes who are the weaker sections?

Now these problems are extremely difficult, because each one of them has to be tackled specifically. There is no general prescription here at all. And our emphasis in the Plan is on making as many experiments as possible in relation to these in various directions in all the States so that some general programme would emerge. I fully visualise that to most people this will appear to be too gradual a programme, lacking revolution. I do not immediately see what actually could be done.

safe landings for supersonic aircraft... on Dunlop jet tyres

As an IAF supersonic fighter touches down, Dunlop jet tyres, made in India, take the shock of landing and help the pilot to stop within the limits of safety. Ever since the first aeroplane to come to India landed on Dunlop tyres, India's airmen and Dunlop have flown together to reach new heights. Dunlop was the first to manufacture aero tyres in India. In 1953, Dunlop successfully met a new challenge: making tyres for jets. And today, IAF aircraft, including the famous Gnats and Hunters and the new supersonic fighters like HF 24 are equipped with Dunlop jet tyres. Civil aviation, too, has been developing fast and Dunlop manufactures tyres for almost every kind of aircraft flying in the Indian skies.



DUNLOP INDIA —keeping pace with India's Aviation

DPRC-21

What concrete measures are there to uplift the small farmer ?

Given the fact that we are an ancient land so that all the land resources have been fully occupied at a relatively low level of technology, and given the fact of our continuously increasing numbers, the dilemma is that we have not the resources for adopting a high-level of modern technology in many respects immediately. With the immediate unemployment effects of the adoption of high-level modern technology, we have to watch our steps more carefully.

The middling and the substantial cultivator have contacts with officialdom; they are members of Boards of Co-operatives and so forth. So they are in a position to profit from any new mode of assistance that comes forward or any new governmental programme that has developed. The smaller farmer does not have those contacts, does not often know the programmes and has not the manoeuvrability of resources which are oftentimes required for taking advantage of them and this is the same with any programmes that you can think of. There have been, for example, for some years past, governmental programmes for guaranteeing small risks in small industries. The complaint from banks—quite a number of co-operative banks—is that no individual viable applications come to them in that regard. So the position is difficult. Any programme by itself will not be helpful to them. Unless you go out of your way, unless there are governmental agencies and unless there is an adjustment of the programmes in such a way that these classes get the help and, in fact, profit, nothing is going to happen. I believe there is a greater ready recognition today of this basic reason for our failures. I have recognised this fact for some time and, I believe, it is true of the Planning Commission. It is possible to communicate this slowly to the Ministries and it is possible to lay emphasis on taking special steps for orienting your programmes.

And then the other example, of the Reserve Bank giving concessions for location of industry in backward areas. This is an area in which, I believe, even the vested interests are clever enough to see that unless they do something, opposition to them will grow. This is an area of doing something concretely, so to say, for the underdog, or the weaker sections. It does not cost a great deal. The inputs are personal inputs, administrative inputs, of taking an intelligent view of the programmes rather than so much money in the first instance. I would not entirely say I am thoroughly optimistic, and immediately things will happen.

To what extent will defence expenditure affect development ?

In a broad way the real difficulty is that in this country all considerations of defence are wrapped up in great secrecy. And this is a sort of thing in which the general public is not interested or should not be taken into confidence. So that, whereas in other countries White Papers are placed before Parliament which say what the strategy is, what the costs are and

when the strategy is changed, why it has been changed, unfortunately, we here and, I am afraid, we include the Planning Commission, know too little about it. So that we do not really know why defence expenditure is likely to rise. The real important point is that we have a beginning of a general debate as to what is our strategy...I take it that it is generally agreed that in the context of the country's development of technology—a big country like India can never be secure. It just has not the resources to completely man itself against all eventualities.

Obviously, therefore, we must choose a certain level as being the compromise between what we can afford and what we think we must have. Now what that level should be, how it should be reached, and whether it will begin to go rather into our developmental expenditure is extremely important...Any large further expenditure on defence will definitely be at the expense of development, and I think that needs no explanation at all. It is very clear. But if we have to take a decision that defence expenditure must increase, development must give way, it is, I think, due to the people at large that they should understand the full implications and why the decisions were taken. Well, to the extent that the Planning Commission is concerned with it, for example it is extremely closely concerned with the administration of the management of the public sector enterprise, it is a matter in which the Planning Commission does not say it has nothing to do. The Planning Commission has views on those matters which it proposes to put in cogent form and to press on the authorities.

AUTHORISED FOREIGN LOANS FOR INDIA'S DEVELOPMENT TOTAL ABOUT RS 8,000 CRORE

The total amount of fresh loan agreements signed during July-September this year amounted to Rs 82.18 crore. Loan agreements amounting to Rs 304.37 crore were signed during the earlier quarter April-June.

With these commitments, the total amount authorised by foreign countries and institutions for India's economic development comes to about Rs 7,977.195 crore. This excludes U.S. commodity assistance (under P. L. 480), all grants and the drawings from the International Monetary Fund.

Out of the new authorisations of Rs 82.18 crore, only Rs 1.5 crore is in the form of project aid. The remainder is non-project aid (including debt relief).

"There is an element of service involved in science and that is why I would want to come back to India. It is very right to say that if I had stayed back, my personal contribution may not have been as much but even if I would have trained up three or four students, I would have done my part."

Picture by T. S. Nagarajan



Dr S. CHANDRASEKHAR TALKS TO YOJANA

Dr. Chandrasekhar, the eminent Professor of Theoretical Astrophysics at Chicago University, was recently in New Delhi to deliver the second Nehru Memorial Lecture on Astronomy in Science and in Human Culture. Dr. Chandrasekhar, who had his education in Madras at Cambridge, has been in Chicago University from 1936 till today teaching and doing research on astrophysics. He became an American citizen in 1953. Dr. Chandrasekhar's brilliant researches on the structure and dynamics of stars and galaxies have won for him many coveted distinctions and honours including the National Medal of Science, the highest award for scientists in the United States, and Padma Vibhushan from India.

IN INDIA THE STRUCTURE FOR WORK IS THERE BUT SCIENTISTS ARE UNHAPPY

"TAKE the Tata Institute of Fundamental Research or the Atomic Energy Establishment. What they have done is a phenomenal achievement by any standards. One can refer to it only in superlative terms. Our Atomic Energy Establishment is as competent as the Canadian. Bhabha's accomplishment in Indian science is really great." Dr. S. Chandrasekhar, the renowned astrophysicist and Distinguished Service Professor of Theoretical Physics at Chicago University, seemed to want to be charitable and point his finger at the brightest patches when

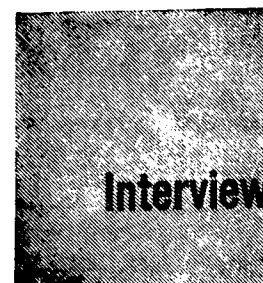
we asked him what he thought about the research carried out at the large number of national laboratories established in the post-independence period. His sensitive face lit up when he made these remarks.

Indian Scientists Are Frustrated

About other national laboratories, he said, "I don't feel as critical as some people here have felt." He was told many times in the last few days that brick and mortar did not make science. But where would anyone work if there were no brick and mortar structure, he was prone to ask. He emphasised, "The point is that these laboratories are there. That is, the structure is available. The very fact that the set-up is there, and the opportunity is there, makes the problem simpler. So when the right people come, they don't have to work to create the structure. Men and equipment have only to fill these laboratories and work." Dr Chandrasekhar was quite confident that the deve-

lopment of these laboratories would be justified in the long run.

But the picture of Indian scientists that presented itself to him in America was not altogether bright. "I want to be frank and honest," he said with disarming candour. "It seems to me that the scientists are not happy. They are frustrated. I do not really know what the origin of it is. The country is passing through difficult times." We probed his mind for any reason that he had for this state of affairs. "There are a variety of reasons. But the main one is that there is insecurity. Many of our young men go abroad and they don't return." But he hastened to add, "It is not for me to criticise. I am one of those who have gone away. But it is an unfortunate situation that most young people want to leave." However, it was not a phenomenon that affected only India, he emphasised. "Take Great Britain, for instance. Some thing like 37 per cent of engineers who graduated from Britain last year migrated to the U.S.A."



Dr Chandrasekhar is too much of a polished gentleman and a refined scientist to take a 'J'accuse' attitude on any question and rush headlong into conclusions. That was why he said, "My own feeling is that *perhaps* there is much needless frustration. It is an unfortunate situation." He had no ready-made remedies. "Somehow or other it has to be rectified. The young people have to be assured that even within the country they will get their worthwhile. Granted that only a certain amount of money is available, it could be made available more easily and with less restrictions." He would of course single out hierarchy as one of the major obstacles in the progress of Indian science. "You seem to be caught in a ladder in which you can't skip a single step. You want to buy an equipment for which you have to get a requisition signed. That goes to the man above you, then above and above and ultimately it is lost. Nobody knows what has happened to it." Something had to be done with these administrative snags, he felt.

Youth Lacks Sense of Pride

But more than all prescriptions of material and administrative changes, Dr Chandrasekhar seemed to lay emphasis on developing a sense of patriotism and pride in our young men, which, he said, they seemed to lack. He felt sorry that it was so. That seems to be the impression uppermost in his mind. When he was asked how India appeared to him now, having been away from India for such a long time, he replied "It is very difficult to say. India is quite different from what it was 40 years ago. However, there is one big difference—I do not know if it is true. There was one thing which was dominant in all our minds: We were proud of Mahatma Gandhi, of Nehru, of Tagore, of Ramanujan. We were proud of the fact that anything that we could do would equate to anything else in the world. I did not participate in politics but I felt that as a person I could do the best if I could have the opportunity." In other words, the whole atmosphere in those days seemed to him to be capable of inspiring the youth and instilling a sense of pride in them. "It does not seem to me that the youth

of today has that sense of pride," Dr Chandrasekhar lamented. But like a true scientist he would hate to be categorical and would leave room for correction. "Maybe I am wrong in thinking so. I have been away so long; I have come back to India after eight years," he added.

India Has Made Significant Progress

And his sense of pride about his mother country made him only too eager to acknowledge her achievements. Since Independence "India has made significant progress," he remarked. To illustrate this he repeated what he had told the Indian Press earlier: "I was in India in 1951 and gave a number of lectures. I was again here ten years later, in 1961, and gave 70 lectures. All those lectures were given in halls which had not existed in 1951. That is to say, in ten years there had been so much construction, so much progress."

Asked if the scientist had a role to play in developing the nation's economy, Dr Chandrasekhar, who has spent almost a lifetime studying the stars and their spectra, said, "He has a definite role to play. After all a scientist is also a citizen and in a democratic country all citizens should contribute their best to national development. A scientist has the competence to contribute. Scientists have to play a key role in many fields, for instance agriculture, technology." And he did not think there was anything wrong in buying the latest know-how from advanced countries to bridge the technological gap in developing countries. "If you can start with the advance which the other countries have made, time and expense can be saved," he said. He did not see any point in starting from scratch and doing everything all over again in fields in which others have progressed considerably.

Sugar Shouldn't be Cut Out to Make Up Protein Deficiency

Perhaps it is Dr Chandrasekhar's devotion to pure science which brought out the telling reply from him to our question whether in a developing country applied research should not take precedence over fundamental research: "If you are

deficient in protein, you have to make up the deficiency. For that you don't have to cut out sugar or carbohydrate, do you? If your diet is deficient, the proper thing is to balance it." In other words, he seemed to say that pure research was entitled to an equal place with applied research.

Dr Chandrasekhar agreed that whether it is in pure science or applied science, achievements in modern research to a large extent depended on sophisticated equipment and well-equipped laboratories. "There is no gainsaying the fact that you need facilities, books, laboratories, equipment," he emphasised. When we brought to his notice that Dr C.V. Raman said recently that he did his Nobel-prize winning work with equipment costing only Rs 300, Dr Chandrasekhar remarked: "True, even today there are examples of discoveries made with very little equipment." But he added, "One should remember that science is not made of great discoveries. It is made of a great amount of information. It does not depend on any single man making a discovery. It depends on a large number of people doing competent work." He would not consider individual brilliance as important as building up a large body of scientists. That is why he would not brook any reference to the eminence that he himself had achieved in science. "I discount firmly all those remarks about my eminence and heights," he said, when we referred to his achievements. "One should remember that in science one tries to contribute to knowledge and it is wrong to identify that contribution in terms of what a single person does. The main thing is that you try not only to contribute to science but help others to contribute."

He largely agreed that it was not correct to judge a nation's scientific excellence by the number of Nobel Prize winners it had in science, except when their number was sufficiently large. "For example," he said "India has only one. Japan has two. Japan's science should be twice as good as India's. As a matter of fact, it is ten times better than India's science because in Japan there are ten times more scientists than in India." To drive home the point, he said "Mahatma

Gandhi was the greatest man of the century. That does not mean India is the greatest country in the world. To take another example, Cherrapunji has the heaviest average rainfall in the world, but it does not mean in India as a whole there is heavy rainfall."

Dr Chandrasekhar, who has strode like a colossus in astronomy and astrophysics for well over three decades laying bare the hidden secrets of distant stars, impresses anyone by his patent humility and simplicity. He carries his eminence lightly on his shoulders. He has no airs and does not throw his weight about. Although he has spent almost a lifetime gazing at the stars, he is not starry-eyed. He pauses for a while and ponders before he answers any question. Typical of a teacher he maintains an equipoise and equanimity and is never ebullient. And training young people in science he considers as the greatest contribution one can make to science. "A scientist's life is more important by the example he provides, the service that he renders to his fellowmen and to his students," he told us. "Science is not a means by which anyone can become a Newton or Einstein. What a scientist does may not be as significant or as important as what Newton or Einstein did, but the values of science can be attained by the extent to which he does the kind of things which the great men have done and help other people to do likewise," Dr Chandrasekhar added.

When we asked him why he chose astronomy from the vast range of scientific subjects, he said, it was purely accidental. "I was interested in certain branches of physics and it turned out that I had an aptitude for it. You are drawn to a thing which you can do. What a scientist does is the result of a great variety of reasons." We asked him a hypothetical question: if he had stayed in India instead of settling down in the United States, would he have achieved what he could now? He thought for a while trying perhaps to look back in a second over the thirty two years he had spent in the United States and then said: "Well, perhaps I would have done less myself. But maybe, I would have created ten

people better than myself in science, and those ten would have trained ten more people and in this way perhaps I would have done much more for science than what I have done. It is possible that a person in India may not be well-known outside India, but if he creates ten people who are well-known, it is significant. There are thousands of physicists living today in different countries contributing to science and thus helping their countries to develop."

What about Coming Back to India?

This, we thought, was an opportune moment to ask the renowned astrophysicist if he had ever toyed with the idea of coming back to this country and give a chance to the new generation to benefit from his experience. When we posed the question, he crossed his fingers, looked up at the skies, as it were, and fidgeted for a second. "I should naturally like to come. But, as you know, life is a one-way street. There are two aspects to this question—personal and external. I am now 58. I don't believe that in any sense what I can contribute is really very much. That is one thing. On the other hand, if circumstances would permit me, it certainly would be nice. I have always associated with young men of the age group of 24 to 30 and in the last thirty years the age group with me has not changed." We asked him if he had any regrets that he had left India. He replied, "There is an element of service involved in science and that is why I would want to come back to India. It is very right to say that if I had stayed back in India, my personal contributions may not have been as much but even if I would have trained up three or four students, I would have done my part. Some forty students have taken Ph. D.s working with me. Of course forty Ph. D.s in the U.S.A. are a drop in a bucket. But in India, that number means a lot."

Science Is Social Activity

We told Dr. Chandrasekhar that *Yojana* is read by a number of young men and women and asked him if he would like to tell them, specially

University students, something through our columns. The teacher in him became eloquent: "The only thing I can say is that the life of a scientist is primarily concerned with social activity. Science is social activity and is not really very different from other worthwhile activities. You have to do it in such a way that you derive pleasure from it and that depends on the aims which you have. What are your aims? Understanding. When you study science, you have a critical attitude. You always ask questions and then at a certain stage you do not get the answers. So you try to answer them. After some time you will be able to ask deeper questions and the answers you give will be significant. Science is a means of better expression, a means by which you can serve your community and young people. So long as you take that attitude, then you have done science."

We asked him if the common people should be made aware of science in an effective manner by putting telescopes in temples, as a famous Indian science writer in the U.S.A. suggested to us. Dr. Chandrasekhar did not think it was necessary to make the public aware of the benefits of science. He thought that everyone who lived in the modern world was aware of the technological advancement. "There is no use in putting telescopes in temples," he said. But wasn't it necessary for the people to have a scientific outlook, we persisted. "Well, in India there is an enormous amount of superstition," Dr. Chandrasekhar remarked and he found that it was there even in high places. "But installing a telescope in the temple is not going to drive off superstition. We have to make the people believe that superstition and mythology would not do them any good. They have to be eliminated."

R. K. P.



THIS INDIA

I took charge as B.D.O. and Chief Executive Officer of the Taluk a few days ago. One day in my office the Chairman of a particular Panchayat wanted to meet me. When I called for him, two persons came in, one with a fine dhoti and silk shirt and the other with a big red turban and soiled clothes. When I offered them seats, the man in the silk shirt hesitated whereas the other man immediately sat on the floor. The silk clad man gestured to him to sit in the chair but himself did not sit. Taking him to be the Chairman, I tried to know what he wanted. He pleaded that the cheques of the Village Panchayat were not honoured for more than four months and that he wanted authorisation for the cheque to be honoured by the Sub-Treasury Officer.

When I looked into the concerned file, I found that the man with the silk shirt was the Secretary of the Village Panchayat, who was also the Patwari (Shanbhoga) of that village and the man who sat on the floor was the Chairman. Further, the Chairman of V.P. was the Talyari previously and he had just learned only to sign his name. Out of the 13 members of the Committee, all the 12 were illiterate except the Chairman who was taught to sign. The Secretary was all in all and he manipulated the proceedings, decisions and accounts of the Village Panchayat according to his sweet will.

Deodurg B. S. NAGAPPA

One evening I was standing near Connaught Place in a queue waiting for the bus. A small boy selling the evening newspaper approached me. He was wearing a torn shirt and nickers and his eyes and cheeks were sunken. It was obvious that he had not had enough food for many days. I took pity on him. After buying a newspaper I paid 30 paise. The boy stared at me, kept the five paise which was the price of the newspaper in his hand and return-

ed the 25 paise coin saying "I am not a beggar. I only get money for my labour. Please keep it with you." I was stunned.

New Delhi

O. P. GUPTA

At a party which I attended to bid farewell to an employee of my friend's office, on the eve of his retirement, two senior officers spoke in appreciation of the retiring employee's services. One of them appealed to the employees gathered, quoting the Gita, that they should work without expecting any reward. The other boss said that the value of a man should be measured by his mind and manners, rather than the amount of money he gets.

Later on, on enquiry, I was told by my friend that of the two bosses while one was drawing a salary of Rs. 7,000 a month, the other was getting Rs 5,000, excluding other allowances. As against this, the retiring man, at the end of about 25 years of service, was getting a meagre monthly salary of Rs 420.

Delhi

PAWAN CHAUDHARY

At midnight someone knocked at our door. My husband got up and opened the door to find the landlady crying for help and a child lying unconscious on her hands. Her husband followed rubbing his eyes. He tried to pacify her but she wouldn't listen. She insisted on his fetching a doctor immediately.

After her husband left, she turned to my husband and almost cried, "Be a good neighbour. Please call the Maulana from the mosque." My husband wanted to wait for the doctor but her insistence left him also with no option.

Responding to her emotional outbursts our next door neighbour also joined us, who was also sent out to call the Pandit of Mahavirjee Temple.

First came the Maulana and then the Pandit. Both of them examined the child. The Maulana passed his judgement: "This is nothing but an evil spirit dominating the child." The Panditji took no time to agree. Just then the doctor entered. He examined the child and the room. On finding a burning hard-coke oven inside the unventilated room, he could immediately say that it was a case of asphyxiation. He administered certain medicines and said the child would be all right in a few minutes. The doctor left after collecting his fees.

The lady was not satisfied. She turned to the Maulana and weepingly said, "Please do something to save the child." The Maulana took some coins in his hand and rotated it round the child's hand.

Touching the feet of Panditji, the lady again begged for the life of her child. Panditji took out some holy ashes and placed on the forehead of the child.

The child regained consciousness and the mother was happy. I was wondering who won the mother's affection, the doctor, the Maulana or the Panditji?

Shikarpur

SAVITRI SAXENA

IS GROWTH RATE PROPOSED FOR FOURTH PLAN FEASIBLE?

M.A. OOMMEN

A Plan has to be related to an overall growth rate. The Approach to the Fourth Plan has envisaged a 5 to 6 per cent compound rate of growth or 30 per cent aggregate growth during the Plan. It is held that this growth rate is "based on reasoned calculation". Is this order of growth in national income really feasible? Let us examine.

The growth rate is generally thought of as a function of two variables, namely capital-output ratio and the rate of savings invested. Though the figure of the capital-output ratio assumed for the Fourth Plan is not specifically laid down in the Approach, it is possible to calculate it.

The Approach points out that the average rate of savings will have to be stepped up from the current level of about 8 per cent to around 12 per cent. We may assume that the savings in the first year of the Plan would be 8 per cent of the national income. To this may be added the foreign savings made available for investment in India, which works out to about 4 per cent of the national income. The total savings that will be invested in the first year of the Fourth Plan would be 12 per cent of the national income.

Assuming only a 5 per cent growth rate in the first year, the capital-output ratio works out to 2.4 and would be 2 if 6 per cent growth rate is assumed. We may say that the capital-output ratio ranges from 2 to 2.4.

In the light of the performance of the Indian economy in the past,

is it realistic to assume a capital-output ratio of 2.4? The capital output ratio for the First Plan works out to 2.3, that of the Second Plan to 2.9 and of the Third Plan to 6.2. For calculating these ratios, the investment and national income figures were taken at 1960-61 prices.

The last year of the Third Plan (1965-66) was an abnormal year. The country faced the worst drought of this century in that year. This depressed the national income considerably, thus pegging up the capital-output ratio to a very high level. During the first four years of the Third Plan, the national income increased, on an average, at the rate of 4.2 per cent per annum. Assigning this rate to 1965-66, the capital output ratio for the Third Plan works out approximately to 3.5.

Thus, the capital-output ratios for the first three Plans come to 2.3, 2.9 and 3.5 (adjusted) respectively, showing more or less a uniform increase of 0.6 point in each Plan. We do not take into account the trend in investment and output in the last three years of the annual Plans which are admittedly abnormal years. If we assume that the same trend as in the first three Plans would continue in the Fourth Plan, the capital output ratio for the Plan may be placed at 4.1.

FAR FROM REALISTIC

There is no firm indication in the Approach Note to show that the high priority given to the capital-intensive investments during the Second and Third Plans would be reversed. It is just not possible to radically alter the investment pattern.

It is likely to remain substantially unaltered. Even if we assume that the present high rate of agricultural production would be progressively increasing and that the industrial capacity already built up would be more fully utilised, the capital-output ratio could not be considered much lower than 3.5. At any rate, the Planning Commission's assumption of a capital-output ratio of 2.4 for the Fourth Plan seems to be far from realistic.

As regards the rate of savings also, the assumptions of the Approach Note do not seem to be valid. The domestic savings is expected to rise from 8 to 12 per cent. This depends on (a) the magnitude of the additional income and (b) the marginal rate of savings out of the additional income. The expectation that the average rate of savings would rise at the rate of 8 to 12 per cent means that the marginal rate of savings may have to be stepped up even as high as 50 to 80 per cent. This is unlikely in a country where the marginal propensity to consume is near unity. During the three Five Year Plans, the marginal saving-income ratios were 29.5 per cent; 18.9 per cent and 14.6 per cent respectively. In view of the sharp increase in prices during the last 3 years, this may be assumed to be lower still. Hence it appears unrealistic to assume that the anticipated growth in savings would materialise.

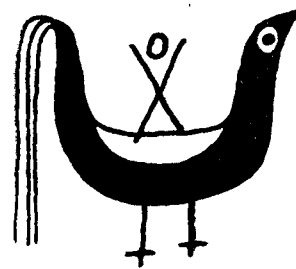
From the present trend of national income growth, we may estimate the national income for 1969-70, the first year of the Fourth Plan, which comes to about Rs. 31,000 crore. As 30 per cent growth in national income is expected during the Fourth Plan, the additional income that would be generated comes to around Rs 10,000 crore. Assuming that the capital-output ratio of 3.5 which we have arrived at for Third Plan is valid for the Fourth Plan, the investment required would be of the order of about Rs 35,000 crore. We may also assume that the marginal rate of domestic savings would increase as it had during the Third Plan. Then the

total savings available would work out to about Rs 15,000 crore. In line, the domestic resources that would be normally available would not be more than 43 per cent of the amount required to obtain the desired growth rate.

Less Hope of Aid

As far as the size of external assistance is concerned, nothing is definitely known. Assuming that the same order of foreign assistance as in the previous years would follow, the total aid, including P.L. 80 imports, could be placed at about Rs 6,000 crore. But the approach expects that the foreign assistance would be reduced to 50 per cent of the present level by the last year of the Fourth Plan. This based on the heroic assumption that exports could be stepped up at the compound rate of 7 per cent per annum during the Fourth Plan. But Indian exports in the past have not gone up by more than 4.5 per cent. So it does not seem realistic to pin much hope on the performance of the export sector. In view of the tight balance of payments position of the U.S.A. and the dependence of the various international lending institutions on U.S. assistance, the U.S. assistance is likely to be of a low order. We may put the size of the foreign assistance approximately around Rs 5,000 crore.

The foregoing discussion shows that it may be unrealistic to assume a capital-output ratio of less than 5. Even on the basis of optimistic estimates regarding the resources that are likely to be raised, the total resources that could be raised, internally and externally, are not likely to exceed Rs 20,000 crore. This would generate an additional income of only Rs 5,700 crore on the basis of a capital output ratio of 3.5. Thus the growth rate that reasonably possible seems to be of the order of 3.4 per cent as against 6 per cent envisaged in the approach to the Fourth Plan. The assumptions of the Approach Note appear to be, therefore, somewhat unrealistic and overambitious.



QUOTATION

BOX

It was said of an ambitious Indian educator early in this century that he wanted to make every ass a graduate. For pure reasons of husbandry, we seem to have decided that it would be cheaper to make every graduate an ass, so that the difference will not be noticed.

—Prof V.V. John in "Quest"

There is no Gandhian among the Ministers, either at the Centre or the States...the fact is it is not very easy to be a Minister and at the same time a Gandhian.

—Prof V.K.R.V. Rao

Only those who do not follow Gandhian philosophy can become Ministers.

—Bhishnu Mishra M.P.

The feeling that Communists are a terrible lot and that the Marxists are even more terrible should go. After all we eat the same food.

—Panampilli Govinda Menon

Many of us would be delighted to pay as we go, if we could only catch up from paying as we're gone.

—Cartaret County News-Time, USA

I had association with George Harrison...Does it make a great player of the sitar because I am his teacher?

—Ravi Shankar

Every year thousands of tons of fertilizers, weedkillers and so on are spread on the land, and ultimately, at least some part of this is leached into the water courses. The effect in the future, if not immediately, must be to upset the ecological balance of the systems upon which the chemicals infringe.

—Ariadne in "New Scientist"

The inhabitants of Humphrey, New York, voted mainly for Richard Nixon, but in Nixon, Texas, the local favourite was Hubert Humphrey.

—A Reuter report

They've tried to dispossess us of our manhood and womanhood. Of course childhood and adolescence... Why, they even tried to dispossess us of our dislike of being dispossessed!

—Ralph Ellison, the Negro American novelist, in "Invisible Man"

No deaf or dumb will be left in China, thanks to Chairman Mao Tse-Tung. A Peking Radio broadcast said that a doctor has evolved a method to cure them. The method involved pricking of certain part of the patient's body with a needle. He pricked himself deeper and deeper until he reached the level to be fatal.

Fortunately for medical science and for the patients, Peking Radio added, just as he was about to give up the experiment Mao's thought "When we die for the people, it is worthy death," occurred to him. He continued his experiment, and now he can cure the sufferers.

From "Link"

The low cost people's car of the late fifties has now been transformed into the small car. It is quite alive and kicking even after a decade or so of gestation within the files of the Industry Ministry and Yojana Bhavan.

—From an article in "Mainstream"

In the eighteenth century people wore false teeth for vanity and took them out when they wanted to eat. Nowadays people resent having to be without them even for an anaesthetic. Not long ago well-off people insisted that false teeth should be complete replicas of their own crooked natural ones. Nowadays people go to some trouble, and often considerable expense, to have their own teeth made as regular and unnatural-looking as the old fashioned cheap false ones.

—From a book review in "Economist"

Unlike an average Indian baby, the Indian baby car stubbornly refuses to be born...

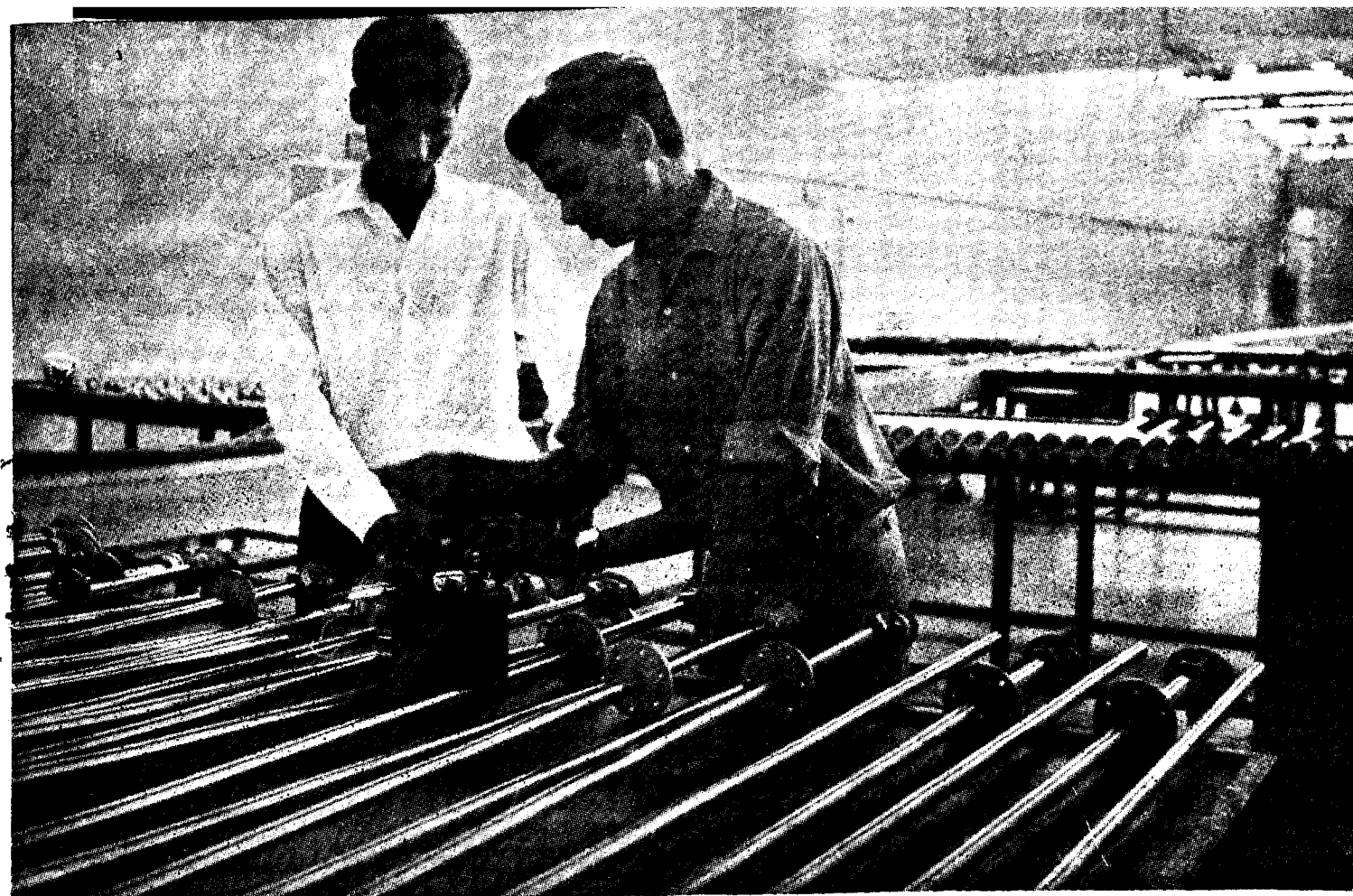
—From "Organiser"

The once faceless, bureaucrats are now issuing their photographs to the newspapers and waxing eloquent on the innovations they are about to introduce in their Ministries.

—Mr Romesh Thapar in "Economic and Political Weekly"

In field houses, armouries, factories, football stadiums and high school gymnasiums (in the U.S.A.), more than 29,000 people gathered to scrub their teeth for about 2½ minutes, as part of a mass 'brush-in' to demonstrate the decay-preventing qualities of a new dental paste.

—From "Time"



Instruments are vigorously tested before they are despatched

KOTA gets Rs 10 crore orders for its PRECISION INSTRUMENTS

MORE PHOTOGRAPHS OVERLEAF

INSTRUMENTS have come to be widely used for industrial process control, and their increased use has resulted in better quality control, higher production and reduced manpower. Our country is currently using about Rs 100 crore worth of these instruments, a major portion of which is accounted for by steel and chemical plants and thermal power stations. With our growing industrialisation, the need for these instruments was bound to grow, and, until recently, no manufacturing facilities of a substantial capacity existed in the country.

Realising the important role played by the process instruments

in the setting up of basic industries, it was decided to undertake their manufacture in the country, and the 'Instrumentation Ltd.' was set up for the purpose in the public sector. This enterprise set up the Rs 5-crore (pre-devaluation) Precision Instruments Plant at Kota with an annual production capacity of Rs 10 crore worth of instruments to be reached after the 7th year of commencement of production. The plant commenced production in September 1968, and, by the end of March 1969, it expects to effect sale of about Rs 80 lakh worth of instruments. Orders and letters of intent valued at over Rs 10 crore

have already been received from thermal power stations and the Bokaro Steel Plant. The product range, which has been diversified in the light of customer requirements as also to ensure better utilisation of the existing installed capacity with minimum marginal investments, includes a variety of sensing elements, magneto-electric instruments and electronic indicating, controlling and recording instruments. The diversified products are in course of time expected to save crores of rupees in foreign exchange. The manufacturing faci-

turn to PAGE 26

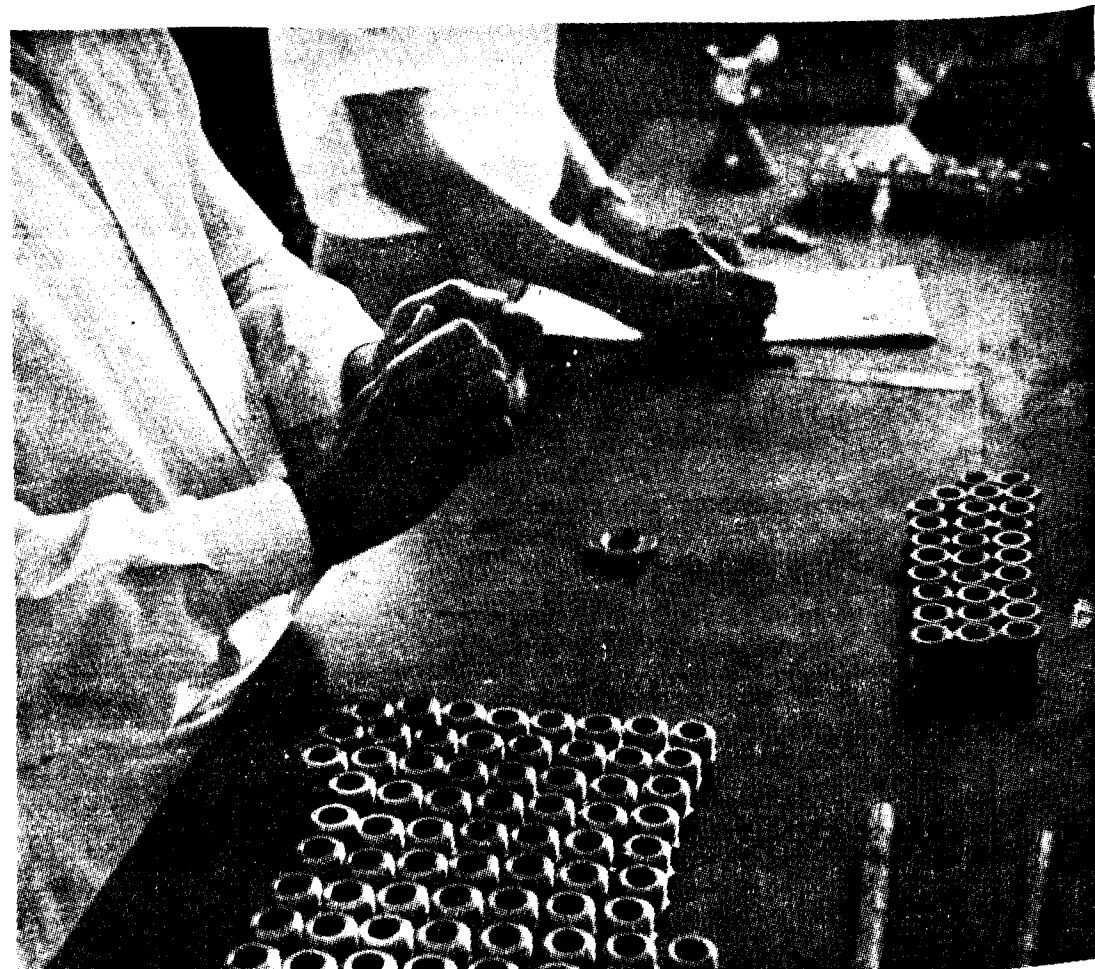
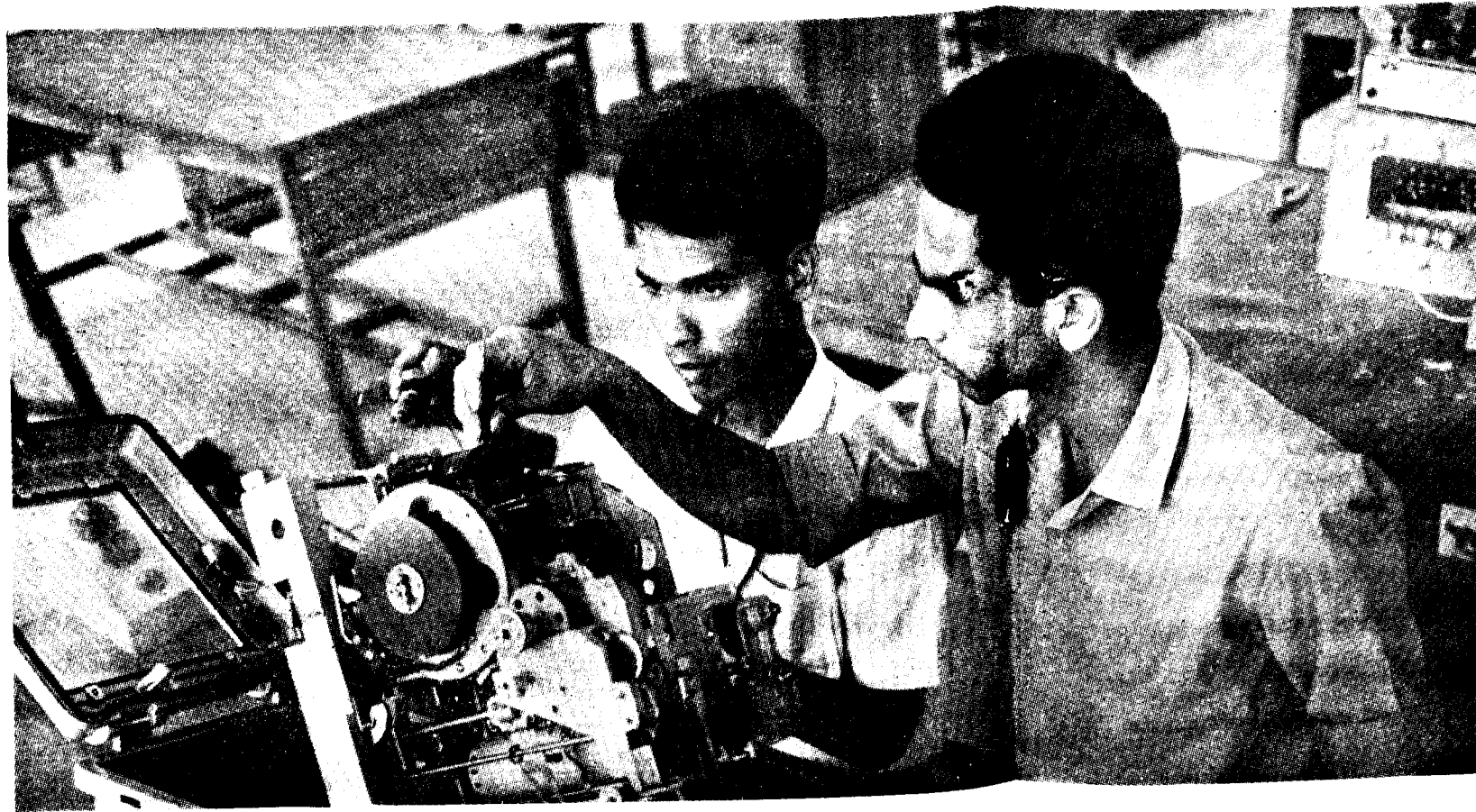
PHOTOGRAPHS

BY

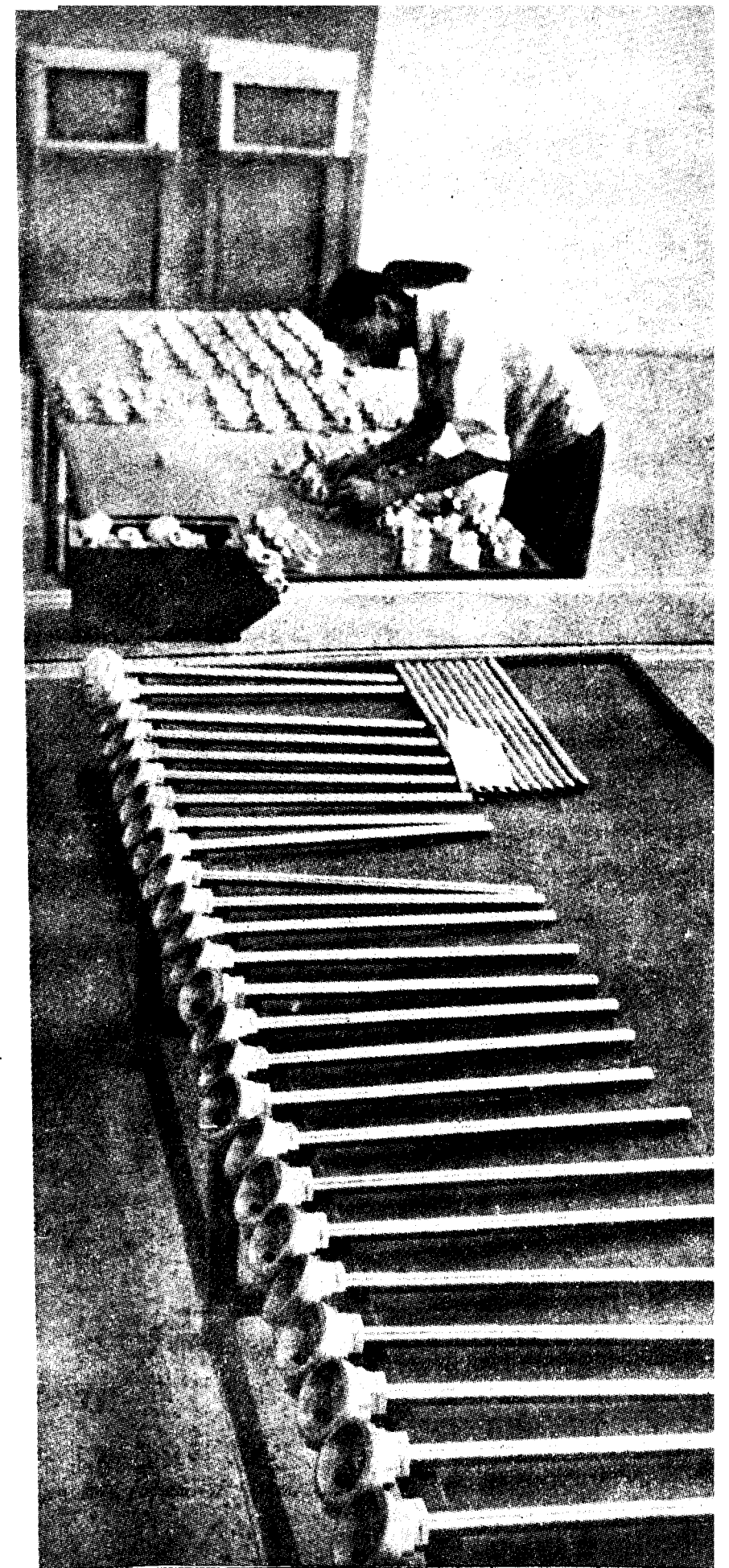
K. NARAYANA

SWAMY

Some facets of the Kota plant are seen here: assembly line (pictures on the right and extreme right) and quality testing (the other two pictures). The instruments made here are used for delicate jobs in industries like fertilisers, atomic power and cement, where cent per cent accuracy is needed. Every part of the instruments is strictly tested for its precision and quality.



**YOUNG
HANDS**
at work
at KOTA



SCIENCE ALONE CANNOT GUARANTEE EQUAL OPPORTUNITY AND DIGNITY TO MAN

This is an edited version of the memorable Presidential Address delivered by Dame Kathleen Lonsdale at the annual meeting of the British Association for the Advancement of Science this year in Dundee. Dame Kathleen is the first woman to be elected President of this august body of British scientists.

Dame Kathleen Lonsdale (65) is one of the foremost scientists of the United Kingdom and one of the most remarkable women of the century. She was one of the first two women to be elected a Fellow of the Royal Society in 1945 and to hold office as a Vice-President of the Society. She has won its Davy Medal for her studies on the structure and growth of crystals.

Dame Kathleen was born in Ireland on January 28, 1903, youngest of ten children of Mr Harry Yardley, a postmaster. A scholarship holder in school and college, after graduation she joined the team of research workers under Sir William Bragg, pioneer of the X-ray method of determining the structure of crystals. She married Dr Thomas Lonsdale, a scientist, in 1927.

Except for a period of eight years, 1927-35, when she brought up her three young children, Dame Kathleen has all along been engaged in research in crystallography.

Slightly-built, grey-haired and quiet, she in her appearance gives little hint of her dynamic qualities. She is a pacifist and is a former British President of the International League for Peace and Freedom. So strong are her pacifist convictions that during the war she refused to register as a fire-watcher (though carrying out the duties voluntarily) unless the regulation carried with it a conscience clause. Prosecuted, she refused to pay the fine and went to prison for a month. She took with her two books, Clark's Applied X-rays and Peake's Commentary on the Bible.

Her husband said of her recently: "She has a tremendous volcanic energy. She will get up at 4.30 in the morning and work all day, and still be fresh in the evening. Her other characteristic, I would say, is her great personal courage."

Well used, Science Enhances Quality of Life; Ill used, It Quenches Life

**DAME KATHLEEN
LONSDALE, F.R.S.**

THIS year, 1968, has been designated as the International Year of Human Rights. Two thousand, even 200, years ago, children, women and slaves had no rights, and only a very few admitted claims.

To a certain extent, a very limited extent, technology has put power into the hands of the under-dog, but hardly into those of children, or indeed of slaves. Yet it is in the technically developed countries that slavery has disappeared, at least in its crudest forms. Legalised slavery still exists in only two small States, but it is recognised that in many other countries there still is slavery although it has been declared illegal and is verbally condemned by their present governments. Slaves who want to be free have only to declare themselves to be so and to walk out. Why don't they? Because if they do they will literally die of hunger. The freed slave has no way of hiring out his labour in a country with few industries or other possibilities of paid employment.

Science and technology could provide those possibilities, but only through the offer and acceptance of technical assistance on a scale much wider than is at present practicable.

It is a curious fact, however, that technical development has brought with it a marked development of conscience on the part of those who actually wield power: perhaps because technical develop-

A Top British Scientist analyses the capacity of Science to build A Good Life and some related problems of modern world.

The longer we live with the terror of nuclear weapons, the more we get used to it. But these weapons do not make future wars impossible.

The technically-developed powers sell arms to the developing countries on the plea that if they did not do it, others would. It is the same as the argument advanced by brothel-keepers, black marketeers and sellers of stolen goods. The real need of the majority of the common people in these developing countries to which arms are exported is for teachers, doctors, engineers, know-how and social security. At least the developed countries should pay a "transfer fee" to the developing countries for draining their trained people.

A society in which some 50 per cent of the people are dissatisfied with their daily work or their monthly salary is hardly a happy community.



The author in her study

ment originated in the nominally Christian countries.

Generally speaking, we do feel uneasy when we hear of people starving in India who are only a few hours away by aeroplane and a fraction of a second away by radio, because we also feel that, with all our modern scientific resources, we ought to be able to do something about it, and should. We feel guilty or annoyed about technological disasters because we feel that we ought to have been able to anticipate and prevent them, and as science and technology advance, so the range of our control over nature advances also and only human nature eludes us. Perhaps that is one reason why social science is becoming so popular among university entrants. We want to understand ourselves, although we shudder, rightly, I believe, at the thought of being scientifically manipulated against our will.

Science can indeed, if usefully applied, minimise starvation and alleviate sickness; and labour can be reduced by mechanisation and automation, but only if re-education

and perhaps redirection are accepted so that unemployment does not follow. Science can release men from the domination of frightening superstitions if they are willing to be released but cannot guarantee equal justice, equal opportunity and equal dignity without discrimination which have been defined as the universal rights of every man, woman and child.

But the modern scientific world is not the Kingdom of Heaven on earth. Far from it.

Most scientific and technological debris, for example, is so ugly; slag-heaps, hideous mining districts, specially those that have become derelict, the detergent foam on little streams, the tar and the oil on the beaches, the sulphurous fogs, the paper and the tins, the smells and the noise; especially the noise. Surely scientists cannot altogether wash their hands of these horrible consequences of the commercial application of their work.

Of course, I realise that life in prehistoric and medieval times was not one long ecstasy. My home life today gives much more time for

enjoyment of the countryside and of the arts than my grandparents had, because I have ample supplies of water, electricity, gas and easily washed textiles. And yet my uneasiness persists because I so deeply sympathise with those of whom Egan Orowan, a Fellow of the Royal Society, wrote recently: "The vast majority of the Earth's population regards science and technology as an increasingly mortal threat to their lives. They feel themselves powerless at the mercy of a few, as if they were on the operating table in the hands, not of healers, but of irresponsible playboys driven by curiosity."

IMMORAL SPECTACLES

There has, of course, been opposition to the applications of science at every stage, some of it amusingly irrational. The Royal Society was castigated three centuries ago by the vicar of Chew Magna in Somersetshire, who, wanting a stick with which to beat the scientists, seized the newly invented "optick glasses" and denounced them as immoral. He claimed that they perverted the natural sight and made all things appear in an unnatural and, therefore, false light. He argued that society at large would become demoralised by the use of spectacles, which were sinful because the eyes were adapted to the capacity of the individual, whether good, bad, or indifferent. They would give one man an unfair advantage over his fellow, and every man an unfair advantage over every woman since women could not, on aesthetic and intellectual grounds, be expected to wear them.

It is easy to laugh off such bigoted nonsense. It is not so easy to be really quite sure that the ability to get to New York or Moscow or Melbourne in a few hours is worth the fact that bombs and chemical or biological weapons can be and are being dispatched and delivered in the same way. Oh yes, I know that we can have holidays abroad, and that many international scientific conferences would be impossible if we were not able to fly to them. I'm not even sure whether that might not be a good thing.

The expense and the consumption of working time involved in the proliferation of scientific conferences,

however, pale into insignificance compared with the amounts spent on nuclear physics and on space travel. I am not trying to crab nuclear physics and space research in particular, just because they get the largest slices of the financial cake. It is true that the first incentive to huge expenditures of money and manpower on nuclear research was for the production of atomic weapons, weapons which were supposed to make future wars impossible but which in fact have done nothing of the sort, as Korea, the Near East and Vietnam bear witness. **The horrifying fact is that the longer you live either with terror or with guilt, the more you get used to it.** So far, the horror of nuclear weapons and the inevitability of retaliation have prevented their use in war between the great powers, but for how long? Until we breed another Hitler? But chemists and biologists do not have clean hands either, even though the cost of what they do is much less. Chemical and biological warfare could end life on this earth just as nastily and much more cheaply than nuclear weapons, and leave the world to the bacteria. What price the good life then?

HORROR OF WAR

Our children and our children's children have no certainty at all of a good life unless the horrors of possible future scientific wars are eliminated. As a so-called professor of chemistry and a grandmother I cannot avoid the issue. When, during the Korean war, the West were accused of using chemical and biological weapons, the accusation was indignantly refuted. Now, there is no attempt to deny that the weapons themselves are being made and that some of them have been used in Vietnam. The first reports of this that leaked out in March 1965 provoked an immediate storm of national and international protest, but this died down, as such protests always do die down with time and familiarity. We were horrified at the use of napalm once, and before that at the bombing of civilians from the air. Of course, horrors are never on one side only in war. But we can and I think should protest against what is done in our name or by our friends. It is because I like and admire many Americans that I say that what is

done by an enemy is no excuse for following suit, nor for producing and using new methods no less uncivilised for being scientific.

Those of us in the British Atomic Scientists Association and in the Federation of American Scientists who, after Hiroshima and Nagasaki, thought that we could help to inform the public and so to promote a quick agreement on the International Control of Nuclear Weapons, found that we were mistaken. People either did not want to listen or, if they did, became frightened; and frightened people do not act sensibly. One result was the anti-communist scare associated with the notorious Senate Committee on Un-American Activities. It takes more than facts to create judgment.

STUDENTS REJECT OLD MORALS

An alternative reaction is that of many young students today: a rejection of the whole system of old-fashioned morals which failed to prevent the horrible situation into which they were born. As I write this lecture I have just been reading, in *Science*, an account of a police raid on Stony Brook, the new State University of New York, at which our next year's International Crystallographic Congress is to be held. Some 49 students were arrested for selling or possessing drugs. One of them, described as "an extremely bright science major of about 20 years old", said in an interview with *Science*, "at first we used to look over our shoulder when we took 'pot' but we never saw anything, so we even stopped bothering to look. You know", he added, "it's like atomic weapons. When you first learn about them, you're scared. But they never go off, so you stop worrying about it". Many of the students, the report continues, feel little but pure disgust for the performance of their elders. They know that the law proscribes drugs, but they regard the law as inane. "They say we can have alcohol", said another student, "but we cannot have marijuana. This university is made up of scientists; they know there's nothing in the literature that says 'pot' is harmful, but you can fill a library with data on the harmfulness of liquor."

I am not defending the behaviour of these students and of course I don't agree with them that "pot" is harmless. I think I understand their feelings but I wish that a study of science and of scientific method had taught them more common-sense. And when I hear (as at the time when Mr. Malcolm Muggeridge resigned from the Rectorship of Edinburgh University) that a young woman student says that they want the "pill" because it is the done thing nowadays for men and women students to sleep together, I am not shocked—I'm much too old for that—but I just wonder 'How silly can you be?'

Science has ameliorated the punitive consequences of folly to a certain extent: unwanted children can usually be avoided and although, according to WHO, venereal diseases on the increase, one no longer sees, in Britain anyhow, the evidence of the inheritance of venereal disease on the faces of the third and fourth generations. **But don't these stupid boys and girls (especially the girls) realise that there is a real ecstasy about sexual love, when it is accompanied by deep affection and mutual respect, that they are throwing away for the sake of a dick?**

ARMS AND THE MAN

But aren't we stupid too? Forty years ago some of us were worried by the activities of arms manufacturers. We could not shut our eyes to the fact that modern weapons were the product of modern science and technology. We knew that during the First World War British boys had been killed by weapons made in Britain and exported, and we knew that Disarmament Conferences were being disrupted by arms manufacturers' agents. We thought that, failing complete disarmament, it would be better to have the arms industry nationalised, so that arms would only be made for national use if required and not for export. How wrong we were! This infamous trade still goes on.

Few people, and certainly very few of the Members of Parliament to whom I have written, feel any sense of uneasiness or shame that in order to improve our own balance of payments our country is making

and is selling vast quantities of armaments and that we have an arms salesman to promote such an evil trade. These sales of arms by the technically-developed powers are justified by all of them on the grounds that if they did not do it, the others would; and that the supply of arms to friendly governments is a means of sharing the cost of maintaining the balance of power, and of helping the developing countries to maintain their internal security.

BROTHELS AND BLACK MARKETEERS

These arguments simply do not hold water. "If we did not do it, others would." Would that be regarded as an adequate defence for a drug pedlar, or a receiver and seller of stolen goods? It is the same argument that I heard inside Holloway Gaol in 1943 from keepers of brothels and black marketeers, quite nice women really, who thought I was a little crazy and were kind to me.

"We need the money we get from exports, and the developing countries need internal security." In fact, the majority of the common people in the countries to which we or others now export arms (including those where a white minority holds power) have a high degree of illiteracy and a low standard of living, much lower than ours. Their real need is for teachers, doctors, nurses, engineers, knowhow and social security. In many cases we are importing their doctors and nurses, their scientists and engineers here into Britain to replace our own whom we have lost to America, although the need of underprivileged people is much greater than ours. What chance have they of a good life; illiterate, hungry, and often diseased? Well, it can be argued, and with some justification, that the good life, in the best sense of that word "good", does not depend on possessions or surroundings, and that happiness consists in the fewness of one's wants rather than in the multiplicity of belongings. But that is a comfortable doctrine for those who have power, and even if true it only applies after elementary needs have been supplied.

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RECOMPENSE FOR BRAIN DRAIN

What we should do, if we wish to increase our own exports, is first of all to pay for the doctors, scientists and other trained people whom we are draining from the developing countries. We cannot expect the technological gap to close if we import the best-educated young people of the poorer nations without any recompense to the countries concerned. I have suggested this kind of "transfer fee" before, and I do so again now. Then we could offer for export, not arms, but more of the things they really need.

Many of those countries who are asking for jet fighters need water and irrigation systems far more; we could step up arid-zone research on a much greater scale than at present. We could stimulate a bigger popular demand for, and could build or help to supply them with, more roads, drains, artesian wells, agricultural equipment, fertilisers, improved seeds, schools, technical colleges, teaching aids, school equipment, books, radio sets, bicycles and other means of transport. It is possible to stimulate a demand for things worth having, by skilful international advertising. We all do it to a certain extent: not enough. The Germans have built technical colleges abroad and have filled them with German-made engineering equipment in order to gain the market for such goods. The Americans have done the same with hospitals and medical colleges.

If our customers can afford to pay for armaments they can afford rather to buy the material fundamentals of a good life for their peoples when we have the wit and wisdom to provide these for export. We need to step up our present efforts in this respect.

INTERNATIONAL SERVICE FOR SCIENTISTS

Moreover there are many of our own scientifically-trained young people who would be not only willing but glad to put in a period of international service abroad where their skills were most needed. What I am suggesting is not an unpaid voluntary or semi-voluntary service, admirable although that is, but a properly-organised, pro-

perly paid-for period of international service abroad for young scientists, young engineers, young doctors, young teachers in those countries who need them, but who cannot afford them, and whose scientists and doctors we are draining away. One of my former students, an Indian who is now professor of physics in a provincial university in his own country, tells me that he cannot keep any lecturer, who knows enough nuclear physics to be able to teach it; they emigrate. I believe very strongly that young British physicists who went out for, say, two or three years to teach in such universities would get as much as, if not more than, they gave. They would, in the first place get to know people whose whole background has been very different from their own. They would gain some experience of the application of their own scientific knowledge to the real needs of real people.

I am not suggesting that the only justification for scientific research is that it should be useful, or that the man or woman with the rather rare capacity for creative and fundamental research should be re-directed to some kind of social service. I am saying, however, that the person who begins to specialise in science at the age of, say, 14, and who then becomes more and more concentrated in one narrow field, and even along one narrow line, who stays on as a postgraduate in the department from which he graduated and then becomes a member of staff and eventually a Reader or Professor, may achieve high honours and may enjoy that kind of life in his own way; but I doubt whether it is the best kind of life, or whether that is the way to ensure the kind of scientific teaching or research that will help to forward a good life for men everywhere, even in the long run. My own research life has been greatly enriched by having been broken into by periods of enforced change. I was not idle while I had my three children: far from it. But it gave me the opportunity of standing back, as it were, and looking at my work. And I came back with new ideas.

My picture of the one-track scientist is not a caricature. Every academic scientist knows that many

of his colleagues do aim at retaining their own best students for postgraduate research and eventually keep them on the staff because they are well-trained in just those branches of knowledge for which the department has gained a reputation for special excellence.

It is no wonder that many middle-aged men, not only scientists, look back at their period of war service with something like nostalgia. Discomfort, danger, anxiety are at least a break in the routine. It is quite certain that such a one-track life sounds terribly boring to most school boys and girls.

Some 11 years ago Margaret Mead and Rhoda Metraux reported on a nation-wide survey carried out on behalf of the AAAS to find out what was the image of the scientist among American high-school young people. They found the scientist is thought of as very intelligent, patient, dedicated and open-minded; but his work, although essential to the well-being of mankind, is (apart from occasional discoveries) uninteresting, monotonous, tedious and time-consuming, while he himself bores his wife, his children and their friends (for he has no friends of his own except other scientists) by talking, eating and sleeping nothing but science, or so the youngsters thought. While it was interesting that these young people did not reject science itself, such an opinion among school-children is not likely to produce many future scientists.

But does the real scientist find satisfaction and fulfilment in his work? Not if he is employed in industry, according to a survey recently published by the Graduate Appointment Register. Out of the sample tested, which included 850 graduate scientists and engineers employed in industry, 39 per cent had determined their future careers by the time they took "O" level, 86 per cent by "A" level; but after a few years 50 per cent of the scientists and 65 per cent of the engineers said that they would have chosen a different career if they could go back and choose again; whereas out of some 550 graduates in non-scientist commercial jobs only 40 per cent wished that they had chosen differently. Given a fresh choice of occupation, only 13 per cent of the whole dissatisfied

sample would have chosen a scientific job and eight per cent an engineering job. A society in which some 50 per cent of the people are dissatisfied with their daily work or their monthly salary is hardly a happy community.

I don't know whether this sense of dissatisfaction is universal or whether the sample taken, although large, was not representative enough. I don't think that there would be the same reaction among academic scientists, or not at least among those who enjoy teaching and the contact it brings with young minds or among those who are able to pursue the study of pure science with an adequate grant for apparatus and a clear conscience.

But the plain fact is that a pure research worker, if not conditioned by an earmarked grant, usually investigates something simply because it is not known and interests him and not because it is likely to be useful. The incentive is similar to that which drives a painter to paint or a musician to compose: it is a creative urge; and happy indeed is the man or woman who, having such an urge, is able to fulfil it.

Knowledge and privilege do bring with them great responsibilities, not merely the rather easy responsibility of informing others and of leaving them to take the consequences, but rather of foreseeing what the "fall-out" from one's research is likely to be over a wide area of human happiness and of devising "feed-backs" to give warning of potential dangers.

The scientist then could and, I think, should exercise his powers of influence and pressure as an informed citizen to see that, as far as in him lies, a right choice is made and right action taken. I think also, although this is a more debatable question, that one should not work in any field, however pure, of which the immediate and obvious application is evil and the good application obscure.

The responsible use of science will enhance the quality of life. Its irresponsible use could quench human life as we know it.

DANDAKARANYA'S DECADE OF PROGRESS

Ramayana Sanctuary Is New Home for Refugees

DANDAKARANYA, once the legendary land of the Hindu epic of Ramayana, has become the field of a great rehabilitation experiment which is bound to have far-reaching repercussions. Comprising an area of 25,000 square miles and covering the Koraput district of Orissa and Bastar district of Madhya Pradesh, it has offered an opportunity to thousands of homeless refugee families from East Pakistan to begin a new life in its sylvan surroundings.

It all started with the setting up of the 8-man Dandakaranya Development Authority in September 1958 by a resolution of the Government of India. The object was not only the expeditious rehabilitation of displaced persons from East Pakistan in Dandakaranya but also the integrated development of the area with special reference to the tribal population.

Once the die was cast, things started moving. Land released by the Government of Orissa and Madhya Pradesh began to be reclaimed; villages began to be planned and essential rehabilitation facilities, including financial assistance, provided to the intending settler families of displaced persons and landless tribals.

In a decade, that is from September 1958 to September 1968, out of the 2,24,702 acres released, over 1,31,000 acres had been reclaimed and over 113,000 acres harrowed. As many as 241 settler villages had been set up by the Authority, besides 61 tribal villages established by the two State Governments. A total number of 12,272 displaced families had been resettled. An expenditure of Rs 32.20 crore had been incurred on the entire project by June 1968.

A village in Dandakaranya is carefully planned. Normally, 40 to 60 families are accommodated in each village where facilities essential for rehabilitation are provided. An agriculturist-settler family is provided about six acres of agricultural land and 800 square yards for building a homestead. Besides, a house building loan of Rs 1,700, an agricultural loan of Rs 1,015 and an irrigation loan of Rs 150 for sinking a well in the homestead plot is given to each family. In addition, maintenance subsidy at prescribed rates is made available to each settler family. So far, Rs. 15.68 crore have been spent on the resettlement of displaced persons.

Since tribals constitute the bulk of the total population in Dandakaranya, their welfare also forms the cornerstone of the Authority's development programme. The Authority provides funds to the two State Governments to finance the settlement of tribals. Each tribal family is given Rs 2,600 as outright grant for its settlement on reclaimed land. Each new tribal settlement must have a minimum of 40 families. So far, Rs 4.66 crore had been directly allocated to tribal welfare. Reclaimed land measuring 12,043 acres has been distributed by the Orissa Government among 1,936 families constituted into 45 villages, while on the Madhya Pradesh side, up to July 1968, 5,482 acres had been distributed among 495 tribal families comprised of 16 villages.

During the last 10 years, a good deal of work has been done in the direction of developing communications. The Project has built 198 miles of main roads, 341 miles of link roads, 151 miles of roads for tribal villages, 165 bridges and 1,289 culverts. All these have faci-

litated the economic and social development of the area. Further, 212 wells and 950 tubewells have been constructed for providing water for drinking and irrigation.

In the educational field, the Authority has established 212 schools, including 9 Middle Schools and 3 High Schools, spread over the entire area. In the sphere of public health 6 hospitals and 10 primary health centres and dispensaries have been opened. As many as 40,954 indoor patients and 41,15,552 outdoor patients have so far been treated at these medical institutions. By systematic measures, malaria has been completely eradicated from the operational areas of the Project and anti-malarial measures are regularly in force.

Various measures have been adopted for the improvement of agriculture which is the primary occupation in Dandakaranya. A number of minor and medium irrigation works have been constructed. New varieties of paddy as well as cultivation of Rabi crops have been tried successfully, with the result that Dandakaranya has now become self-sufficient in foodgrains.

Attention has also been paid to the development of animal husbandry, fishery and dairy and poultry farming. As many as 3,272 cows and heifers have so far been distributed among settlers. Pisciculture is being increasingly adopted as a subsidiary occupation. A dairy unit and a Central Poultry Farm have been set up. By August 1968, 15.15 lakh eggs were produced and 2.13 lakh chicks hatched.

To give an agro-industrial bias to the developing rural economy, an Industrial Training Institute has been set up at Ambaguda. Other training units impart training in toy making, umbrella assembly, carpentry, blacksmithy and other handicrafts such as weaving.

A notable landmark in Dandakaranya has been the re-entry of settlers in the national political life. About 13,000 settlers were enrolled as voters and the majority of them participated in the last General Elections. In short, Dandakaranya is vibrant with new life and vigour. It is on the march.

BAILADILA PLACED ON INDUSTRIAL MAP OF INDIA



ASIA'S BIGGEST MECHANISED IRON ORE PROJECT

REPORT BY M.V. KHER

ABOUT three quarters of a century ago when Mr. J.N. Bose, a reputed geologist, located the iron ore in Bailadila hills, he might not have hoped that it would one day develop into one of the most leading national projects of India. The Bailadila Iron Ore Mines will be one of the biggest foreign exchange earning public sector industries in the country. During the first year of its working, 1968-69, it would earn Rs 13 crore as foreign exchange.

Bailadila means 'hump of an ox' in the local tribal dialect of Bastar District. The area of the mines here is 32 kms. long and 4 kms. wide and rises up to a height of about 1,250 metres above mean sea level with a surrounding table land.

The Bailadila range of hills infested with wild life, such as tigers, panthers, bears, wild boars, bisons and deers, was, probably, one of the most inaccessible parts of India, unconnected by even jeepable roads. Ten years ago, it used to take about a week to reach the area from the nearest railhead at Raipur or Visakhapatnam. Sal wood of good variety is found in abundance here. Teak of medium quality and Bija, both hard and soft varieties, are also available. The temperature throughout the year is normally below 30° C., except from mid-May to mid-June when it goes up to 41° C. During winter months it usually goes down to 6° C. The total yearly rainfall is nearly 300 cm. Different rivulets from Bailadila merge into the river Godavari.

In 1957 Mr Asada, a leading Japanese expert, representing the Japanese Steel Mills Association, visited the area and made a study of the iron ore deposits. He suggested a more detailed study in

depth. The Asada Mission, which incidentally stayed in a hut located at the hill top, paved the way to an agreement in March 1960 between the Government of India and the Japanese Steel Mills Association for the export of 4 million tonnes of sized iron ore to Japan.

The Bailadila Iron Ores are claimed to be one of the world's best iron ore deposits. The percentage of iron ore here varies between 65 and 70. Reserves of iron ore containing more than 65 per cent iron content are estimated to be 121 million tonnes, while that of blue dust having 66 per cent iron content are estimated to be 40 million tonnes.

A NEW PORT

The Bailadila Project has offered to supply to Japan ten million tonnes of iron ore annually from 1972. The Bailadila Iron Ore Deposits, with its total deposits of 3,000 million tonnes, are quite capable of supplying iron ore to Japan for 15

years at the rate of 10 million tonnes a year. At present Kiriburu is supplying the iron ore to Japan. There is a proposal to divert Kiriburu supplies to the Bokaro Steel Plant and entrust Bailadila Project with supplying six million tonnes of iron ore to Japan from 1970. A new port 'Gangavaram' is being built near Vizakhapatnam to handle traffic of 6,000 tonnes of ore per hour against the present 2,000 tonnes per hour.

Detailed prospecting of two deposits, No. 5 and No. 14, was taken up six years ago, after the near completion of the exploratory work at No. 10. In 1961 the job was handed over to the National Mineral Development Corporation (N.M.D.C.). The exact deposit which had to be exploited for meeting the export commitments was not decided till early 1963. On the basis of preliminary projects prepared by Mr. K. L. Sehgal, the then Chief Engineer of N.M.D.C.

and now the General Manager of the Project, a Japanese team under the leadership of Dr. Sugamata of Yawata Settl selected Deposit 14 for meeting Japanese orders. Construction work began in 1964.

The Madhya Pradesh Government has linked Bailadila foothills with Jagdalpur by a tarmac road over a distance of 100 kms. Work on this road for straightening various bends and for the construction of new bridges is still going on. The National Mineral Development Corporation has made an equally good road to Deposit No. 14.

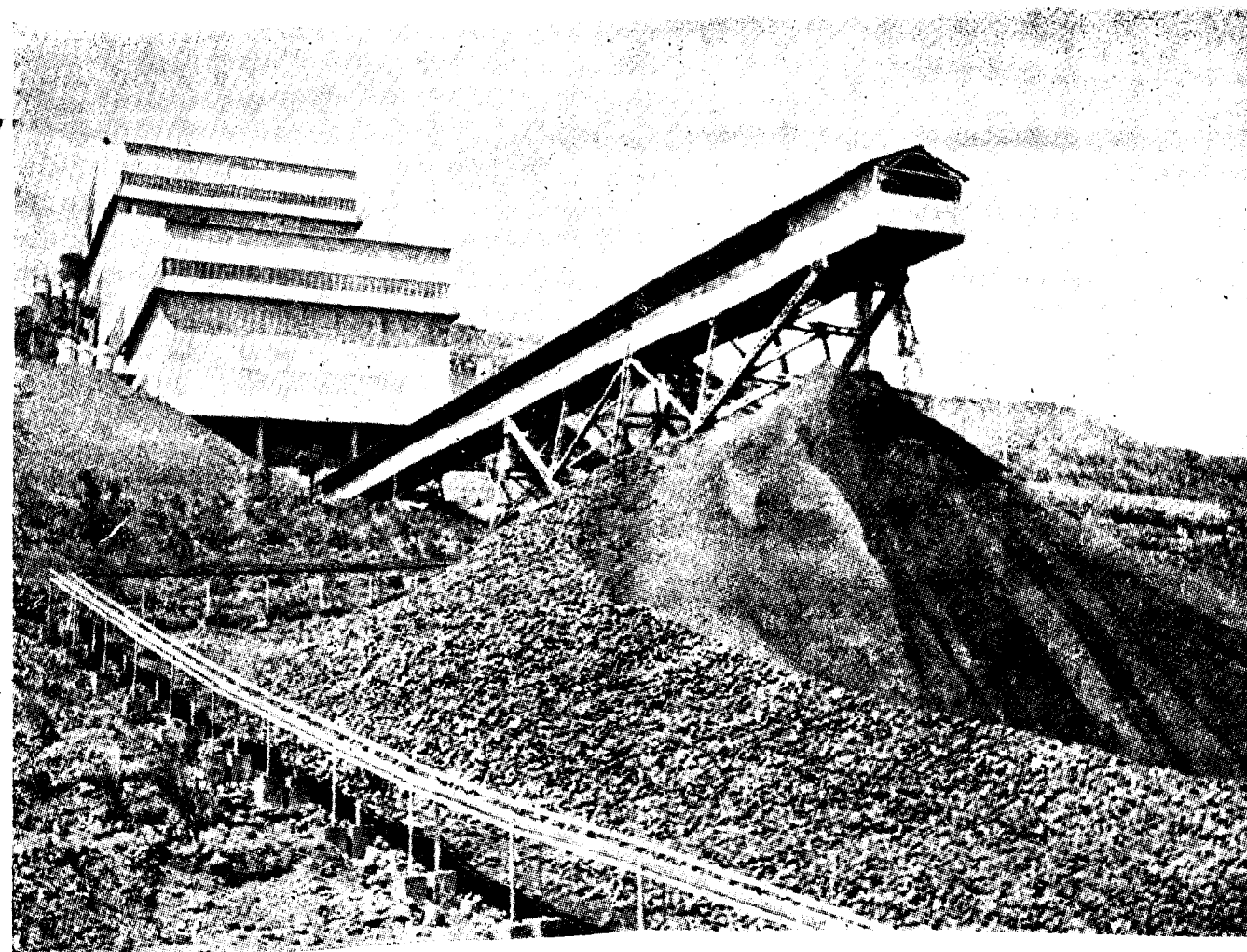
IRON ORE PLANT

The iron ore plant has a capacity of 1,500 tonnes per hour for sized up lump ore meant for export and 500 tonnes per hour for fines

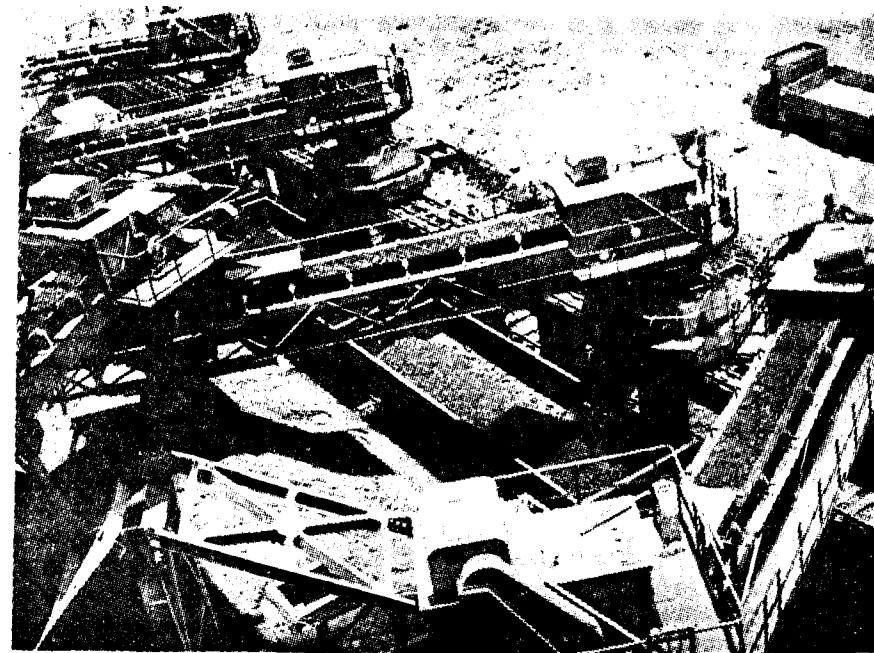
The ore coming out of the crushing plant, the biggest in India, is stockpiled.

to be diverted to stockpile. Individual components of various sections of the Plant have rated capacity as high as 2,500 to 3,000 tonnes. Huge ultra-modern mechanical equipment has been installed at Deposit No. 14 for drilling and for treating the ore at different stages of crushing, screening, wagon loading and fine ore disposal. These include 15 drills, one blast hole drill, nine shovels, 25 discharge dumpers and 18 bulldozers. The crushing plant of Bailadila is the biggest in this country.

The plant has an automatic sampling and quality control which enables the management to know the details of the ore being mined and despatched on different dates or during different periods of any working day. Provision has been made for an automatic sampling plant. The sampling plant, first of its kind in India, has provision for screens which give an idea of the percentage of fines going along



The ore-loading plant automatically loads the ore into wagons at 9,000 tonnes per hour. While loading, the ore is weighed simultaneously. Six wagons each of about 59 tonnes are loaded in 3 minutes.



with the lump ore. Mining benches, places of digging/blasting and scheduling of shovels can all be adjusted in the light of the results of the sample assay. The conveyor of the iron-ore handling system is 1.84 km. downhill, perhaps the longest of its type in the East.

The wagon-loading plant has been designed in such a way that it can handle any type of railway wagon. A rake of 40 wagons, each with a capacity of about 60 tonnes, can be loaded in about an hour. Travelling beams of the six leading conveyors to six different wagons ensure uniform central loading of the wagons.

The Bailadila deposits are connected with Visakhapatnam port which handles export from the plant by a broad gauge railway line over a distance of about 480 Kms. Completed at a cost of Rs 55 crore in April 1967, the railway line is capable of carrying 8 million tonnes. It is proposed to raise it to 12 million tonnes with suitable modifications. Visakhapatnam port can handle 4 million tonnes of ore. The capacity is being raised to six million tonnes per year.

The number of employees working in the various sections is over 3,600 who include about 700 Adivasis. A township of 475 quarters with modern amenities, a 30-bed hospital with modern equipment, primary and higher secondary schools, clubs, social centres and welfare centres makes the employees' living pleasant.

KOTA

(from Page 15)

ilities at the Kota plant have been supplemented, besides other programmes, by Research and Design which provides the technical base responsible for indigenous development and substitution of imported components and material. A number of instruments have already been developed with indigenous know-how and these are expected to be introduced in production next year. Development programmes have also been undertaken with the object of providing instruments with greater accuracy, speed, miniaturisation and digitisation. Several production orders to meet defence requirements as well as development orders for a sophisticated instrument for atomic power projects have also been undertaken by the management.

The two major problems facing the management are the slackening of demand due to our difficult resources position and outlays for setting up of basic industries, and the tendency of some of the major customers to look to foreign sources for their requirements due to lower rate quotations and also because their confidence in indigenous instruments has yet to get fully

reposed. Also, in view of the comparatively higher production costs, the indigenous enterprise finds it initially difficult to supply its products at competitive rates. Efforts are being made to reduce production costs by economising on capital investment by deleting certain imported equipment or phasing out indigenous supplies. Particular attention is being given to the maintenance of quality standards and to standardisation aspects to ensure interchangeability of various components and also to achieve economies of scale for manufacture.

The management also has not ignored the development of human resources in this field and the requisite technical and production expertise. Out of the present personnel strength of about 700, with an average age of 26 to 27, some 140 are engineers and technologists. Labour-management relations are excellent and all personnel are attuned to make this enterprise one of the best public sector units in the country. Manpower planning caters for the growth of these personnel to about 1500 by 1974.



ISRAEL

Computer Helps Distribution of Its Scanty Water Supply

Israel is a semi-arid country. Rainfall occurs mainly during the four or five winter months and ranges from a 1,000 mm. annually in the mountainous north to under 200 mm. in the arid south (known as the Negev) which contains most of the country's arable land. Most of the crops depend on artificial irrigation, which has become the primary limiting factor to the expansion and intensification of agriculture. Surface water sources, such as springs and streams, are relatively rare, and water is obtained by drilling into aquifers—the water-holding rock formations. This water is supplied to the consumers through a network of pipelines, boosters and reservoirs.

During the early days of Jewish settlement water supply problems existed only on a small scale and were solved locally by farmers and communities drilling wells on their property. In the 1920s, a number of co-operative water-supply companies were organised. As the rate of agricultural settlement rose, the problem became more acute and, in 1936, the Jewish authorities founded a national water company, which grew rapidly over the years. Its scope included the construction of water works, their operation and

maintenance, as well as supply to consumers, who were generally villages or towns rather than individual farmers.

With the birth of the State of Israel in 1948 it became necessary to settle the Negev. The problem of water supply to this area became a major concern of the Government.

During the early fifties, local supply in the Negev was practically exhausted. Water import was possible from only two areas: the springs of the Yarkon River in the centre of the country, and the upper Jordan River and Lake Tiberias in the

north. The Yarkon-Negev Project was designed to carry water from the former area. It became operative in 1954, but, within a few years, prolonged droughts and over-pumping caused a heavy depletion of its sources. Simultaneously, a new Government agency named Tahal (Water Planning for Israel) was created for hydrological research and the planning of water projects. Together with Mekorot (the National Water Company) it undertook the design and execution of the National Water Carrier Project. This was designed to pump water from Lake Tiberias at 210 metres below to 117 metres above sea-level and carry it through a succession of channels, tunnels, reservoirs and pipelines to connect with the Yarkon-Negev system. The two systems together today form the National Water Carrier.

From the very beginning Israel has been water-conscious. Too scant is this most precious resource. First, for agriculture, for more than 50 per cent of Israel's exports are farm produce—principally citrus. Ever-increasing irrigation is required to grow food for her rapidly expanding population. Another mounting demand for water stems from the nation's swift rise in industrial pro-

duction, a prime essential for Israel to help close the gap between imports and exports. Moreover, Israel's rapidly swelling cities demand more and more water for domestic consumption and to elevate further already high standards of living.

Facing this challenge, Israel has made a thorough inventory of all her land and water resources. Every inch of soil has been earmarked for the best possible use—irrigation, dry farming, grazing pastures, forests and orchards and vineyards on slopes of re-built terraces. To make full use of all her resources, Israel has formulated and launched a Master Water Plan. Designed to co-ordinate and to integrate all her water resources into a comprehensive, country-wide network, the programme involves the assembling of water wherever it is available and funnelling it to the areas where and when it is needed.

To understand Israel's need for more water, one must bear in mind that in 1948 only 17 per cent of the country's potential water resources were being used, whereas today that figure is fast nearing the 90 per cent mark predicted for 1970. At present, approximately 60 per cent of waters in Israel are made up of ground water requiring pumping from wells. Another 30 per cent consists of perennial surface flow; the remainder will be in reclaimed sewage from cities and salvaging of winter flood flows. To continue to grow, Israel must have additional water.

In 1962, the execution of the national carrier approached its final stage. The engineering staff at Mekorot was entrusted with its operation and integration into the national network. It became apparent that the operational philosophy for the past twenty years for small-scale, independent water-works would not suit a large, inter-connected system. When it was discovered that the salinity of Lake Tiberias was too high for certain crops, it was decided to dilute the water of the Jordan Project along its way south with less saline water from the northern aquifer. This would be pumped into the carrier from boreholes by boosters distributed along the pipe-line. They now constitute the Mixing System. Under pressure

from farmers and agricultural communities, the Government passed a law defining the tolerated salinity in water supplied by the national carrier. The increasing demand for water made it necessary to pump the maximum amount from the Lake, which meant approaching the tolerated limit as closely as possible. A delicate balance would have to be maintained, for which advanced control and calculating devices were needed.

In addition, the energy consumption of the water distribution system was evidently going to be extremely high. Efficient control of current energy expenditure, which had not played a big part till then, could no longer be avoided. Finally, the scope of the new system made it possible to consider large-scale manipulation in case of faulty conditions and breakdowns which could not be carried out locally. It was decided, for example, to discharge quantities of water underground during the winter as artificial replenishment and storage. All these considerations indicated a need for centralised operational control and planning. It was decided that the new techniques of operations research, systems analysis and the use of computers should be employed in attacking these problems. Experience in Israel of these technique was limited at that time, and the management of Mekorot concluded that it should seek expert advice from abroad. A British firm was selected for the purpose and a joint team was formed in the summer of 1963. In 1964, the national water carrier went into operation.

The joint team functioned until 1965. It laid the foundations for operations research department and the computer unit. It initiated work on both the scientific analysis of operational problems and the systems analysis of the company's administrative and commercial activities. It introduced the systematic use of computers. The salinity problem was solved by a computer programme which simulated the activity of the actual system. This made it possible to examine operational plans and to choose the most adequate. A hydraulic simulator was developed as a first step towards more efficient energy control. A basic master plan for control was outlined and the design of the first

centralised regional control centre was put in hand. The team was instrumental in the establishment of an operational control centre at the headquarters of the company in Tel Aviv to supervise and co-ordinate the operation of the national carrier.

In 1965, Mekorot decided to rent another computer for delivery in January 1967. Work on the scientific analysis of operational problems continued in the operations research department. The hydraulic energy simulation programme for the national carrier was completed, as also an automatic optimisation programme for one-reservoir systems. A new method of consumption fore-

casting was developed and tested. All these efforts were integrated in the plan for a pilot project, where information would be automatically transmitted to the computer, which would display, log and analyse it for more efficient control. This pilot project was developed with the aid of IBM and is at present being considered in detail by the management of Mekorot. According to present plans, it should be operative this year. By 1970, it will be possible to control the central section of the water distribution system by means of a computer connected on-line to the system. At the same time, the same computer will be performing commercial data-processing work.

VASECTOMY IN THE SEA

For the first time in India, a vasectomy operation camp has been successfully carried out in the sea as a part of a mass Family Planning campaign in Jamnagar in September this year.

Dr. S.B. Trivedi, the District Health Officer, Jamnagar, arranged a Vasectomy camp in the sea. A large cargo tug of Bedi Port was converted into a temporary Operation Theatre. Care was taken to disinfect the tug. The Port Officials, Mr Dave and Mr Rana, gave all help.

The operations were carried out by Dr M.S. Patel and Dr S.B. Trivedi. In all 11 sailors were sterilised in the camp.

A NEW CHOLERA VACCINE

The Indian Institute of Experimental Medicine (CSIR), Calcutta, has developed a new live vaccine which, orally taken, can afford better protection against cholera. The vaccine is based on a naturally avirulent El Tor vibrio strain isolated from water sources in Calcutta. Existing injectable cholera vaccine has been found inadequate by

recent field trials carried out under the auspices of WHO.

The new vaccine strain had been found to be apathogenic in animal models and capable of inducing protective immunity against virulent cultures of both classical and El Tor vibrios. It had also been shown to multiply in the rabbit gut giving rise to serum and copro-antibodies. The protective effect has now been shown to result mainly from an antitoxic immunity, although definite antibacterial immunity was also produced.

The safety of the vaccine for human use has been fully established. Now controlled field trial will have to be conducted to assess its value in comparison with those presently in use.

The Rajasthan Government proposes to spend Rs. 40 lakh for the development of new industrial areas during the Fourth Plan period. Another Rs 60 lakh has been earmarked for completing the work in the existing industrial estates. The State Government has plans to expand the industrial activity and has started discussions with several foreign Governments for collaboration agreements.

The Governing Council of the UNDP has allocated to India \$2.5 million per year for the next four years 1969-72 from its technical assistance component.

BOOKS

Octopus-Hold of Industrial Power

INDUSTRIAL COMBINATIONS
By M. L. Kothari. Published by Chaitanya Publishing House, Allahabad. 235 pages. Price not given.

M.K. Dharma Raja

GROWTH of industries in India, as elsewhere, has naturally brought in its wake the problem of industrial combinations. Grave it is, viewed in the context of a socialistic pattern. The emergence of industrial combinations forms the subject of this commendable monograph. Mr Asoka Mehta in the foreword speaks of the need to perfect the legal framework so that entrepreneurial talent is not choked off just because the financial and physical resources at its command are small. Also, it is paramount to ensure that society is not held to ransom because some of the industrial combinations have access to almost unlimited resources. A new element in the situation is our public enterprises. The public naturally expect of them to set the norm of a correct attitude and, if possible, rectify the imbalances.

Dr Kothari introduces the subject by explaining the basic concept of 'Concentration' and its technical aspects, and goes on to elaborate on its growth in the Indian context both during the pre-war period and through the years after Independence.

Industrial combinations forming as they do a feature of modern industrialism have aroused serious controversies and considerable thought has been given in many countries to the serious repercussions arising from their organisation. The author cites the examples of trust-bursting legislations in countries like the United States, Canada, Australia and New Zealand, specially to counter price discri-

mination and monopoly development. High-power Commissions of Inquiry have gone into various facets of the problem. A recent case in the United States was the action ordered by President Johnson against the steel cartels after they had rigged up prices.

In India, the problem has engaged serious attention over the years. The objective of Government policy stems from the Constitution itself enjoining upon the state to direct its policy towards ensuring that the operation of the economic system does not result in the concentration of wealth and means of production to the common detriment. Concrete expression came through the acceptance by Parliament of the socialistic pattern of society as the goal of future economic and social policy. The basic promise of the Five Year Plans has been to prevent the concentration of economic power and the growth of monopolistic tendencies.

The author has with remarkable objectivity and balance traced the growth and ascendancy of the few Indian business families, how they have enlarged their industrial empires out of proportion, partly through partnership with foreign companies and partly through mergers and amalgamations. The total picture that emerges is of industrial power in a few houses which, through their octopus-hold, constantly endeavour to defeat the purpose of legislation heralded by the Companies Act. Dr Kothari, it can be stated, has succeeded in reflecting the tempo of repeated demands for steps to suppress self-perpetuating oligarchies. The inescapable conclusion is that accumulation of excessive economic power in relatively few hands not only disturbs the balance of power in a democracy but also exposes the social fabric to strains and tensions which impede

the diffusion of economic opportunities.

This study has the object of pinpointing the managerial aspects of industrial combinations as an important device of cornering capital resources. The techniques of integration have been analysed in detail to show how even after the enforcement of the restrictive provisions of the Act of 1956, the industrialists have managed to retain their control over a large number of companies. The ubiquitous and ingenious methods of converting managing agency rights into those of Secretaries and Treasurers, and the devices of multiple directorates and holding companies leading to the interlocking of firms have all been explained. Also explained are the various and dubious ways of financial integration helped substantially by foreign capital and industrial assistance policies.

In the final analysis, arguments have been advanced in favour of comprehensive legislation to regulate and control concentration and the monopolistic tendencies in the private industrial sector. The author favours the appointment of a permanent body to study and investigate monopoly combinations and practices in India.

A series of tables and statistics have been used by the author to buttress his main arguments against combinations of all varieties, horizontal, vertical or circular. The various reports on company reforms have helped the author in formulating his proposals based on information and data available up to 1961. In the Postscript are included the findings of two later studies, reports of the Monopolies Inquiry Commission, and the Managing Agency Inquiry Committee. In subsequent editions, Dr Kothari may also take note of the analysis made by Prof. Hazari in his report on licensing policy. Now that the managing agency system is to be finally done away with, the question how the institution of managing directors will herald an era of healthy co-existence in our economy should be a subject for future study by economic investigators like Dr Kothari.

ECONOMICS OF VOCATION

Introduction to Vocational Economics. Edited by B.N. Pal. Published by Vora & Co. Pvt. Ltd., Bombay. Pages 301. Price Rs 15.

S.C. Seth

THIS book tries to establish multi-dimensional correlations between education and economics from the point of view of vocational economics. It certainly is a pertinent point of view.

The message of the book is simple, which is that the vocational spread contributes to economic growth and each stage of economic activity in turn adds to the vocational potential and, therefore, there is considerable need for vocational planning which should become an important element in a developing society's economic and social planning.

This study tries to explain the intricacies of economic development, socio-economic planning, population and manpower analysis, demand for and supply of literacy, adequacy of wage levels, recruitment trends in different occupations, and general occupational distribution.

In the words of the author:

"Most economic and social maladjustments can be considerably alleviated through vocational and occupational guidance. Still, the fact remains that technological and other advances have not improved the common man's lot: there is general insecurity—social, economic, political and cultural. There is unrest, impatience, irritation, and hurry, which mark today's civilisation. The problems of backward and developing regions is how to steer clear of all these evils. Economic and technical progress is so rapid that no individual can keep pace with it; he lags behind socially and culturally. Vocational guidance cannot provide answers to these urgent and desperate problems. But vocational economics does suggest some remedies, as these issues are economic, and not merely vocational."

This study in spite of its refreshing slant and scholarly analysis fails somewhat on purely technical grounds. Its chapters are unwieldy and the thought process does not flow

from one to the other. Thematically, therefore, there is lack of sufficient coherence in the arguments advanced either for or against an issue. Perhaps a more ably edited version of this work would have made it appear more logical. Presently many oddities occur. The correlation of vocational economics to questions of war and peace, for example, is a little out-of-the-way, though not totally irrelevant under certain circumstances.

After going through nearly 200 pages of academic acrobatics in nearly 19 chapters of analysis, where do we really reach and to what effect? It would be wrong to say, as the author's logic would guide us to believe, that in the context of India, our manpower analysis and educational development have not been fully matched with the economics of Indian planning. If that were so, can this book help us in overcoming the imponderables of the Indian failings with respect to vast unemployment, underemployment and brain drain. The answer is obviously no.

Essentially this book remains what its title suggests: "an introduction to vocational economics", and nothing more.

The get up of the book is good, and it is supported by a fine subject index.

A Block Survey Report

Needs, Facilities and the People—A Socio-economic Survey of Simalwara T.D. Block II by N.N. Vyas and O.P. Goyal. Published by Tribal Research Institute, Udaipur. 1968. 146 pages.

A.N. Mehra

THIS is a survey of the socio-economic development of a Tribal Development Block in Rajasthan's Durgapur District.

The Block covers 5 V.L.W. Circles comprising 96 villages with a population of 45,405. The distribution of institutions in the tribal and mixed villages is uneven. The tribal areas covering as many as 64 villages have only 28 village institutions, while 42 mixed villages account for 91 such institutions. Again, large-size villages have almost every type

of institution. Villages of small size have been neglected as regards development.

The mixed villages have a higher sex ratio of 938 women to 1,000 men as against 909 to 1,000 in the tribal villages. In the age-group 0-4, the ratio of females to a thousand males is 1,021. This is interesting. Perhaps inaccurate collection of figures has led to these figures.

In all, 92 households were selected from 4 villages, located in the Bandela and 3 in the Jhalap V.L.W. circle of the Block. The other 3 Circles, namely, Simalwara, Dhambola and Chadoli, were not represented. The authors would have done well to include families from these circles also. The number of families to be studied could have been distributed proportionately among the five circles.

From the sampled population of 575, 66 persons were married when they were below the age of 14 years. Of these, nearly 76 per cent were females. Out of the 92 families, the majority was engaged in agriculture with one or more subsidiary occupations. The percentage of families having subsidiary occupation(s) was the highest among the non-tribals. The tribals did not take to traditional occupations of the castes. They would be engaged in sundry occupations and still would be holding an equal social status with other tribals. But they would not take to the occupations of the so-called untouchables. Where non-tribal population was dominant, they might work as watchmen or as messengers and where they were politically and economically strong, they utilised the services of the lower castes such as Balais, as messengers.

The levels of income of the families showed that, on an average, income of the non-tribals was much higher than that of the Scheduled Castes and Schedule Tribes. The income of Scheduled Tribes was higher than that of Scheduled Castes. The report showed that 25.8 of the non-tribals, 17.4 per cent of the Scheduled Castes and 8.4 per cent of the Scheduled Tribes were literate. Despite the fact that a good effort has been made to collect the data, the analytical portion of the report is poor. This mars its usefulness.

Indian Farmers Keen To Adopt Improved Agricultural Practices

PLANNING FORUMS

FOR long the Indian farmer has been dubbed as too outmoded to take to new ideas and to adopt improved agricultural practices and techniques. But the findings of the Bharatiya Vidya Bhavan's R. A. College of Arts, Ahmedabad, help to explode this myth. The Planning Forum of the College surveyed four villages in Kadi Taluka, Sarsa Ardesan, Jasalpur and Untva, to study the farmer's attitudes towards improved agricultural practices and their problems. It found that the farmers there were very keen to adopt improved methods of cultivation. The farmers preferred the improved varieties of seeds and chemical fertilisers. However, their non-availability dampened the farmer's enthusiasm. The lack of interest shown by the Gramsevak and the extension officers worsened this situation. In Jasalpur, where the Gramsevak and the co-operatives were active, the farmers used more high-yielding seeds and fertilisers than in the other three villages. The Government machinery and the co-operatives have done little in giving guidance or in properly distributing the seeds and fertilisers in the three villages.

The farmers reported that the Taluka officers used to tell them new ideas, a few years back, but now they come mostly to complete their diary and for administrative and inspection work. Follow-up work is lacking. Ardesan's farmers reported that they were impressed by a demonstration arranged two years earlier by the Gramsevak and were willing to adopt the fertilisers combination used in the said demonstration. But no Gramsevak or any other officer since then has ever again explained anything about this to them.

Though all the four villages had co-operative seva societies, only that in Jasalpur was active and

arranged for the supply of improved seeds and fertilisers for its members. One-third of the credit advanced by this society was in kind. Sarsav society maintained only a nominal stock of seeds and fertilisers which was too inadequate to meet the demand of its members. Ardesan Society did not deal in seeds and fertilisers. Untva society had been totally inactive for the last five years. It was observed that a majority of the members of the societies were keen to advise their societies and to fulfil the demand for seeds and fertilisers, but because of the indifference of the leaders very little could be done.

Surprisingly, the Taluka Seed Multiplying Farm of sixty acres remains idle, in spite of a high demand for improved seeds.

Improved implements and insecticides and pesticides are seldom used. Among the insects, 'dor' is doing much damage to the crop.

There has been a good deal of development of irrigation facilities in the last two decades. Quite a few pump-sets have been installed and underground pipelines laid. Nevertheless what is urgently needed is a simplified procedure for irrigation loans and rapid electrification of villages. Since the initial and the running cost of oil engines is nearly double the corresponding cost of electric motors, many more pump-sets are likely to be installed, if rural electrification programme is expedited. Most of the farmers complained against the working of the Government tubewells.

THE damage caused by the recent floods to village Kachhiawadi, situated on the bank of the river Purna in Bulsar district of Gujarat was surveyed by the Planning Forum of S.B. Garda (Arts) & P. K. Patel College of Commerce, Navsari.

The survey revealed that nearly 95 per cent of the 278 families in the village were affected by the floods. The total loss came to nearly Rs 10 lakh. Rising waters in 36 hours ate away more than the entire annual income of the village of Rs 9 lakh. The yearly expenditure of the village has been about Rs 8 lakh.

The people lost almost everything, houses, agricultural crops and other belongings. The loss to agriculture and plantation was worth Rs 5.75 lakh and the remaining loss was accounted for by houses, cattle, fruit-bearing trees, wells, machinery, implements and household belongings.

CHEMICAL EXPORTS UP BY 17 PER CENT

India's exports of chemicals and allied products went up by about seventeen per cent during the period April to September this year. It is estimated that the export of such products will reach Rs 25 crore during the current financial year as against Rs 21 crores last year, as there has been a good increase in the exports of these products to East European, West Asian, African and Far Eastern countries.

There has been about a five-fold increase in the value of drugs and pharmaceuticals produced in the country in the last 13 years. The increase has been from Rs 34 crore in 1954 to Rs 175 crore in 1967. Plans are under preparation to increase the value of output to Rs 250 crore in the next three years. The capital investment in the industry is likely to go up to Rs 190 crore by 1971.

7,50,000 acres of land have been provided with irrigation facilities in Gujarat this year.

Development Diary

● The Bailadila iron ore mine, which will be Asia's largest mechanised iron ore mine with an annual production capacity of four million tonnes for export to Japan, has been formally inaugurated at Kirandul in the Bastar district of Madhya Pradesh.

When in full production, the project is expected to earn Rs 27 crore a year in foreign exchange. Set up in the public sector at a cost of Rs 23.5 crore, including financial assistance from Japan, the plant has many new features. One of these is a steel cord belt conveyer, the longest of its type and used for the first time in the country.

● A new plant for the manufacture of engines for cars and trucks has been inaugurated at the Uttarpara factory of Hindustan Motors near Calcutta at a cost of Rs 25 crore. The most modern plant of its kind in the country, the plant has a capacity of producing 38,000 car and 15,000 truck engines annually.

● A new process for the manufacture of corrosion resistant jute fabric by treating the fabric with various inhibitor compositions has been developed at the Defence Research Laboratory (Materials), Kanpur. The process which is simple does not involve any special equipment, and contact and volatile corrosion inhibitors, required as raw materials, are indigenously available.

● A big plant to manufacture high-density polyethylene, a plastic raw material of superior quality, has been inaugurated in the industrial estate at Thana, near Bombay. The project, costing Rs 12 crore, has been set up in collaboration with a West German firm. Asia's biggest and one of the most modern and technically advanced units of its kind in the world, the project is expected to produce 20,000 tonnes of high density polyethylene and other processed products per year. The material can replace non-ferrous metals, jute, paper and glass in a variety of uses.

● The foundation stone for a Rs 29-25 lakh Modern Dairy has been laid at Pondicherry. The project, which is being established by a Co-operative Milk Society, will be completed by the end of next year.

● Work has begun on a Rs 21-crore scheme to bring the Cauvery waters to augment the water supply of Madras city. Water will be brought through a 180 km-long pipeline.

● The keel of the second Leander class frigate, being built by the State-owned Mazagon Dock, Bombay, has been laid. The warship, scheduled to be launched next year, will be delivered to the Navy in 1972.

● A new agreement on air services between India and Switzerland has been signed in New Delhi. It makes a provision for increase in the number of weekly flights of Air India and Swiss Air and also for the future operation of large capacity aircraft.

● India has gifted twenty fat-testing machines to Iran. The machines, built in

India according to standards laid down by the Indian Standards Institute, are modelled on the best foreign make.

● A 31-km broad gauge railway line between Dharangadhra and Halvad in Saurashtra area of Gujarat has been opened to passenger and goods traffic. Constructed at a cost of about Rs 2 crore the new line forms an important link in the main Jhund Kandla broad gauge railway line under construction at a cost of Rs 16 crore.

● An airfield lighting equipment manufacturing unit, set up with Czech collaboration, the first of its kind in the country, has been opened as part of the Silver Jubilee celebrations of the Ordnance factory, Dehra Dun. Most of the plant and machinery installed in the unit is of indigenous origin. The factory has received

orders for airfield lighting equipment from 22 airfields. One complete set has already been supplied, and another full complement is under despatch.

● The Geological Survey of India has located good deposits of copper in the Hassan district of Mysore.

● Iran has placed orders for the supply of cable coating machine costing Rs 45,000 and manufactured by the National Small Industries Corporation with Japanese collaboration.

● A total of 74,594 tonnes of iron and steel products worth about Rs 3.89 crore were despatched from the Bhilai Steel Plants for export in October.

● A long-term trade and payments agreement has been signed between Poland and India. An important feature of the agreement is the long-term arrangements reached for the supply of increasing quantities of sulphur and urea from Poland to India. In return India will export substantially increased quantities of Indian engineering goods.

FRUIT RESEARCH NEAR KOTA

GRAPE cultivation in Rajasthan is becoming more and more popular.

While five years ago grape cultivation was considered to be nothing short of a miracle in this State, no less than 300 acres are now covered with vines bearing this luscious fruit. And it has been realised that the climate of this region as a whole, especially the hot and dry atmosphere of Marwar, is well suited for developing vine-yards.

Grape cultivation in this State made a modest beginning in 1964-65 when about one acre of land was brought under vines at the 100-acre fruit Research Station-cum-Progeny Orchard of the State Agriculture Department on the Kota-Bundi road. The experiment was very successful. Grape cultivation has since been extended to Jaipur, Jodhpur, Ganganagar, Bundi and other districts.

It is proposed to develop large vine-yards in Hanumangarh, Sikar and Jalore areas also. Necessary trained personnel have been appointed by the Agriculture Department for this purpose.

The Fruit Research Station's orchard near Kota will itself grow vine-yards in one hectare next year. Some 20 varieties are already growing there, of which Beauty-seedless,

Parlete Thomson-seedless, Khandari and Anab-e-Shahi have been quite successful.

This part of the year is the harvesting time for grape. At the Fruit Research Station's orchard the vines are full of bunches of grapes. The varieties which have seeds are harvested from 12 to 15 thousand kilograms in one acre, while production of the seedless varieties like Thomson and Parlete is from 10 to 12 thousand kilograms per acre. A well-known vine bears as many as 100 bunches of fruit.

MODEL PIGGERY

A model piggery is to be set up at Gannavaram in Andhra Pradesh. The Freedom From Hunger Campaign Committee of Ireland would supply to the piggery 130 pigs of improved strain of breeding stock. The estimated cost of the pigs is over Rs one lakh which the Committee would bear. This is under an agreement between the Government of India and F.A.O.

The superior strain of pigs would be multiplied for distribution in rural areas to the bona fide breeders in the hinterland of a Bacon Factory which is to be set up at the same place at a total capital outlay of over Rs five million. The Central Government has sponsored the scheme. The project is to supply protein rich food of animal origin to our population.

A FISHY BUSINESS

THE bumper harvest last year has taken the country substantially nearer to the goal of self-sufficiency in food. But, this is only part of the problem, because our people are still suffering from nutritional deficiency. The per capita consumption of protein in India is one of the lowest in the world. In this context, the development of fish resources can make a major contribution in increasing resources of animal protein.

Production of fish in India, both fresh water and marine, was estimated at 7.52 lakh tonnes in 1951. The annual average for the period 1963-67 was 12.97 lakh tonnes, while last year it rose to 14.23 lakh tonnes. Despite this, the per capita availability of fish today remains as low as 7.5 grams per day. Even at this low rate, India would require 15.6 lakh tonnes of fish by 1971 when the population is expected to reach 56 crores. Actually, the recommended protein requirement is 75 grams per capita per day. Assuming that 60 per cent of the population is fish-eating and that half of the recommended protein requirement is to be met from fish, India would need 46 lakh tonnes of fish per annum by 1971.

Fishing will always remain a gamble until some idea of the resources available in the sea is gained by reliable and scientific methods. Exploratory surveys conducted by the Government of India's Deep Sea and Off Shore Fishing Organisation and the fishery departments of some States are adding to our knowledge relating to fishing grounds, suitable types of vessels, gear, etc. Tagging is a method which contributes to specific knowledge on resources. It involves fixing some identity mark on fish, releasing it again and, on its subsequent recovery, assessing growth rate, direction of migration, population size of shoals. Tagging of sardines and mackerel has been taken up as a priority programme by the Central Marine Fisheries Research Institute, the Central

Institute of Fisheries Education and some State organisations. More than 10,000 mackerel and sardine were tagged in the Bombay coastal sea in 1967, while a few thousand fingerlings were tagged also at Gandhisagar in the Chambal valley of Madhya Pradesh in order to assess the availability of fresh water fish.

Carp varieties do not breed in confined waters and the conventional method is to collect spawn in river mouths and rear them to fry and fingerling stage before they can be grown further in ponds and swamps. Wastage can be high in this method. Recently, carp has been successfully induced to breed in confined waters by injecting them with pituitary hormone. Experiments are also being carried out on the development of hybrid varieties of carp for evolving a breed with more meat, faster growth and better taste.

Well-equipped laboratories have been set up for sophisticated biological investigation. An instrument analyses the quantities of Vitamin A and other biological components in fish and fish liver oil and measures the rate of fish spoilage. Another apparatus helps to identify the various proteins.

The transport of fish fry is a sophisticated technique. The fry is kept in plastic bags and the amount of oxygen to be introduced into the bags varies with the distance. Drugs are also administered to depress metabolism.

EDITORIAL TIPS

The following piece from an American journal (*The Weekly Packet*, Blue Hill, Maine) speaks for itself. We would only like to add that what it says is perhaps true of some cities in India, too, so that we are not the only victims of the vagaries of telephone operators.

"We have been asked from time to time just how we go about writing editorials.

"Well, we've stumbled upon a foolproof technique, much like that



IGNORAMAN Wants to Know

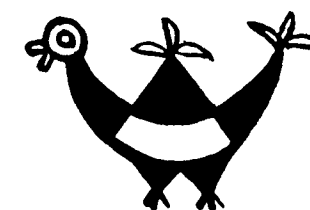
*Isn't brain drain
better than
leaving the brain
in the drain?*

of P.G. Wodehouse who said he constructed his fantastic plots by seating himself before his typewriter and "swearing a bit."

"We pick up the telephone, cock it on our shoulder, dial the operator, and while we wait for her to answer we write an editorial.

"The beauty of the system is that people see we are using the telephone, and so they don't disturb us. And by the time the operator gets around to answering us, the editorial is pretty well sewed up.

"Should we ever get direct dialling, like the civilized part of the country has, we shall probably have to give up writing editorials altogether."



WORDS THAT INSPIRE

The very essence of democracy is that every person represents all the varied interests which compose the nation. It is true that it does not exclude and should not exclude special representation of special interests, but such representation is not its test. It is a sign of its imperfection.

Surely, timidity has no place in democracy, where people in general believe in and want a particular thing. Their representatives have but to give shape to their demand and make it feasible. A favourable mental attitude of the multitude has been found to go a long way in winning battles.

The truest test of democracy is in the ability of anyone to act as he likes, so long as he does not injure the life or property of any one else. It is impossible to control public morals by hooliganism.

I claim (to be a democrat) if complete identification with the poorest of mankind, an intense longing to live no better than they and a corresponding conscious effort to approach that level to the best of one's ability can entitle one to make it.

I have repeated times without number, for national work, it is not necessary that national workers should have political power. But it is necessary for the people to keep in constant touch with those whom they put in power. These can easily be counted. They are too few. But if the people were to realise their power and use it wisely and well, things would right themselves.

People in a democracy should be satisfied with drawing the Government's attention to mistakes, if any. They could remove the Government if they wished to. But they should not obstruct them by agitating against them. Ours is not a foreign Government having a mighty army and navy to support them. They have to derive their strength from the people.

Let us not push the mandate theory to ridiculous extremes and become slaves to resolutions of majorities. That would be a revival of brute force in a more virulent form. If rights of minorities are to be respected, the majority must tolerate and respect their opinion and action. It will be the duty of the majority to see to it that the minorities receive a proper hearing and are not otherwise exposed to insults.

Claiming the right of free opinion and free action as we do, we must extend the same to others. The rule of majority, when it becomes coercive as intolerable as that of a bureaucratic minority. We must patiently try to bring round the minority to our view by gentle persuasion and argument.

I have repeatedly observed that no school of thought can claim a monopoly of right judgement. We are all liable to err and are often obliged to revise our judgements. In a vast country like this, there must be room for all schools of honest thought. And the least, therefore, that we owe to ourselves as to others is to try to understand the opponent's view-point and, if we cannot accept it, respect it as fully as we expect him to respect ours. It is one of the indispensable tests of a healthy public life, and, therefore, fitness for Swaraj.

Intolerance, discourtesy and harshness are taboo in all good society and are surely contrary to the spirit of democracy.

I attach the highest importance to quality irrespective almost of quantity. In the midst of suspicion, discord, antagonistic interests, superstition, fear, distrust and the like, there is not only no safety in numbers but there may be even danger in them. Numbers become irresistible when they act as one man under exact discipline. They are a self-destroying force when each pulls his own way or when no one knows which way to pull.

I would only ask a candidate, "How much of a man or woman you are?" Provided he or she passes these tests, I would select first the one who belongs to the least numerical section. I would thus give preference to all minorities along just lines, consistent with the welfare of India. Welfare of India means welfare of India as a whole, not of Hindus and Mussalmans or of a particular community.

I ask you not to be cowed down by the thought of a small minority. It is sometimes a privilege. I have so often said that I would love to be in the minority of one, because this artificial majority, which is the result of the masses' reverence for me, is a clog in my progress. But for the clog I would hurl defiance.

Democracy is a great institution and, therefore, it is liable to be greatly abused. The remedy, therefore, is not avoidance of democracy, but reduction of possibility of abuse to a minimum.

True democracy or the Swaraj of the masses can never come

through untruthful and violent means, for the simple reason that the natural corollary to their use would be to remove all opposition through the suppression or extermination of the antagonists. That does not make for individual freedom. Individual freedom can have the fullest play only under a regime of unadulterated ahimsa.

Democracy of the west is, in my opinion, only so called. It has germs in it, certainly, of the true type. But it can only come when all violence is eschewed and malpractices disappear. The two go hand in hand. Indeed, malpractice is a species of violence. If India is to evolve the true type, there should be no compromise with violence or untruth.

India is trying to evolve true democracy, i.e. without violence.

I venture to suggest, in all humility, that if India reaches her destiny through truth and non-violence, she will have made no small contribution to the world peace for which all the nations of the earth are thirsting and she would also have, in that case, made some slight return for the help that those nations have been freely giving to her.

A free democratic India will gladly associate herself with other free nations for mutual defence against aggression and for economic co-operation. She will work for the establishment of a real world order based on freedom and democracy, utilizing the world's knowledge and resources for the progress and advancement of humanity.

I would make the spinning wheel the foundation on which to build a sound village life; I would make the wheel the centre round which all other activities will revolve.

The idea behind the village industries scheme is that we should look to the villages for the supply of our daily needs and that, when we find that some needs are not so supplied, we should see whether with a little trouble and organisation they cannot be profitably supplied by the villagers.

Gandhiji

