

460

INDIAN Industries

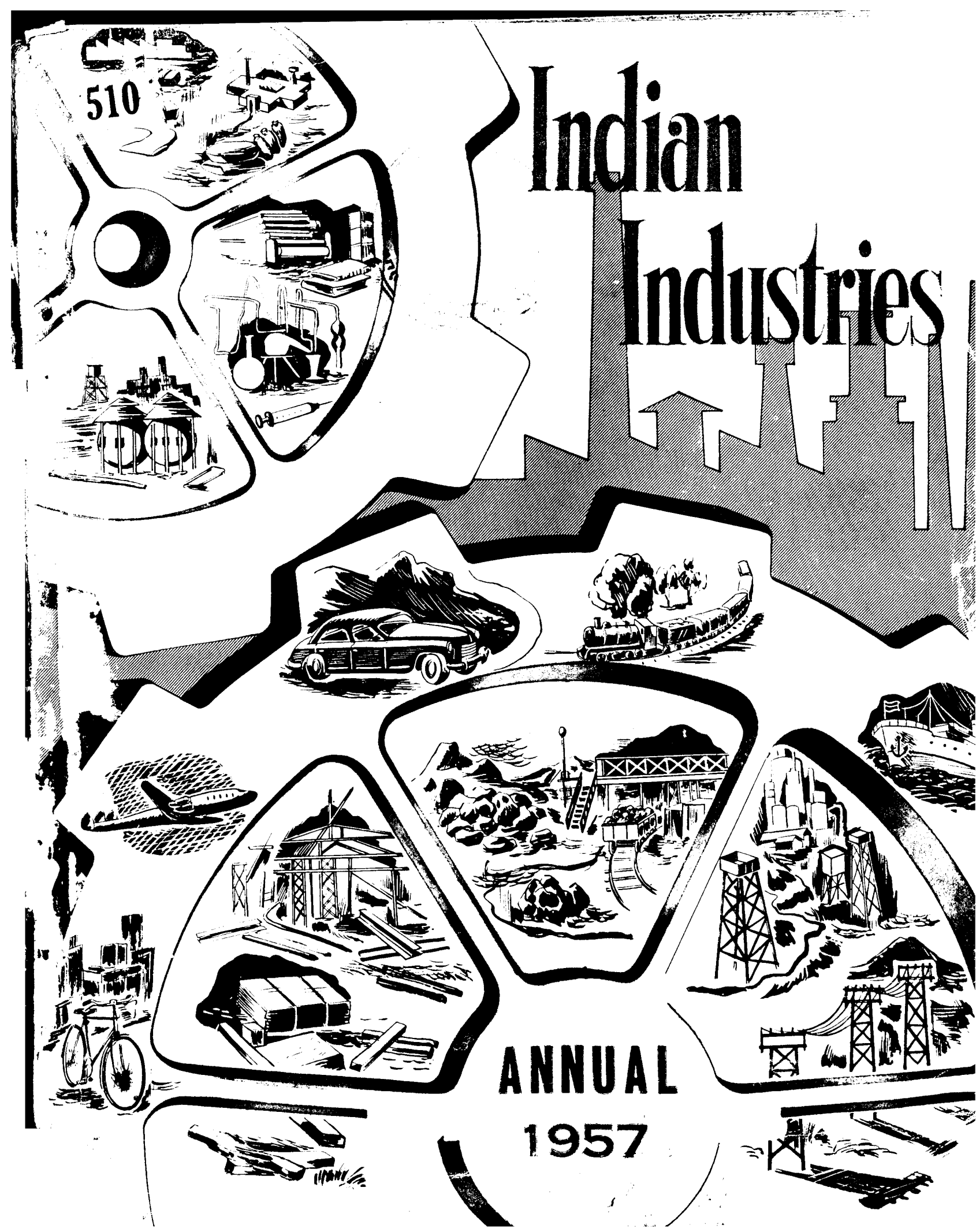
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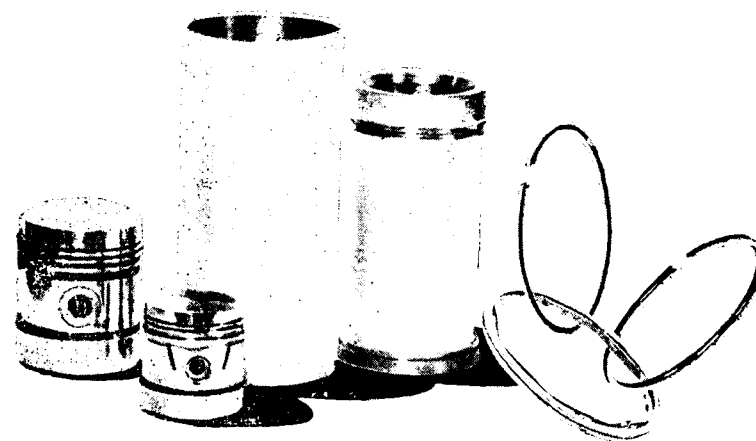
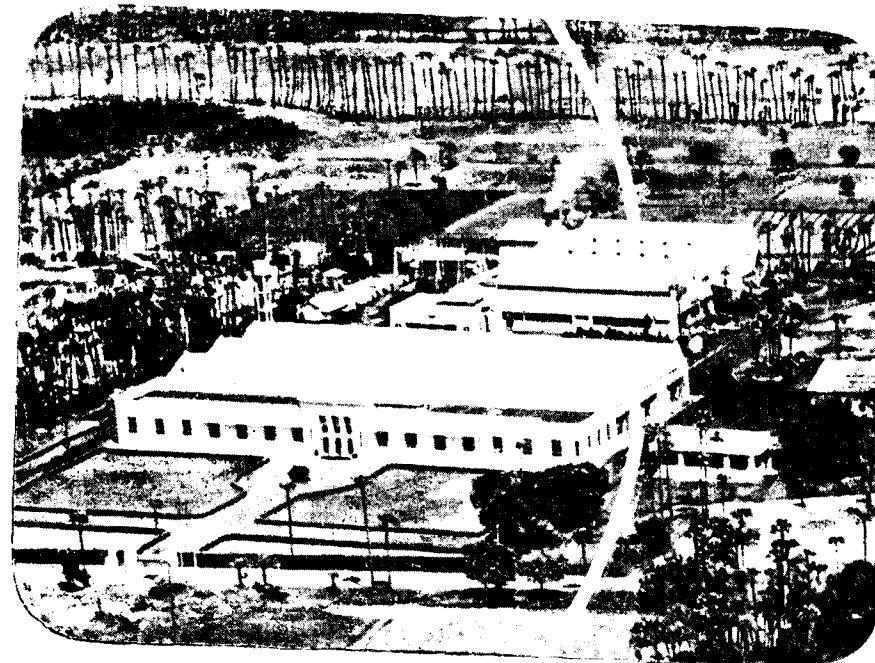


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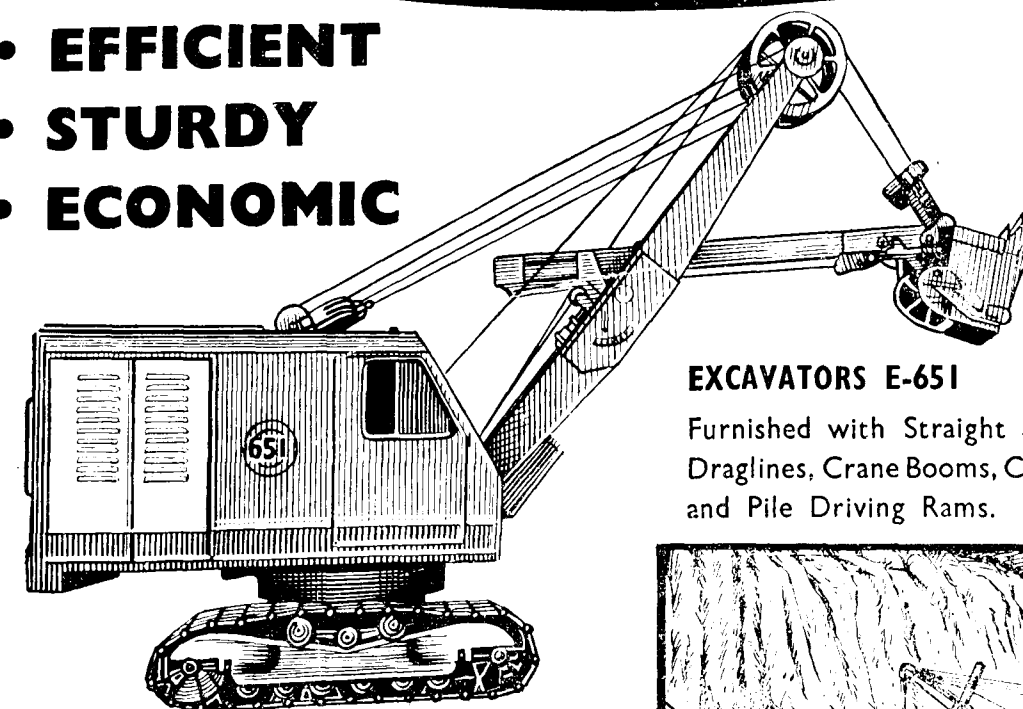
PROGRESS AT A GLANCE

- 1949 ERECTION OF FACTORY
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- 1951 CAST IRON FOUNDRY
- 1952 PISTONS
- 1953 CYLINDER LINERS
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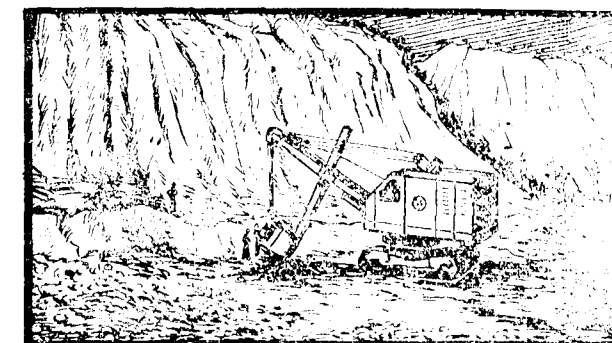
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cables, high grade paints, pumps, air conditioning plant, plywood, tallow and many others.

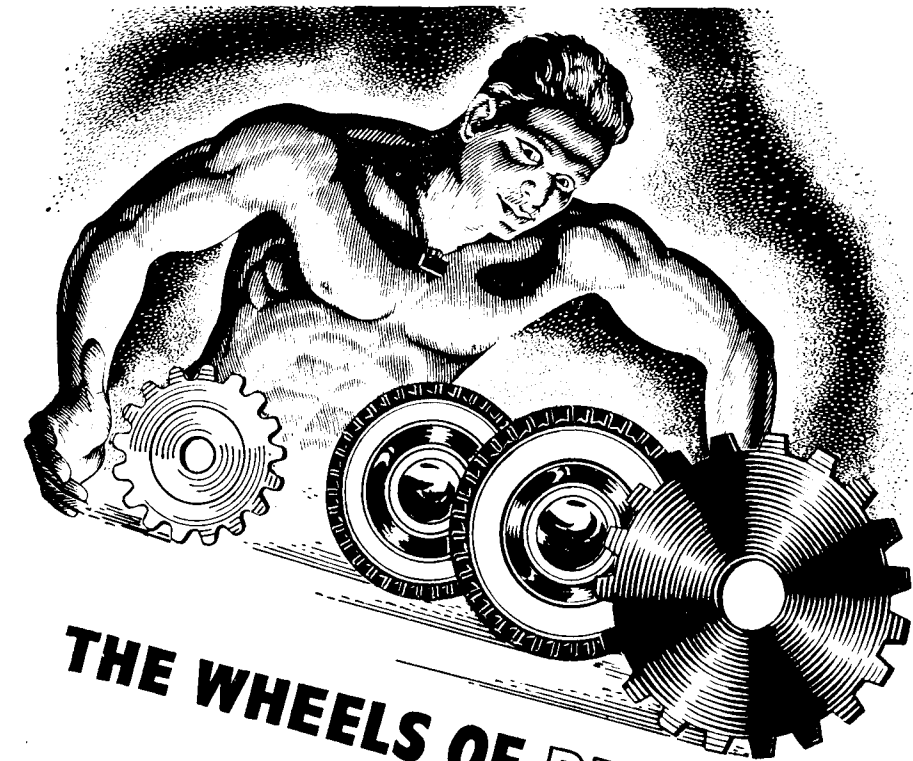
Binny's Engineering Works fabricate steel tanks and all kinds of steel structures; cut gears, ferrous, Mechanite and non-ferrous castings; carry out oxy-acetylene, electric welding, and boiler repairs.

Binny's offer shipping, stevedoring, clearing and forwarding and insurance facilities.

Binny's

—a great name in India!

BY 961



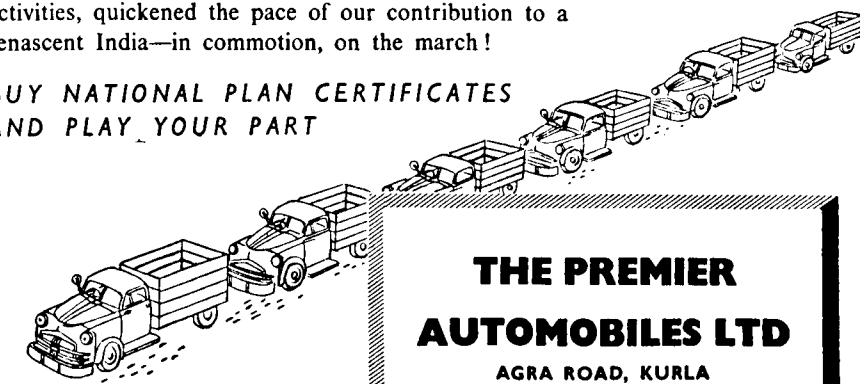
THE WHEELS OF PROGRESS

The people of India, in the words of our beloved Prime Minister, are on the move. There is a spirit of adventure abroad, awakening after decades of torpor.

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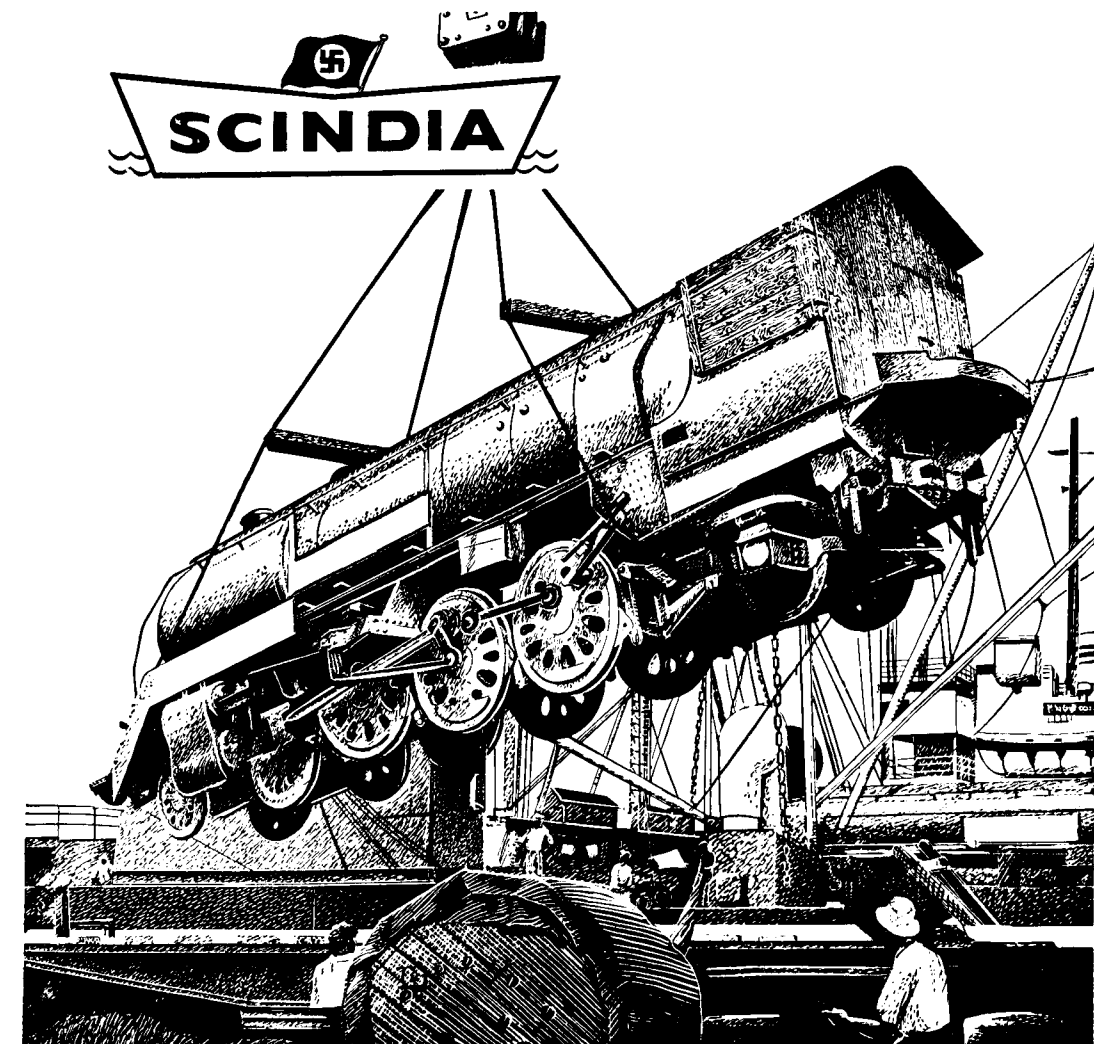
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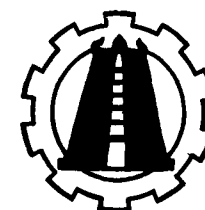
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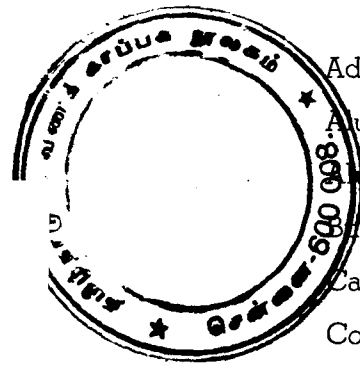
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FOREWORD

by

Dr. S. RADHAKRISHNAN, M.A., D.LITT., LL.D., F.B.A.,
Vice-President of the Indian Union

NEW DELHI
June 29, 1957

I am glad to know that you will review the Second Five Year Plan in all its aspects.

We require to be educated on the different aspects of the Plan.

The Plan should also help in raising the standards of our education system and improving the quality of the students who are turned out of the Universities.

After all the Plan is intended for the people, not merely for their material welfare but also for their cultural and spiritual elevation.



EDITORIAL

Economic Freedom

A decade ago India won her political freedom. But the freedom she longed and toiled for over a century is in the make.

The gusto that animated our millions to call our own the land of our birth—is it alive? That iron *will* that stood the fire of scorching sacrifice, the bullets from alien guns, the trample of military horses on their cracking bones, the anguish of prison life, the loss of dear and near—so long that *will* sends out its roots into the core of us, defeatism is not for Indians. We absorbed the shock of partition with classic patience. The food crisis was calmly tackled. To improve the living standards and working conditions of the people, the Five Year Plans were launched in 1951.

The feverish excitement to grow industrially strong is present in the activities of nations all over the world.

Defeated in war, stripped of colonies, never rich in resources, Japan has re-emerged as the foremost industrial power in Asia. Ninety million industrious people have proved all over again that there can be no permanent defeat for human energy. That energy is spilling all over Japan. Merchants greet each other with "How's profits?" Japan has surpassed Britain as the world's foremost shipbuilder. With

some coal, much limestone, a good rainfall, she has registered in exports a 57% advance over 1954. It is small industries that give Japan stability. In backyards, in basements, and even parlors, men and women are industrially turning out piecegoods, nuts and bolts, drive shafts, axles with old machine tools.

China's foreign trade has practically doubled. Chinese machine tools and motors are sold in Far East. Shanghai and Cheng Chow produce all types of equipment needed for textile industry in China. In most factories, they are working two shifts and even three eight hour shifts. Constructional engineers will profit by the achievements of Chinese technicians. By 1967 the target for foodgrains is 450 million tons, a 150 percent increase.

U. S. S. R. has set itself the task of overtaking and surpassing U. S. economically. 1,30,000 engineers and scientific workers graduated in 1955 from Universities and Colleges while only 60,000 graduated in U. S. The index of industrial production shows thus:

	1940	'43	'50	'55
U. S.	67	127	112	139
U. S. S. R.	100	100	173	320

While U. S. industrial production doubled in

INDIAN INDUSTRIES ANNUAL

August 1957

15 years, Russia has registered a 300 percent increase.

France's economic recovery has been one of the speediest in Europe. Its progress in 1953 has been surpassed only by Western Germany and Holland. In the French coal mines, a technical revolution is going on. Lorraine output has jumped to 12 million and will hit 20 million tons in few years. Since 1930 over 200 dams are built. "White Coal" or water power resources are developed and France's electric installations rank among the most powerful in the world. Other nations must profit by her new 'ribbon' rails.

German economy seemed beyond repair at the end of the war. Industry had been severely hit. Cities and towns were a mass of rubble. No food, no coal, no steel. But the indomitable courage of her people put Germany on the road to prosperity. A new life crept into the veins of German economy with Currency Reform in 1948 and the Marshall Aid. She progressed tremendously and today she occupies the third place in global trade—United States ranking first and U. K. second.

And Indian industry is also expanding furiously.

Britain and America are rich today but they took more than two centuries to grow rich. India cannot go slow. She must grow wealthy in a short span of two decades. What took 200 years for Occident, Orient must realize her objective in about 20 years. It is essential to accelerate the rate of economic growth and to speed up industrialisation, to expand the public sector, and to build up a large and growing co-operative sector. These provide the economic foundations for increasing opportunities for gainful employment and improving living standards and working conditions for the mass of the people.

The past decade witnessed a spectacular increase in our industrial products. The production of textiles, Vanaspati, Chemicals, engineering industries, coal, cement and steel is phenomenal. In 1947, there was a total absence

of engineering group of industries. Today the progress is astonishing. Six-and-a-half lakhs of bicycles come out of our factories every year—almost 95 per cent of the components being indigenous.

Before Independence, the production in automobiles was 'nil'. The present annual production is 35,000 units. India is making today 1.68 lakhs of sewing machines. Diesel engines production is spectacular.

At the time of partition, India produced 30 million tons of coal annually. The current rate of production is 44 million tons. Steel has gone up to 13.4 lakh tons from 8.6 lakh tons in 1947. Cement production was 14 lakh tons ten years ago. Now it is 61 lakh tons. With a Rs. 45 crores heavy machinery plant in Bihar, India would be in a position to manufacture A to Z components of steel, cement and chemical plant, other heavy machine plants and various other chemical and industrial manufacturing units. Small scale industries have made tremendous progress. Practically in all sections of industry, a minimum increase of 30 per cent in production has been achieved.

The remaining years of the Second Five Year Plan will witness a tremendous expansion in heavy industries.

On the recommendations of the Soviet team of experts and the British Heavy Engineering Mission, Government of India has decided to execute the following heavy machinery projects: a Heavy Machine Building Plant, a Heavy Plate and Vessels and Heavy structural work, a Heavy Machine Tool Works and a Mining Machinery Plant.

Czech, French, Italian and British firms have submitted reports for a project to produce special alloy and stainless steel for the manufacture of Industrial plant and machinery. A team of East German experts have proposed the project for manufacturing cinema films, x-ray films and photographic paper. By 1960 we require 300 crores worth of machinery. In 1956 was produced only Rs. 30 crores worth of machinery.

August 1957

Hindustan Machine Tools Factory will reach an output of 400 machine tools per annum by 1960.

The target of 65,000 telephone instruments and 45,000 exchange lines per annum will be achieved by Indian Telephone Industries (P) Ltd. by 1961.

India's three Steel plants—Rourkela, Bhilai and Durgapur—will go into full production before the end of the Second Plan. Steel production will reach the enviable 6 million target. Our Finance Minister aims at 18 million target by 1966.

Japanese engineers and technicians are engaged in working Kargali cool washery. Russian and Rumanian experts are helping us in oil well drilling. An American firm on a turn key basis is starting a DDT factory in Kerala.

Our foreign exchange difficulty is purely a temporary one.

As against the estimate of Rs. 1200 crores of foreign exchange required, we have the following resources:

1. Unutilised foreign aid credits	... Rs. 99 Crores
2. Russian and British loans for steel plants	... " 76 "
3. U. S. Surplus Commodity Agreement	... " 137 "
4. World Bank loan to our Railways	... " 42 "
5. World Bank loan for Koyana Project	... " 15 "
6. U. S. S. R's aid for Heavy Machinery Mfg. Plant	... " 60 "
7. U. S. development assistance	... " 27.6 "

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	Rs.	Crores
8. Grants by Canada & N. Zealand under Colombo Plan	...	7.35
Total	...	463.95

World Bank's and Colombo Plan's assistance would be an annual feature in the coming four years. The Indian Industrialists' delegation, led by our great industrialist Shri G. D. Birla, is contacting leading American business men in New York for a 600 million dollars aid (Rs. 300 Crores) and our Finance Minister Shri T. T. Krishnamachari's presence will create the right climate. Every advanced country in the world including U. S. and Britain looked to foreign capital for its development. India just needs Rs. 300 crores of foreign exchange and it will get it either by external aid or increase of her exports.

As our Finance Minister says: "What is the use of a free country, what it is the use of Government which is elected by adult suffrage, if it does not undertake to move the economy from its position of stagnation, an economy which is terribly static and which would not move into something which is dynamic?"

In the memorable words of our dear, dear Prime Minister: "You cannot cut down the steel plants and the big machine plants. It is a basic fact that if you want to progress, you have to progress by having more steel and by making machines yourself. We are looking ahead with faith to the time when steel flows out of these big plants, wealth comes out of them, for our construction, for our export and for using it in so many ways."

Sweat we must.

Win we will.

**

Krishna Prasad

IN NOVEMBER

1957 ISSUE

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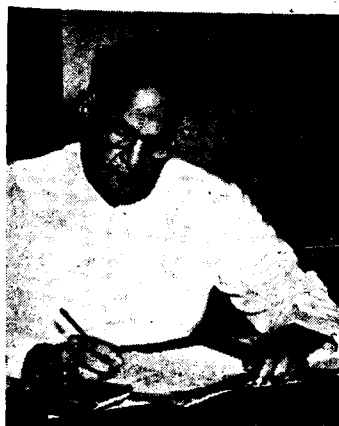
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Director of Press Services, U.S.I.S., Madras

CZECH ABRASIVES

A. Hauptvogel

INDIAN INDUSTRIES

MADRAS-17



India is a land of villages and our planning chief, an admirable administrator himself, powerfully pleads for village autonomy. the ideal state the Father of the Nation conjured up.

VILLAGE SELF - GOVERNMENT

V. T. KRISHNAMACHARI

Deputy Chairman, Planning Commission

Throughout India's long history, the village has always been an important administrative unit and has always had a large measure of autonomy. This was inevitable in the government of a big country—especially one in which agriculture constitutes the main occupation of more than 80 per cent of the population. The disintegration of village life began early in the nineteenth century owing to causes which are well known. The question before the country now is how to build up village autonomy in the present circumstances and in accordance with modern conditions.

We should build up a free and vigorous village life linked up to productive activities through (1) a village panchayat, and (2) a village multi-purpose cooperative society. Broadly speaking the functions of the village panchayat

will be administrative and regulatory and those of the cooperative society will be to stimulate social and economic development. These functions are closely inter-related and neither can be useful without the other.

It is gratifying that considerable progress has been made in the establishment of village panchayats in most States. The number of villages covered by panchayats in March, 1955, was about 3,64,000 out of the total of about 500,000 villages in the whole country. In many States, all villages are covered by panchayats and in the rest steady progress is being made in this direction. All the Acts of the States give fairly comprehensive powers to panchayats.

The N.E.S. movement has provided a strong, well-trained official organization to guide the villagers in making these two institu-

INDIAN INDUSTRIES ANNUAL

tions really effective. For every 5 to 10 villages there is a multi-purpose village level worker and in every block there are teams of experts whose duty it is to assist every village and, through the village organisation, every family with the technical advice which it needs. There are also trained technical staffs at higher levels. The guidance of these official agencies and of non-official workers at all levels is available for this programme of laying the foundations of the village self-government.

It is not to be understood that I regard the existing village boundaries as sacrosanct. Far from it. In modern conditions many of them are too small. There are over 380,000 villages with a population of 500 and below and more than 100,000 villages with a population between 500 and 1,000. In my view, these should be merged together so as to form convenient units with a population ranging from 1,000 to 1,500, that is, about 200 to 300 families. Such units can provide effective leadership and also sufficient financial resources for development while at the same time there will be a sense of solidarity and all the families will be known to one another. It is the villages thus integrated that should form the basis for self-government, each having a panchayat and cooperative society. It is also essential that these units should establish close contacts with adjoining units and higher units at the block level. Village panchayats should be linked up with taluk or tehsil panchayats. Village cooperatives should be linked up with unions and also with processing and sales societies at higher levels.

It goes without saying that much educative work will have to be undertaken to give members of village panchayats, Directors of Co-operative Societies and other village leaders a clear idea of their duties and functions in a plan of intensive rural development. At the headquarters of every N.E.S. block there should be permanent arrangements for this kind of work during the off season when there is no cultiva-

August 1957

tion in progress. The educative work should not be confined to the administrative and regulatory functions of panchayats and to cooperation but should embrace all aspects of development including increased agricultural production, use of fertilisers and manures, making of composts etc. The aim should be to see that the support of the best non-official leadership available in the block is enlisted for rural development and that these leaders are made sufficiently acquainted with the programmes.

Whenever we talk of village panchayats and cooperatives, mention is made of village factions as a powerful factor hindering their healthy development. There is no doubt that factions do exist and that every effort should be made to see that their bad influences are eliminated. My own view is that most of the evils in present day village life are traceable to the long period of enforced unemployment in agriculture—to the many months between monsoons during which no agricultural operations are possible. The remedy lies in a plan for increased employment and production for every family. If villagers as a body are organised for a concerted attack on poverty and for raising standards of living appreciably through their own efforts, many of the evils in village life will disappear. This is the basic idea underlying the N.E.S. movement.

I have brought out in a general way the lines on which village self-government should be reoriented to suit the requirements of our plan. There should be no drive for rigid uniformity. Every State—and in fact different areas in States—should work out patterns which will suit their own conditions. What is essential is that everywhere villagers should be enabled to take their own decisions, become members of cooperative societies in their own right and contribute as much voluntary labour as they can to works of benefit to the entire community. It is only thus that improvement can become possible on the scale we desire.

..

★

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INDIA'S ADVENTURE

ELLSWORTH BUNKER

United States Ambassador to India

I have been impressed by the great adventure on which India has embarked, reaching out, as it does, into every aspect of her national life, economic, social and political—the determination to provide a better life for all people.

We Americans are accused by some of our critics of being in too much of a hurry—and perhaps we are. But since I have been in India, I have found that Indians are in a hurry too—a hurry to modernize and industrialize, to raise standards of living, to develop village communities, to spread education and health services, to build a feeling of greater social justice—particularly in South India where the population is relatively denser and where, in the past, there has been less industrialization.

But in their zeal to get on with the job I hope they won't forget other things that are a part of their great heritage. When India's distinguished Prime Minister was in Washington last December in speaking once about the village development program he remarked that in spite of the many changes coming about in their communities the villagers had not forgotten how to laugh, and to dance and to sing—and this is important too.

India's Five Year Plans which form the Charter of her economic development program are undertakings of great scope and magnitude, developed with imagination and courage, and are being pursued with industry and enthusiasm. The people of the United

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tates are watching with sympathy and hope India's efforts to prove to Asia and to the rest of the world that an economically underdeveloped country can modernize rapidly under democratic institutions and by democratic methods. We want her to succeed—for their sake, for the sake of all the free peoples of the world. Without economic freedom, political freedom is bound to perish.

Since 1947 our assistance in the form of loans and grants for economic development has amounted to more than 450 crores of Rupees.

The overwhelming part of the effort, of course, has been theirs. Yet I believe our aid has played an important role in helping, as partners, with many projects for which necessary resources were lacking. In other cases I think it has acted as a catalyst in making it possible to get certain projects under way.

I do not want to dwell unduly on American assistance to India but I should like to mention a few highlights. The United States during the food shortages of 1951 loaned India 190,000,000 dollars or about 95 Crores of Rupees, for the purchase of wheat. Some 187 Crores of Rupees in loans and grants have come to India under the terms of the Indo-American Technical cooperation Agreement of 1952—and all of this has gone into projects in her Five Year Plans. Last August the United States agreed to sell to India for Rupees wheat, rice, cotton and other agricultural commodities worth 172 Crores of Rupees, with most of the receipts from the sale of these products to go to India for economic development programs.

Besides the United States Government private organizations and private business in my country have played—and continue to play—a substantial part in this country's progress. For example, the Rockefeller and Ford Foundations are assisting the Government of India in the fields of health, education, public administration, community development and in other ways. I announced in New Delhi that the Ford Foundation, in cooperation with Indian Government and the United States steel industry—both management and labor—will

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train between 900 and 1,000 young Indian engineers in the United States during the next five years. These young men will return to India to take their places in her growing steel industry.

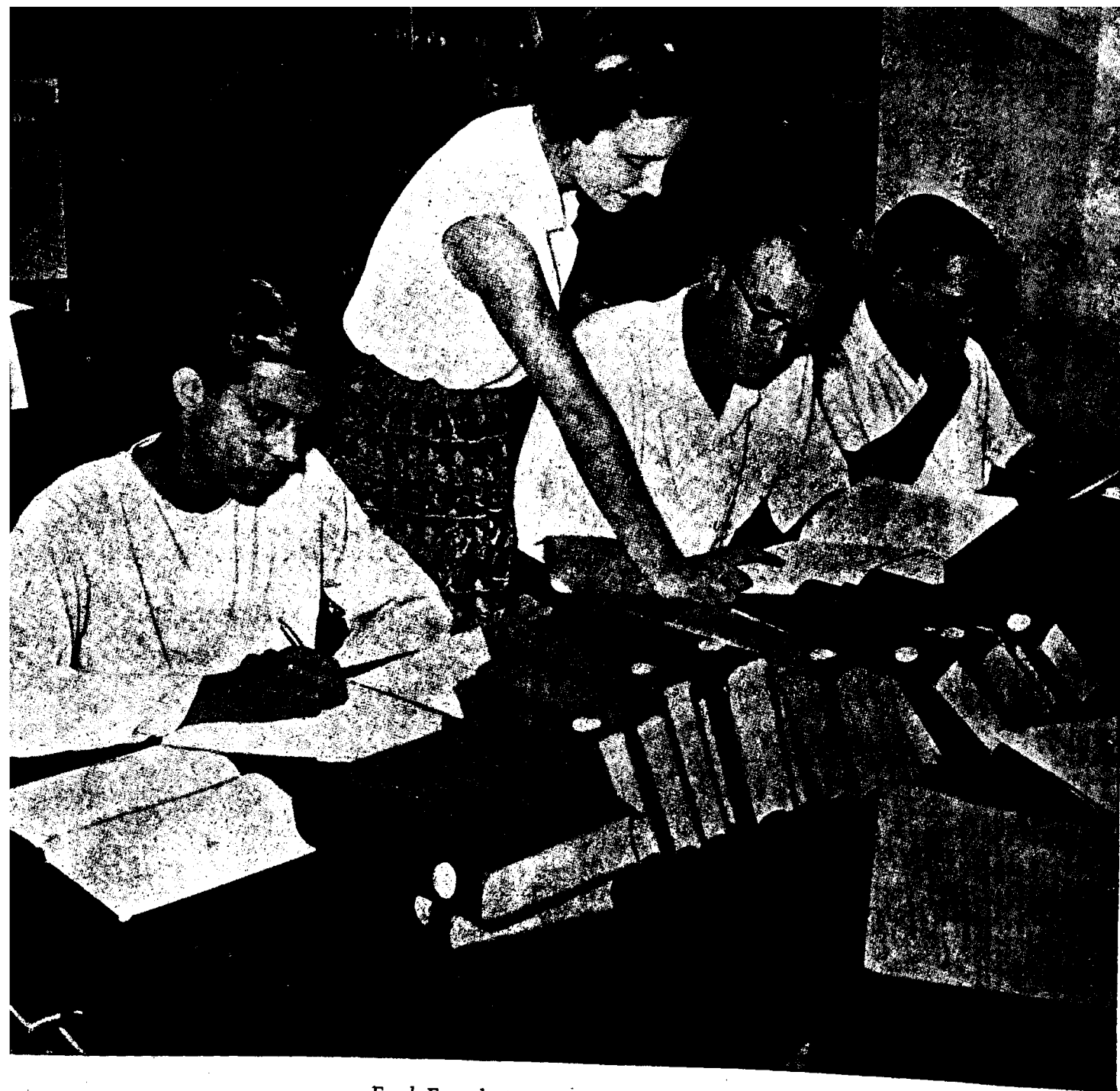
The assistance of various forms which the United States is supplying to India is just one facet of our economic relations. Two-way trade between our countries is growing in amount and importance. Last year goods imported from America—steel, heavy equipment, trucks, electrical devices, food grains—amounted to nearly 100 Crores of Rupees. As the Second Five Year Plan gains momentum, that total will probably increase.

The United States too has become a good customer of India. For example, one-third of our manganese, three quarters of our jute, 30 percent of the mica, 70 percent of the shellac, half of the pepper, and more than a third of the tea we use—all come from this country.

A United States trade mission has completed a six weeks tour of India. The members of that mission are optimistic about our future trade relations. Their leader, Mr. Forbes, told newspapermen in New Delhi that he felt that during the next three years there would be a substantial increase in Indo-U.S. trade and financial collaboration.

An increasingly important economic link between our two countries is the American tourist. There is an inexhaustible supply of "things to see" in India—from the snow peaks of the Himalayas to Cape Comorin; from the Elephanta Caves in Bombay harbor to the fabled tea plantations of Darjeeling (and of course Madras, so full of charm). These "natural resources" of this land attracted almost 12,000 American visitors in 1956, nearly four times the number who came here five years ago. And the tourists of 1956 saw more of India, too. In the last year, for example, the number of American visitors to South India increased by 50 percent. And American visitors spent in India in 1956 Dollars amounting to an estimated three Crores of Rupees, a not insignificant amount of foreign exchange.





There is one other economic tie between our two countries which to my mind is the most important in terms of India's continuing growth and development. That is American private investment. In comparison with our investments in some countries, present American investments in India are relatively small. The total is about 190,000,000 dollars or about 95 Crores of Rupees. Nevertheless, I believe

it is significant in terms of India's progress. Here in South India you have one good example of the benefits of this private investment—The Caltex Refinery at Vishakapatnam, built at a cost of about 30 million dollars. This is an example of increasing interest on the part of American private business in India.

Some people I know express fears at what they call the "invasion" of a country by outside

capital. American experience has been exactly the contrary. Most people do not realize that the phenomenal industrial expansion of the United States during the latter years of the nineteenth century and the early years of this century was given impetus by European capital. American railways, coal mines, steel mills and factories of all kinds had the financial assistance of British, French, Dutch and other investors. They invested their money on exactly the same terms as their American counterparts, received the same consideration, and enjoyed the same advantages. In the process they made a great contribution to our industrial growth.

I finally believe that India could benefit as we did. You may ask, how can India attract American capital? That I think is a matter for Indian Government to decide. Many countries have worked out techniques to attract foreign investment and I am sure that India's leaders will find methods which will be mutually beneficial to this country and to the private foreign investor.

Perhaps the introduction of American manufacturing techniques and management practices can be of as great value to this growing country as American capital. I think one of the main contributions of America to the world has been the production and distribution of material wealth. A sharing of the experience and the knowledge gained in the organization of production and its distribution can, I believe, be a significant factor in stimulating India's rapid economic growth.

We must be adaptable to the needs of a rapidly changing world, yet hold fast to the ideals of a free society. We shall need to be bold in planning, courageous in execution. There will be little room for the timid soul. We must be generous toward our friends; tolerant toward those who disagree with us; vigilant in protecting our liberties; steadfast in holding the course until the goal is in sight.

Is that too much to ask of the two largest democracies in the world when the prize is the kind of world in which we may live in dignity, in freedom and in peace?



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Success comes to those who take few steps in advance of others and this the author remarkably argues accounts for the industrial might of America.

AMERICAN INDUSTRY

R. A. PADMANABHAN

Director of Radio Services, U.S.I.S., Madras

I am just a writer and journalist, not an industrialist or businessman. Recently I had an opportunity to see varied aspects of American life—from farms to highly specialised industrial and technical establishments. I also spent a month in Europe to judge America with a better background, and learn a few things from the European scene.

Many things impressed me; and, many not. But I was convinced we in India today at this juncture of our history when we are trying to make up for an industrial and constructive lag of over a century, have many lessons to learn both from the successes and failures of America and Europe.

The first thing I thought of when I had the first glimpse of American society was the famous advice of a great son of India who visited the New World sixty years before I did. I was reminded of the words of Swami Vivekananda, that proud exponent of all that is best in Indian thinking, who came back and told his Indian brethren that we could afford to learn some materialism from the West and give them in exchange a little of our idealism in the spirit.

This thought has come over me over and over again. I believe that what was true more than sixty years ago is as true today.

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The prime need for India today is a new approach to problems of material welfare. Our outlook in the past century at least has been one of greater emphasis on resignation than of achievement. Without losing hold of the sheet anchor of spiritual values, we must move forward in the line of material comfort. A proper balancing of the body that is and the spirit that indwells is essential, if we are to profit by the progress of the West in material welfare.

This then is the basic approach that needs to be remembered, whether in industry or in art. A balancing between the two extremes naturally calls for a decision as to which is greater need of emphasis at this given period of our nation's history. Compared to the lives lived by most people in the West, we live a life of extreme poverty. Like King Janaka of old, who lived the life of a sage, we should cultivate a rounded outlook of achieving plenty and still living unattached. It is easy to talk of renunciation when you have nothing to renounce; the greater test of our own faith will be when we face the issue in the midst of plenty.

I do not want to philosophise, but only wish to emphasise that the moment our industrialists decide to cater to our immediate needs, the same moment they will discover many an opening for a new venture.

To take a concrete example, I shall mention a very small and very easily produced gadget, which nobody in India has thought of producing. I came across this small device in one of the many stores that I went round in the States. It is a simple faucet for attaching to the mouth of any water tap, a faucet that prevents water splashing all over but does not lessen the quantity of water flowing. It has to be seen to be believed, for it is so simple, so cheap and so useful. While I was no doubt amazed by what I saw in motor car assembly plants, helicopter production workshops and oil refineries and huge industrial establishments producing anything from paper and cellophane bags (from the smallest size to a huge bag for

enclosing a motor car chassis meant for export, to prevent it from rusting!), I wish to take this example of a small water-tap gadget to explain myself.

The whole gadget is very simple in construction. It is just a wire gauze and a disc with holes, held together in a rubber holder which permits the gadget being attached to any water tap. Water flows from the mouth of the tap through the holes in the disc and then through the wire gauze. In this process the water loses its diversified angles of flow and comes out through the wire gauze in parallel lines of flow, as though it is a beam of water. This parallel lines of flow, naturally, prevents water being all over the place; even when the tap is above four feet high, as in my house, the water falling from the tap through the gadget does not splash over a square foot in area.

Even in small wash basins, as in many of our closely cramped hotels, where water flows with some pressure and splashes all over the people sitting in nearby tables, this gadget completely eliminates the trouble. Not a drop of water is spilled outside the basin even when the tap is opened to the full. I have shown this to many Indian businessmen, who too have been amazed at the simplicity of the arrangement, but who, unlike their American counterparts, have done nothing to go forward with this idea or improve on it. I have tried to produce the same effect with a local wire gauze and holed disc, and found that it works!

This then is my point. It is not necessary to imagine that America is great because it is highly industrialized and that it has huge industrial establishments, which we cannot easily hope to rival for a long time to come. It is very essential to remember that at every stage in America's industrial development, it was the man with a new idea, a new utilitarian idea that appealed to large masses of people, that showed a lead and struck a new path of development. I could name a long list of such geniuses, but content myself by indicating a few—Edison who developed the electric lamp and many things besides, Henry

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Ford who made a cheap car possible, and this unknown inventor of the water tap gadget who, I am sure, would have been blessed by the millions now using this device.

I do not for a moment suggest that we should rob somebody else of his patented product; but it is always open to enterprising businessmen and industrialists in India to come to a business arrangement for exploiting this and many other gadgets of universal appeal and utility. If they have vision, they could also encourage local talent to improve on these gadgets and benefit themselves and Indian industry thereby.

I repeat—the prime need for industrial expansion in India is not only to look into the colossal industries of the West, but also to look into the hundreds of small industrial ventures that make life liveable. I repeat—it is a question of approach. I repeat—it is a matter of relating a new idea to an immediate need, for that is the easiest path to success. I repeat—Indian industry needs not so much monetary capital as brain capital. I repeat—the man who keeps his eyes wide open can discover a hundred outlets for prosperity. I am a successful man in my own right, in my own chosen avocation in life — and I repeat — success depends in ideas and vision, determination and flexibility, rather than luck and chance, sheer capital and a suitable climate. The world of successful men in every walk of life teach us by example and precept that the man who studies the present and takes a few steps in advance of the others is rarely a failure. This then is the major lesson I would say relearned from viewing at close quarters the industrial might of America and Europe. **

ANNUAL
SUBSCRIPTION
RUPEES FIVE

Indian Industries
MADRAS-17

In India gigantic dams are built and these River Valley Projects will usher in an era of prosperity and plenty to millions who sweat and toil today.

TRACTORS AND PROJECTS

M. R. S. NARAYAN
Larsen & Toubro Ltd.

With the advent of our political independence, the Republic of India was faced with the biggest and complex problems of finding suffi-

cient food, clothing, shelter and employment to her millions of people and to the refugees from Pakistan. The authorities and the people of

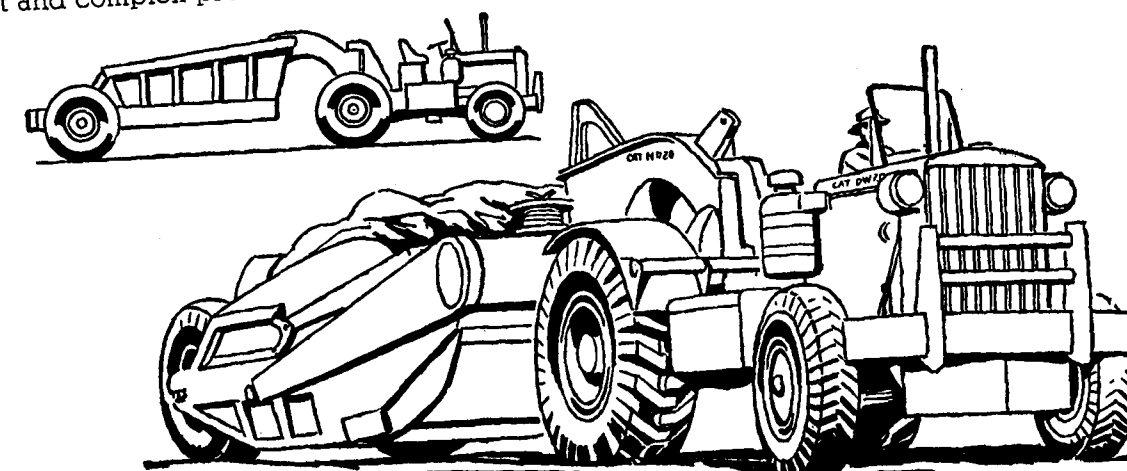


Fig. B



Fig. A

the Nation, with zeal and enthusiasm, took up this stupendous task with a determination to attain self-sufficiency.

The First Five Year Plan was dedicated to self-sufficiency in food and the highest priority was devoted to the implementation of the 'Grow More Food' campaign and to the rehabilitation of displaced persons, throughout the country. Millions of acres of fallow and waste lands were brought under plow; townships sprang up in places which were once unapproachable jungles and shrubs; River Valley Projects like Lower Bhavani, Tungabhadra, Gangapur, Hirakud, Damodar Valley, Bhakra Nangal, were initiated, some completed, to harness for irrigation and power, the invaluable waters, which in the past were wasted into the seas.

Thanks to our country's natural resources of water, land, and sun, it was possible to solve the food problem: but let us review the other important factors which contributed to this solution with such speed and economy.

Recent years have brought tremendous strides in the adoption of new construction techniques so necessary for the rapid development of modern highway system enabling quick and inexpensive transport of men and materials and for the harnessing of rivers for irrigation and power. Reclamation centres and river valley projects sites were in the past years, the scene of a round-the-clock battle against the

rapidly spreading food shortage. Fleets of modern construction equipments were rushed to the selected areas. Powerful crawler bulldozers (vide Fig. A) giant earthmoving equipments like motorised scrapers and dumpers (vide Fig. B) gigantic cranes and excavators (vide Fig. C) and numerous other construction equipment were the chief tools of the campaign.

One man operated crawler tractors (the 'mobile power house') with different and specialised front and rear attachments handled with ease and speed, varieties of jobs which by manual labour would have taken ages to accomplish. These sturdy crawler tractors were effectively used for:

- making road ways,
- reclaiming waste lands,
- felling trees and clearing jungles,
- levelling terracing and bunding for combating soil erosion and flood control.

Modern earthmoving machines on pneumatic tyres (scrapers and dumpers) quickly moved and still move millions of cubic yards of earth for building earthen dams.

Quick loading and speedy handling were accomplished in record time, by the use of the giant excavators and the huge cranes.



Fig. C

It has been proved beyond doubt that modern construction equipment is a 'must' and indispensable for any development plan.

To an increasing degree, mechanisation is being introduced in every country, in all jobs. Without modern equipment construction of high dams and other projects of similar magnitude is certainly no child's play and the hazards involved are inconceivable.

Selection of Construction Machinery

It is a natural tendency to resort to low bid buying, as a Rupee Comparison of bid price is certainly something tangible. Quality comparison, however, would more often than not, prove to be a basis for a wiser investment in equipment.

The accepted way of making a 'quality comparison' into a useful factor that will guide investment in heavy equipment, is by using a fairly accurate 'hourly owning and operating cost' as the basis for comparison as that cost figure, take into account not only the initial investment, its depreciation and interest, but also an accepted, by experience, cost of maintenance and repairs over the expected life of the equipment—in other words the quality has a bearing on the basis of comparison.

In instances where cost records are not readily available, it is always possible for a prospective buyer to visit one or the other of the larger projects/fleet owners and benefit from their job record costs. It is then a foregone conclusion that quality built machines which hour after hour, year after year, will

operate satisfactorily at the least expense with a minimum amount of repair and down time prove to be the desirable choice.

Research, engineering, improvements, sales and service experience, are concentrated in a quality built machine as will be evidenced also by the overwhelming customer preference.

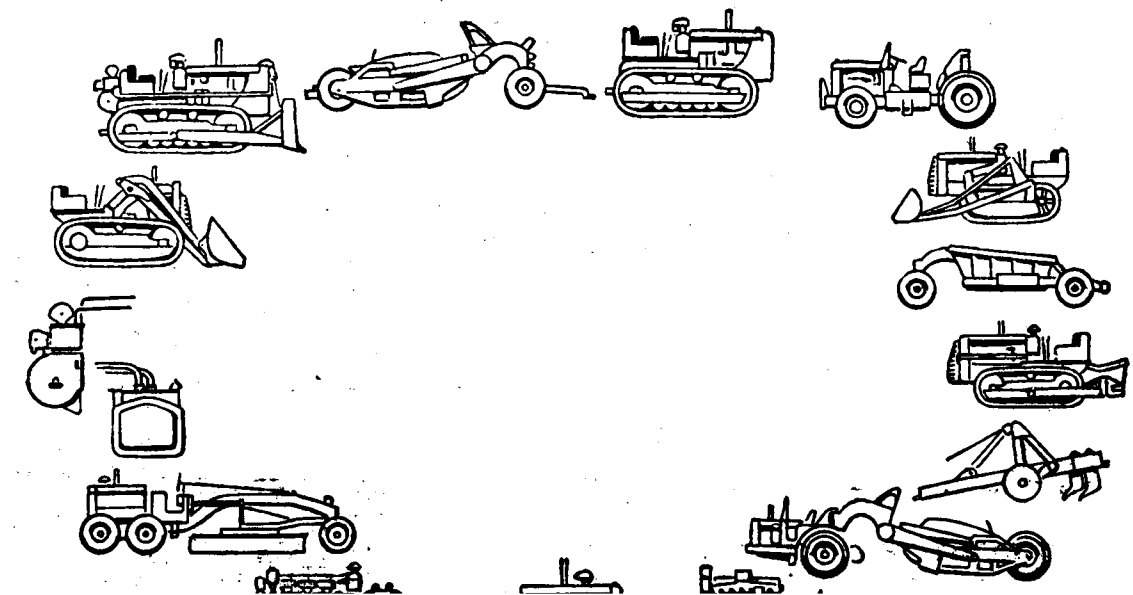
Quality built machines cannot be measured by initial price alone. Buying strictly on price may be a hazard—hazard which may prove extremely detrimental to the economy and the work schedule of the project.

Standardisation

The importance of standardisation is recognised the world over. In order to keep the production cost as slow as possible, to maintain high standard of performance, and to ensure quick and satisfactory completion of jobs, it is most essential for any project to standardise on field-proven quality machines, backed by efficient after-sales-service.

Man vs. Machine

It is often said and believed that machines deprive men and women of employment especially in a country like India where inexpensive labour is available in plenty. However, while it is true that skilled and unskilled labour would gain if the big jobs are done by manual labour (what one big earthmoving machine can accomplish will roughly require many men and women), it is equally true that the delay of several years in the completion of the projects, will itself seal the doors of opportunity of increased



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production and consequent employment both in agricultural and industrial fields.

In reality, mechanisation does not reduce employment opportunities. It is a fallacy to think so. In fact, the more mechanised a country, the greater is the range of vocations in which increasing numbers of men and women can find better and more lucrative jobs which help them to increase their living standards.

In all large construction projects, there are jobs, even of great magnitude, which do not lend themselves too well to machines. These jobs are, of course, reserved for the manual labour absorbing all available labour.

In every part of the world, authorities concerned with construction projects are wrestling with the problem of how best to utilise the modern high speed construction machinery without jeopardising the employment chances of the available skilled and unskilled labour. When high dams, water ways, highways etc. are urgently needed for increasing food production and for hastening industrial develop-

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ment, it is very important to analyse all economic factors and to decide each case on its merits.

Conclusion

We have made a good beginning and it will be well to our advantage to benefit ourselves from the experience gained by countries which are fore-runners in industrial and economic spheres.

We have to increase the standard of living of our people. This can be achieved by finding ways and means of fully utilising our vast resources and mineral wealth yet unexploited. The prospects for our progress and expansion are indeed immense, and these are well-taken care of in the Second Five Year Plan.

Thanks to the Almighty, we have enough men, material and resources; what we now must apply is *right thinking, concentrated and united efforts with determination for the onward march*. The Nation's success depends upon the character, ability, spirit and will of its people and leadership—we have these and sure will be our success.

..



To score a phenomenal increase in agricultural production, cooperatives will prove a good harbinger. Our farmers will benefit tremendously by emulating their American brethren.

AMERICAN COOPERATIVES

P. K. SIVAPRASADAM, M. A.

Director of Press Services, U. S. I. S., Madras

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Cooperatives have helped to develop many farming communities in the world. In India, the Community Development Projects envisaged in the Five Year Plan are patterned on cooperative principles. In the United States of America, cooperatives form an integral part of her agricultural economy.

Although interest in cooperatives existed for many years in the U. S., widespread expansion has not taken place until the present century.

Today there are over 10,000 cooperatives in U. S. A. which form a permanent feature of her agricultural economy. These cooperatives stood the test of time admirably because of their ability to adapt to changing times and changing

needs. As a result, the benefits that accrue to the farming community through cooperatives is immense.

By introducing advanced farm techniques, these cooperatives have induced the farmers to produce more and better crops. They formed the means by which farmers took to grading their products for marketing. This is one of the earliest of progressive farm practices introduced by the American cooperatives. The introduction of this method directly helped farmers to increase their income; at the same time consumers were happy that they could buy goods of their choice. Every farmer became interested in increasing his income by producing and marketing better and better products.



Many government and private agencies started research institutes to develop advanced farming techniques. The cooperatives helped farmers to adopt these latest scientific improvements not only by making the knowledge available to them but also by assisting them to implement the advanced techniques and methods.

There are many cooperatives today which market canned food stuffs from products produced by their member—farmers. If farmers had to depend on another organisation to market their canned products, the expenses would have mounted up increasing in its turn the prices of

these products. Now cooperatives are theirs and they get better services at no extra cost.

Surplus production, if not tackled properly, will become a problem to every farmer. Hence, there are many cooperatives in U. S. A. that also handle sales of surplus commodities.

American farmers sell about 22 percent of their products through cooperatives. In 1952—53 the turn over was to the tune of 7400 million dollars (Rs. 3700 crores) according to the report published by the Farm Cooperatives Service of the U. S. Department of Agriculture. Through the cooperatives, farmers buy the required

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agricultural tools and other agricultural supplies economically. In 1952-53, the amount spent on such purchases totalled over 2000 million dollars.

In 1940—41, there were 3.4 million members in farm cooperatives in U.S.A. In 1952—53, this figure increased to 7.5 millions.

One may wonder how there can be so many members in cooperatives while according to statistics there are only about 5 million farmers in U.S.A. But a farmer is eligible to join any number of cooperatives. There are people who are simultaneously members

of various types of cooperatives such as marketing, purchasing, ginning etc.

Gradually with the growing agricultural economy the functions of the farm coops have also multiplied. For instance 58% of Cooperatives which specialize in selling also at times purchase supplies required by their members. Similarly, more than 20% of purchasing farm cooperatives also function as marketing cooperatives for their members. The idea of multi-purpose cooperatives is gaining momentum in U.S.A. because it saves them time, energy and extra expenses.





The beginning of American co-operatives may be traced to those early days when farmers worked together during harvest by helping one another. Silos near rail road stations in the rural parts of the country, a cotton mill in a small town in the South can be said to be pioneers of today's cooperatives which are to be found the world over.

The first known cooperative in America was founded in Philadelphia in 1752. A fire insurance cooperative, members agreed to share the losses from fire sustained by individuals in the group. One of the founders of this cooperative was Benjamin Franklin, later a signatory to the Declaration of Independence. Some years later farmers founded mutual fire insurance companies on principles similar to those of the Philadelphia group. The Rochdale type of cooperatives founded in England exerted its influence on the evolution of co-operatives in the United States.

When neighbours joined together either to market their products or to purchase supplies, farm cooperatives came into being. Aided by cooperatives, the U.S. farmer has been able to plan, organize and increase his

operations so that he can manage larger acreages with an economy of time and effort.

A farmer acting alone can do little to affect conditions relating to marketing and purchasing. Joined with his fellows in cooperative organizations, however, he has been able to wield great bargaining power and bring efficiency and economy to his operations.

Realizing the nation's dependence on farmers, the United States Government has encouraged the farming of cooperatives. Through its agricultural extension service, it has aided in their actual organization.

United States farm cooperatives are closely controlled by their memberships. Usually each member, regardless of his stock ownership, has one vote in decisions of the organizations. A few farm cooperatives allow votes according to number of shares held, but usually limit the number of shares to prevent individual or block control.

The cooperatives have attained in many sections of the country considerable influence and are an important part of the modern American economic scene.

**

OIL REFINERY

The Caltex Oil Refining (India) Limited's Rupees fifteen crore plant at Visakhapatnam, on the shores of the Bay of Bengal, is the largest single construction project ever undertaken by private enterprise in Andhra Pradesh.

The Refinery strengthens India's economy as a whole, providing a new source of refined products within the country. It also conserves foreign exchange and contributes substantially to increased employment besides proving a constant market for Indian supplies, materials and services.

The Caltex Oil Refinery at Visakhapatnam has many claims to distinction. One of the most unusual is that it is located in an area strategic for the swift transportation of petroleum products into a large hinterland that for long had to depend on distant supplies.

The original decision to construct the Refinery was simple and practical. India had a definite need for increased supplies of refined products and it was deemed essential that a refinery should be located on the east coast to complete the chain of the recent refinery building programme, which was hitherto largely concentrated on the west coast, namely, in the Bombay area.

A three-man technical team surveyed the east coast in 1952 by land and air and fixed on Visakhapatnam as an ideal site. On March 28, 1953, an agreement was signed with the Government of India to build a new oil refinery. In keeping with the terms of the agreement, Caltex formed an Indian company, Caltex Oil Refining (India) Limited.

The Refinery is clearly then an offspring of India's Second Five Year Plan. It is situated on a site as big as 515 acres and this relaxed setting, an unique feature among the refineries in India, makes for safety, comfort for the men at work and beauty. It also offers room for further expansion.

Also of unusual significance is that the Refinery is situated in a young state - Andhra Pradesh - in whose rapid development it has had a share. The construction of the refinery has also enhanced the strategic and commercial importance of Visakhapatnam Port which is already the centre of India's ship-building industry.

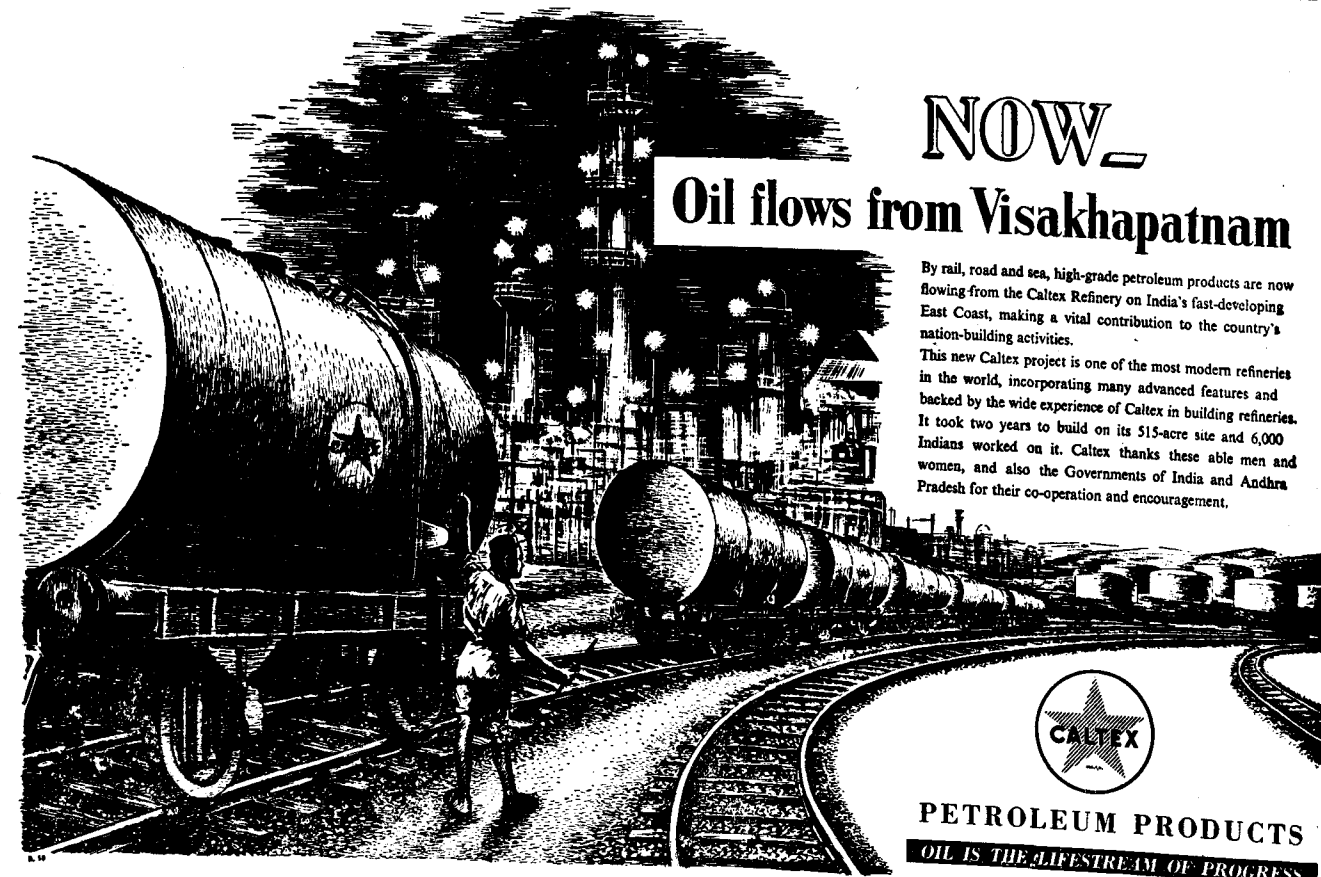
Caltex Services Limited, London, were responsible for the designing work which took nearly two years. The Lummus Company of London were the prime contractor for construction with many Indian firms participating as sub-contractors.

In mid 1955 the first bulldozers went to work levelling the ground and the first foundations were poured. As the drama of construction unfolded many problems challenged the engineers. All of them were met and overcome. By middle of 1957 the Refinery was in full operation pumping petrol, diesel oil, fuel oil and kerosene for distribution all over India. From the Refinery annually approximately 311,000 tons of refined products move by rail and 282,000 tons by sea to various consuming centres all over India.

Visakhapatnam has in the past suffered severe water shortages. To counteract this the Government has constructed a 26" water main from the Gosthani River to ensure fresh water not only for the Refinery but for the city itself. Payments by the Refinery for fresh water will substantially contribute towards financing the new pipeline. Thus the Refinery has helped in the city's welfare.

The power lines serving the city as well as the Refinery are fed from the new Machkund River Dam, 125 miles from the city.

Wherever possible indigenous material and local contractors were used for construction. New industries sprang up supplying a wide variety of materials. Examples of basic materials



used give some idea of the size of the undertaking. Into the construction of the new Refinery went over 16,000 tons of cement, nearly 30,000 tons of steel. There are over 100 miles of pipes ranging from $\frac{1}{4}$ " to 24" in diameter at the Refinery. Quarried and hammered to size by hand, thousands of tons of crushed blue stone were used for tank pads. The sub-contractors supplying the stone gave employment to 2,000 people. Over 9,000 Indians, largely recruited from the Andhra Pradesh worked at the peak period. They gained, aside from the wages, the long range benefits of on-the-job training in such essential building trades as welding, pipe fitting and plumbing, electrical installation and wiring, steel work, carpentry and wood work and other useful skills. A number of Indian workers, trained in a similar refinery in Batangas, in the Philippines, are now part of the permanent staff of 500.

The construction of tanks was undertaken by Chicago Bridge Limited, an American Company. The main processing plants, boilers, electrical plants and machines were erected by The Lummus Company. The balance of the

work was handled by Indian sub-contractors who constructed roads, walls and buildings.

By the middle of January 1957 the tank section, comprising 68 tanks, was completed in a record time of 12 months, marking the end of a significant phase of refinery building. The tanks ranging from eight feet in diameter to 160 feet used approximately 7,600 tons of steel. The tanks have a storage capacity of 65,000,000 Imperial gallons of crude oil and refined products.

On February 18, 1957, the first tanker carrying crude oil for the refinery was received at the new wharf and the cargo was pumped through a mile-long pipeline to one of the refinery's four crude oil storage tanks.

About 45 tankers of crude oil are required to feed the refinery each year. The average tanker carries about 120,000 barrels of over four million Imperial gallons.

The refinery produces every year 74,000,000 gallons of motor gasoline, 21,257 gallons of superior kerosene, 8,177,300 gallons of inferior kerosene, 31,631,000 gallons of diesel oils, and 26,495,000 gallons of fuel oils.

NOW Oil flows from Visakhapatnam

By rail, road and sea, high-grade petroleum products are now flowing from the Caltex Refinery on India's fast-developing East Coast, making a vital contribution to the country's nation-building activities.

This new Caltex project is one of the most modern refineries in the world, incorporating many advanced features and backed by the wide experience of Caltex in building refineries. It took two years to build on its 515-acre site and 6,000 Indians worked on it. Caltex thanks these able men and women, and also the Governments of India and Andhra Pradesh for their co-operation and encouragement.



PETROLEUM PRODUCTS
OIL IS THE LIFESTREAM OF PROGRESS

Present plans allow for the production of all these products from the refinery's flexible two-stage crude distillation unit, the fluid catalytic unit with gas recovery facilities, the polymer plant, the propane decarbonization unit, and treating and blending plants.

When the last unit—the 175 feet high fluid Catalytic Unit—was completed, the Refinery started manufacturing its full line of products.

An integral part of the Caltex Oil Refinery is its terminal which includes tanks for various products, a tank-car loading rack, a truck loading rack and a can and drum filling building. All of the bulk shipments by tanker are made from the finished products storage tanks of the refinery and are not routed through the terminal.

The Caltex Oil Refinery has one of India's most modern machine shops, where all repair work is carried out. The facilities include a central tool room and a tool shop; instrument, electrical and paint shops; machine boiler, valve testing, sheet metal, and welding and blacksmith shops.

The Refinery's laboratory building is equipped with the most modern apparatus for analysing and testing raw and finished petroleum products. Highly trained technicians are on duty every hour of the day to safeguard product quality.

One of the reasons why Caltex decided to build at Visakhapatnam was the closeness of the site to a harbour capable of handling deep sea tankers. To make the Port usable by tankers, the Port Authorities have constructed an oil wharf capable of handling two tankers simultaneously. The Port is also making plans to deepen the harbour entrance so that larger tankers can be handled in the future.

To assist the community in conserving its fresh water, Caltex has added special alloys to

many of the refinery's heat exchangers so that salt water can be used for cooling purposes.

Another interesting feature at the harbour was the tying in of the Indian Navy Oil Depot with two submarine pipelines so that it can be serviced directly from the refinery.

A team of specially trained fire fighters are on shift at all times. In addition, all of the operating and maintenance personnel have been trained in fire fighting to supplement the regular team.

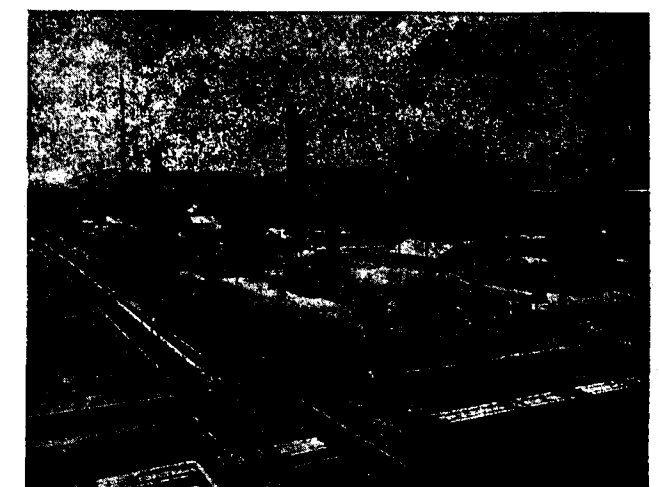
The Administrative Building is a two-storey, completely air-conditioned, building accommodating around 100 people. In the same building is a 16 mm. microfilm unit for recording important data. Connected to this building by a covered walk are other buildings of the administrative group; the Gate House with the Personnel Offices and First Aid facilities, the change house with a modern locker room and shower, the garage, Fire House and Laboratory and Yard Office Building.

The Staff Colony is situated a mile away from the Refinery. Known as Yarada Park, it can accommodate 98 families. There are 49 building units with two self-contained and compact apartments in each. The colony has a park, and plenty of room for individual gardens. The Senior Staff Colony, known as Waltair Park, is situated about 7 miles away from the Refinery. This consists of 12 4-family apartments and a number of individual bungalows. In addition to well-equipped housing, there is a swimming pool, a guest house and other service buildings.

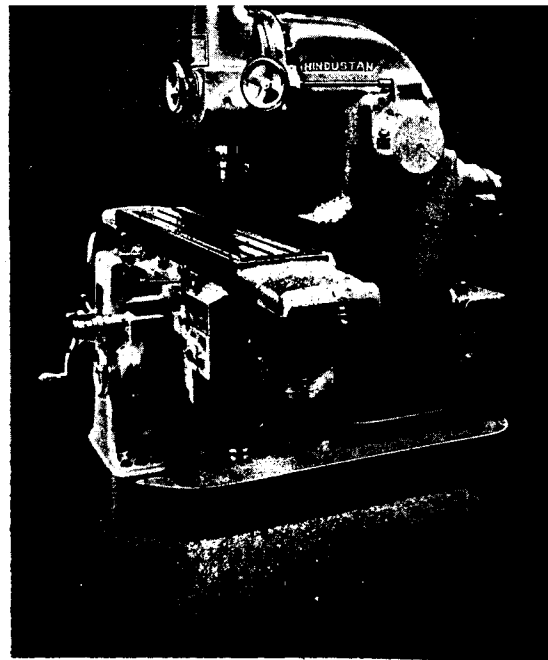
Working 24 hours a day, the Caltex Oil Refinery at Visakhapatnam fulfils a major part of the Caltex programme of greater service to the Indian people with high quality products made in India. It has thus an important share in the building of the India of tomorrow. **



Fluid Cat-Cracker Unit feed tanks



Process units



Hindustan Vertical Milling Machine Size 3

INDIAN MACHINE TOOL INDUSTRY

S. M. PATIL, B.E. (Mech.), B.E. (Elec.), A.M.I.E., A.M.I. Prod. E.

Deputy General Technical Manager, HMT (P) Ltd.

To ensure a more rapid growth of national economy and to increase the country's productive potentiality in a way that will make possible accelerated development in the succeeding plan period, is the principal objective of the Second Five-Year Plan. Great emphasis has been laid on the expansion of capital and producers goods Industries, with a view to firmly laying the foundation of further industrial progress in the country.

The expansion programme in respect of Industries during the Second Plan has therefore to be conceived in terms of the following priorities:

- (1) increased production of iron and steel and heavy chemicals, including nitrogenous fertilizers and development of the heavy engineering and machine building industries;
- (2) expansion of capacity in respect of other developmental commodities and producer goods such as aluminium, cement, chemicals, pulp, dyestuffs, phosphate fertilizers and of the essential drugs;
- (3) modernisation and re-equipment of important national industries which

- have already come into existence such as jute, cotton textiles and sugar;
- (4) fuller utilization of existing installed capacity in industries where there are wide gaps between capacity and production; and,
- (5) expansion of capacity for consumer goods keeping in view the requirements of common production programmes and the production targets for the decentralised sector of industry.

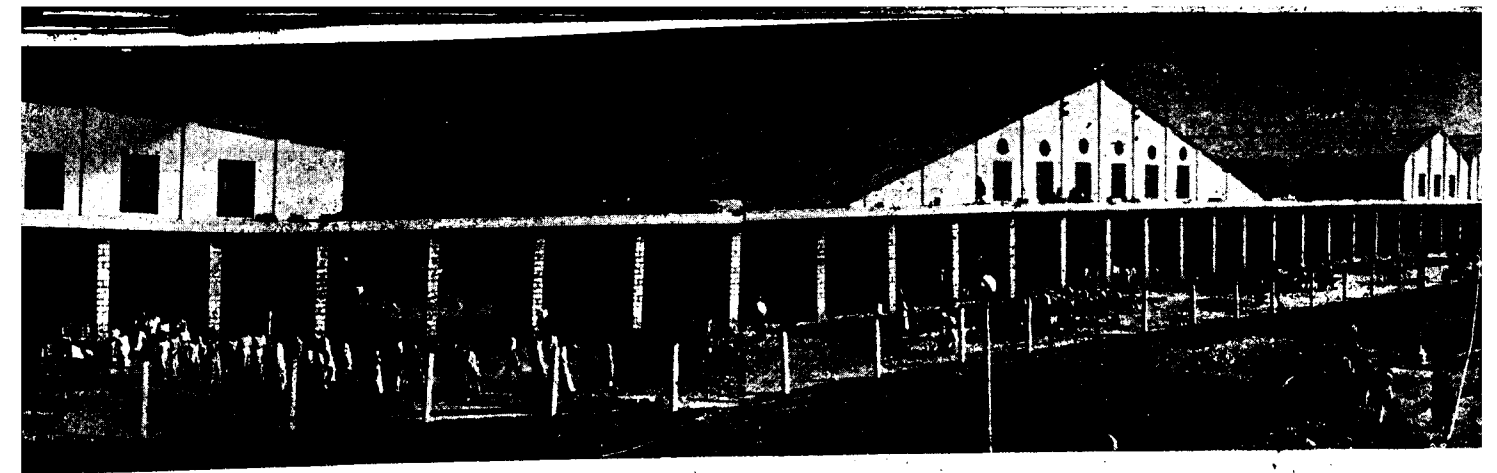
As can be seen from above, the machine building industries like that of the Hindustan Machine Tools classify under top priority in the Plan and consequently increase the responsibilities of this public enterprise, namely HMT to give the nation the machine tools that are so vitally necessary for the successful realization of this gigantic plan.

History of Indian Machine tools Industry

Perhaps it will be also worth while to trace the history of Machine Tool Industry in India so

as to understand its strategic rather than quantitative importance of any independent nation. The earliest record of Machine Tools made in India goes back to 1890; but the progress since then upto about 1939 had been so slow that barely 100 machine tools a year were made by factory owners principally for their own use. One of the reasons of this slow progress may be attributed to the fact that our country under the foreign rule had no plans to develop this vital industry, and machine tools required by the Railway Ordnance and other private factories were easily available through imports mainly from U. K.

Wars have given the machine tool industry a great impetus. The historical survey of the development of Machine Tool Industry in foreign countries particularly in Germany amply proves that wars have almost nourished this Industry. It seems that the Industry 'lives by Wars' and 'Wars seem to live by it!' Indian Machine tool Industry therefore cannot be an exception and it was the first World War of 1914-18 which induced certain manufacturers in the North to produce machine tools suitable for Steel Turning. This continued during the war and after 1919 there was a slight increase in the machine tool manufacturing activities.



Existing production buildings

The outbreak of the Second World War however, entirely turned the complexion and foreign machine tools were increasingly difficult to obtain. As Indian Industry geared itself in the manufacture of defence equipment, the demand for machine tools increased although the situation even as late as 1939 was not so acute as imports, though in reduced quantities, still continued.

Apprehensive of the future, Government of India passed the Machine Tool Control order in February 1941 and appointed a Machine Tool Controller to make an inventory of machine tool production and regulate imports and improve the quality of the local products and secure for the armed forces, Ordnance Factories and other war industries, the best quality machine tools. This marked the beginning of the Indian machine tools industry as it exists today.

With the fall of France and Italy's entry into War, India was virtually cut off from England and America and the country more or less had to depend upon her own production and on a very little quantity of imports of low grade machine tools from China and Japan. When Japan declared War in 1943, even this small source was cut off and India was left to rely entirely on her own production.

These exigencies of War compelled the then Government to harness the resources of the country and develop every possible industry for the manufacture of machine tools and for furthering the war efforts in order to transform this sub-continent into a mighty arsenal of the Allies in the East. Every indigenous manufacturer showing slightest interest and inclination was encouraged to build machine tools.

However, the response of the private sector was not so much encouraging as there was a general apathy to launch on a new venture when there was the availability of plenty of war work of simple and highly remunerative nature.

Under the stress of war, Government however, had to pursue their efforts and the Machine Tool Directorate was authorised to take immediate steps to organise the Industry and induce the general engineering and jobbing workshops to enter the machine tool trade. Some five leading factories were provided with the Government owned modern balancing plant and further four firms were assisted in obtaining plant and machinery for outright purchases from U.K. & U.S.A.

In addition, to give the technical know-how of building of machine tools to the indigenous manufacturers, the Machine Tools Controller in U.K. sent out to India a team of machine tools experts and technicians, who went round the machine tool factories in the country to give the necessary help and guidance.

Further, to rationalise and regulate the quantities of machine tools produced in the country and to bring them up to the international quality standards, the machine tools produced in the country were inspected by the Government I.S.D. Inspectorate almost free of any inspection charges.

As a result of these steps, Industry made good progress as may be seen from the fact



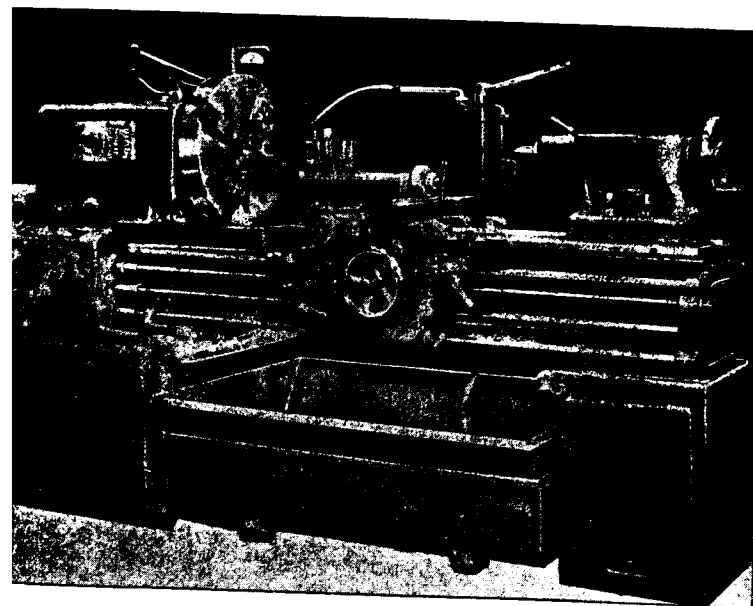
New Assembly Building under construction

August 1957

that whereas in 1942 the total number graded machine tools manufactured in India was 273 only, in 1946 this number had increased to 8,810 approximately valued at Rs. 17.5 million.

State Initiative

While the Indian Machine Tool Industry made this remarkable progress in comparatively short period, it must be admitted machine tools produced in the country during war period were not up to the mark. They were mostly of simple design, easy to manufacture and did not come up to the standards of foreign machine tools. This was mainly because the general organisation of the Industry was not a specialised one and firms which were previously engaged in the manufacture of



Hindustan H22 High speed precision lathe

general engineering items, had taken over the production of machine tools. Most of them did not either possess adequate equipment for producing high quality parts or possess the requisite knowledge and technique of building precision tools. As a result, after the termination of the war, this infant and war-nourished machine tools industry faced a crisis. In 1949 sales of machine tools manufactured in the country had steadily fallen and large stocks of unsold machine tools had been accumulated with the result the production of machine tools had to be severely curtailed and in 1950 the Industry produced only about 1500 machine tools valued about Rs. 2.6 million.

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INDIAN INDUSTRIES ANNUAL

Although the Industry had made a slight recovery in the subsequent years, perhaps due to the outbreak of Korean War, yet there remains much to be done. There is general prejudice among the consumers towards indigenous machine tools as the standards and designs, quality and workmanship, service and performance are far too low in comparison with the reputed imported machine tools. Majority of the machine tool firms have not yet been able to get over their handicaps and to produce an article which the consumers could use with some confidence. As a good machine tool forms the basis and determines the quantity, quality and the efficiency of the articles manufactured with it, no country can be forced to put up with mediocre and inefficient machine tools merely because they are indigenous. Patriotism alone will not be an adequate inducement to users of machine tools in India to discard a machine tool of long established reputation in favour of low standard and poor quality ones, locally manufactured.

The existing factories are not adequately equipped with up-to-date plant, jigs and tools, which are most essential for developing interchangeable parts for producing machine tools economically and to the international high standards of accuracy and performance. There is no marked tendency with our indigenous manufacturers to go on to the latest developments and to produce machine tools in line with those produced in countries abroad. This may be due to their inability to invest heavy capital required not only in making jigs, fixtures and tools but also for the plant, machinery and for developing really first class modern designs of machine tools. Furthermore, for only railway Workshops and Ordnance Factories which are about 25 in all in the country, employing over 16,000 machine tools, the annual requirements for replacement alone is estimated to be about 1600 machine tools. The Machine Tool Committee, set up by the Government of India to examine the potentiality of the existing units in the country of machine tool builders and assess their respective ability to adopt more progressive and dynamic programmes of production to meet the growing needs of the country for really latest and most suitable types of sizes of machine tools and to recommend steps to utilize and expand the resources to the optimum capacity of the individual unit and if required to set up additional units in the country, has in

INDIAN INDUSTRIES ANNUAL

its report stated that the growing industrial activities in the country will create by 1961 a demand for machine tools in various diversified types and sizes aggregating to about 5000 to 6000 machines per annum worth about Rs. 9 to 10 crores.

The existing indigenous machine tool manufacturers, barring HMT, however, have not been able to give the country machine tools worth more than Rs. 2 to 3 crores. In addition, the manufacture of modern machine tools involves high precision and controlled processes with a very narrow margin of profits and none at all in the early stages. With very little financial resources at their disposal, private Machine Tool manufacturers in the country could not spend large sums of money on initial investment towards highly specialised and precision modern plant and machinery, jigs, tools and fixtures, so essential for this industry.

Hindustan Machine Tools

Realising these vital short-comings, the Government of India in consultation with experts entered into a technical assistance agreement in April 1949 with Messrs. Oerlikon Machine Tool Works, Beuhle & Co., Zurich, Switzerland, for setting up a modern machine tools factory in India, namely, the HINDUSTAN MACHINE TOOLS, Bangalore, at an estimated capital cost of Rs. 30 crores which includes the establishment of a Gear Cutting Factory and a Central Foundry.

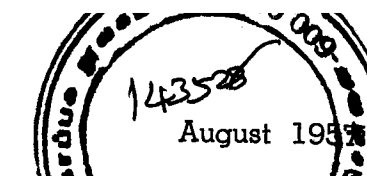
The agreement included the manufacture of:

1. High Speed Lathes
2. Shaping Machines
3. Heavy Duty Drilling Machines
4. Milling Machines
5. Planing Machines
6. Grinding Machines
7. Gear Cutting Machines, etc.

The Factory is equipped with the finest of plants and equipments and possesses a great potentiality to handle medium size precision machine tools.

The Factory went into production early in 1955 of 8½" Centre High Speed Precision Lathes.

The first 12 lathes were assembled from the imported component parts during 1955; and the first 5 lathes completely manufactured and



assembled at the Factory were despatched during May 1956. The 100th lathe came off the Assembly line during the close of the year 1956 and so far about 250 lathes have been manufactured and sold to customers, both in the private and public sectors.

A new chapter in the annals of the Indian Machine Tool Industry was opened when during May this year Hindustan Machine Tools went into the manufacture of modern Milling Machines—Horizontal, Universal and Vertical in Sizes 2 & 3.

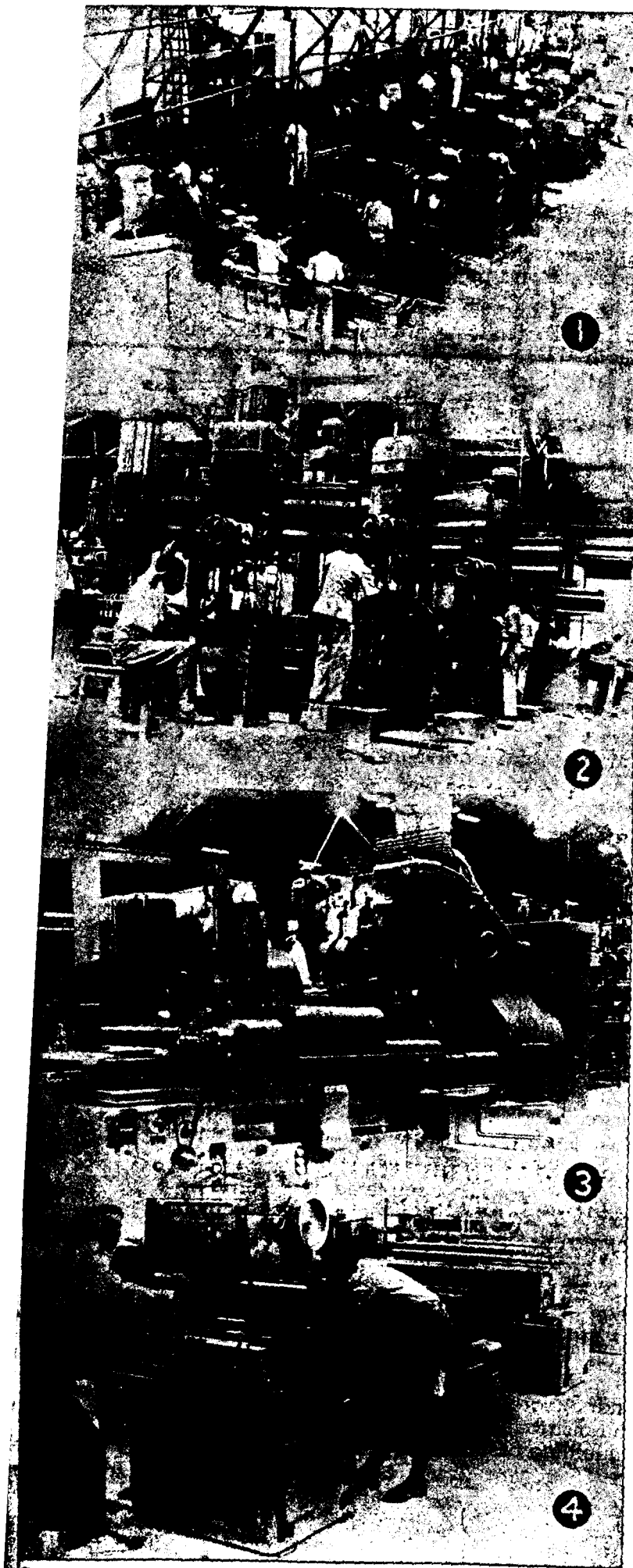
The manufacture of these Milling machines is under the Licence Agreement with a reputed firm in West Germany, viz: M/s Fritz Werner, Berlin. With the world-wide reputation behind Fritz Werner's Milling Machines, as up to date, versatile, suitable for both batch and mass production work, and ideally useful for Tool Room, their counterparts HINDUSTAN Milling Machines now manufactured in HMT, will meet the country's entire requirements for Milling Machines of this range and types.

The Hindustan Machine Tools will gradually increase its output and will undertake the manufacture of other basic Machine Tools besides Lathes and Milling Machines; like Radial Drilling Machines—1½—2" size with varying Arm lengths; Heavy Duty Lathes etc. Licence Agreement with certain leading European Machine Tool Manufacturers for the early induction of Radial Drilling Machines in the HMT programmes are almost nearing the final stage. With this it is expected that a target of 1000 machine tools per annum in various diversification viz: lathes, Milling machines, Radial Drills etc. will be reached by the end of the Second Plan-period i.e. 1960-61.

Plans are also completed for setting up a composite and self-sufficient Grey Iron and non-ferrous Foundry in the vicinity of the Factory with a capacity to turn out about 2500-3000 tons of castings per year with a possibility of further expansion to 5000—6000 tons per annum. The Foundry, it is expected, will be one of the model and modern Foundries in the country, with Electric Melting Furnaces, Sand Slingers, latest Sand conditioning and sand distribution plant, Hydroblast for cleaning and fettling castings etc.

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K8m2.15715



At present the Factory employs about 1650 men including 40 European technicians, Indian Staff and skilled workmen, many of the latter two categories being under training.

The Company's area extends to about 400 acres of land out of which 300 acres being a generous gift from the Mysore State Government. The scheme to acquire additionally about 800—1000 acres of land is under the active consideration of the Management.

The Factory Buildings include two huge aeronautical Hangars, one for the Machining Sections and the second for the Auxiliary Department. Alongside this Hangar is the large building for the Assembly and Finishing departments. Facing these three main Factory buildings, are the neat and tidy Administration buildings, Canteen and Dispensary. With the

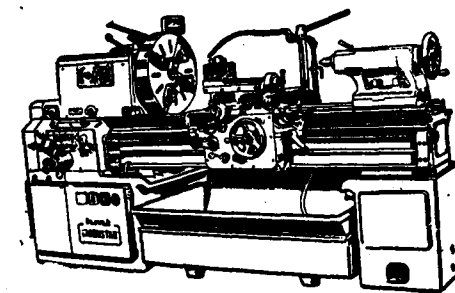
Production involves intricate operations. 1. Turning Section; 2. Radial Drilling Section; 3. Gear Grinding machine; 4. Final Assembly of H22 lathes

growing activities of the Hindustan Machine Tools, many more buildings are to be erected out of which a building for the Training Centre and Pattern Shops are completed and a large building for one of the Assemblies is under construction.

As a part of the main plan of the HMT Colony of 1000 houses for staff and workers, about 450 houses have already sprung up near the Factory, some of these having been built in the Government of India subsidized labour housing scheme.

Thus as conceived by the Government of India, the HMT is bound to form a nucleus for rapidly progressing Indian Machine Tool Industry and contribute its own humble share to the Nation's gigantic plans of industrialisation in the Second Plan.

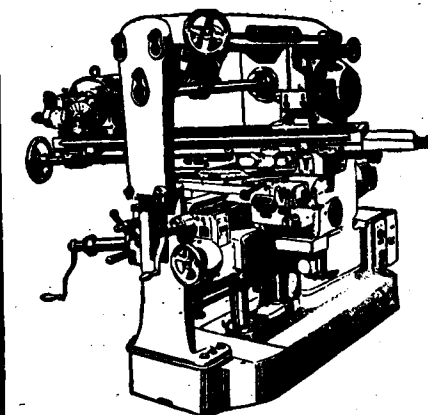
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HINDUSTAN HIGH-SPEED LATHES MODEL H-22

available ex-stock
(000 mm Centre Distance)

- ★ 225 mm Centre Height;
1000 mm or 1500 mm Centre Distance.
- ★ 12½ Horse Power Built-in Motor
- ★ 16 Speeds, 40—2000 R.P.M.
- ★ 48 Longitudinal & Transverse Feeds
- ★ Built out of High Quality Alloy Steels & 'Meehanite' Castings
- ★ High Standard Workmanship



HINDUSTAN MILLING MACHINES

- ★ Nos. 2 & 3 Universal, Horizontal & Vertical
- ★ Power & Quick Traverse in all directions
- ★ Arranged for Production & General Milling
- ★ Single hand-wheel selection of Feeds & Speeds

HMT

Enquire :

**HINDUSTAN MACHINE TOOLS
(Private) LTD.**

(A Government of India Undertaking)

JALAHALLI P. O., BANGALORE.



AUTOMOTIVE

FAMOUS PERKINS P6 ENGINES

S. Anantharamakrishnan

One Hundred and Sixteen years are but a moment in the long history of the ancient land of India.

Travel along any of the shady roads of the mofussil and you may see how short these one Hundred and Sixteen years are, for in the space of an hour or so, the history of road transport in the century rolls before you.

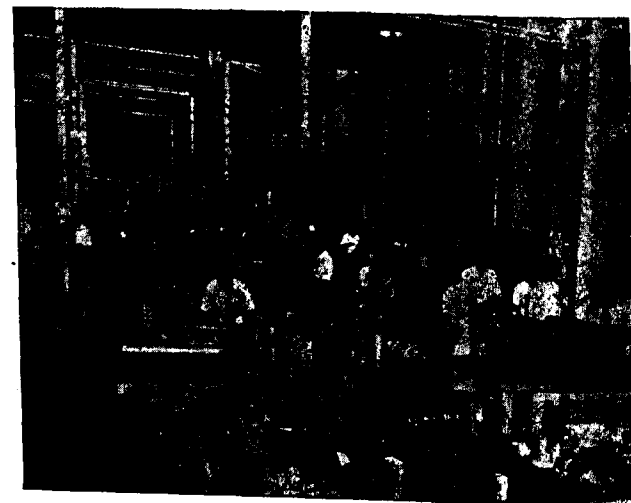
Through the dappled light and shade of the dusty roadway comes the coolie, tramping along on his bare feet, his bundle on his head. Creaking past him in a covered wagon, the bullock driver sits: his patient bullocks plodding along slowly with an occasional spasmodic effort at speed as the driver applies his stick or gives their tails a twist. Nearing a temple town, an elephant slouches along — the transport of the ancient and still used on occasions of ceremony and splendour. Passing these age old transporters comes the modern streamlined internal combustion engine powered motor coach, speeding along in safety with its passengers. Diesel Trucks also roll along, all these methods of transport linking up village to village.



Shri Morarji Desai visiting Works

And so, in a short hour, more than a century's progress in road transport is bridged over, and we see the ancient and modern side by side.

The firm of Simpsons, Madras, has had the proud privilege of living through these one Hundred and Sixteen years of India's life, beginning with the manufacture of the Howdah, Litter and Palanquin, then Travelling Vans,



Tool Room

State Carriages, Pony Tongas, Landaus, Victorias, etc., always keeping abreast with improved methods of road transport.

The year 1903 ushered in a new era in road transport in India with the introduction of internal combustion engine propelled vehicles and since that time, the firm specialised in Automobile Engineering, including Motor Car, Motor Coach and Motor Truck body building, in which field they have achieved and maintained an excellent reputation throughout India.

The advent of the Diesel Engine for Road Transport Vehicles was one of the most important developments in recent years and as

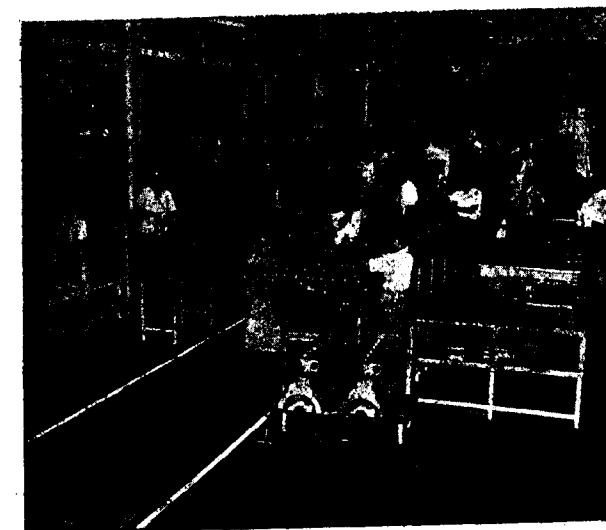
DIESEL ENGINES

FULL PRODUCTION AT MADRAS



A. J. Lund

Simpsons realised the popularity diesel transport would quickly gain, they entered into an agreement with F. Perkins Limited, Peterborough, as Distributors for the whole of India for the famous Perkins "P" Series Diesel Engines. Subsequently, they entered into a manufacturing agreement with the approval of the Government of India, following which



Cylinder Block Bay

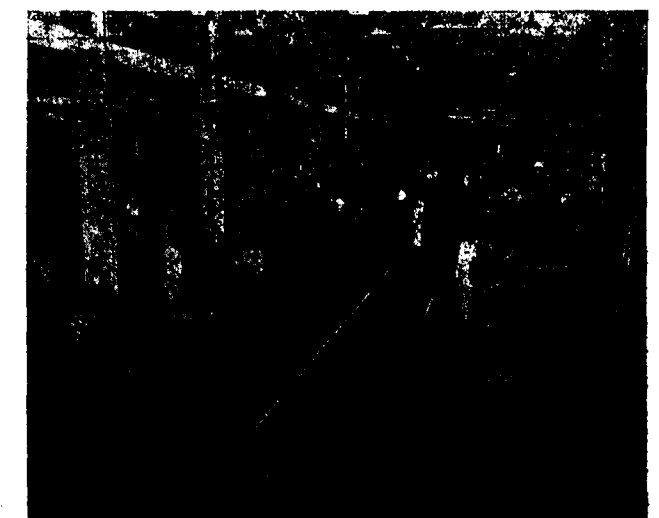
a Phased Manufacturing Programme was submitted to the Government of India and on June 5, 1955, the Chairman of Simpson & Co., Ltd., Shri S. Anantharamakrishnan, the noted South Indian industrialist, gave an assurance to Government that by December 1956, i.e., in the remarkably short period of 18 months, Simpson & Co. would achieve complete indigenous manufacture of the Perkins P6 Automotive Diesel Engine to a capacity of 3,000 Engines per annum.

This was a tremendous task and under the able direction and control of the Company's Director & General Manager, Mr. A. J. Lund, a Chartered Engineer, possessing considerable

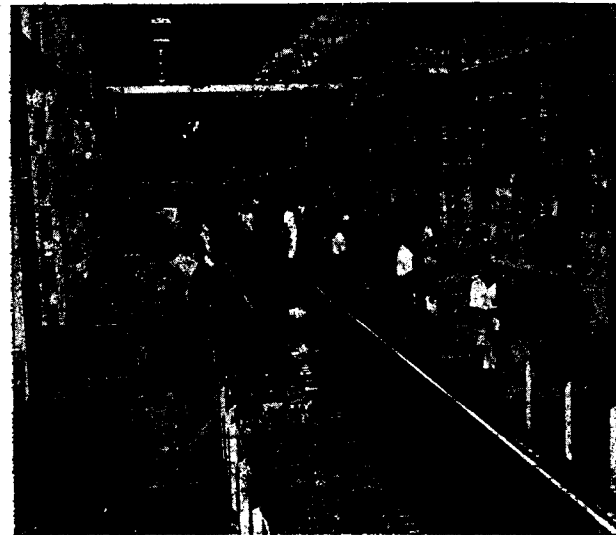
administrative, organising and production ability, the programme was fully completed.

The utmost co-ordination and co-operation of all administrative staff, draughtsmen, jig & tool designers, other technical, managerial and general staff, Workers' Union, and every employee of the Company was most essential for such an undertaking, and it is undoubtedly a great credit to all that a project of such magnitude was accomplished in the very short space of 18 months.

Specifications and capacities of all plant and machinery had to be worked out to suit all machining operations for each and every component part of the Engine. Orders then had to be placed for deliveries Madras to suit the respective phased periods of the Manufacturing Programme. Complete factory layout plans for positioning of the machinery for flow-line production had to be prepared, excavations made and machinery foundations laid ready for installation of machinery on arrival. Additional electric power supply had to be provided including purchase and installa-



Cylinder Head Bay



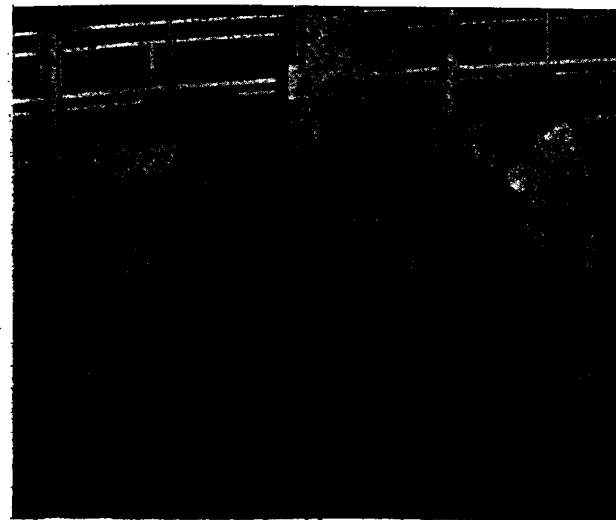
Crankshaft Bay

tion of additional Transformers, new electric power cables and feeder lines together with distribution boards and switch gear. The entire lighting arrangements throughout the factory had to be re-planned.

Jigs, Fixtures and special Toolings had to be designed and manufactured at their Madras Works to the tune of nearly 3 lakhs of rupees value. Simultaneously, necessary labour force had to be trained, especially for the manufacture of high precision work involved in the production of Jigs and Fixtures. And high tribute should be paid to Indian labour for their remarkable adaptability and progress in this specialised sphere of engineering.

Simpsons' Works

A massive modern construction, double-storied building houses the Administrative Offices, Financial and Cost Accounts, Drawing and Design Office, Sales Department, Central Stores, Purchasing Department, Material Control



Deep hole drilling

and Planning Office. And behind this building is the spacious and most modern Workshop. The factory area covers approximately 2,50,000 sq. ft.

The Perkins P6 Automotive Diesel Engine

This is a 6-cylinder unit, having cylinder bore 3.1" and stroke of 5". Swept volume is 4.73 Litres (288.6 cu. inches) and develops a maximum commercial vehicle rating of 83 b.h.p. at 2,400 r.p.m. Maximum torque is 202 lbs. ft. (27.9 Kgms.) The weight of the Engine with electrical starting equipment but without fly-wheel and starter ring is 696 lbs. In its power range, Perkins P6 is unquestionably the most popular diesel transport engine in the World and in India alone about 40,000 of these engines are operating with extreme reliability and efficiency.



Material Control Office

The Manufacturing Plant

The Perkins P6 Diesel Engine consists of nearly 1,800 component parts, and, of these, 20-odd items are still not manufactured in the country, viz., Proprietary items consisting of Motor Starter, Dynamo, Fuse Box, Venturi, Timing Chain, Starter and Heater Switch Assembly, Etc.

Planning for Production

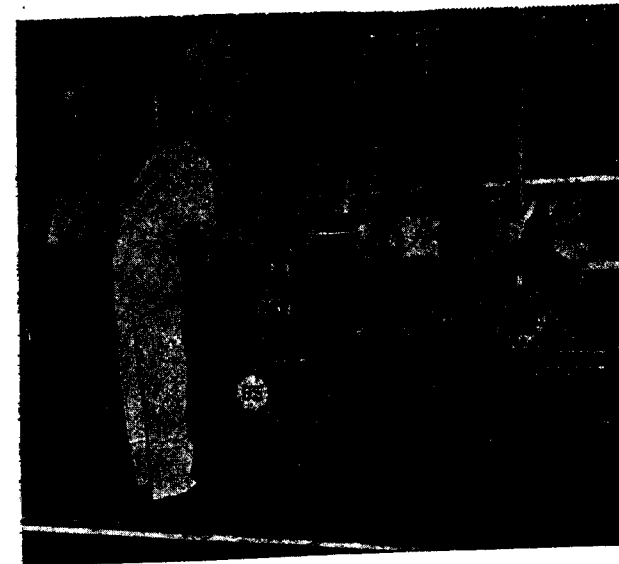
The organization of the Planning Department has been done on the modern lines, using very extensively the Graphdex Board Charting System and with this the day-to-day stock position of the various engine components and also the flow of the manufacturing programme can be gauged at a glance.

Job Control Boards are operated by the Loading Section of the Planning Office and this method ensures very proper loading of the various production machines and also helps to

keep an effective eye on the planned and actual production hours for doing various machining operations. The efficient organization of the Planning Department and co-ordination with the Works and the Cost Office facilitate accuracy in determining the manufactured cost of the component parts day to day.

Planning of Cutting Tools

The various cutting tools required by the Machine Shop are planned and procured, taking into consideration the tool life and the monthly tool consumption. The tools are properly numbered and as per the Operation Sheet, these are stocked in the Tool Stores for easy delivery. The procurement of tools has become a very important function to keep the Machine Shop running uninterruptedly, especially in view of the country-wide shortage of and

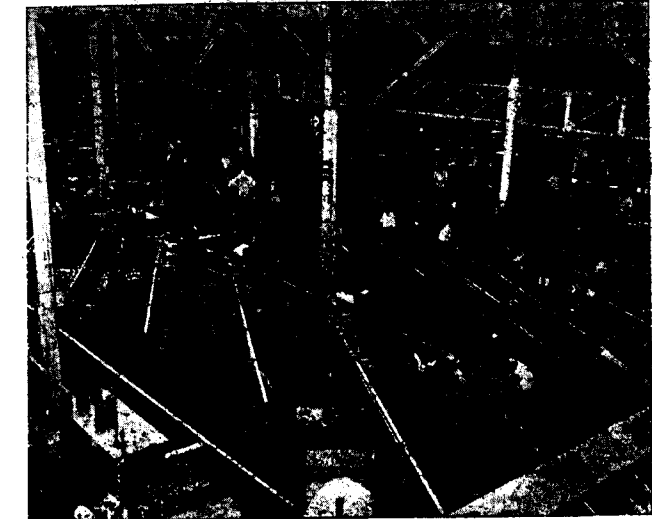


Boring of Cylinder Block

import restrictions for various cutting tools. In the selection of various cutting tools, factors governing maximum production and tool life, and also the materials to be machined are taken into consideration.

Material Control Department

The different types of raw materials required for the production of P6 Engines are procured through the Material Control Department. This Department is responsible for the location of suitable materials and ordering them as required. They take very suitable steps to contact various suppliers and ensure that only the right type of material as specified in the designs are procured. All raw materials received at the Works are bonded until material and chemical analyses as required have been taken. This procedure is rigidly followed to ensure that



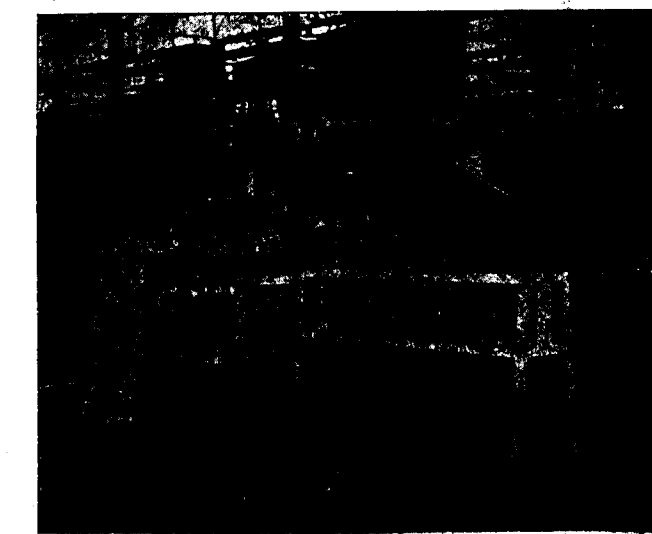
A part of Capstan Section

only approved materials to specification are used for the production of the Engine.

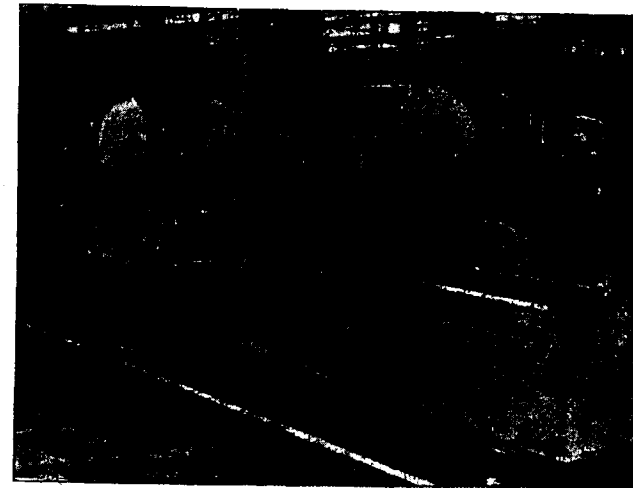
This Department also looks after the procurement of various purchased components and also maintains a close liaison with Messrs. F. Perkins Ltd., Peterborough, England, and their Resident Chief Inspector, for obtaining their approval for these items. In the case of completely machined purchase items, a rigorous inspection is instituted in our inward goods section and these goods, like parts manufactured in Simpsons' Works, are constantly under review by F. Perkins Ltd.'s Resident Chief Inspector and his assistants.

Machine Shop

The Machine Shop is broadly divided into two sections: one section manufacturing miscellaneous component parts and the other is



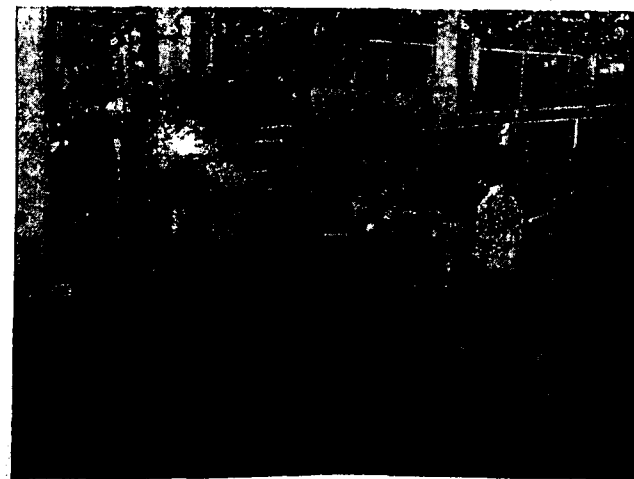
Milling Side Faces



C. Bay-Servicing operation

laid out for flow-line machining of Cylinder Blocks with Main Bearing Caps, Cylinder Heads, Connecting Rods, Camshafts, Crankshafts, Lubricating Oil Pumps, Water Circulating Pumps, etc. The arrangement of Plant and Equipment has been carried out with a view to obtain a good deal of flexibility in production. Various Capstan Lathes and Automatics have been grouped in one section and several Radial and Pillar Type Drilling Machines in another and in this manner general purpose Milling Machines including Gear Hobbing Machine and SS & SC Lathes have been arranged in different groups.

Four of the Machine Shop bays extend lengthwise within the buildings and this arrangement enables very effective supervision and easy flow of components from machine to machine to be achieved. Manual handling of the components is minimized by necessary mechanization and goods, wherever possible, are palletised and the movement of components at various stages of machining is carried out by



C. Bay-Pin & Journal Grinding

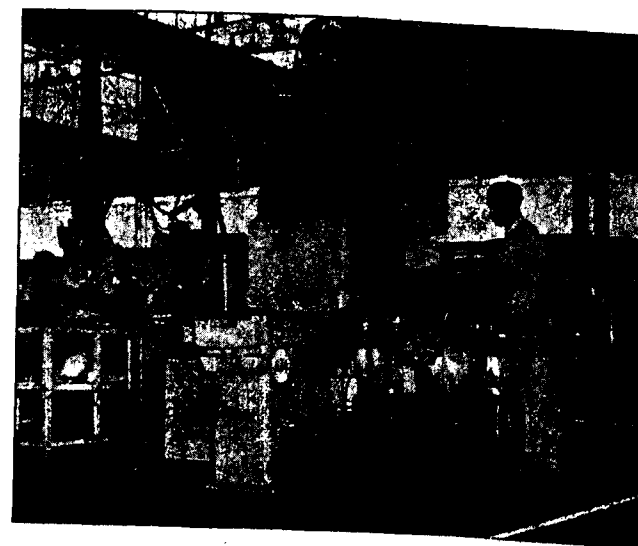
the employment of a large variety of specially designed pallets.

Cylinder Block Bay

The rough castings are delivered at one end of the bay and these are first washed with paraffin in a cleansing tank.

Gravity roller Conveyors are arranged all along the bay and the castings travel on these from machine to machine, thus reducing to the minimum physical handling. This also helps to avoid 'stock piling' of components on the floor at the various machine stations.

After fettling and washing, the castings are inspected with necessary inspection fixtures to ensure the correct locations of cores, jig location points and machining allowance, and placed on the roller conveyor.



Surface Grinding

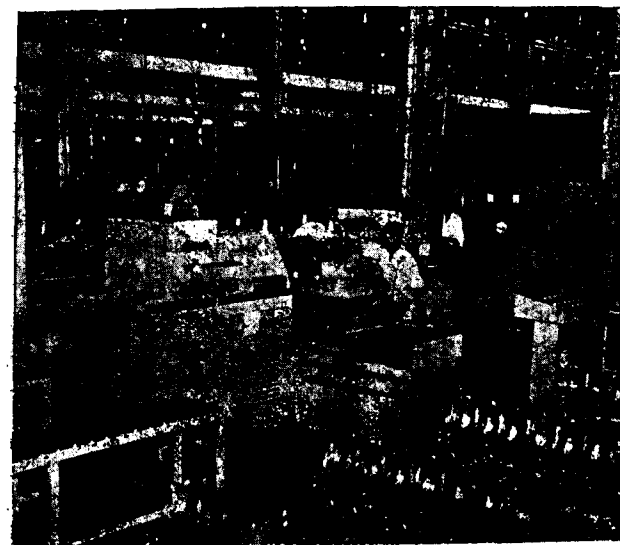
From these the work is loaded directly into the fixture on the first machine, this being a Duplex Miller provided with 2 Nos. 16" dia. inserted tooth carbide cutters. After this operation the work is moved on the roller conveyor to the next operation, i.e., drilling of sump and head faces. In this operation two locating holes are drilled and reamed on the same face for jig location purposes for subsequent operations.

In the Cylinder Block Bay there are several special purpose machines of the modern type such as 6-spindle Snout Borer specially designed for the rough boring of all the cylinder bores, Special Horizontal Drilling Machine for drilling the pressure rail hole in one setting and the wide base Miller for straddle gang milling the Crankshaft bearing sides and also for form milling the Crankshaft bore. 2 Nos. specially tooled Boremetrics are stationed for finish boring the parent bore of the Block and

the Liners with hydraulically-operated 3 station fixtures. The Honing Machines are positioned next to the Boremetrics for rough and finish honing the Cylinder bores after finish machining of the Liners.

Most of the other operations are carried out on general purpose machines including Radial Drilling Machines, Vertical and Horizontal Milling Machines, Radial Arm Tappers, etc. All machines have been tooled up for doing particular operations through suitably designed jigs and fixtures.

The Crankshaft and Camshaft bores are finish bored in a Horizontal Boring Machine after fitting the main bearing caps which are processed alongside the Block and brought over to a fitting station. When the machining



Duplex Milling Machine

operations on the Block are completed, the Main Bearings are fitted and line bored.

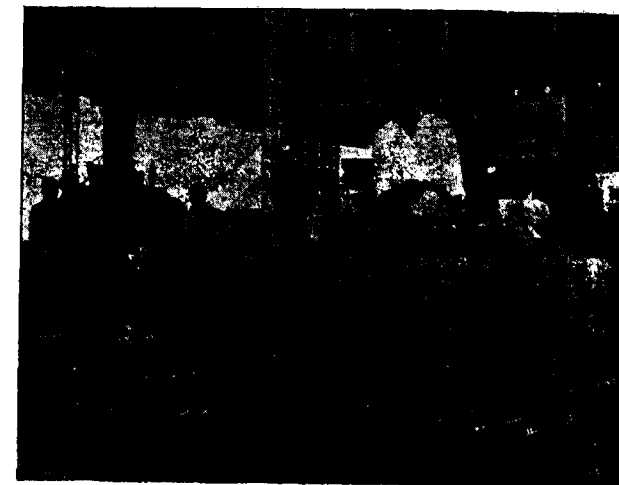
At every stage of machining, strict inspection is maintained by well trained stage inspectors to ensure that only correctly machined Blocks are allowed to move forward to their next operations.

Before line boring the Blocks these are water tested and also the pressure rail paraffin tested to ensure that the Blocks are leakproof in every respect.

Completely machined Cylinder Blocks before delivery for assembly are inspected by Final Inspection Department, although rigid stage inspection has already been done at different stages of production.

Cylinder Head Bay

The various machines for processing this component are arranged operation-wise. The



C. Bay-Crack Detecting

rough castings are fed from one end and the completely machined heads are delivered to assembly from the other end. The work travels on roller conveyors and arrangements have been provided for lifting the work from machine to conveyor and conveyor to machine with the help of overhead lifting gear. For the machining of Cylinder Heads Vertical Milling Machines, Radial Drills, Radial Arm Tapping Machines, etc., are used, all of which are specially tooled and jigged for rapid production and interchangeability of the component. As in the case of Cylinder Block, rigid stage inspection is maintained and the completely machined Heads are delivered to Assembly only after passing 100% final inspection.

Connecting Rod and Camshaft Bay

The Connecting Rod stampings, made out of Nickel Chrome Molybdenum steel, are first inspected very thoroughly in the materials inspecting wing of the Inspection Department



Planning Office

to detect twists and other stamping flaws. Only approved stampings are then released to the production line and before the commencement of the first machining operation, the stampings are fettled and crack detected on a Magnetic Crack Detector.

In this bay also the machines are stationed on operation basis and, therefore, the Connecting Rods move from one machine to the other in perfect sequence resulting in the least amount of handling.

Specially designed pallets are used for this bay instead of roller conveyors and the components are placed vertically on these pallets by the operative after completion of each operation.

The various milling operations are done by employing negative rake milling cutters as the material has over 65 tons tensile strength.

After the rods are completely machined, steel backed smallend bush is press fitted and then finish bored to size on a precision specially-tooled Fine Borer. On completion of all operations the rods are again crack detected and demagnetised before delivery to final inspection where these are individually weighed and matched. Specially trained Stage Inspectors vigilantly watch for any process variation at different stages of production.

P6 Engine Camshafts are machined on journals which are ground to micro-finish. The Cam Lifts are profile ground and a specially designed Cam-o-matic Grinding Machine, specially-tooled, give correct profile of all cam lifts.

Crankshaft

The P6 Crankshaft is machined from high tensile Nickel Chrome Molybdenum steel drop forgings. This most important component has been tooled up with utmost care as the efficient performance of the P6 Engine depends to a very great extent on the precision of the Crankshaft.

Most modern equipment is installed for the production of Crankshafts, the general sequence being crack detection of Crankshafts before passing into Machine Shop, centering for turning operations, rough and finish turning main bearing journals and crank pin journals, rough grinding all journals, drilling lubrication oil holes, induction hardening all journals by a special induction hardening plant, tempering after hardening, finish-grinding, balancing the Crankshafts and final crack-detection before being passed for assembly. Very rigid inspection is employed throughout the various machining and grinding stages and 100% inspection is carried out after all the operations have been completed.

General Section

In the General Section in the Machine Shop, various component parts such as Water Pump, Fuel Pump Drive, Lubricating Oil Pump, Starter Ring, Timing Case, Exhaust and Induction Manifold, Sprockets, etc. are manufactured. The Starter Rings are electrically butt-welded and passed through the Crack Detector before going forward for machining and cutting of teeth. The Starter Rings are again crack detected before 100% final inspection and utilisation in assembly.

Two special Hobbing Machines are utilised for cutting teeth in all Chain Sprockets, Spiral Gears, and all gears are tested by means of a Goulder Gear Testing Machine fitted with chromium plated master gears.

Tool Room

The Tool Room is equipped with excellent high precision machinery, including a Jig Borer. Special grinding machines are used for maintaining necessary supplies of correctly ground milling cutters, reamers, drills, taps and other small tools. All jigs and fixtures are periodically checked for wear and are carefully maintained to ensure absolute interchangeability and maintenance of very close machining tolerances.

Assembly of Engines and Testing of Engines

The Engines are assembled in the well laid out Assembly Section on a line assembly basis and every Engine, after complete assembly, is subjected to very rigorous functional tests utilising Hydraulic Dynamometers. Fuel and Lubricating Oil Consumption figures are checked to ensure that each and every Engine complies with the very rigid standards laid down. Each engine averages 5 to 6 hours of actual functional test. After test, each and every Engine is very carefully examined, after finish painting and packing prior to despatch from the Works.

The production of an automotive type diesel engine of the Perkins P6 type calls for very efficient technical planning, extreme skill and supervision and also the adoption of modern production methods. The Perkins P6 Engine is world famous for its simplicity, rigidity, accessibility, economy and high quality, and Simpsons have taken every care to ensure that each and every component fitted into the Madras-manufactured Engine is, in every respect, equal to, if not better than, the previously imported product. From the manner in which the various machining operations on the several components of the Engine are produced in Madras and the excellent administrative co-ordination, one can very boldly state that the Perkins Engine being produced in Madras is not, in any way, inferior to the foreign product.



ALUMINIUM INDUSTRY IN INDIA

V. D. AGARWAL, B.Sc., B.Sc. (Met. Eng.), M.I.I.M.

Aluminium Corporation of India Ltd.

The vast reserves of bauxite in the world which at a time were a source of great inspiration to scientists have fairly well been explored and are being utilised for the production of aluminium. The existence of aluminium in its metallic form was established as early as 1825, but it was so rare till 1855 that it was given the romantic title of "Silver from Clay". Aluminium production on commercial-scale commenced only in 1886 and for this, unqualified credit would go to the work of Hall and Heroult.

The modern aluminium production plant, basically, consists in the purification of bauxite from its impurities by the Bayer Process. The bauxite is crushed and finally powdered and digested with hot Caustic Soda solution under steam pressure. The alumina of the ore forms

Aluminium is one of the most recent among the major industries of the world. It pervades human activities. Its future lies in the economic future of India.

Sodium Aluminate which when treated with 'Seed' forms Aluminium Hydrate. This is calcined at elevated temperature to remove its water content and form alumina. The alumina when treated with cryolite in the Electric Furnaces commonly known as Cells or Pots breaks into metallic aluminium, which is cast into ingots. It may seem so simple, yet the process involves complicated reactions and requires a good amount of care and consideration at all points.

The location of the aluminium production plant and running it most efficiently, need thoughtful planning. Where possible, the bauxite should be converted into alumina near the deposits itself. This offsets the extra cost of transporting the dead weight of the sludge

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as that of fuels and chemicals and results in considerable economy. Similarly, if the plant for the reduction of alumina into aluminium is near the source of power, there will be a reduction in the cost of transmission of electricity; this will mean a great deal in cutting down the cost of its production, eventually.

It is somewhat unrealistic that important producers of aluminium in the world, including Canada and U. S. A., are mostly depending upon their imports of bauxite. The rich deposits of South America and Africa form the chief sources of their supplies. India, however, is gifted with considerable deposits of reasonably high grade bauxite and does not have to look for its imports.

Of all the raw materials required in the production of aluminium, electric power plays

the most important role. As much as 20 per cent of the cost of aluminium production falls on electric energy. For over two decades, intensive work to minimise the electric consumption per ton of aluminium produced has brought significant reductions on the Kwh spent and efforts to curtail it further continue and it may not be improbable to effect more economy on this element, though possibly on a diminishing scale. In certain privileged countries like Canada and Norway where power is available at low cost, it represents only about 7-8 per cent of the ingot value. The nonavailability of cheap electricity, so vital to aluminium production, has been the limiting factor in the development of the Aluminium Industry in India. However, the new projects to intensify country's hydropower resources are very promising and

efforts should now be concentrated on increasing the aluminium production with minimum power-consumption on it. This is important, particularly when the country has to stand competition from producers, already enjoying lower power costs.

Capital investment on aluminium production plants still remains high—roughly Rs. 10,000 to produce one ton of aluminium. But the capital charges in a sense are less imperative and give Aluminium Industry far greater flexibility. Like any other industry, it is true for aluminium too, that the higher the production, the lower would be the production cost. It is natural, therefore, small size aluminium plants would be found uneconomical to operate; and hence the trend should be to increase the capacity of the existing plants and for large new ones to come.

North America is the major aluminium producing centre of the world. In Quebec, already one single plant is producing 500,000 tons of aluminium per year. There is another plant of

similar capacity on its way to completion in Canada. Plans are well advanced in Gold Coast also to put up a plant producing 200,000 tons of aluminium annually. Production plants of similar magnitude are being designed in other parts of the world too.

World production of aluminium in 1954 was about 3 million tons and it is expected to rise upto 4 to 4½ million tons by 1960. India's contribution to the world production has been very humble. At present, there are only two aluminium producing plants in India; their combined production range is 7,000 to 7,200 tons per year as against India's consumption of aluminium of the order of 20,000 tons. The demand for aluminium is expected to increase *inter alia* upto 30,000 to 35,000 tons per year from more extensive utilization of A.C.S.R. for transmission of power and its applications in many other industries; and the target annual capacity therefore of 30,000 tons of aluminium by 1960-61 has been fixed with a capital investment of Rs. 22 crores during 1956-61.

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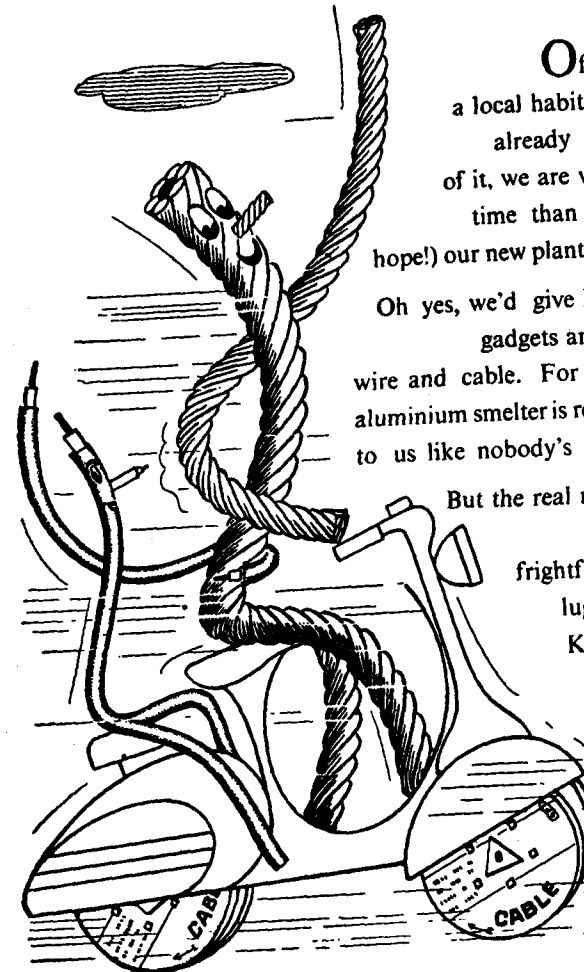
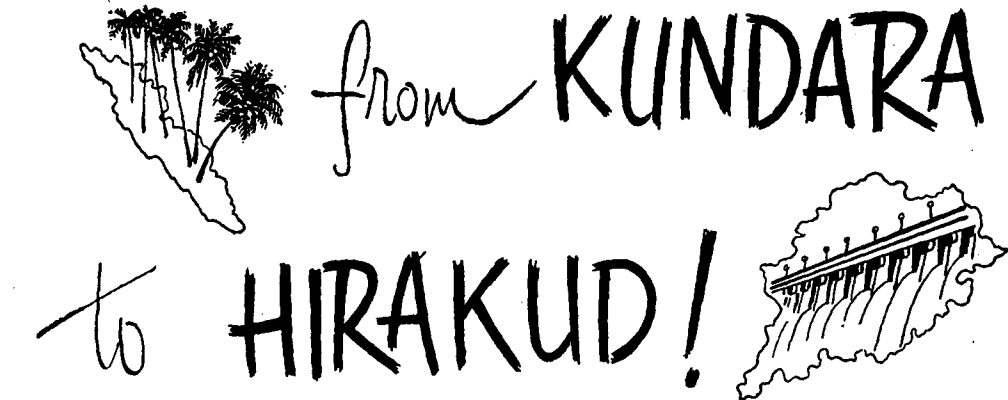
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The existing aluminium plants in the country would hardly be able to cope with the growing internal needs. Their productions have to be boosted up to put them in line with the plants abroad and new plants erected for additional production. Though the Hirakud Project would add to India's production 10,000 tons of Aluminium by the end of 1957, there would yet remain a gap between demand and production. That the State Government would be putting up an aluminium plant of 10,000 tons capacity is indeed a welcome news. The sooner it comes, the better for the nation.

The story of aluminium does not end with its production into ingots. From the consumers' point of view, its fabricated products are more important. This versatile metal in the service of man, on account of its rare combination of various useful properties, has become the choice of designers, engineers and architects alike. The importance of aluminium to modern civilization cannot be over-emphasized. Aluminium—the dynamic metal of the age—in one form or the other, is replacing many metals and non-metals from their fields and therefore facilities to fabricate the aluminium produced in the country are as much important as the aluminium production plants. By the end of the Second Five Year Plan, the overall index of industrial production is estimated to rise to 194 from 130 in 1955-56 and aluminium industry has to play a very significant role in the Industrial Revolution taking place in India.

Demand for Aluminium in 1960

Utensils	...	12,500 tons.
Cables and Accessories	...	8,000 "
Transportation	...	4,000 "
Packaging	...	3,000 "
Building and Construction	...	1,000 "
Miscellaneous	...	1,500 "
Total		30,000 tons.



Off we go to Hirakud...to give ourselves a local habitation and a name! The name part we already have, but the local habitation part of it, we are working out now. And probably in less time than you and we had bargained for (we hope!) our new plant would be a-hum with bustle and activity.

Oh yes, we'd give Hirakud the works all right! The usual gadgets and gimmicks for making aluminium rod, wire and cable. For one thing, over there a new 10,000-ton aluminium smelter is rearing its lovely head. And it's beckoning to us like nobody's business, and our own special business!

But the real reason is you, dear customer. It breaks our young heart to see you pay all the frightful freight you are now paying on lugging our thing all the way up from Kundara, Kerala, to wherever you are in Andhra or Assam, Bengal or Bihar, Madhya Pradesh or Uttar Pradesh.

Tut, tut, we said to ourselves, we must meet our dear customer at least half way, and there you are—rather, there we are—at Hirakud!

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AL-398



Hard facing techniques increase the efficiency of engineering parts and reduce maintenance costs. The author excellently analyses the causes of wear.

HARD FACING

P. S. VISVANATH, M.Sc.,
J. B. Advani-Oerlikon Electrodes (Private) Ltd.

A constant preoccupation of every engineer in every industry is the repair and replacement of worn parts. Since the commencement of welding, one of its many important uses has been the reclamation of worn components, and for this work, specialised hardfacing rods and techniques have gradually been evolved.

HARD-FACING, as its name implies, is the art of welding an economical amount of the most wear-resistant alloy, to the position where it is most needed. This protection allows cheaper materials to be used for the body of the job, but an even greater economy is given by the longer life, decreased shutdowns and higher working efficiency.

Before we go on to the use of hardfacing in various industries, we shall analyse the

various causes which lead us to the need for hardfacing. Excluding corrosion, wear may be considered as various combinations of abrasion and impact. Abrasive wear is encountered when one material scratches another, and impact wear when one material hits another material. This abrasion is twofold: (1) **SLIDING ABRASION**: i.e. Sand slipping over agitator paddle (2) **ROLLING ABRASION**: Crane wheels rolling over crane rails, gear teeth meshing against each other. The impact wear may also be classified under two groups: (1) **EDGE IMPACT**. This may be compared to the impact on the edge of a chisel. Heavy compression may also be encountered as on a rail track. (2) **FLAT IMPACT**. This implies to a blow without accompanying heavy compression.

normal to a surface such as might be encountered between a cement roll mill and the die ring where the crushing force is normal to the die ring but the load is never tremendously large. There may be also service conditions where a combination of both abrasive and impact wear are present similar to the service condition imposed on bucket lips and action of earth on ploughshares. There may also be conditions where various combinations of heat and corrosion with abrasion, impact and erosion are encountered such as in exhaust valves.

Before undertaking any hardfacing on any job, the wear conditions encountered on the job must be analysed completely before the choice of a right electrode can be made. The factors that cause the wear will determine whether the part should be hardfaced or not

and what type of hardfacing to use. Since it is generally admitted that very little is known about the mechanism of wear, it can be appreciated how very difficult it is to make an appropriate choice of an hardfacing electrode. The price of an electrode is not the only criterion for an hardfacing electrode: (i.e.) that a higher priced electrode will give a better wear resisting surface. It is quite possible that a better wear resisting surface can be obtained with a lower priced electrode than with a higher priced electrode.

Now having analysed the various causes of wear and the essential need for hardfacing, we shall deal with the problem of hardfacing in some industries.

Mining Industry

Coal undercutter bits are subjected to very severe abrasion and they should be hardfaced

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suitably to resist this very severe abrasion. It has been found by experience that a deposit with a good percentage of chromium has been found to give the best results against this severe abrasion. Similarly the crushing equipment made of carbon or austenitic steel like the crusher rollers have to be surfaced periodically to give maximum service against abrasion. As work hardening usually takes place in such type of rollers, an austenitic Manganese weld deposit with 12-14% manganese has been found to give the best results.

Railways

Although rail steels are of very high quality with sufficient manganese and chromium to resist wear, losses caused by wear are very high, particularly in the case of switches and crossings. It has been found by experience in various railways all over the world that a medium carbon deposit with small quantities of chromium and Molybdenum have been found to be very ideal for these types of applications. This hardfacing of points and crossings with a suitable electrode as mentioned above, saves the high cost of replacements and also provides continuity of traffic without any dislocation.

Oil Industry

There is a lot of grinding and crushing work involved in this industry and the oil expellers used for crushing the oil seeds have to be hardfaced periodically to keep the continuity of production with the least amount of stoppage. It has been found by experience that a highly alloyed deposit of Chromium and Molybdenum is ideal for these types of hardfacing applications.

Valves and valve-seats have to be hardfaced against wear, erosion and also against high temperature that may be encountered. To resist erosion (i.e.) on a water wheel, a stainless steel deposit has been found to be very satisfactory. To resist high temperature that may be encountered, a rod should be chosen that it is not easily annealed at high temperature. The hardsurfacing rods of this class generally contain either a high per-

centage of Tungsten or in some instances they may be composed entirely of synthetic carbides which resist high temperatures. Sometimes cutting tools have to be retipped and it may also be necessary to deposit cutting edges on mild steel bases of shanks. It may be necessary sometimes to heat the tool after welding. In such cases it may be necessary to choose an electrode which will give a deposit to undergo the same heat treatment as the base metal. This does not imply that analysis of base metal and weld metal should be identical.

I will deal with the various advantage and economies that are possible due to the adoption of this hardfacing technique. The main advantages that are obtained are:

- (1) Longer life of Equipment.
- (2) Fewer replacements with resultant savings in labour charges and lost production time.
- (3) Utilisation of low-alloy metal as the base for wearing parts.
- (4) Salvaging or reclaiming of worn parts.
- (5) Savings in power consumption.
- (6) General increase in operating efficiency.
- (7) Hardfacing maintains surface dimension against wear, thereby increasing efficiency and reducing power costs.
- (8) Hardfacing permits a smaller inventory of replacement parts, which reduce spare part investments.

For the first time in the history of Indian welding industry, one manufacturer of electrodes, has started the manufacture of the entire range of hardfacing electrodes. The practice of scrapping costly worn out parts which is a very common practice in most of our Indian work-shops will be given up and serious efforts will be made to reclaim them at a much lower cost than would be necessary to replace the worn out part. This method will not only save lot of shutdowns in industry but will also save a lot of foreign exchange as most of the spare parts for machineries have to be imported into India.

..

In this age of speed, motor cycles play a vital part and a great future awaits Enfield India.

MOTOR CYCLE INDUSTRY

INDIA is taking giant strides towards her goal of equal opportunity and full employment for her people. A multi-purpose project here, a steel plant there, a national extension scheme in every other village, and a host of huge undertakings help further the welfare of our people, and change the face of our country.

Pace of progress has quickened. People are on the move. Their wants and aspirations have grown. Their standard of living is on the increase with every advance India makes in her planned attempt at self-sufficiency in our basic needs.

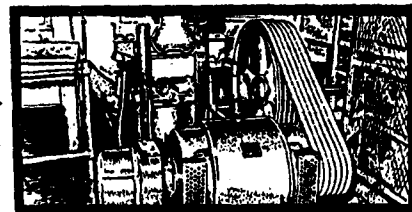
Development of transport is a pivot upon which our national plans revolve. The First-Five-Year-Plan saw the rehabilitation of the railways in a big way, and also helped to establish the motor car and bicycle industries

on stable footing. It also laid the foundation for the progressive development of the motor cycle industry.

Judged by the proportion of motor cycles to motor vehicles in India, in comparison with those countries where the cost of petrol is as dear as in India, the familiar iron-horse (the motor cycle) does not appear to be as popular in India as it should be. In Great Britain, France and Japan, for example, the proportion of motor cycles to motor vehicles is respectively 20%, 34% and 40% as against only 9% in India. Evidently, there remains a lot of pioneering effort to be done in India to promote this mode of transport which is perhaps the most economical automotive vehicle that can take people (and goods, on a three wheeler) who must go places, quickly and at low cost.

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INDIAN INDUSTRIES ANNUAL

The importance and place of the motor cycle in our economy is self-evident. Between 1931 and 1951 great changes have come upon the way of living of our people. People engaged in trade, commerce, transport and production (other than agriculture) have trebled. In effect, large numbers of our people have migrated to towns and cities. The number of cities with a population of over 100,000 alone has more than doubled, not to speak of the total increase in the number of towns generally. Every city has grown out of proportion to its normal size, resulting in 'extensions' and 'colonies' and 'suburbs'. Consequently local transport has become a major problem resulting in bottlenecks and strain on the available conveniences and resources. This trend has been greatly accentuated by the successful implementation of our First Five Year Plan. In this context, the development of the motor cycle industry is of great significance.

ENFIELD INDIA LIMITED have therefore, ventured to pioneer the establishment of the motor cycle industry in India. Planned and promoted in collaboration with the ENFIELD CYCLE COMPANY, Redditch, England, they have established their factory at Tiruvottiyur, near Madras, and have commenced production of the world-famous Royal Enfield Motor Cycle and the RE Three-Wheeler chassis. Their approved programme provides for production of 5000 motor cycles and 1800 Three wheelers a year.

The future of the motor cycle industry is very bright indeed. With increasing production in every field of our national economy, people (and goods) must go places to serve, to produce, to sell and to buy to keep their business moving. We are in an age of speed. There's nothing like a Royal Enfield motor cycle to travel at will to places far and near in great comfort and economy.

Royal Enfield motor cycle is a boon to every salesman. He can save his travel time for persuasive selling, he can go in comfort, appear fresh and be on time to meet his prospects. Business executives, engineers, lawyers, doctors, Office assistants, supervisors,

INDIAN INDUSTRIES ANNUAL

foremen, all need a motor cycle to keep a ready link with their prospects and places of work, to turn their valuable time into profitable ventures. Business establishments encourage their executives and assistants to go in for this powerful speedy vehicle to do their work more quickly and on time.

In order not to fritter away available resources, the Enfield factory concentrates on producing only two models of Royal Enfield motor cycles—Ensign 150 and Bullet 350. Ensign 150 is a completely redesigned machine having many features hitherto found only in larger more expensive models. For sheer economy, combined with comfortable personal transport, there's none better than Royal Enfield Ensign 150. It gives as much as 130 miles to a gallon.

The Royal Enfield Bullet 350 is a dream of a machine. It's big, it's quick and smooth with the flashing power of its large 350 engine. For the sheer thrill of riding a motor cycle, there's nothing more enjoyable than a Royal Enfield Bullet 350.

Motor cycles are in extensive use in police and defence departments of states all over the world. Our Police forces and army use them. Why? On a motor cycle you can go anywhere, no matter how good or bad the roads.

Because of large wheels, you can go long distances in great speed without fatigue. Large wheels grip road better and help you to manoeuvre your way with confidence. Fewer revolutions per mile make for less wear and tear, and higher road clearance lets you enjoy smooth riding comfort in perfect balance.

You sit on a motor cycle as you would do on a horse and ride on it as a man should, and go in great dignity.

Royal Enfield models give you all these advantages in ample measure, and yet cost no more than other comparable forms of transport. Spread over a period of five years, you would pay no more to own your Own Royal Enfield Motor Cycle than you would pay for your local transport in crowded buses, trains and trams. Moreover, Royal Enfield



For men who must be on the spot

—there's nothing like a

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TRAVEL AROUND on your own ROYAL ENFIELD Motor-cycle! It's the way to save time—no delays waiting for crowded trains and buses, no fear of missed appointments. You save money, too... ROYAL ENFIELD ENSIGN 150 gives you as much as 130 miles to the gallon!

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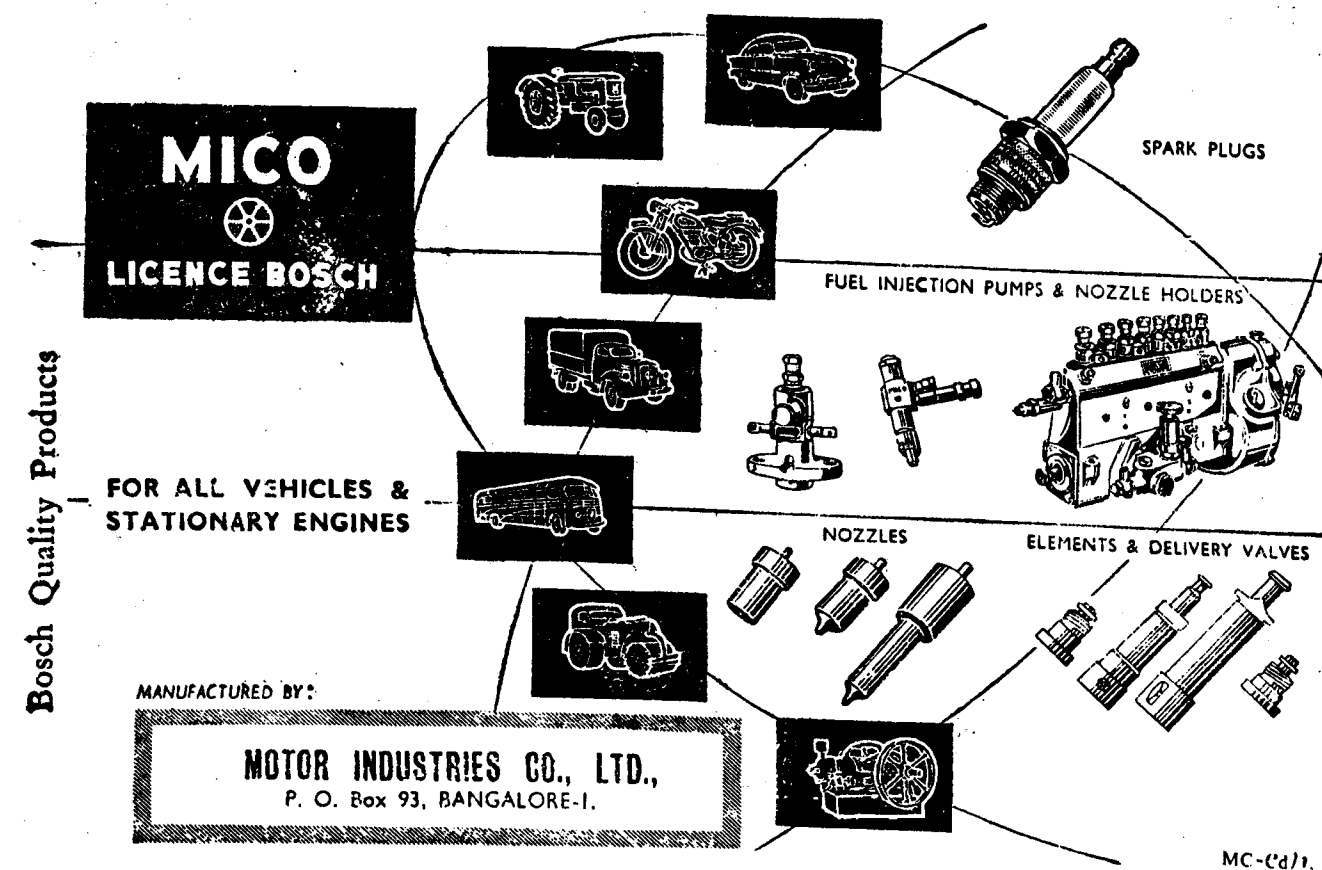
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motor cycle is available on an Easy Payment Plan.

Royal Enfield Three Wheeler is a boon to a city private transport operator or a local distributor. It has so versatile a chassis that you can build a body appropriate to your purpose. Built like a truck with foot operated accelerator and hydraulic brakes, rear axle with differential, it's powered by a four stroke 3.5 engine. Its chassis is of robust construction, specially designed to carry a payload of over half a ton and yet it's surprisingly economical. For example, you can use three Royal Enfield Three Wheelers for the cost of operating a small delivery van; similarly a Royal Enfield Three-wheeler, because of its high powered engine, can carry twice the load of 1.5 Three-Wheeler. In effect the Royal Enfield Three Wheeler is of great help in

transporting passengers (four at a time, excluding the driver) or goods in volume of 1500 lbs. If a distributor has three Royal Enfield Three-Wheelers instead of a small delivery van, he can load them separately and send them for distribution to different ends of the city rather than wait to fill the full load of the van and make it take its time to go to different corners of the city.

Royal Enfield motor cycles and Three Wheelers, therefore, are designed to serve every type of profession and business in India. Carefully built to standards obtaining anywhere else in the world, with distribution and service facilities strategically located all over India, and with spares made available literally "on tap" with full production facilities in India, Enfield India bids fair to play a vital role in the development of our economy on modern lines.

Russia plays an admirable part in India's growing prosperity and the Bhilai Steel Works is a standing monument.

SOVIET FOREIGN TRADE

I. G. BOLSHAKOV

Deputy Minister, Foreign Trade of the U.S.S.R.

The Soviet Union conducts trade now with more than 60 states. Powerful upsurge of Soviet economy in the post-war period created favourable conditions for the swift development of Soviet foreign trade. The volume of Soviet foreign trade was approximately fivefold the pre-war level last year. Where as in 1938 the Soviet Union occupied 22nd place in the world in the field of foreign trade, it has advanced to the sixth place now.

The Sixth Five-Year Plan for the development of the USSR national economy (1956-1960) envisages the further expansion of Soviet foreign trade with all countries.

Mutually advantageous trade among countries promotes the national economy of every

country and helps to raise the welfare of the peoples.

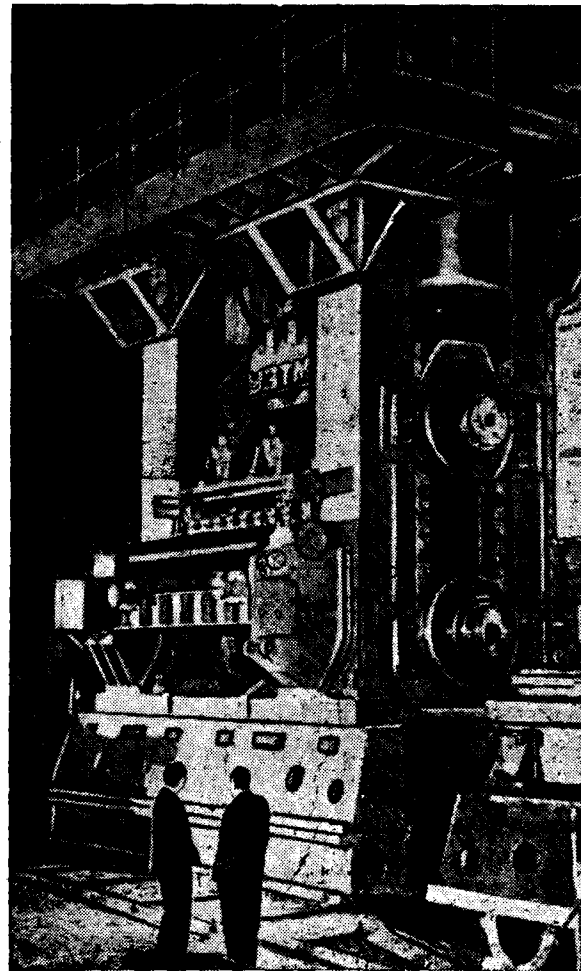
Throughout its history the Soviet state has always striven for the development of trade relations with other states on the principle of the consolidation of technical and economic independence of the country and independent development of its productive forces.

International economic relations call for an exchange of goods among various nations and all and sundry barriers, raised artificially in the way of international trade, greatly damage the economies of the states and aggravate international tension.

Trade brings people closer together, it strengthens mutual confidence, creates favour-

able conditions for the development of friendly relations among countries and serves as a basis for peaceful co-existence of states with differing social and economic systems.

Soviet foreign trade policy is based on the democratic principles of equality, respect for the sovereignty of states, big and small, non-interference in their home affairs, mutual advan-



A powerful rolling Mill

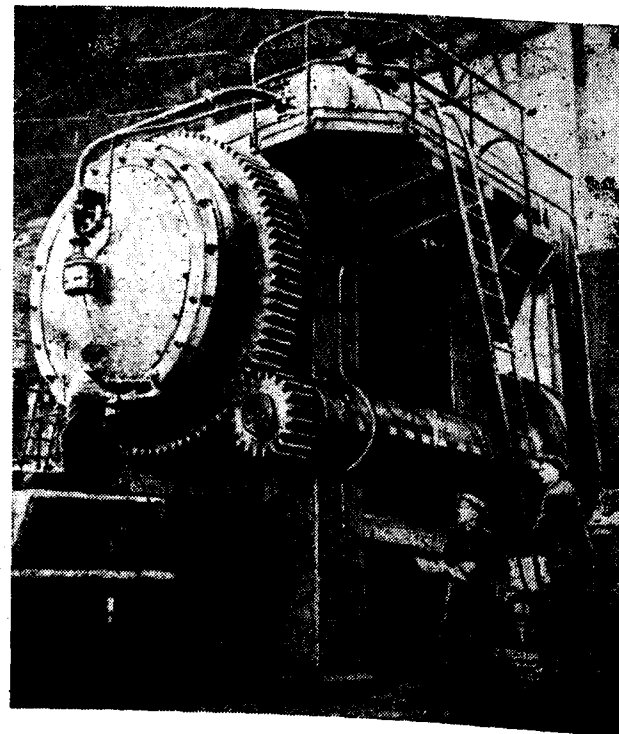
tage and a conscientious fulfilment of obligations assumed.

International fairs and exhibitions, organized in various countries of the world, play an important role in the promotion of foreign trade. They make it possible to gain an extensive knowledge of the economy of a country represented at the exhibition, of its export possibili-



An Oven

ties, the level of its industrial and agricultural production and the quality of its goods. As to the commercial side, the fairs promote the extension of trade relations, the establishment of direct contacts between companies and the conclusion of mutually beneficial contracts. The fact that the USSR and the People's Democracies take part in international fairs in which capitalist countries also participate, is an eloquent illustration of the possibility of a peaceful co-existence of the two social systems—socialist and capitalist—and the development of trade



A dye press

among all countries of the world. Everybody who visited international fairs in Leipzig, Milan, Delhi, Damascus, Lyons and other cities had a splendid chance to see it.

The Soviet Union displays special concern for the development of trade and economic relations with economically under-developed countries which have recently liberated themselves from colonial oppression and have taken to the road of independent economic development, such as India, Burma, Indonesia, Egypt, Syria. The USSR and the People's Democracies base their trade and economic relations with these countries on the principles of respect for their sovereignty and observance of mutual interests.

Thus, for instance, Soviet-Indian trade turnover has increased approximately five-fold in the last four years that have elapsed since the conclusion of a trade agreement in 1953.

The Soviet Union imports from India jute articles, tea, shellac, hides and skins, spices, vegetable oil and other goods and exports to India ferrous metals, paper, chemicals, industrial equipment and other goods.

But the Soviet Union does not only conduct mutually advantageous trade with these countries, it also renders them substantial economic and technical assistance.

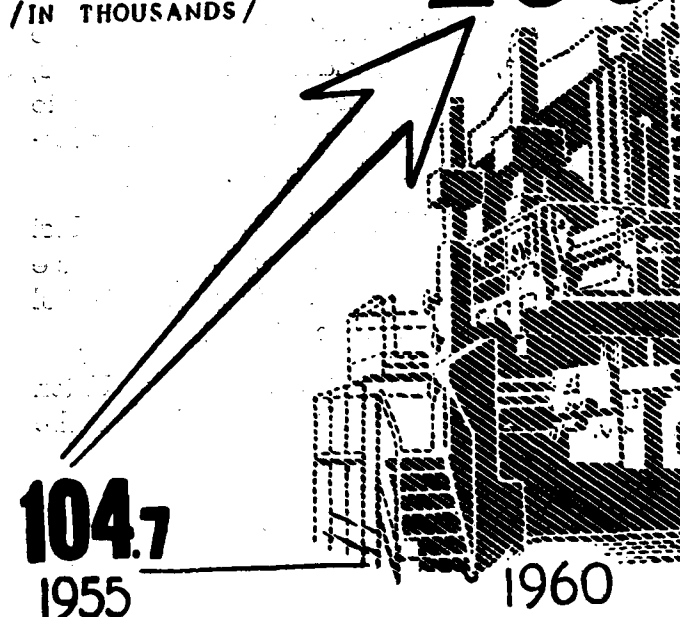
In 1955, for instance, the Soviet Union concluded an agreement with India for the



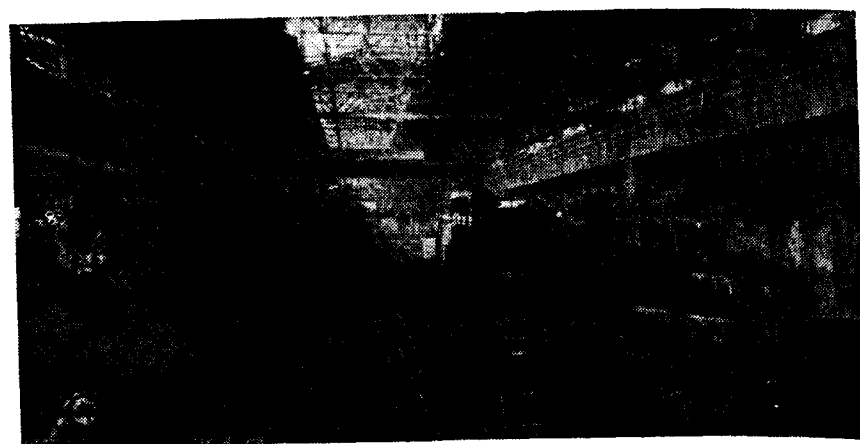
Cement blocks piling up in a factory near Moscow

METAL-CUTTING MACHINE TOOLS 200

/IN THOUSANDS/



construction in India, with Soviet assistance, of a steel plant with an annual capacity of one million tons of steel. The construction is carried out on conditions favourable for India.



Russian Iron and Steel Works

For example, the Soviet equipment will be delivered on credit to be repaid in instalments during 12 years, the payments will be made in the Indian currency. The significance of this agreement lies in the fact that it will help in the development of the iron and steel

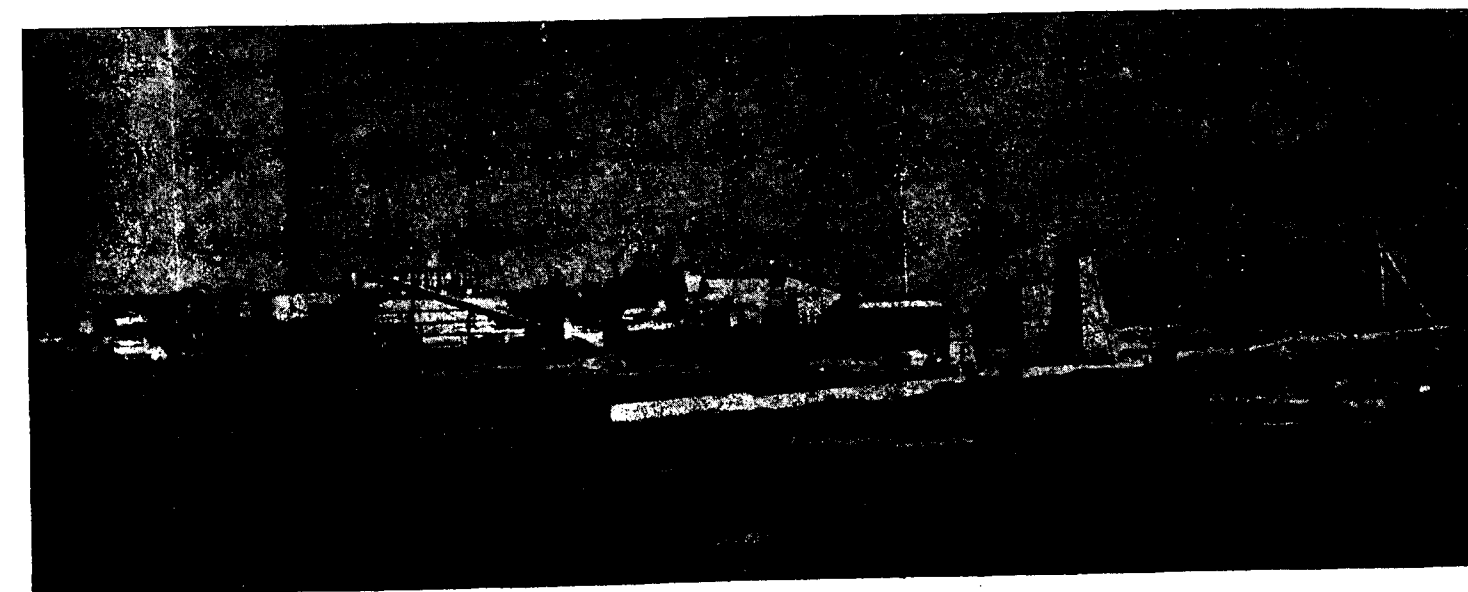
observe the principle of mutual benefit and equality in their trade relations and do not raise any obstacles or apply discriminatory restrictions. And this, in its turn, will provide a good basis for the relaxation of international tension.

INDIAN INDUSTRIES ANNUAL

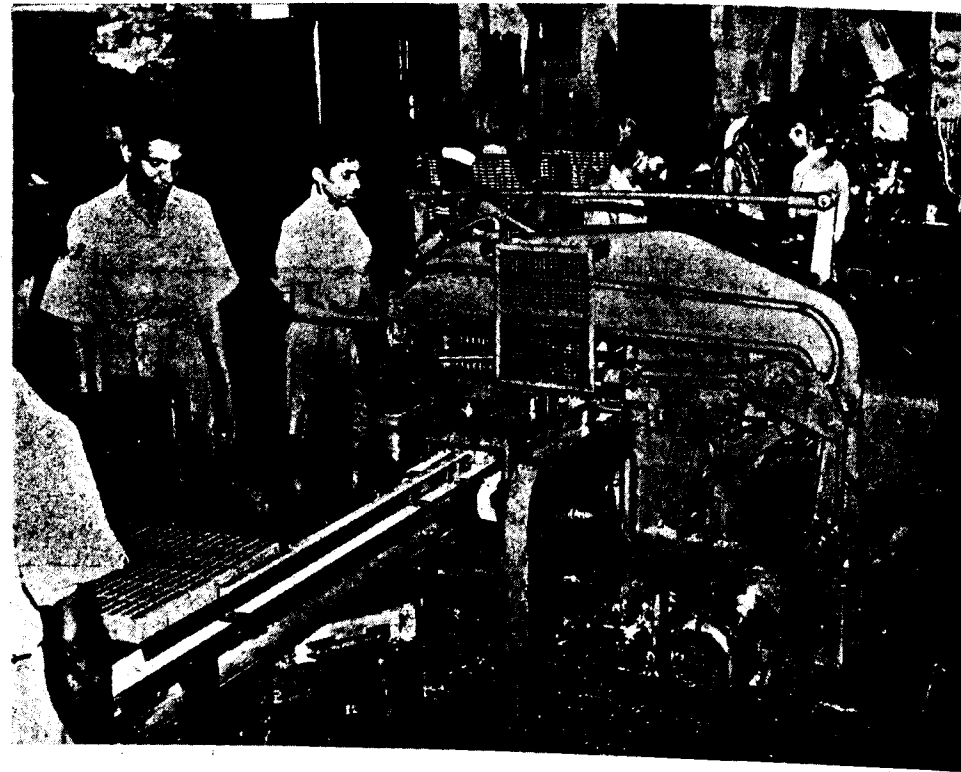
industry in India and will promote the country's industrialization.

The growth of the industrial strength of the Soviet Union changes also the composition of Soviet exports and imports. Before the war, food-stuffs and raw materials were the principal items of Soviet exports, while its imports consisted mainly of equipment. The situation changed greatly in post-war years. In addition to food-stuffs and raw materials the USSR now exports large quantities of metals, equipment and machines and imports not only equipment but also many raw materials and food-stuffs.

The formation of the world socialist market and the further extension of economic and trade relations of the USSR with the People's Democracies do not preclude, but, on the contrary, envisage the development of mutually advantageous trade with other countries of the world. The experience in the field of foreign trade of the last years bears witness to this. International trade will develop successfully, provided all the countries of the world strictly



The largest single fertilizer unit in the East is SINDRI FERTILIZERS FACTORY. The factory went into production in 1951. It has a power house with an installed capacity of 80 M. W. - which is also connected to the D.V.C. - coke ovens with a capacity of 600 tons of coke per day, the gas plant, the ammonia plant and the sulphate plant. It cost 25 crores of Rupees and the production of ammonium sulphate saved over 50 crores of rupees. The expansion of the fertilizer industry in India is to keep pace with demand and ultimately eliminate all imports. A start has been made at SINDRI.



According to Shri Manubhai Shah, Minister for Industry, the present annual production of soap by the large units was 1,10,000 tons, while the production by smaller units was estimated to be 1,20,000 tons. The following assistance was being given to small units engaged in the production of soap:— The first 200 tons of soap of all kinds manufactured for home consumption on or after the first of April each financial year commencing from April 1, 1956, were being exempted from the whole of excise duty leviable thereon.

The All India Khadi and Village Industries Commission was also giving financial assistance for soap making in rural areas.

The prosperity of India is very closely linked up with the development of cement industry whose gigantic expansion is excellently portrayed here.

CEMENT INDUSTRY IN INDIA

N. DANDEKAR

Managing Director, A C C

The history of cement manufacture in India began in 1904 with the establishment of a small factory at Madras. This enterprise failed and the shareholders lost their money. Ten years later, at the start of World War I, the industry was revived, and three factories were established. Between 1919 and 1924 seven more factories came into existence. Cement was still looked upon with suspicion as a building material, and the prejudice in favour of brick and mortar died hard. The producing units found themselves faced with serious competition to supply a small and reluctant market. Three of the new factories were forced to shut down.

In the ensuing years the producers took certain co-operative steps to save the industry

which included the formation of the Indian Cement Manufacturers Association in 1925, the establishment of the Concrete Association of India in 1927, and in 1930 the Cement Marketing Co. of India came into being to co-ordinate the distribution of sale of the production of the member companies. The two major factors which brought the industry through this time of trial were the resolution of the promoters to see that they did not fail, and the faith and the confidence of the shareholders in the future of their companies.

In 1936 the four major manufacturers of cement, namely Killick Nixon & Company, F. E. Dinshaw & Co., Tatas, and Khataus merged into a common organisation named the Associated Cement Companies Ltd. At that time the total



A light machine - shop

annual production of cement in the country was 9.84 lakh tons of which the Associated Cement Companies provided 9.10 lakh tons. Since then many other producers have entered the cement field and today there are sixteen manufacturers who together produce very nearly 5 million tons, and of this quantity the production of the Associated Cement Cos. Ltd. is 2.7 million tons.

In the matter of quality, Indian cement is required to pass the high standards laid down by the Indian Standards Institution. It is tested against these standards both in the laboratories of the producing factories as also at the Government Test House, Alipore. Indian cement passes these standards with a substantial margin of safety and is comparable in quality with the best cement produced elsewhere in the world. So far as availability is concerned, it is true that the industry is not able today to supply the full requirements of the country. This, however, is not due to any lack of endeavour or initiative on the part of the industry, as is evidenced by the fact that cement production has been trebled between 1948 and 1955, and also that the industry achieved and exceeded the targets laid down for it in the First Five-Year Plan.

The shortfall is due to the tremendously increased requirements of cement needed to



A Vertical Boring - Mill

meet the targets of the Second Plan. When, over a year ago, the industry foresaw the extent of the shortfall, which was likely to develop, not only did it immediately inform Government of its fears, but offered to finance the import of the additional cement required, and to distribute it to consumers without making any profit.

Distribution is done through an organisation which reaches down to the small consumer and in accordance over-all allotments made by Government. It is categorically stated that even though this vital building material has been in short supply for some time past, the manufacturing group has never exploited this position to gain one single additional illicit anna. If black-marketing has taken place, it has been beyond that point in the distribution organisation over which effective control can be exercised.

Next let us turn to the selling price of cement and its cost to the consumer. For the past 14 years not one ounce of cement has been sold except at a price approved of by the Government of India. The existing selling price is based on a Tariff Commission Enquiry held in 1953. The Associated Cement Cos. have twice taken the initiative in voluntarily reducing the selling price, on each occasion by Rs. 2-8-0 per ton.

The Associated Cement Companies employ approximately 22,000 persons ranging from top-level administrative and technical staff of the mazdoor who hews limestone in a quarry. The aggregate monthly emoluments in cash and kind, comprising basic wages, dearness allowance and grain concessions of the lowest paid unskilled worker, have increased by 39 per cent. since 1948-49. The long-term security of the workers has been catered for by the provision of two retiring benefits—gratuity and provident fund.

In the matter of housing the company provides for 25 per cent. of its employees free of cost. Of the 85 shareholders who own 1,000 shares or more 43 are private individuals, and the remainder are investment trusts, insurance companies (most of them now nationalised), and other public bodies which in their turn are owned by a large number of shareholders. The 43 private shareholders together own 8 per cent. of the issued stock. Therefore, 92 per cent. of the Associated Cement Companies' capital is held, as it properly should be, by a wide cross section of Indian society consisting of individuals and families, who have invested their savings in this company because of their faith in its future.

In the matter of production the company has increased its output from 18,62,000 tons in 1950/51 to nearly 30,00,000 tons today. It has consistently followed the policy of producing and selling this basic building material of the best quality at as cheap a rate as possible, consistent with the need not only to provide for its workers and its shareholders but also to finance the ever increasing production which the country requires. Over the next five years the company will expand its capacity to a total of 5.2 million tons in order to play its part in reaching the national target of 12 million tons of cement by 1961. This expansion will involve an expenditure of more than Rs. 30 crores. This money will be raised and spent on the national industrial development of the cement industry without Government assistance and without any burden on the taxpayer, consumer or worker.

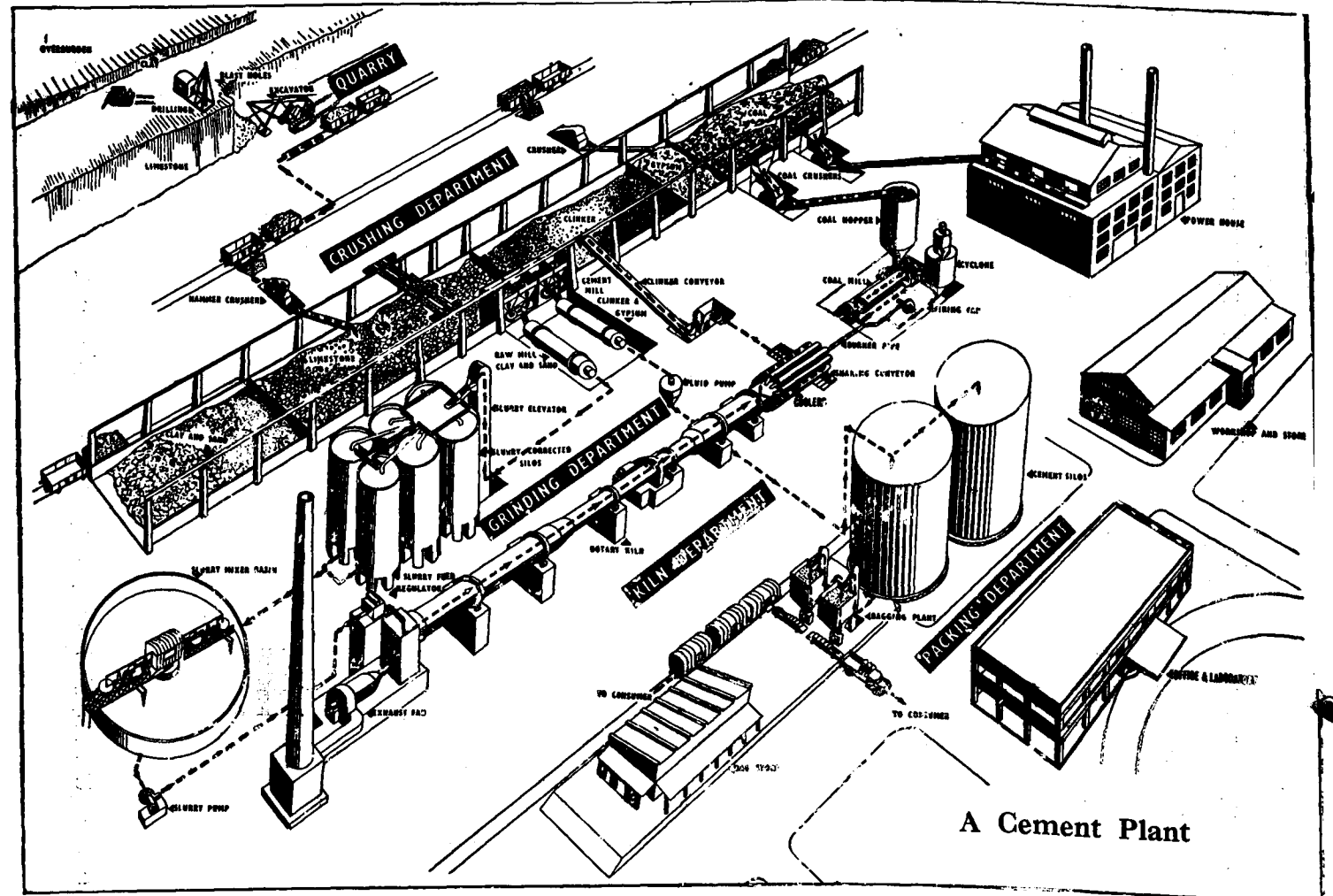
During the war years when it became increasingly difficult, and later impossible, to import cement-manufacturing machinery from abroad, the company started the manufacture of machinery in its own workshops. Today it is the proud boast of the company that it manufactures in its own workshops 70 per cent. of the cement-making machinery required in a



Heavy machine shop



Mills fabrication bay



factory. Not only has this saved India very large sums of foreign exchange, but even more important it has provided the country with the nucleus of a specialised heavy engineering industry.

It is now the intention of the company, making use of this nucleus to join hands with two of the best known machinery manufacturers in the United Kingdom in the establishment of an up-to-date heavy engineering plant which will, within a few years, make India entirely self-sufficient in the whole range of cement-making machinery, and will also provide a substantial amount of her requirements for

mining machinery and water tube boilers for power plants.

All this has been achieved through the initiative of free enterprise and the voluntary and willing co-operation alike of the shareholder, the consumer, and all categories of workers, technical, administrative, skilled, semi-skilled or unskilled. The progress could obviously not have been achieved without the constant encouragement and support of a national Government. This support has been freely asked for and graciously given. The industry acknowledges this debt to Government with deep gratitude. That indeed is how free enterprise works in a free democratic country. *

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By

KRISHNA SRINIVAS

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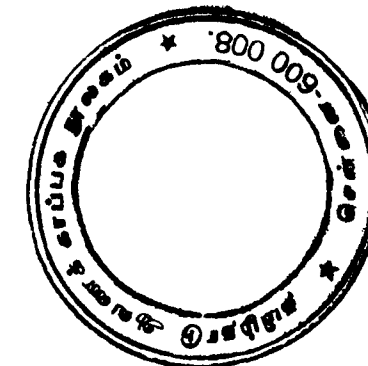
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INDIAN COTTON MILL INDUSTRY

SIR SHRI RAM

Chairman, Delhi Cloth & General Mills Co. Ltd., Delhi

As constituents of a nation determined to raise its living standards, each one of us has a duty to perform vis-a-vis the Plan. I would, in all humility, suggest to brother industrialists that they might give up raising the question of the private sector versus the public sector, in season and out of season, as instead of doing any good, probably it does harm. Enough room has been left for the private sector, I believe, even in the Second Plan.

For reasons well-known, the gap in foreign exchange resources anticipated in the course of the Second Plan period has further widened. Under the circumstances, even greater responsibility devolves upon the cotton textile industry, one of the more important foreign exchange earners.

I believe that the export of cotton textiles can be raised to 1,000 million yards, and perhaps even higher. For solving the various problems involved in achieving an expansion of our export trade in textiles, I would suggest a meeting of all the interests concerned - the Ministries of Commerce, Industry, Finance, Railways and Labour and the representatives of industrialists and leaders of labour.

While the production of mill made cloth has gone up year after year, as may be seen from the figures I give below, it is regrettable that the exports have been declining, and have consistently fallen short of the First Plan target of 1,000 million yards. This state of affairs must cause concern to the industry as much as to the Government.



Students of Textile Technology get training

	Production of Mill - made cloth	Exports of Mill - made cloth
1953 - 54	4,964	740
1954 - 55	5,034	761
1955 - 56	5,101	680

In other words, on the basis of current indications in 1956-57 India will export only about 127 out of every 1,000 yards of mill-cloth produced as compared to 151 yards in 1954-55.

Why are exports declining when it is crucial to ensure that exports expand to substantially higher levels? The answers are simple enough. On the one hand, demand in

the home market has shot up tremendously making it more profitable for mills to sell in the home market. On the other hand, the Government policy of not allowing the expansion of the mill industry on the weaving side has prevented the supply of mill cloth from expanding in proportion to the growth of internal demand and has tended to exert a general, upward pressure on prices.

In spite of the limitation on weaving capacity inside mills, the country absorbed in these years nearly 'twice' as much extra mill-made cloth as it produced, and secu-

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August 1957

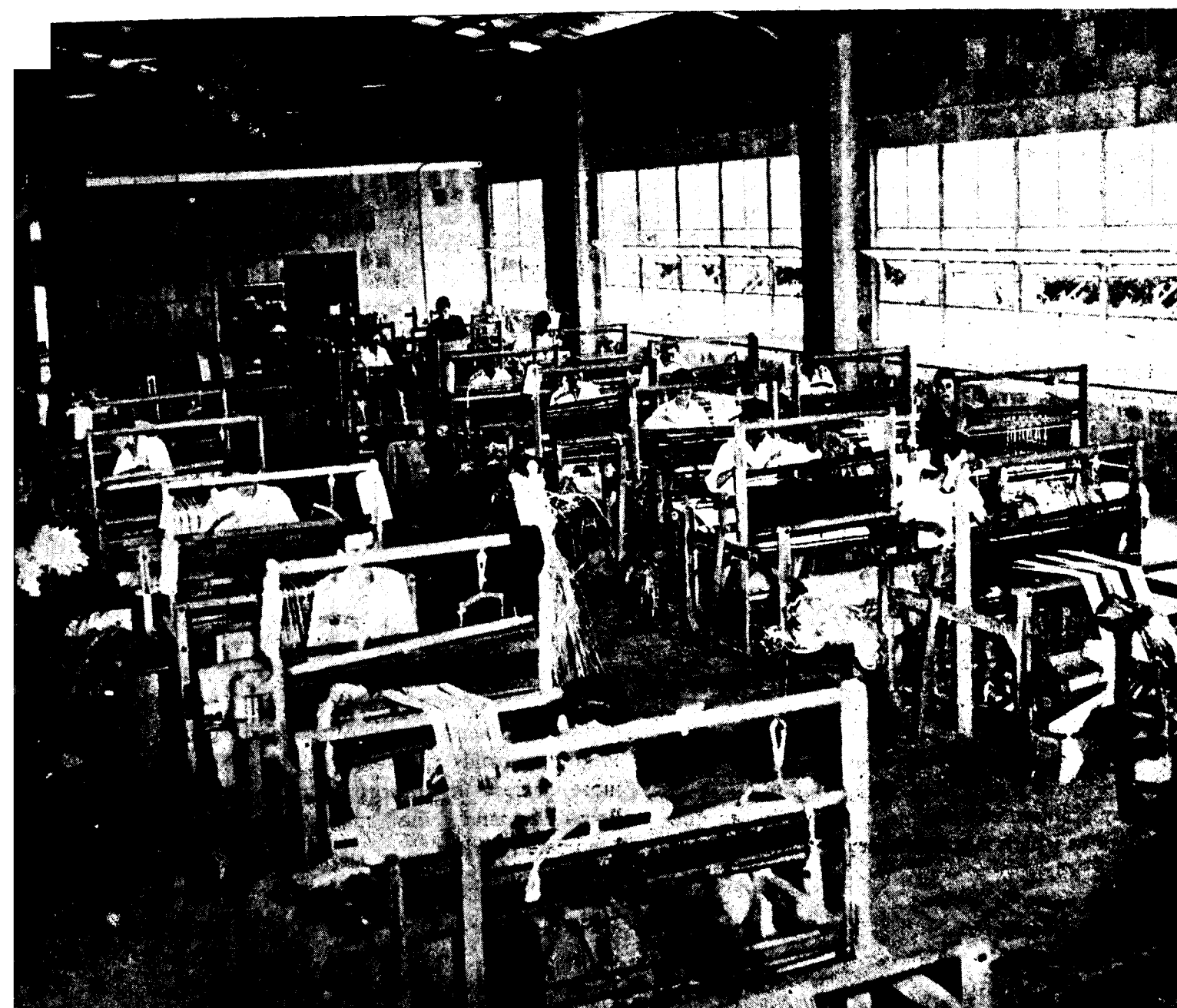
red this excess over the rise in production from two sources - stocks and exports. In 1956-57 alone, as compared to 1955-56, the rise in the demand for mill cloth will be of the order of 475 m. yards, almost double the growth - 250 m. yards - in 1955-56 over the preceding year. May I point out that since stocks have been already reduced drastically, future increases in home demand may affect the level of exports even more decisively?

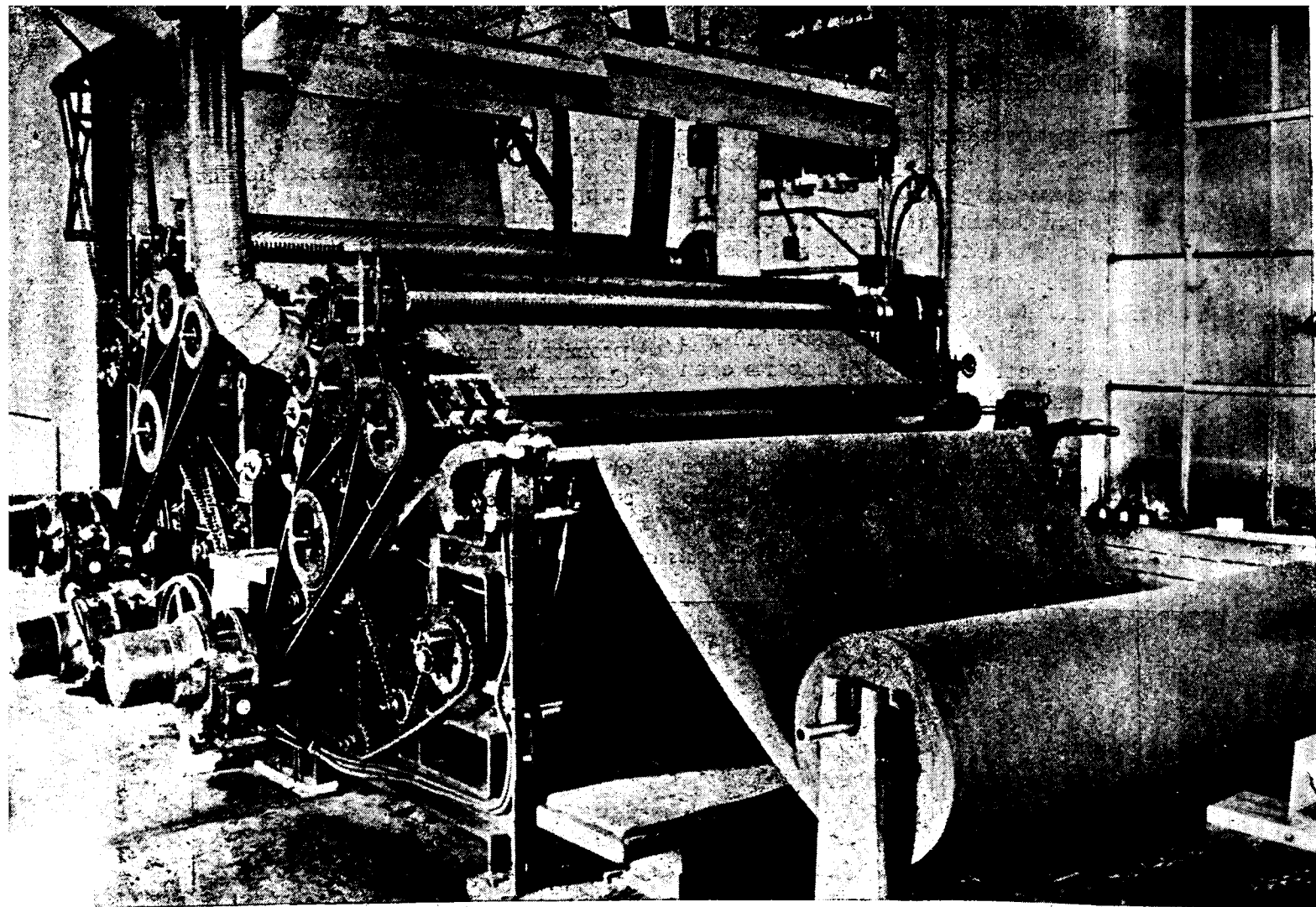
Attention must be directed to the resolution of this paradox of the imperative need for more cloth exports, on the one hand, and the

continuing diversion of exports, on the other, to the home market pressed for ever-larger supplies.

The gravity of the situation has now been recognised by the Government, who have already announced an upward revision of the cloth target to 18.5 yards per capita and also promised a further review of this figure. The Government, as you know, have also decided to license the installation of 14,600 automatic looms whose output will be channelised more or less fully into export. I welcome these measures. However, with all humility, I would like

Attractive Carpets are Woven Galore





Carpets made soft and covetous

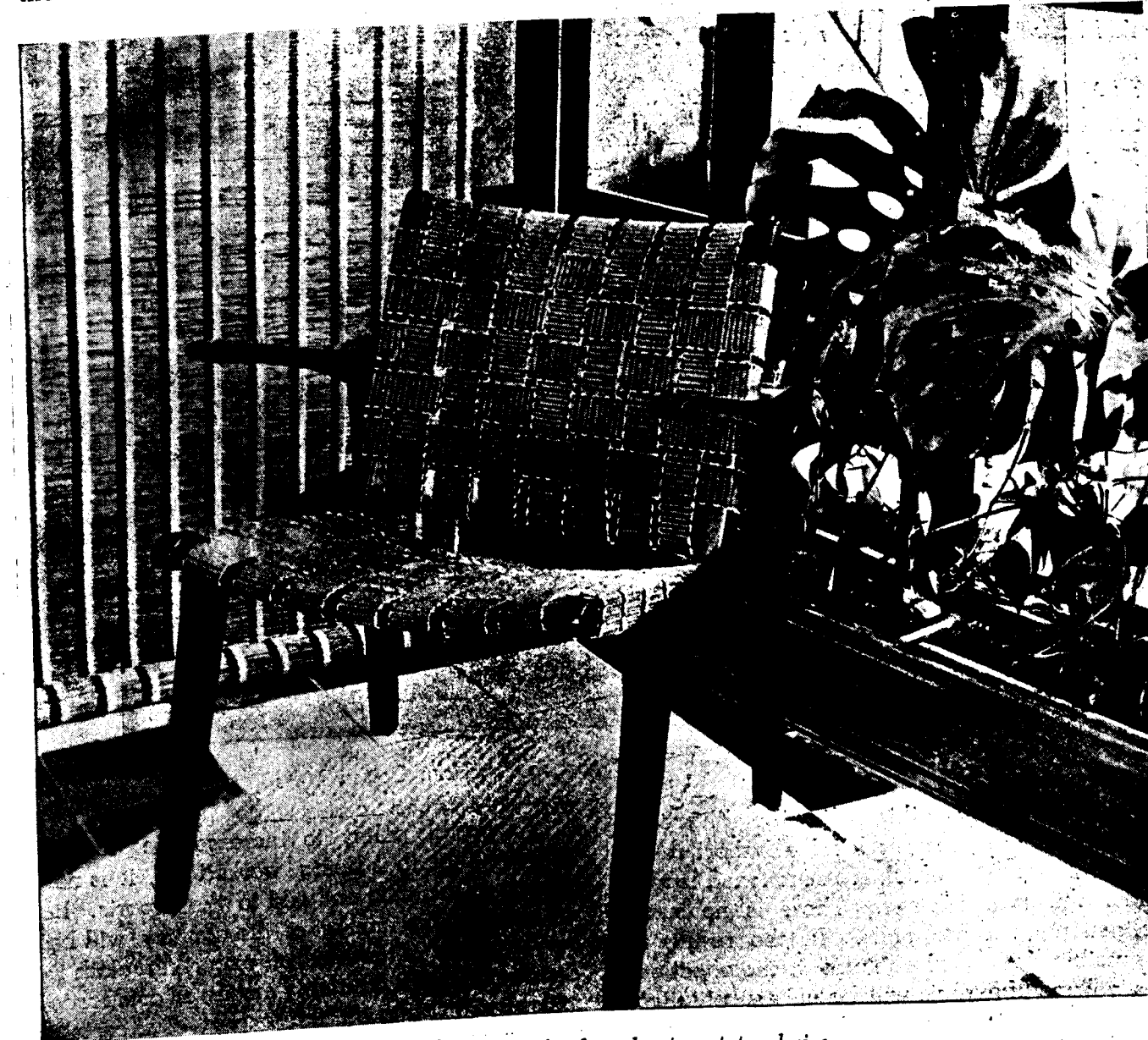
to point out that the marginal raising of the per capita target by half a yard over its original level of 18 yards is not enough. The target must be raised to at least 20 yards in 1960-61, for reasons now adduced often enough, and all arrangements for attaining the target, inclusive of sanctioning of new weaving capacity for the home market, about 30,000 looms both plain and automatic, must be taken in hand well in time. The country cannot afford to risk shortage of cloth, next in importance only to foodgrains in the average consumer's budget. And equally, we cannot risk the loss of our export markets.

The fear that the increase in mill capacity will adversely affect the handloom industry is, in my opinion, unwarranted. Anyway, to the extent to which it is necessary in the opinion of

the Government to augment handloom production, it can be done by fixing annual targets of total cloth requirements, and allowing to the handloom industry a progressively rising proportion of the target in each succeeding year, provided the handloom industry can undertake the necessary productive effort. I will even suggest that if production inside mills is found at any stage to be restrictive of output on handlooms, resort can be had to sealing of a small percentage of mill looms. But in working out our policies in the matter of cloth production, we cannot avoid the compelling consequence of reduced exports so long as output of mill cloth does not expand more or less in proportion to the growth in home demand, the magnitude of which I indicated earlier.

I am sure that the policy of the Government to allow installation of automatic looms, earmarked for export, will afford some relief, but it is obvious that this relief will take a long time to materialise. In fact, I apprehend that about 18 months will lapse between now and the time when the output of these new looms becomes fully available for export. The granting of these licences, I think, is hedged in with too many restrictions, and in view of the much higher capital cost of automatic

looms and other required equipment, the level of returns on the investment appears to be unsatisfactory. More so, when viewed in conjunction with the fact the export price realisation will be definitely on the lower side. It is possible that this will affect adversely the total implementation of this policy in the time desired. I may also point out that timelags are already in evidence in the obtaining of machinery from abroad, a factor of particular importance in the case of automatic looms.



Textile products lend enchantment to chairs



American women play a great part in American Cotton Mills

Moreover, under this policy the obligation to maintain the previous level of export rests only on those mills which are sanctioned looms under this new scheme. There is no such obligation on other mills. In the result, it is possible that to a large extent, the effect on the volume of exports will be only substitutive and not additive, as is to be desired in the interest of the country.

While this policy to increase the production of mill cloth is being worked out, it is necessary to maintain and add to the exports. In my opinion, the interest of the country will be served better if the task of exporting cloth is distributed more equitably among all composite mills by insisting on the export of a certain minimum percentage of output of cloth. In the first instance, the percentage might be fixed

lower but as soon as possible it should be revised upward, as is required in the overall interest of the exchange position of the country, of course keeping in mind the broad considerations affecting the international trade in textiles. The provision of transferability of quota from mill to mill will generally meet the particular difficulties of any individual producer, without

affecting the desired volume of exports in a period of rising and more profitable home demand. The time has come when our export performance must not merely be the sum total of the efforts of a few units but the reflection of an industrywide efforts in the national cause of earning the needed foreign exchange, sure and quick.

Students take keen interest in research



There is a textured beauty from the golden fibre of the coconut. Coir carpets look luxurious but it is a luxury anyone can easily afford.

THE COIR INDUSTRY

The golden coloured clean industrial hard fibre extracted from the husk of the coconut is in great demand for its cheapness, natural resilience, durability, resistance to dampness and many other qualities, providing a means of living to 6 lakhs of people in India. India is the second largest coconut-producing country in the world with an area of 15,48,000 acres under coconut cultivation.

The Raw Material

The coconut is de-husked before it begins to dry. The husk is then collected and transported to the retting areas. Methods of retting are various. Putting the husk in nets in shallow back-waters, in staked enclosures, in submerged fields in pits in sandy soil close to canals or by putting it in cement tanks are some of the more important. It takes in practice 6 to 10 months to ret according to the ripeness of the nuts, prevalent weather and water. The quality of coir obtained from husks retted in brackish waters is better in lustre, tenacity and durability. Experiments using chemicals and machines in the process of retting have produced results which though technically good are un-economical for the present.

The husk thus retted is washed and placed on hard wood and beaten with a wooden mallet to help the pith and dirt fly away,

leaving the clean coir fibre. It is estimated that on an average 1,000 nuts yield 180 lbs. of clean fibre. The total output of fibre is 1,30,000 tons annually. The entire quantity excepting for an export of 600 tons, is spun into 1,20,000 tons of yarn.

Coir Yarn

The production of coir is essentially a cottage industry engaging mostly women workers. Spinning is usually done on the spinning wheel called the "Charka" or "Ratt". Spinning is also done by the indigenous method of twisting the fibre between the palms of the hands. Wheel spinning however is gradually displacing this method. It is estimated that when a woman can spin four to five pounds (lbs) of yarn by hand in an eight-hour day, the production on wheels worked by a team of three is at 25 lbs.

Main Products

The products of the industry generally known to the world are door-mats with pile or fibre, woven coir matting in rolls-usually 50 yards length and 36 inches width and rugs and morzouks. Coir mattings cover a wide range of qualities, colours, and designs to suit the taste of the consumer. It is well-known for its durability, sound proofing and damp-resisting qualities. It is woven on wooden looms and various patterns are obtained by

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the adjustment of treadles used. Designs are also obtained by the use of Jacquard machines. Coir rugs are attractive floor coverings fabricated either from plain matting cut into suitable length with stencilled designs or from coir mattings with woven designs.

The manufacture of these floor coverings is an important industry which has developed in Alleppey, Shertallai, Cochin and the surrounding areas in the Kerala State. This brings into our country foreign exchange worth four crores of rupees, and provides employment for about 15,000 people engaged as workers in about 120 regulated factories and 600 unregulated factories in the Kerala State.

Marketing and Trade

Out of an estimated total production of 1,20,000 tons of coir yarn in India, 45,000 tons (38% of the total) are exported to places outside India. Continental countries are the principal buyers from India.

Out of the total production of 21 thousand tons of coir mats and mattings, only a negligible quantity (about 5% of the total) is being consumed internally. The rest (95%) is exported mainly from Alleppey and Cochin Ports. Our principal consumers are United Kingdom which is a sheltered market for our coir products. The percentage distribution of exports in order of importance are United Kingdom 43; U. S. A. 19; Australia 10; Canada 5; Italy 4; Sweden 3; Denmark 2; and other foreign countries together 14 per cent. Exports of Coir and Coir products on an average account for about 8 crores of rupees in India's foreign exchange. But the fortunes of the industry being largely dependent upon the export of its products, there have been frequent slumps and fluctuations in the industry resulting mainly from factors of supply and demand of the hard fibres which have had an important bearing on coir. It was with a view to avoiding such periodical crises and the great deal of human suffering caused by them that the Government of India set up the Coir Board under a Statute in July, 1954, representing the various interests in the industry. *

August 195

COIR

★

The wonder fibre is a product of India's Cottage Industry.

★

Nothing excels Coir in

BEAUTY

DURABILITY

COMFORT &

CHEAPNESS.

★

Use Coir Products in

HOME

OFFICES &

FACTORIES.

★

Money spent on Coir Products is money spent on feeding hundreds of thousands hungry mouths.

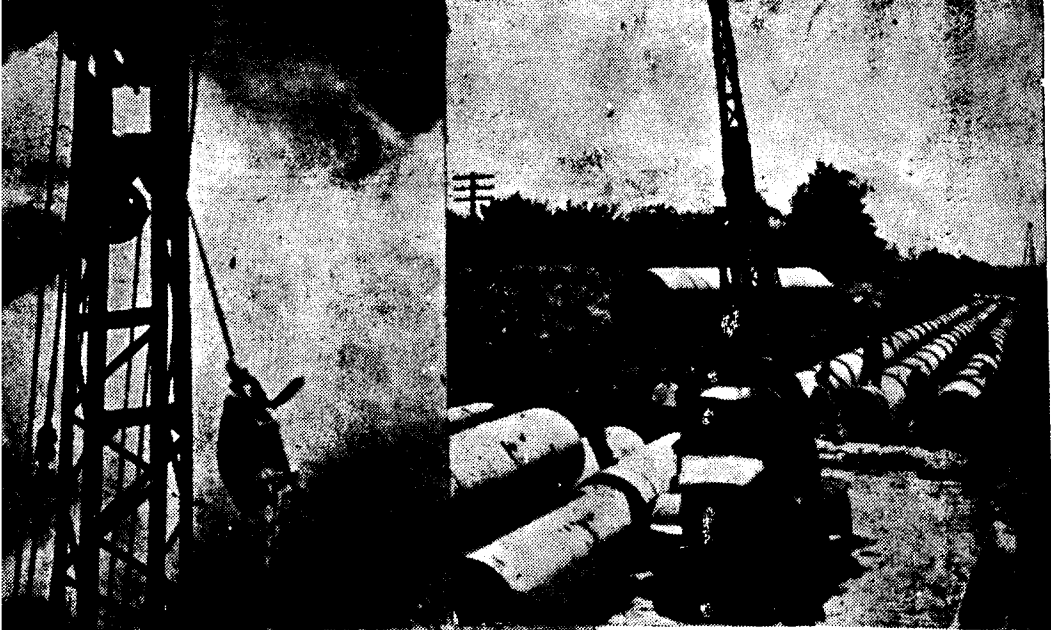
★

For all about Coir, Contact:

COIR BOARD

ERNAKULAM

SOUTH INDIA

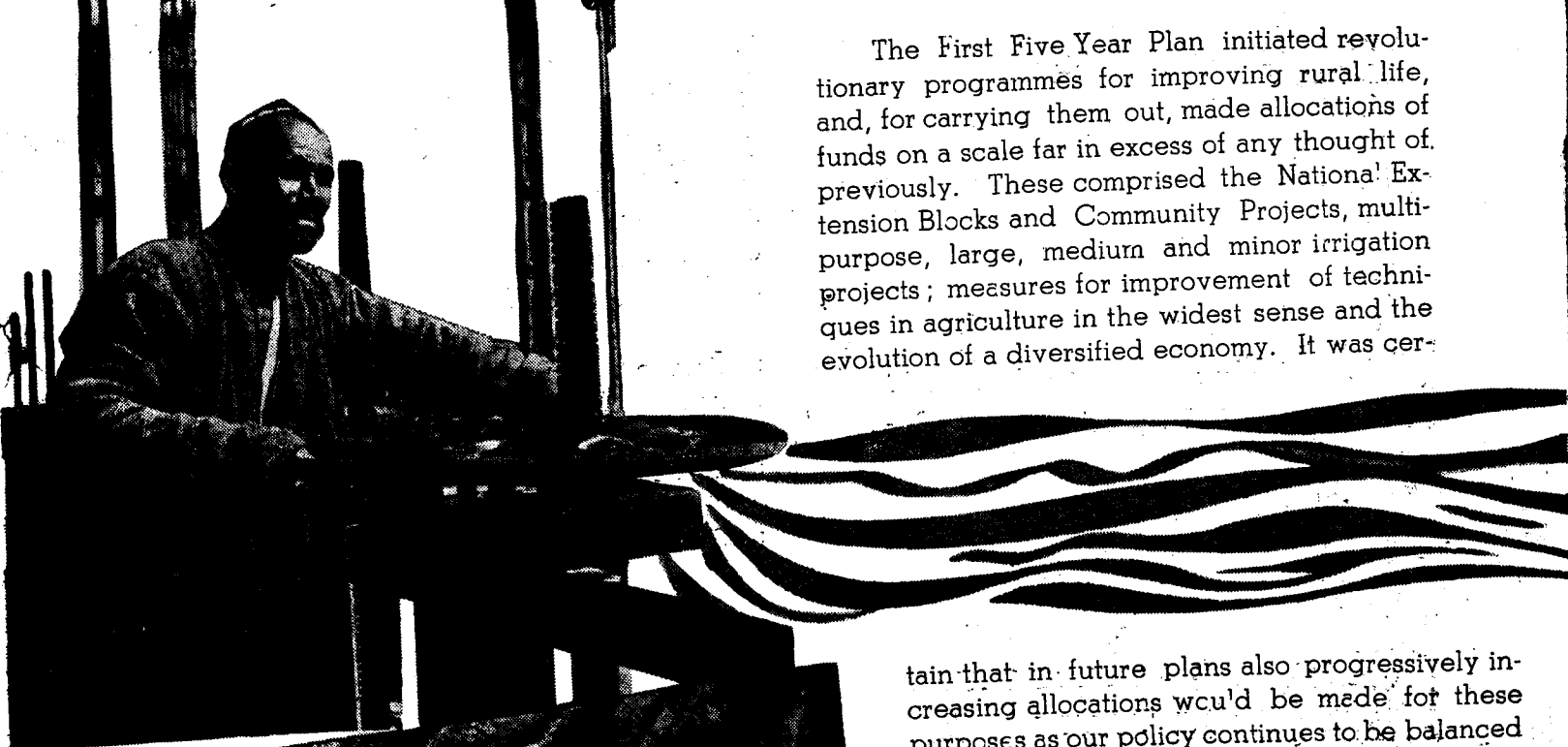


Increased Agricultural Production

No programme for industrialisation can succeed unless it has, as its counterpart, a programme for a large increase in agricultural production, says Shri V. T. Krishnamachari, Deputy Chairman, Planning Commission.

The large industrial development envisaged under the Second and future Plans was bound to lead to rapidly increasing demands for agricultural products and these would have to be met by expanding production. There should also be an additional margin for exports for earning foreign exchange, the demand for which would also increase as our plans progressed. Further, it was only by increased production that the inflationary pressures caused by deficit financing could be held in check.

By far, however, the most important reason for rapidly expanding agricultural production is the need for increasing the per capita income of the rural population. Increase in agricultural production and greater employment will promote savings and thrift and strengthen the sense of security in the community. The widening of the gulf between rural and urban incomes will produce internal stresses and strains and endanger social stability.



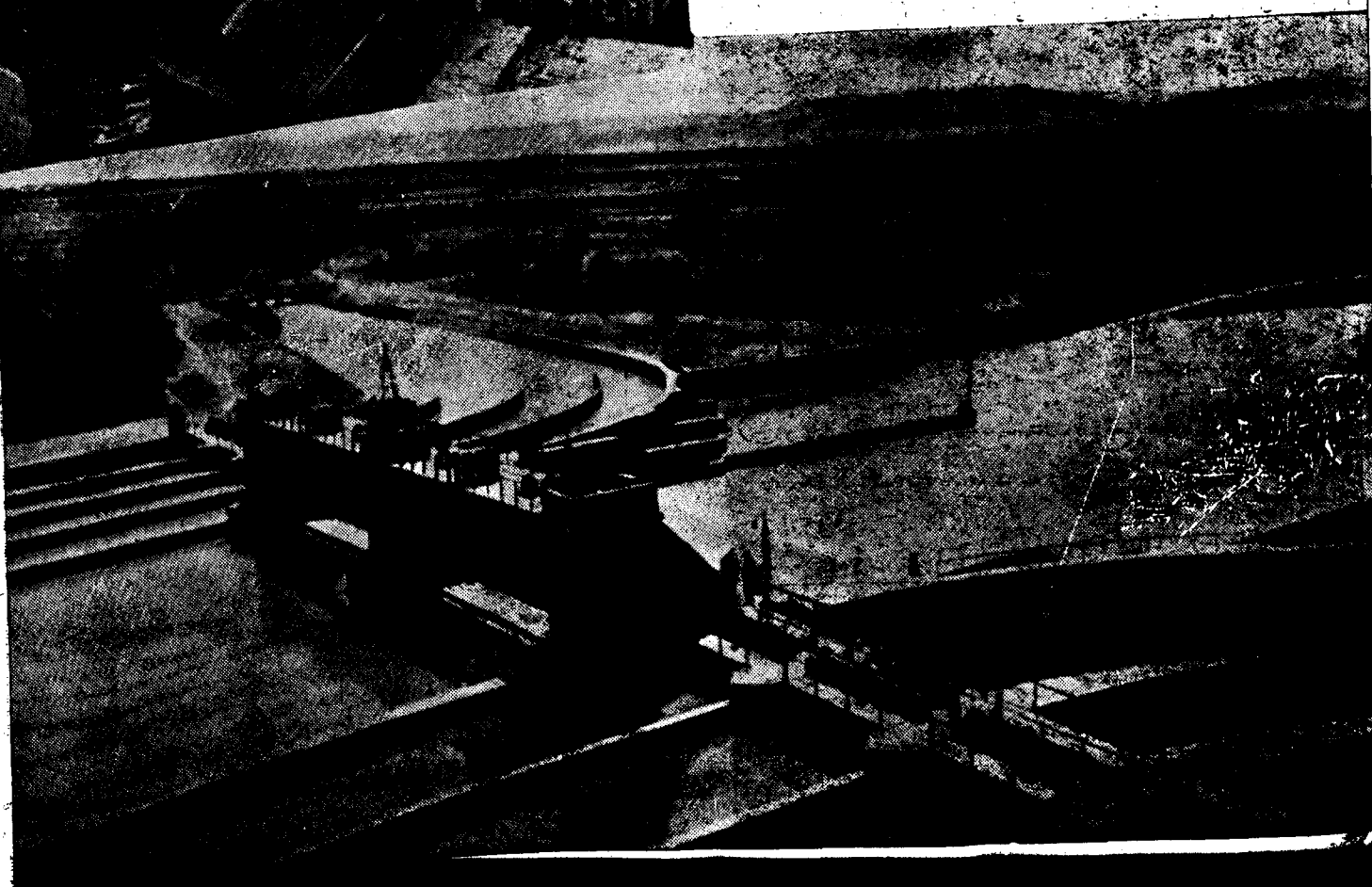
The First Five Year Plan initiated revolutionary programmes for improving rural life, and, for carrying them out, made allocations of funds on a scale far in excess of any thought of previously. These comprised the National Extension Blocks and Community Projects, multi-purpose, large, medium and minor irrigation projects; measures for improvement of techniques in agriculture in the widest sense and the evolution of a diversified economy. It was cer-



tain that in future plans also progressively increasing allocations would be made for these purposes as our policy continues to be balanced development of all sectors of the economy.

The Planning Commission is taking steps to have a 15 to 20 years programme for irrigation projects and also estimates, for the same period, of increases that could be obtained in agricultural production.

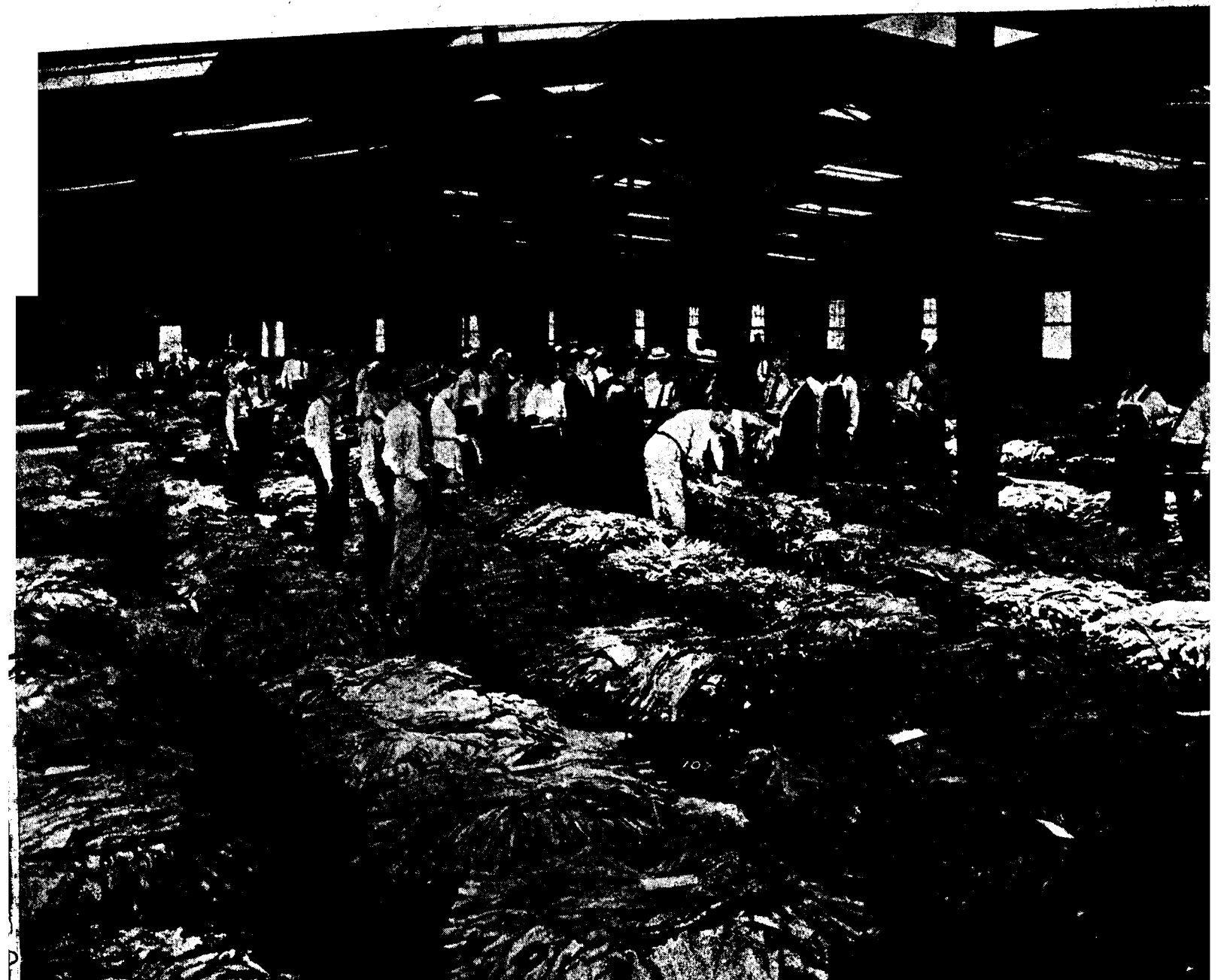
The objectives of inducing public participation and positive support has been comparatively successful in the case of constructional programmes.

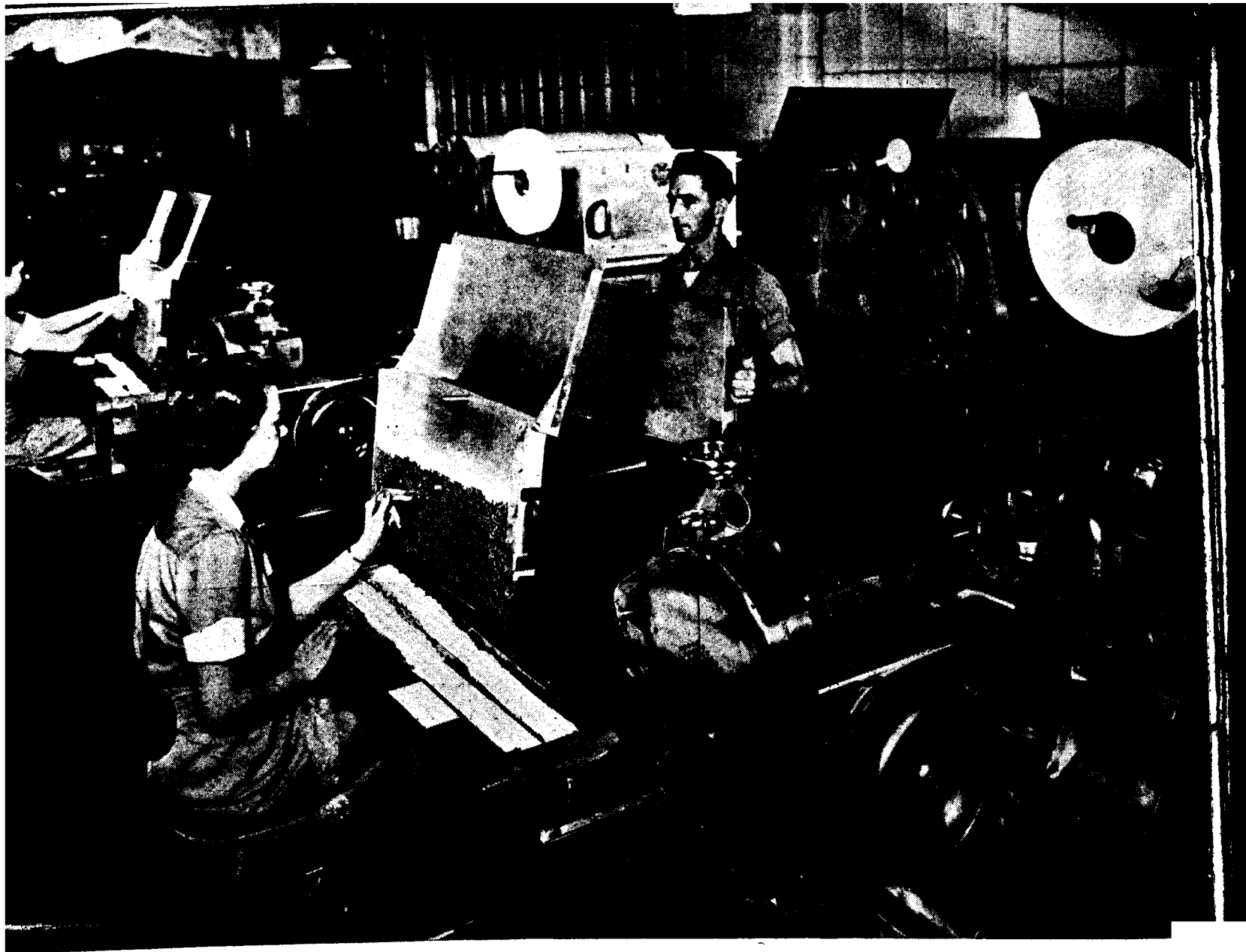




Indian tobacco can find a market in case it is butted and dark brown in colour, heavy bodied and gummy with good combustibility. It should also leave white ash after burning. It is suggested that efforts should be made to push into this market top grades of Virginia tobacco.

The best market for Indian tobacco at present is Aden which has been importing about 6 million lbs. per annum. The next is Egypt with slightly over 2 million lbs. Since Egypt has been importing between 24 and 26 million lbs. of tobacco per annum, the chances of India extending her market, particularly for Virginia tobacco, are considered good.





Formerly, only four cigarettes can be rolled up in a minute. Now machines roll up one thousand six hundred cigarettes every minute. They file up cigarettes in orderly rows and not an error creeps in.



Sindri's Role in India's Expanding Economy

THE SINDRI FERTILIZER FACTORY, which is the first major industrial project of the Government of India to be completed after the attainment of independence and the largest fertilizer factory of its kind in Asia, has led the way by increasing the country's production of fertilizer and thus contributing materially to increased food production.

THESE FACTS
ARE
SIGNIFICANT

Sindri's total production of fertilizer (ammonium sulphate) has so far been over 13.8 lakh tons, equivalent to a saving of over Rs. 48 crores in foreign exchange.

In terms of food production it means over 27 lakh tons more food, valued at over Rs. 78 crores.

Sindri is thus helping the farmer, the backbone of the country, to retrieve his stature and gain new strength, thereby putting India's economy on a solid foundation.

**Sindri Fertilizers &
Chemicals (Private) Ltd.**
MINISTRY OF PRODUCTION,
GOVERNMENT OF INDIA.



It is difficult to imagine a world without Rayon. It is woven into the fabric of modern life. Its beauty is uncommon, magical.

RAYON INDUSTRY

A. R. RAMANATHAN

Chairman, Travancore Rayons Limited

The versatility of rayon is remarkable. It can be made into a thread or yarn with continuous filaments, or it may be spun as a heavy tow of fine filaments, then cut to any desired length for processing on cotton, wool or worsted machinery. The individual filaments could be very fine—finer than the finest hair—even finer than the filament spun by a small spider—or as coarse as horse hair. Then again, these fibres can be made shiny bright or chalky dull or mixed and blended with natural fibres to produce other novel effects.

The rayon industry in this country is one of the major post-war industries. Although substantial quantities of Art Silk Fabrics were being manufactured in India since two decades ago,

all the yarn required was being imported from foreign countries. The weaving industry was, thus, entirely dependent on outside sources with the consequent uncertainties and instability. It was World War II which focussed serious attention on this precarious handicap. The need for establishing indigenous sources of yarn supply was keenly felt and steps were taken to bring into being rayon yarn manufacturing units.

Kerala State enjoys the distinction of possessing the first rayon factory in the whole of South Asia. The Travancore Rayons Ltd., the pioneer enterprise which brought this credit to the State, was established in 1946—sponsored by the enterprising and talented

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businessman, the late Mr. M. Ct. M. Chidambaram Chettiar, in active collaboration with the progressive State Government. Then followed the National Rayon Corporation Limited, Bombay. The third one is the Sir Silk Limited, Hyderabad, followed by the Century Rayons, Bombay, and the Kesoram Cotton Mills Ltd., Calcutta. All the units except Sir Silks have adopted the viscose process, while Sir Silks has chosen the acetate process.

The rayon industry in India has achieved considerable success even during its short span of life so far. The quality of production has been quite good, bearing favourable comparison with the imported brands in regard to all aspects—lustre, fineness, uniformity, strength, etc. A steady and competitive price-level has also been maintained. The price for the various deniers and qualities have been perceptibly cheaper than the landed cost of imported yarn in many cases.

Encouraged by the sympathetic assistance of the Government and with a view to fulfil the target fixed for the rayon industry under the Five-Year Plans the two older units, The Travancore Rayons Ltd., and the National Rayon Corporation Ltd., have embarked upon ambitious expansion schemes. The industries are also having long-range plans, by which, ultimately, complete national self-sufficiency in the matter of rayon yarn could be achieved.

In line with the popularity which rayon has gained in other advanced countries, in India too this wonderful man-made fibre has worked its way up remarkably. As compared with about a thousand power looms which were engaged in weaving imported rayon yarn in India about two decades ago, we have now over 38000 power looms and 1,50,000 hand-looms. With proper co-ordination between the rayon spinning and weaving industry and a judiciously balanced Government policy, the scope for profitable development is bright. The policy adopted by the Government of India in regard to imports of rayon yarn during the last few years has evinced a stimulating appreciation of striking a realistic balance bet-

August 1957

THEY BUY WHAT THEY

SEE IN

TRAYOPHANE
PRINTED BAGS



Yes, customers prefer the product that's wrapped in Trayophane bags. Trayophane bags reduce waste, save time—because the contents are ready to be sold—wrapped, weighed and priced!

Economic!

Hygienic!

Convenient!

Why not get these colourful, eye-catching bags with your printed message, for an average cost of 6 pice?

TRAYOPHANE
PRINTED BAGS

*the new name for Trayons Transparent Film



Write to us today for details

THE TRAVANCORE RAYONS LTD.,

Factory: RAYONPUNAM P. O., - KERALA STATE
Sales Office: 2/8 SECOND LINE BEACH, MADRAS - 1

August 1957

ween the various interests involved. It is hoped that such appreciation will continue to prevail, in the interest of adequate protection to the indigenous industry. Of the main raw materials required for the industry, sulphuric acid and rayon grade caustic soda are now being manufactured within the country. In regard to wood pulp alone, we have to depend solely on imports. The manufacturing of suitable wood pulp from indigenous sources is receiving the earnest and urgent attention of the Government.

It is hoped that the Development Council for Art Silk Industry, established by the Government of India, will devise ways and means of tackling successfully the various problems confronting the industry.

The rayon industry is giving employment to numerous families, directly and indirectly. A network of subsidiary industries have sprung up. It has raised the living standards of hundreds of people. It is ensuring to the thousands of India's handlooms and powerlooms a steady supply of a reasonably priced attractive material, thereby providing them continuous employment and also helping to maintain and develop an ancient and glorious craft. To the small and middle class investors, it has given an excellent opportunity to canalise their funds into a profitable and patriotic enterprise. To the public at large, it is giving fine textiles, with all the texture, softness and beauty of silk, without the latter's expensiveness. Thus, in a variety of ways and variegated forms, it is proving of great importance to the economy of the country.

Transparent cellulose film is a product which a well-equipped rayon factory could profitably produce, as a joint product along with rayon yarn, inasmuch as the viscose solution is the base for this film too. The production of transparent cellulose film is basically similar to the production of rayon in

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that the cellulose is dissolved into a liquid and then regenerated. In this instance, however, once the viscose solution is ready, it is forced through a series of coagulating acid baths, and other tanks containing different chemicals, over a series of revolving cylinders, instead of through a spinneret as in the case of rayon. The resulting material is a thin continuing sheet of transparent film of brilliant lustre.

The cellulose film is today a very popular packaging medium, widely used for wrapping silk and rayon fabrics, toilet goods, pharmaceutical products, confectionery, and an array of other products. Among the many advantages of the film may be mentioned its powerful sales-appeal, its toughness, durability, transparency, cheapness and its hygienic protective ability. At present the Travancore Rayons is the only manufacturer of this product. They have expanded their plant considerably to meet the growing demand, and India has now reached self-sufficiency in this product.

With the fast growing population, with increasing markets, with higher per capita consumption, and the keen desire to raise the living standards of the people at large, the future for the rayon and cellulose film industries in India appear bright. The First Five-Year Plan has ended and a more ambitious Second Five-Year Plan, with a pronounced accent on Industry, is in progress. If progressive industrialisation is to endure and heavy industries of this type are to flourish, Government's sympathetic approach and assistance are no doubt indispensable. Frequent oscillations in the Government's industrial policy or in the interpretations thereof should yield place to a firm and realistic attitude, every available resource should be harnessed, and maximum co-ordination ensured between the private and public sectors. Then, indeed, these Industries will prove to be promising, with powerful economic potentialities.

..



Our traditional treasures can survive only when we respect our own heritage, and our capacity, skill and genius to adapt these products to present day life.

COTTAGE INDUSTRIES

SRIMATI KAMALADEVI CHATTOPADHYAY

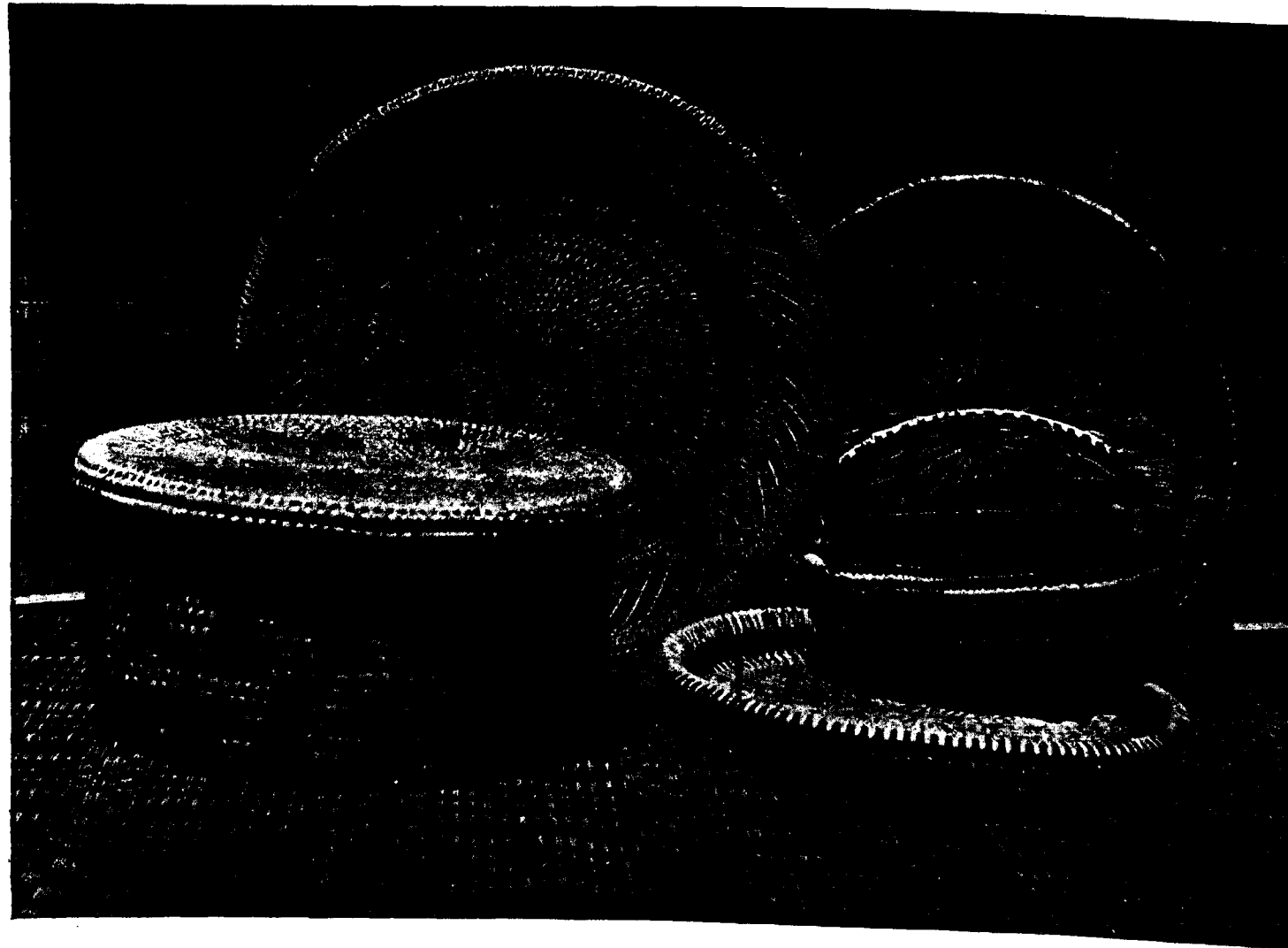
Chairman, All-India Handicrafts Board

According to the Tentative Framework of the Second Five-Year Plan "The extensive development of small-scale industries in the second plan is essential for a number of reasons. Apart from releasing scarce capital resources for the basic industries, they would provide greater employment and incomes for a large number of persons organised in small enterprises. Measures to encourage and protect small-scale and village industries should, therefore, be an integral part of the second plan".

Handicrafts along with other cottage industries have constituted the central elements in the organic and cultural unity of the people. In the numerous and far-flung villages of India, the colourful strands of the tradition and

culture were woven into these objects making each of them unique and individualistic and lovely to look at. Handicrafts could thrive in those days, for society was organised more or less in small community groups, self-contained and self-sufficient, and demand was broken into small groups and economy rested on small establishments. It was the age when individualism was valued, and elaboration of detail appreciated.

The craftsman himself enjoyed a high social status in his own village community. He was looked up to as the man of creation, for out of his vision, imagination and the skill of his deft fingers, there flowed objects which gladdened every heart. So he was honoured and care was taken to see that he was not in



Basket Set from Orissa and Plates from Bombay, Trichur and Coleroon

want. His painstaking labours found fullest appreciation and he had the satisfaction that he was an important member of his society, to which he made his own valuable contribution. It filled him with a sense of pride and dignity.

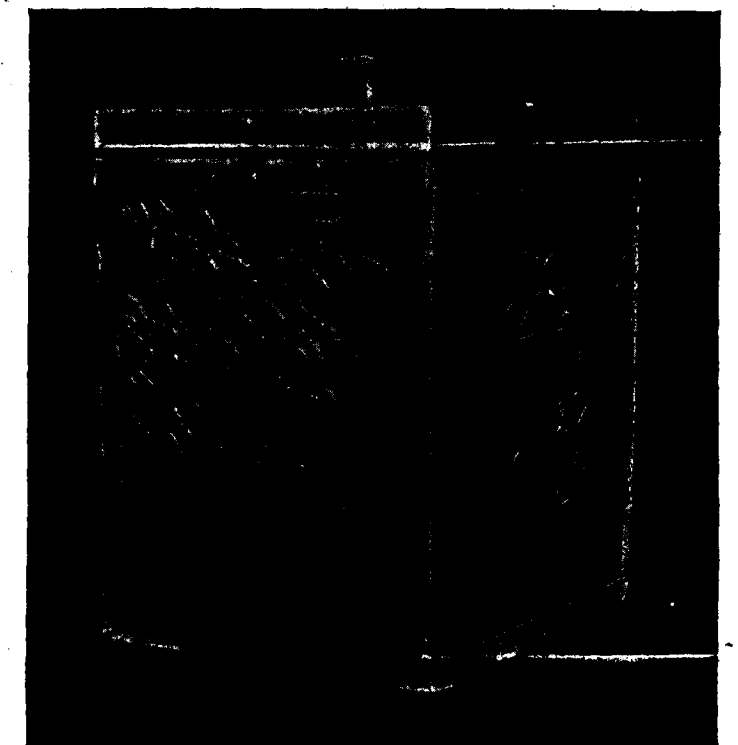
Today though many of the beautiful crafts are with us, they seem very forlorn and lost in a new swift changing world fighting a losing battle against a world that is getting rapidly mechanised and above all contending against the intrusion of a new sense of values. The fastidiousness and sensitivity to beauty began to give way to cheapness and mere utility. One wonders if the handicrafts here will

completely succumb to the large-scale machine goods, as they did in the West. The hopeful thing is the widening current against such a catastrophe generated through the growing awareness in the Indian people of the importance and significance of the role of handicrafts in the new economy of our country. The hard fact is that they constitute the sole means of livelihood for millions of our people. The question before us is how to rehabilitate this crippled industry and provide full employment and some economic security to the craftsmen. Economics apart, it would be a tragedy to lose many of these lovely objects which can fill our lives with so much delight.

The effort to preserve handicrafts must be based not merely on the recognition of a negative necessity but on a positive faith in decentralised, small-scale production as the only means of preserving vital aesthetic and human values. It should be informed by a definite social philosophy the philosophy of decentralism, which rests on the awareness that centralised, overmechanised industrialism has produced a social and psychological chaotic pattern in Western countries which we can and must avoid. Such industrialism has produced gross inequalities by centralising the ownership of means of production. It has destroyed individuality and community feeling



Jewellery from Delhi



Brass Tea Caddy

by congregating large masses of men in a few big factories and overcrowded cities. It has divorced man from his natural environments, and denuded productive labour of all creative, aesthetic joy. Thus it has subverted labour, to his fellowman and himself, and laid the foundations of mass neurosis. It is only when development planning is based on a deep sociological insight into the relative merits of of the centralist and the decentralist modes of production that handicrafts will not merely be temporarily tolerated but given a permanent, and honoured place in India's social-economic structure.

How much of this traditional treasure will survive the impact of new and challenging forces of today is still an interrogation. It will depend largely on our awareness of our own heritage and our capacity, skill and genius to adapt these products to present day life without destroying their basic charm and essential spirit.

The public should remember that development of handicrafts is entirely different from

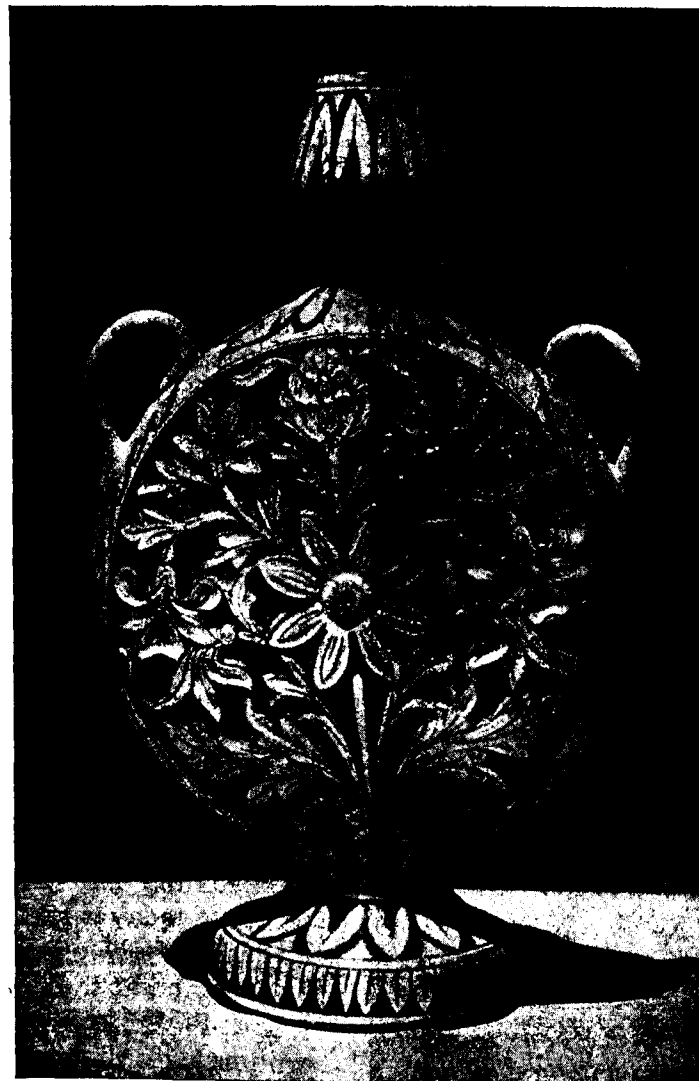
August 1957.

that of village industries or small-scale industries. Not only is each craft highly complicated involving numerous processes, it is also very individualistic and local. Handprinting in Rajasthan is quite different from printing in Andhra. Metal inlay in Hyderabad is different from that in Uttar Pradesh. Every craft differs from region to region. Each has its own traditional ways of production and its own designs, shape, colour, etc. No one single plan can be applied wholesale all over as in the case of chakkis, cart wheels, charkas or carpentry and smithy tools. The craftsmen are

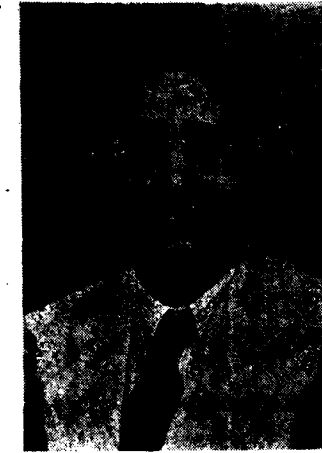
INDIAN INDUSTRIES ANNUAL

also scattered, some here and some there. In some cases the craft is reduced to a few individuals who are almost lost in the interior villages and have to be sought and villages combed even to find them. Not only each craft, but each centre needs careful study and understanding before any measures for its treatment can be applied. It is therefore in the very nature of this industry that it calls for great sensitivity and delicate handling, infinite patience and tireless service before any results can be produced.

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Jug from Orissa



The million men who run the railways in India raise the slogan "We will deliver the Nation's goods". Yes. They will.

INDIAN RAILWAYS

K. SRINIVASAN

Public Relations Officer, Southern Railway

According to the Industrial Policy Resolution of April 30, 1956, Railway transport has been classed as one of the 17 Industries in Schedule 'A'. Therefore, it has to be treated as an Industry, but it is an Industry which feeds the industries by taking raw-materials to the places where they are manufactured and manufactured articles to places where they are required. Any development of any industry has directly or indirectly got a bearing on the Railway Industry. Hence railway is an industry of industries.

The Railway transport industry has got the characteristics of both agriculture and also the mining industry. The Railways in certain localities where the density of traffic is heavy busy sections like Coimbatore, Madras and

Madras Villupuram on the Southern Railway, Bombay suburban electric sections, Calcutta and Madras suburban sections—have to be developed intensively. There will be more goods as well as passenger traffic to be carried. The density of goods as well as passenger traffic is very heavy. There are branch lines which can be developed only extensively where the traffic is light.

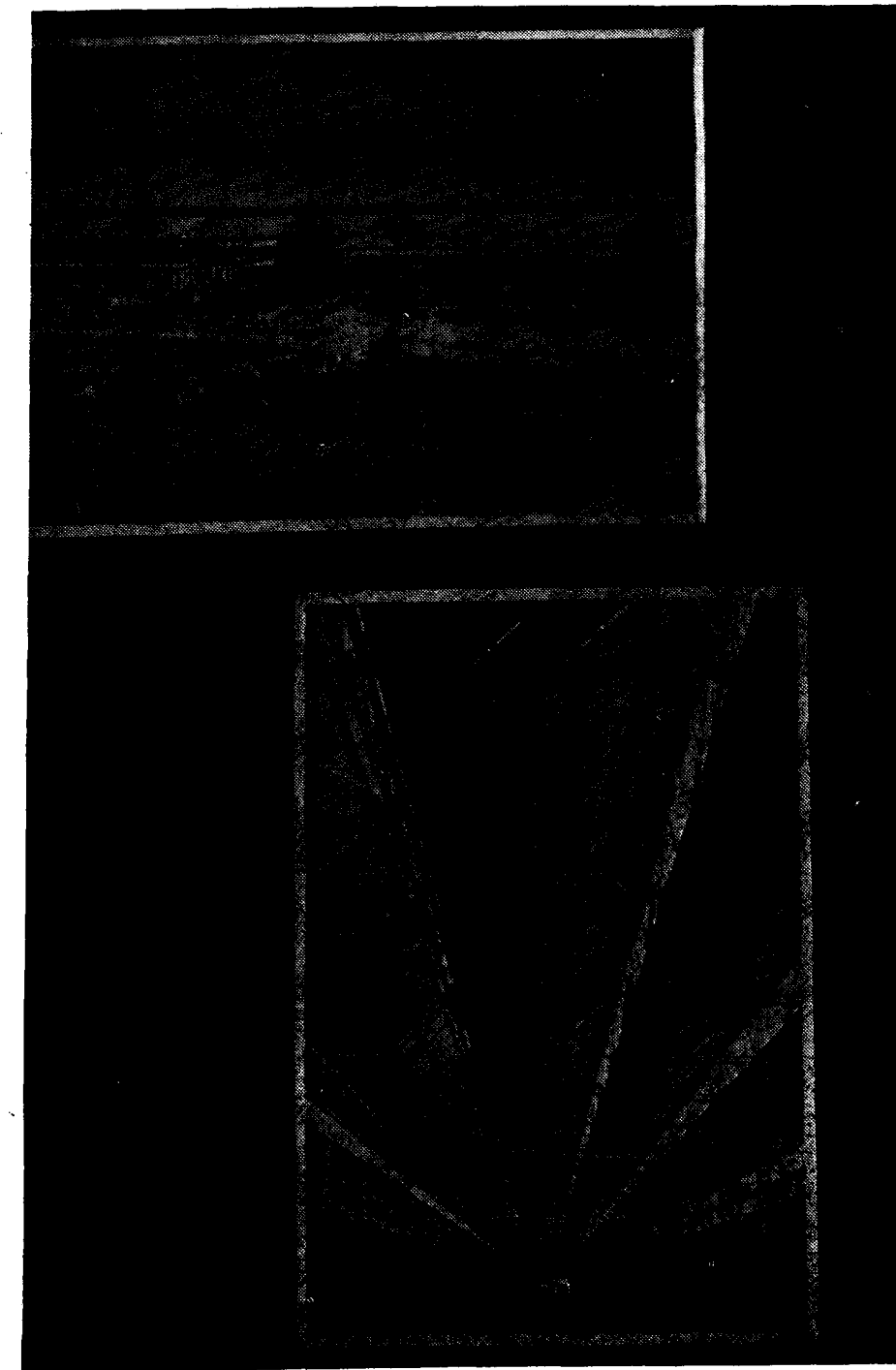
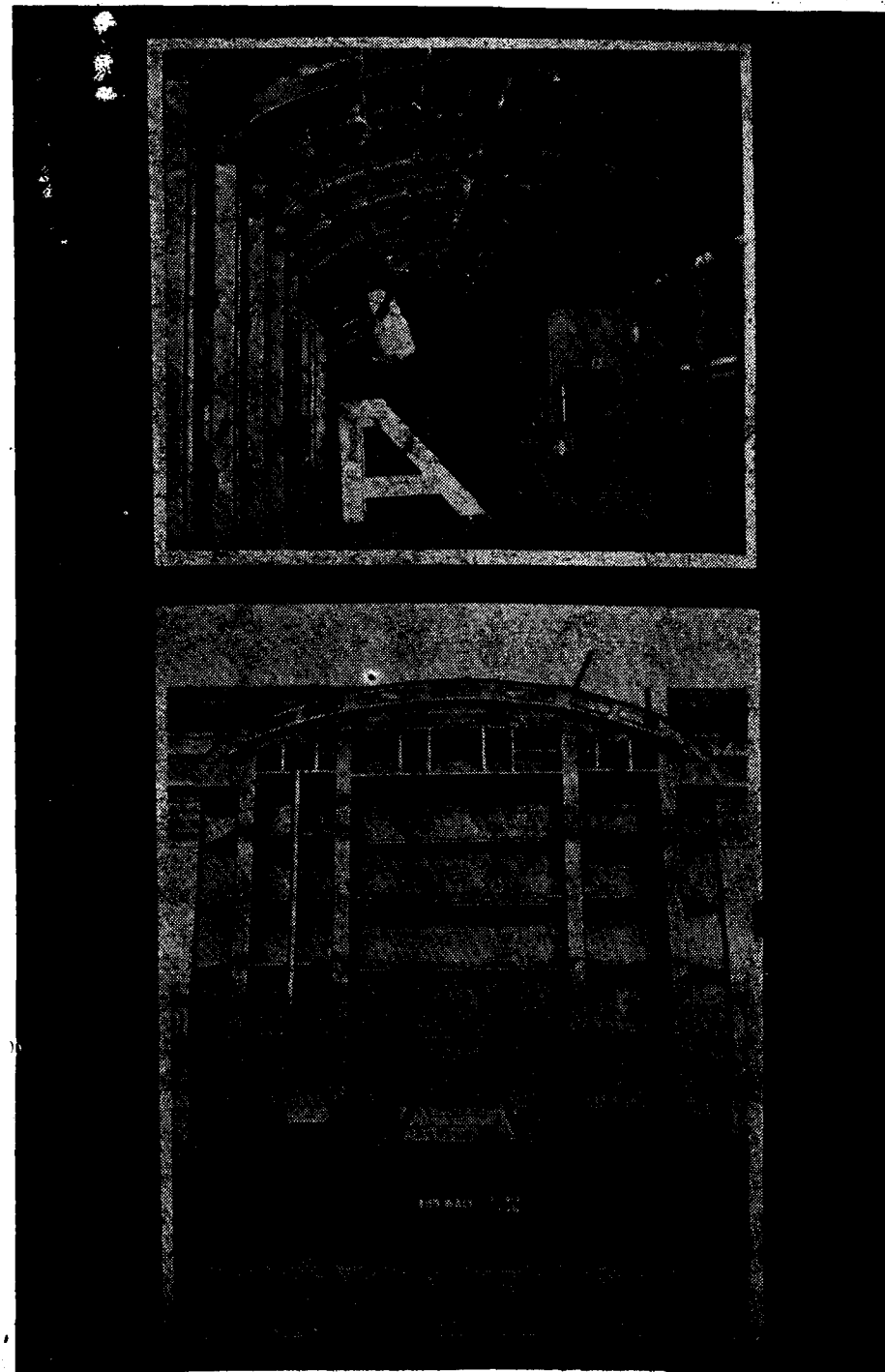
The Railway Plan, as framed by the Railway Ministry, provides the country with a railway system which will not only be fully efficient and economic when the plan is achieved but will also be adaptable to meet the requirements of many years to come thereafter. Calculations based on merely having the increased capacity to carry the commodities, the production of

which will increase on account of Planning Commission's schemes may not meet the needs of the public for Rail Transport.

The technical re-equipment of the railways is long overdue. The need for it became

acute during the difficult years between the wars, but at that time the railways were hard hit financially by road competition and prolonged depression in the heavy industries.

A Rail coach being assembled

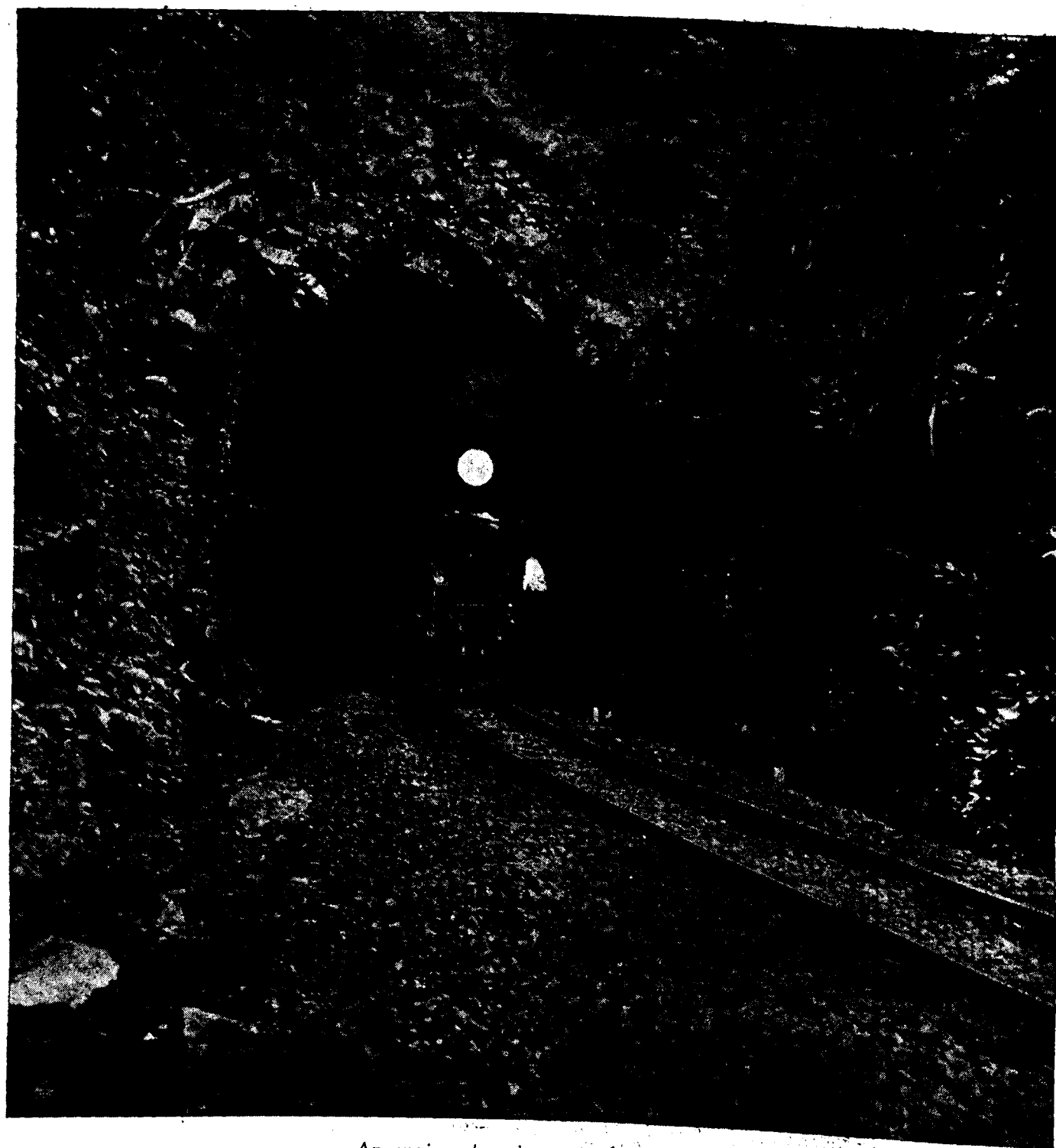


Views of Integral Coach Factory at Perambur

The railway's problem was accentuated by the over-working of their assets in the Second World War. Despite the growth of alternative forms of transport, it is clear that the country must continue to look to the railways to carry

the main flows of bulk traffic, both passenger and goods, for many years to come.

Out of a total of Rs. 4,800 crores allotted for the Public Sector in the Second Five-Year Plan, Agriculture and Community Development



An engine steaming out of a tunnel

got Rs. 565 crores, which is about 12 per cent of the total allotment. It is true that "he who sows the ground with care and diligence can be expected to reap a greater stock of religious benefit than can be acquired by the repetition of ten thousand prayers". Irrigation and

Power got Rs. 898 crores, which is about 18 per cent of the total allotment and Industries and Minerals got 891 crores, which is about 18 per cent of the total allotment. Among the various items, indeed, Railway's allotment of 19 per cent, as a single item, is the highest.



As the panorama has unfolded during the discussions of the last six months of the First Five-Year Plan period, Planning Commission and the Railway Ministry have come to recognise with mounting conviction that augmenting financial allocation to the Railway Ministry on the largest possible scale is an essential ingredient during the Second Five-Year Plan.

The uncovered gap in the transport capacity during the Second Plan period would appear to be of the order of 30 million tons. The food production is estimated to increase by about 30 per cent or by 19 million tons. The additional cement production originally estimated was 5 million tons. This has subsequently been revised to 8 million tons.



Locomotives manufactured at Chittaranjan Works

Out of which at least one-third or 6 million tons will require transport. Besides, there will be numerous other developments. For instance, the target for Piece-goods will be revised. Due to these factors, a substantial increase in the original target of 60.8 million tons of additional transport is expected. The quantity of traffic for which movement has been provided for in the Second Five-Year Plan is 47 million tons. But these factors referred to above will increase the traffic to a total of about 75 million tons. This means about 30 million tons of additional traffic will be the uncovered gap for which transport has to be provided for.



On 12-7-1957, the World Bank announced a 90 million dollar loan to India to assist in modernising the Indian Railway System.

As our Ambassador to U. S. Mr. Mehta said; "The importance the World Bank has attached to our transport programme is wholly appropriate as transport is not only crucial for our economic development but it involves heavy investment and draft on foreign exchange".

The loan amount will pay about half the cost of more than 500 locomotives, 10,000 wagons, 100,000 wheel sets, rails and other materials.

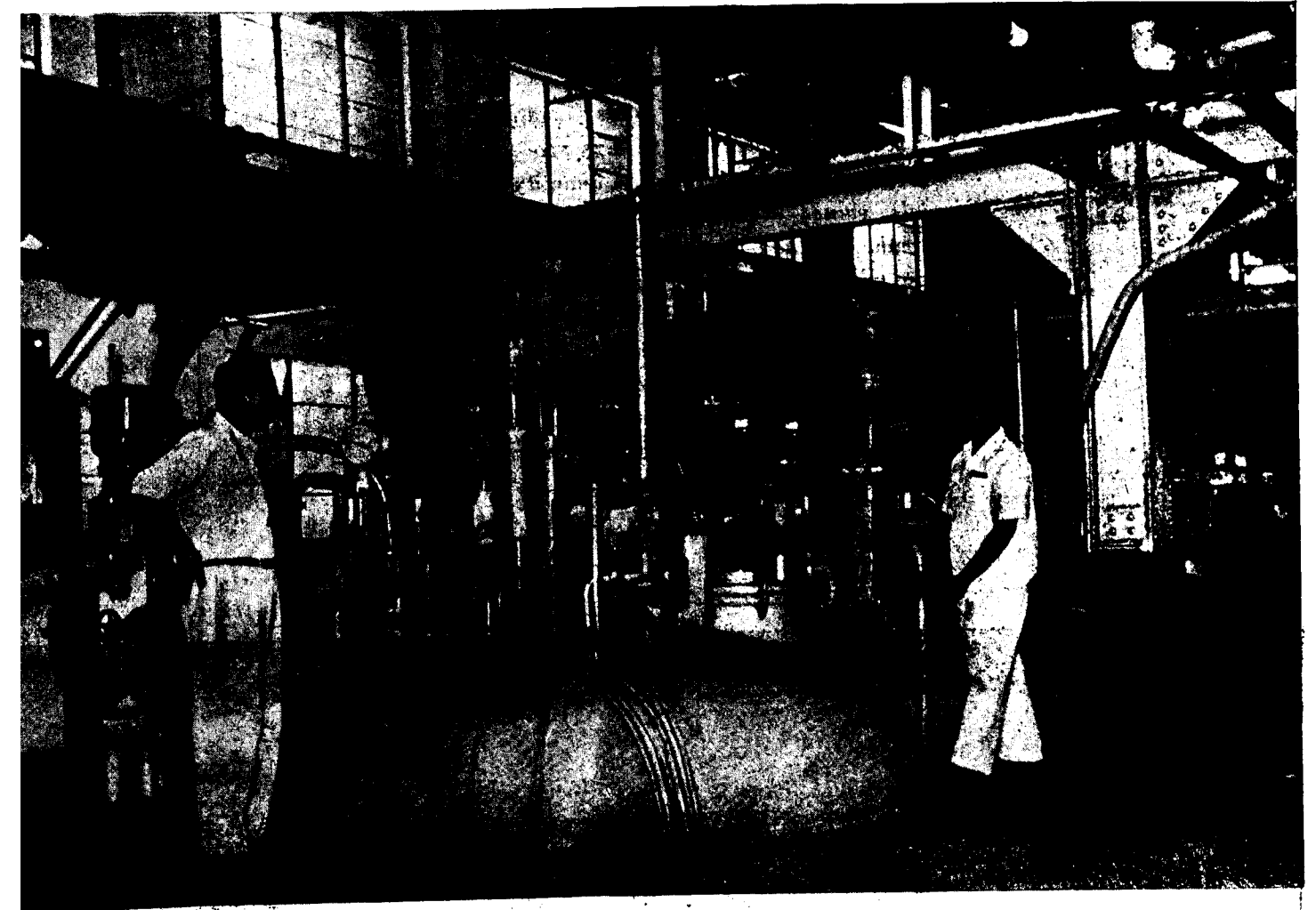
The Union Minister for Railways informed the Lok Sabha that there is a possibility of getting some loans in future years also during the course of the Second Five-Year Plan.



Engine Driver
Shri C. H. Smith
honoured by
our President



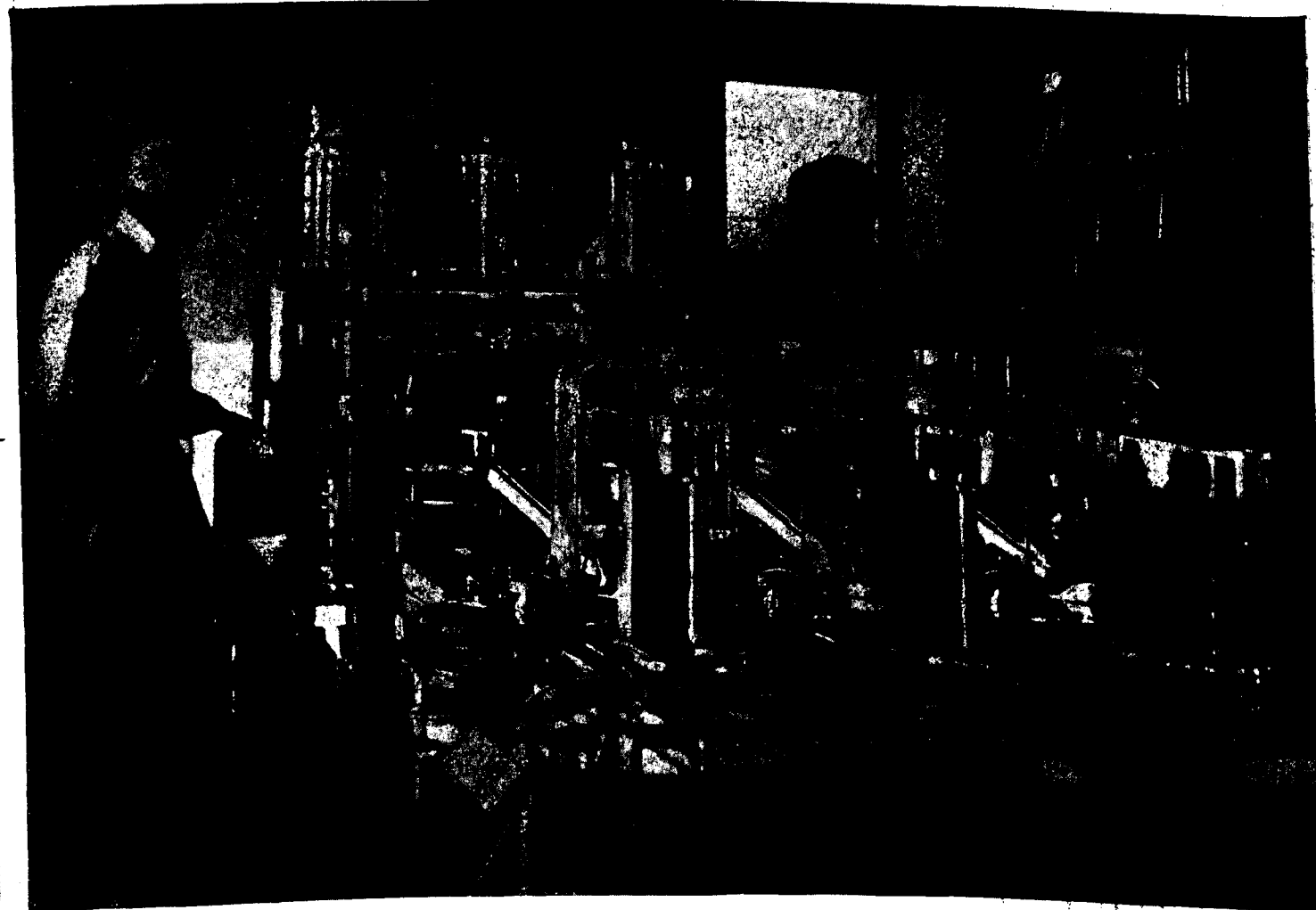
Shri Bhaktavatsalam, Home Minister, Madras
Government inaugurating Breda Coaches in Madras
Beach - Tambaram Line



The Hindustan Antibiotics, Ltd., Pimpri, which is in charge of the Penicillin Factory, has shown commendable progress. The production of penicillin in 1956 amounted to 14.12 million mega units.

Production of penicillin at the Hindustan Antibiotics (Private) Ltd., at Pimpri, reached a total of 12,49,460 mega units during the month of February 1957 as against 11,62,000 mega units in January 1957.

The total number of vials filled and certified "passed for sale" was 8,75,770 as against 10,07,370 in January 1957. A quantity of 6,72,362 vials, valued at Rs. 4,22,539 was sold during the month. To add to the momentum of sales, four new selling agents are being appointed. Arrangements are also being made to sell such quantity to bulk penicillin as is found in excess of the bottling capacity of Penicillin factory to other bottlers in India. Plans for the expansion of the penicillin manufacturing plant by 60 per cent of its present size are proceeding satisfactorily.



TATA INDUSTRIES

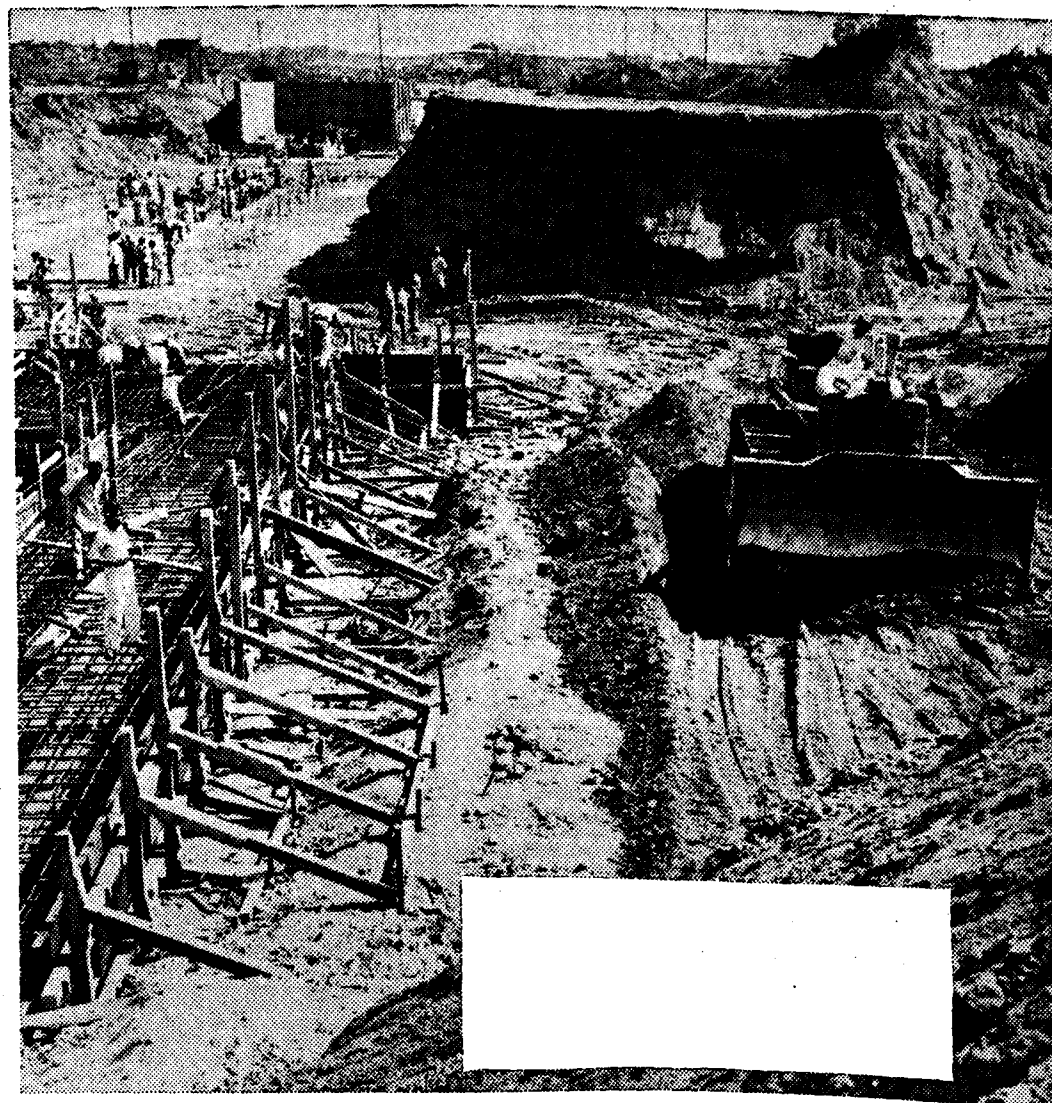
Jamsetjee Nusserwanjee Tata, the founder of the House of Tata, established in 1868 the private trading firm of Tata & Company with a capital of Rs. 21,000. To-day Tata enterprises control the largest single aggregation of Indian

Industry with a total financial investment of Rs. 136 crores.

Tata interests now cover iron and steel, locomotives and locomotive boilers, diesel trucks, bus chassis, engineering equipment



Tata Chemicals at Mithapur



Huge furnaces built at Jamshedpur

(mechanical and electrical), machine tools, agricultural machinery and implements, textiles, textile machinery, electric power, chemicals, cement, vegetable oils, soaps and toilet products, industrial investment, insurance, radios, hotels, airconditioning and refrigeration equipment, pharmaceuticals, antibiotics, vitamins and typewriters.

The Tata Iron and Steel Co.

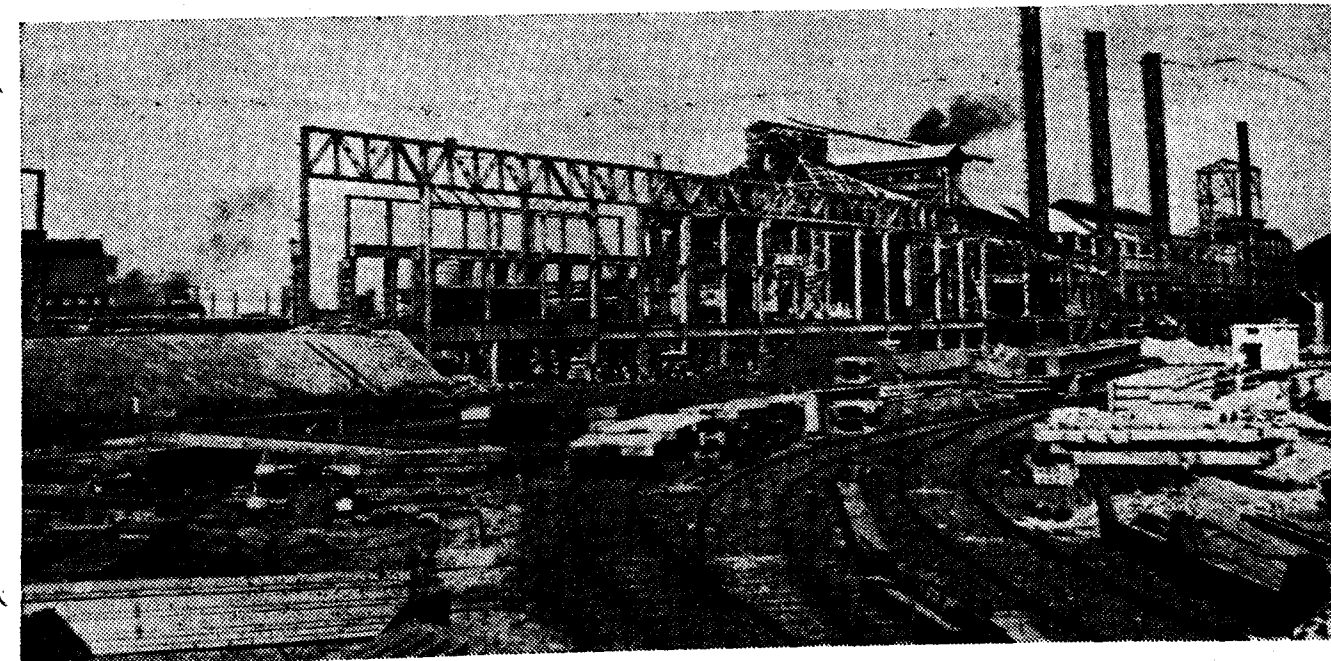
The most important unit in the Tata group of industries, the Tata Iron & Steel Works at Jamshedpur, is one of the largest self-contained iron and steel plants in the world.

Where forty years ago there was little more than a jungle, there stands today the town of Jamshedpur, with a population of about 2,00,000 built up around the Works.

The Works undertake all operations from the production of pig iron to the manufacture of finished steel.

Tata Locomotive and Engineering

Towards the end of 1954, the Company commenced a five-year programme for the progressive manufacture of Diesel-engine truck and bus chassis, in association with Messrs Daimler-Benz of Stuttgart, West Germany. The entire



Large - scale expansions at Jamshedpur

chassis including its engine, transmission gear box and all essential parts will be made in India by the end of the programme.

Tata Textile Companies

The textile industry was the first to which the Founder of the House turned his hand.

The Tata group of four mills operates 7,000 looms and 300,000 spindles manufacturing a

variety of cotton fabrics in grey, bleached, dyed, printed and mercerised state in counts ranging from coarse to superfine.

Tata Chemicals

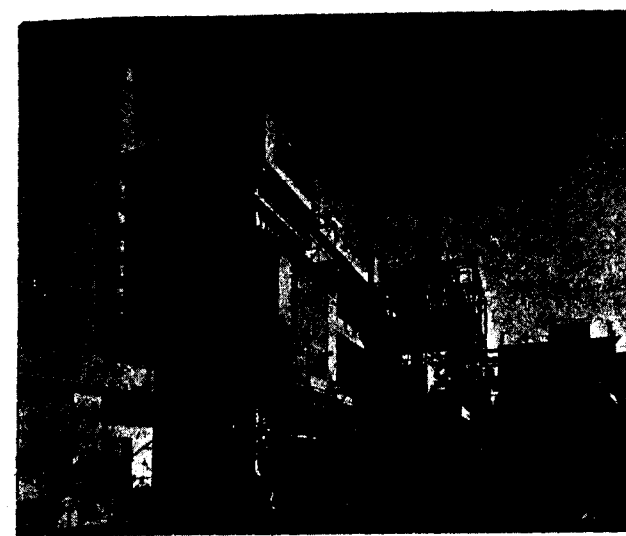
In Tata Chemicals, the brine from the sea is converted into the basic heavy chemicals so essential to India's industrial development.

Mithapur supplies a substantial part of India's total requirements of soda ash, caustic soda and other important chemicals.

Voltas Limited

Promoted in 1954 as a joint enterprise of Tata Sons Limited and Volkart Brothers, Authorised capital is Rs. 5,00,00,000. Voltas has taken over the Engineering and Import Division of Volkart Brothers, a Swiss merchant-house established in India in 1851. Activities of Voltas include import, distribution, erection, design, servicing and part manufacture of equipment and machines in the field of electrical, mechanical, airconditioning and refrigeration, agricultural, earth-moving and textile engineering.

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Trombay Thermal Power Station

The rehabilitation of the Railways was taken on hand. Even then, it was found that the Railways could not take all the traffic offered. Today the spare capacity of rail is worse, because of heavy import of Iron and Steel, Cement, the equipment for the steel factories and other economic activities generated by the Second Five Year Plan.

There has been a Study Group on Transport; there was an appraisal of transport requirements by the Planning Commission etc., After some consideration of the transport needs in the period 1956-60, the Motor Vehicles Act was amended by the Parliament early this year. It had now received the assent of the President. This Bill does not in any way help to foster road transport in general. It is good in a few aspects. Under Section 63, it has eased the flow of inter-state transport movement. It has made the fitness certificate of a Transport Vehicle an All India document, valid throughout India. It has laid down under Chapter IV-A, the procedure for nationalising Road-Transport. It has not made any provision for taking over the assets of the displaced operators.

Even as it is, this Act will not do much of a good to the Road-Transport need of our land, as the motor vehicles taxation is still a State subject. It was never the intention of the sponsors of Road-Transport to appeal for reduction in the quantum of motor vehicles taxes. But sponsors object to the mode of taxation. The mode that exists at present, makes States feel as if they are independent countries; they never consider the motor vehicles operation as one of All India interests. Such a narrow outlook has led the States to restrict motor vehicles operation to their boundaries. The cause of this malady in out-look is historical. We were tied to the British concept of Motor Vehicles Act and Taxation. England is a country of short distances, well served by canals and sea, but with narrow roads. It is a manufacturing country producing Automobiles and spares. Its economy was not bothered by the insistent necessity to run public transport as private transport was well within the means of at least

a majority of its population. Even in this copying of the British mode of taxation, we have not discriminated and hence not wise. For example, the maximum and tight levy of British tax is on fuel. The rest of the taxes on motor vehicle is a token one. In our copying methods, we have shifted the emphasis from fuel to the other taxes. Because of the shifting, the States have killed inter-state transport. This killing is as a result of multiplicity of taxes levied by the States as in the case of inter-state operation.

This is the situation in which we are placed at present.

What is the solution? A solution has to be found because the country needs transport in increasing measure to meet the requirements and needs of the Second Plan.

Of course, the solution has to be found in an integrated manner by a complete estimate of all forms of transport. This over-all picture shall not be partial to a particular mode of transport. It will serve all India interests. The Railways are always hungry for huge capital expenditure. In addition, the major items of Railway requirements have to be imported, thus consuming a lot of foreign exchange. So far as Canals are concerned, the deepening of canals etc., is a long-term problem of heavy expenditure. So far as coastal-shipping is concerned, any increase in tonnage is at a huge cost of foreign exchange.

But so far as road transport is concerned, it is possible to increase the availability of trucks and buses at comparatively less cost. It is less costly because we are having certain types of progressive manufacture of motor vehicles. There is heavy stock in Disposals. Our automobile people have been trained, over the past four decades, in accurate, precise and cheap maintenance of motor vehicles. We know how to re-condition spares and make interchangeability of different makes easy. Because of the prohibitive import duty on spares and on CKD packs the cost of a vehicle to the consumer is very high; in the place of import duty, there should be monetary ceiling

restriction on import of spare parts, with complete abolition of import duty by a up-grading of tax on fuel. The Excise Duty on tyres, sales-tax on motor vehicles and spares and all other multifarious imposts must be liquidated and replaced by a high duty on fuel. Such a shift in mode of taxation will bring to the Exchequer, the total motor vehicles tax revenue it is getting at present. We have not got accurate data of High-Speed Diesel Oil consumption by motor vehicles. Petrol consumption is not less than thirty crores gallons per year; assuming that petrol consumption is thirty-five crores gallons, a direct levy of Rs. 2/- per gallon will bring in a revenue of Rs. 70/- crores to the Exchequer. This figure is exclusive of the tax realisation from Diesel Oil. This tax is incapable of evasion and easy of collection!!

It is to be realised that there will be no increase in the motor vehicles population of our land unless:—

1. The Motor Vehicle's price is acceptable.
2. Motor Vehicle tax is reasonable.

It may seem strange that import duty, Excise duty, sales-tax, State Motor Vehicle Tax, and all other imposts are recommended for abolition and replacement by a single tax on fuel. But our country needs, and the adventure of building a New India demands a new way of thinking - an Indian way to solution.

It is cheap and futile to imitate the conditions in other lands. Such an imitation is wasteful of energy and money.

Let me quote from a recent American Magazine the following.....

"Our mass-produced highways have become as marvelous to the rest of the world as have the mass-produced vehicles that use these people's roads. Like our vehicles, our roads—and the methods for their production—



THE ROCKHARD
25, BANK ST., FORT,
BOMBAY.

The author's solution to Road Transport problems may seem dynamic but it brilliantly suits the genius of our land.

ROAD TRANSPORT IN INDIA

S. N. RAMASAMI, M. A.

Electricity enters into the production of a large variety of basic materials—metals, alloys, pure chemicals, fertilisers, abrasives etc., many of which serve again for other industries. It is indispensable in the production of aluminium, magnesium, sodium, calcium carbide, graphite, fused alumina etc. It leads to a purer product as in the production of metals like copper, tin, lead, nickel, gold and many of the special alloys and steels.

Electro-chemical industries cover today almost every field of national endeavour in India and the Central Electro-chemical Research Institute at Karaikudi is doing excellent work.

In 1914 the First Motor Vehicles Act was passed. After about twenty years, because of the depression of 1930-s, there were many committees appointed to investigate, what was called Road-Rail competition. Because of these reports, the motor Vehicles Act of 1940 was drafted and passed. The basis of this Act was to restrict Road Transport, so that there may not be any loss to the Railways, by what the various Committees consider wasteful competition. It is to be noted that though this Act is a Central Statute, the rules were framed by the (then) Provincial Governments. Even this Act did not apply to the (then) Indian States. In addition, the Provincial Governments were left free to tax as they please motor vehicles operating in their areas.

Because of this Act regulation, there was no operation worth mentioning between Provinces, now called States. Such a restriction served in a meagre way, the then prevailing economic conditions.

It is to be noted that the merits of this Central Legislation cannot be canvassed, as the World War II set in and the Act became a casualty. Many of the sections of this act had to be abrogated because of War emergency.

After 1947, because of the chronic age of and over work by Railway equipment and because of the tempo of the First and Second Five Year Plans, there was a re-appraisal of the transport needs of our land - Rail, Road, Canal, Coastal - Shipping and Air.

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have been sedulously imitated, with signal lack of success.

A notable example of such failure is presented by the case of Germany, under the Third Reich of Adolf Hitler. After careful study of American production and construction methods, the master-planners of Germany's National Socialist Government drew up elaborate plans both for production of the VOLKSWAGEN, or "People's Car", and for construction of the AUTOBAHMEN, an elaborate network of the most modern kind of motor-highways. Widely advertised in the late 1930's as means for motorizing the masses of Germany, these devices were the result of deliberate bureaucratic planning, rather than the end-products of that inter-play of related forces which, as Mr. Belloc Holds, govern the natural evolution of the vehicle and its road. The irony of such master-planning obtrudes

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from the fact, when the real test came, the VOLKSWAGEN, though revealed to have been actually devised as a military vehicle, failed in contest with the military adaptations of automotive vehicle, failed in contest with the military adaptations of automotive vehicles which the American people turned out; and the AUTOBAHMEN, though carefully built by ORGANISATION TODT as a device to implement the speedy conquest of neighbouring nations, became the ideal means for the quick dis-memberment of the German military machine in 1945".

And so, it should be clear that we should tackle road transport problems in a way suitable to our country's needs and conform to the genius of our land. To imitate any other country will naturally result in "a signal lack of success" of our planning.

..

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The emergence of a new industrial power, based on nuclear energy is in the offing. The author brilliantly portrays its living presence.

ATOMIC ENERGY AND INDUSTRIAL REVOLUTION

S. VEDANTAM

Public Relations Office, Southern Railway

All that we know now more familiarly is the immense potentialities of the energy in an atom, and what devastations it can produce when once it is released. But, the story of the atom, from the very beginning, has been one of extremely thrilling and exciting suspense.

Story of Atom

It was early in 400 B.C. that Democritus stated that all elements are built of the same fundamental particles, and they differ only in the number of such building particles. These fundamental particles, after many long centuries, were called by the Chemists as 'Atom' which is a very minute particle of matter and cannot be seen even under the most powerful microscope. Towards the end

of last century, J. J. Thomson established that atoms consist of negatively and positively charged particles. The first to be isolated from the atom were the negatively charged particles, called electrons. The next to be discovered were the positively charged particles, called protons. It was subsequently established that the atom has a heavy positively charged nucleus, and light particles, electrons, rotating around it. Investigations of electromagnetic phenomena and of radio-activity have led to the discovery that the atom is a complex system within which specific physical processes are at work, and that the atomic nucleus itself has a complex structure. Atoms of some chemical elements, such as uranium, radium and thorium emit an invisible,

penetrating radiation, and disintegrate into simpler and more stable nuclei of other elements. Scientists have established that the nuclei of all the atoms consist of positively charged protons, and particles without an electric charge called neutrons. Artificial radioactivity was subsequently produced by science. Under the action of neutrons the atomic nuclei of uranium are split, the fragments dispersing with colossal speed collide with other atoms, accelerate their movement and ignite the metallic uranium. Investigations have shown that there are several (one to three) neutrons for one split nucleus. This factor plays the decisive role in the use of nuclear energy. Since the fission of the uranium nucleus produces in addition to two new nuclei also 1.3 neutrons, these neutrons may in their turn be picked up by other uranium nuclei which divide forming a double amount of new neutrons, and the latter may cause further divisions. The amount of neutrons grows and together with it—the amount of splitting nuclei. The result is a growing amount of energy which can reach colossal proportions. This process takes place very fast. The nuclear reaction described above is called the chain reaction.

Power of Atom

The first announcement of the devastating power of the atom was not made in a scientific journal or even by a scientist; but, in the unparalleled destruction, which on August 6, 1945, descended on the towns of Hiroshima and Nagasaki. Never has a scientific achievement been given a worse start in the sphere of human affairs, than the release of atomic energy. But, the manifestation of the atom is not altogether tragic, if we view it from the more cheerful side. The newly discovered possibility of liberating the hidden energy of the Uranium atoms, promises us almost unbelievable technical progress in the years to come. We may speak confidently about the miraculous 'K-ration fuels', a small package of which will be enough to fly a huge passenger airliner across the ocean. A new type of vessel called

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'Atom-Ship', would be much more economical than steamships and even boats with gas turbines. Ice-brakers with an atomic engine, will have no limit and the possibilities of continuous navigation will be greatly extended.

Atomic Reactors

They surpass even millions of times the forces operating between the atoms in chemical compounds and scores of thousands of times the forces operating between the atomic nuclei and the nearest electronic shells. Thus far, however, atomic energy is obtained for peaceful uses by the fission of the atomic nuclei of uranium, a mineral extracted from the earth. The necessary conditions are created in special atomic reactors. The reactor 'burns' without flame and fire.

The Reactor is the converter of Atomic energy into heat energy. Reactors are of different types such as reactors for power, for the production of radio isotopes, for research work, for the testing of materials etc. Uranium is introduced into the reactor in special Aluminium tubes into the so-called working grooves cylindrically shaped apertures in the central part of the Graphite lining. Aluminium tubes are used because Aluminium does not absorb neutrons. Graphite is used as the moderator. The reactor receives tubes, according to the number of grooves; and the bottom of the tube is filled with Uranium enriched with isotope 235. The point is that the atoms of Uranium and of other chemical elements for that matter vary, the isotopes having a different atomic weight. There is Uranium-238 which means that this atom is 238 times heavier than the atom of hydrogen, U-235 and U-234. U-235 possesses the greatest capacity for division under the impact of neutrons.

The process of getting energy is to split the atoms of a fissionable metal like Uranium U-235 and start chain reaction. The chain reaction is the phenomenon of splitting atoms to shoot out neutrons, that split the other atoms. As a result there is a constant flow of neutrons and this produces a heat energy. If this

process is done at the maximum speed of neutrons, which is 186,000 miles per second, spontaneously released neutrons will not effectively maintain a chain reaction. So the speed has to be moderated with the help of heavy water or Graphite. Fortunately, the Atom bomb and atomic reactor are the same. The chain reaction takes place in both the cases, but all the energy available from the amount of metal used is distributed over a long time by a suitable moderator in the reactor.

Uranium energy produced by the chain reaction is extremely powerful. One kilogram of Uranium can yield about 20,000 million kilocalories of heat i.e., approximately three million times greater than the burning of one kilogram of coal.

Slow & Fast Reactors

A reactor must be controlled and for this purpose rods made from substances such as cadmium and boron, which absorb neutrons strongly, are generally employed. If the chain reaction begins to go too fast, the rods are pushed further into the midst of the Uranium and the 'neutron flux' declines. This description applies to a slow reactor, the commonest type present. A slow reactor does two things. During operation it converts some of its U-238 into a new element, not found in nature—Plutonium. Plutonium, like U-235 is fissionable; it can be extracted from reactors and used for making bombs.

A slow reactor also releases heat energy which can be used via a steam raising plant to drive a dynamo. But, if slow reactors were the only feasible ones, there would be less chance of developing nuclear power on a lasting scale, for in the world's uranium deposits, there is not enough U-235.

Fortunately, another type, the fast reactor, can be made. It promises to solve nuclear fuel problem by "Breeding" more fissionable material than it consumes. A fast reactor has a core of nearly pure fissionable material. Since the core contains virtually no U-238 it needs no moderator to protect its neutrons from capture.

Fast reactors have the convenience also of being very compact, and may thus prove to be the most suitable power units for submarines, ships and perhaps eventually for aircraft.

It might seem sensible to build fast reactors only and there are good reasons for giving reactors a large place in the programme for the next fifteen years. Fast reactors need a supply of previously produced fissionable material, plutonium or U-235, in order to get started, and most of the fissionable material so far made in slow reactors has gone to make bombs. Slow reactor will thus be essential for building up a supply of fissionable fuel before a fast reactor building programme can be launched.

Slow reactors have some other advantages—they are cheaper to build and inherently safer to operate and at present they can almost certainly produce electricity more economically than fast reactors can.

Once a fast reactor gets going, however, it should be able to breed enough fuel both for itself and for fueling other reactors. Thus while fast reactors will be able to produce useful amounts of electric power, they may prove to be uneconomic power producers, and their most important function will be to enable a country to establish an efficient nuclear fuel industry by breeding nuclear fuel.

India has a minor deposit of Uranium in Bihar and several deposits have been located in Rajasthan, Orissa and Madras. It is extracted now from the copper tailings of the Singhbhum Copper mines and from the Monazite sands of the Malabar coast, along with Thorium. Thorium is radio-active but not fissionable. But it could be fissioned, if it is converted to U-233 in a breeder reactor.

Lastly, if the process of transformation of energy is not carried out with minimum expenditure of energy, we may soon eat away our own stock of source of fuels. Anyone who can find direct conversion of heat energy to electrical energy i.e. from fire to electricity or direct from nuclear fission to electricity, cutting out orthodox intermediate stages, will do mankind immense good.

The day is not far off when Indian ships, owned and built by Indians, will carry the national flag to all parts of the world as they did in olden days.

INDIAN SHIPPING

DHARAMSEY M. KHATAU

Chairman, The Scindia Steam Navigation Co., Ltd.

The closure of the Suez Canal had necessitated a surcharge of 15% which was raised to 17½% owing to a steep rise in the cost of fuel oil. The Suez crisis had serious repercussions on our sea-borne foreign trade especially in regard to our imports essential for the execution of various projects under the Second Plan.

Prices of ships have risen beyond all expectations, and the order books of shipyards are so full that deliveries are available only after 1961 or 1962. In this context the provision of Rs. 37 crores made for shipping under the Second Plan, which was insufficient *ab initio* has fallen considerably short of the amount required for attaining the target of 9 lakhs G.R.T. at the end of the Plan period, as this has enabled the tonnage to expand to about 7,75,000 G.R.T. only.

Indian ships operating in the overseas trades are earning as well as saving foreign exchange for our country. The foreign exchange spent in acquiring an additional ship would be fully recouped in 5 to 7 years out of her own contributions to the pool. To reach the target of 9 lakhs G.R.T. a further sum of about Rs. 40 crores will be required. The contribution of shipping to the foreign exchange resources of the country which is, at present, Rs. 7 to 8 crores, will then rise to about Rs. 19 to 20 crores by the end of the Plan period.

I realise that the foreign exchange position at present is difficult, but in view of the important part shipping plays in earning and saving foreign exchange, I suggest that as high a priority as possible should be accorded to it.

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In spite of the continuous rising spiral of costs since 1951 freight rates have practically remained stationary barring small interim increases allowed in October 1955 and May 1956. The question of fixing economic rates has been examined by the Rail-Sea Coordination Committee and their report is awaited. I would like to repeat the request of the Coastal Conference to the Committee that freight rates should be so fixed as to leave, after meeting the increased costs of operation and normal depreciation, a reasonable provision for rehabilitation of fleet and a fair return on capital employed, following the principles accepted by the Tariff Commission for cement, steel and other industries. In order that shipping may be utilised as fully as possible to help solve the problem of transport during the Plan period, it was necessary not only to divert cargoes moving in bulk from rail to sea but to define on a permanent basis the fields of transport by rail and transport by sea. Coastal shipping will not be able to expand to the required target unless co-ordination of transport is based *inter alia* on its economic survival and its progressive development on a permanent basis. I, therefore, hope that these aspects would be considered seriously before

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Government reach decisions on the recommendations of the Rail-Sea Co-operation Committee.

Pending the outcome of the Rail-Sea Co-ordination Committee's inquiry, the low rate structure on the Coast continues. There were practically no imports of rice from Burma during the year under report, but from June 1956 onwards Government have started importing rice from Burma and the Indian Shipowners have given the necessary cover.

In the overseas trades we have started two new services—one, between India and the U.S.S.R. pursuant to the Trade Agreement concluded last year between the two countries and the other, between India and West Coast of Africa via Mauritius.

The Port Authorities have spared no efforts to give better despatch to shipping. The expansion of the capacity of the major ports in terms of berths, handling equipment, transit sheds, wagon supply, pilotage, facilities for night navigation, etc. is an absolute *MUST* if the implementation of the Second Five Year Plan is not to suffer from a failure to cope effectively with the far large quantities of coastal and overseas cargoes that would have to be handled during the Plan period.

INDIAN INDUSTRIES

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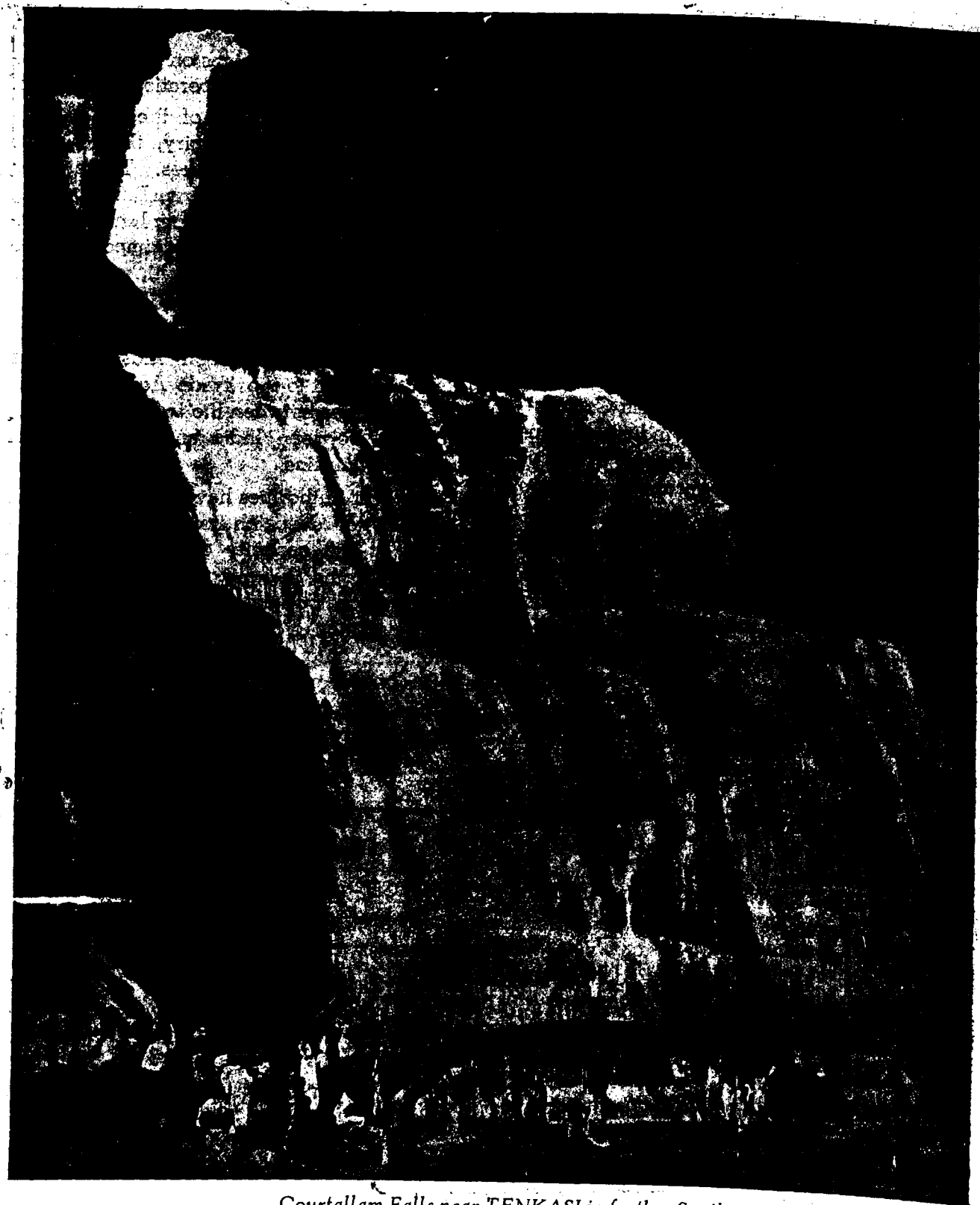
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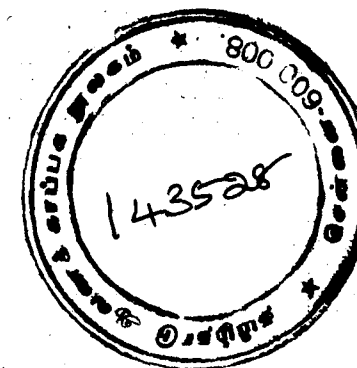
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TOURISM

T. V. SUBBA RAO

Director, Bharat Travel Service Private Ltd.

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By virtue of its money earning potentiality, Tourism has become an important factor in international economy. It was normal that it should also be included in the tuition of general and political economy of our universities. The study of this subject is particularly advanced in many universities in Europe. Our country is on the threshold of bright prospects in the field of Tourism, visualised by the Second Five Year Plan. Every state rich in its glory of the past is forging ahead quite in keeping with the spirit of the times and maintaining its rich heritage.

The Government of India is trying to build up amenities in their Second Five Year Plan by providing 4.35 crores of rupees. This amount

will be spent in developing Tourist facilities in the shape of subsidies, where most of the Tourists would desire to go or places which needs developing. Every state government has become more conscious to the possibilities of Tourism. Quite recently many state governments have set up a number of Tourist Bureaus and have been spending a lot on Tourism. It is admitted that the Government is receiving very good co-operation from the Travel Agents and the Tourist Industry in general in the task of Promotion of Tourism.

According to the Government, the number of Foreign Tourists visiting this country is increasing every year. The money earned by way of Foreign Tourism has also increased fairly

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well. During the first half of 1956, we have earned 7.4 crores of rupees.

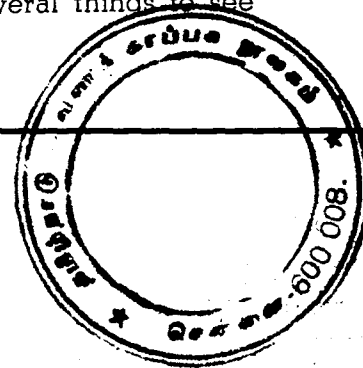
Historically and geographically, India is quite different from the rest of the world. People desire to come and see India more since our country has become FREE. We have a heritage and culture which is of interest to a lot of people from other countries. So far India is concerned, thousand years back, people visited countries like China with no intention of any trade but with a desire to see other human beings. In the field of development of tourism the Travel Agency plays an important part. The Agency provides the public with all information concerning tours and journeys and gives details of all important overseas tourist regions. It supports the activities of the Official Tourist and Information Office by distributing to the public all leaflets and brochures made available. The Agency receives the tourists of its foreign correspondents and provides them the local or regional services required and as accredited agents sells tickets for all means of transport—Rail-Air-Sea and Road. The Agency also ensures Hotel accommodation anywhere as required. The Agency plans tours, works out their cost, chooses the appropriate carriers, hotels and correspondents and supervises the organisation of such Tour. We have in this country several things to see

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and something should be done about it. How much to be done and what factors are there, that will contribute towards that end? This matter really needs not only the attention of the Travel Agents, but even of the Government and other institutions of the Travel Industry.

The abolition of the basic quota of Foreign Exchange for travel by our Government would not redound to the credit of our country in International spheres. The revenue earned by countries abroad are considerably dependent upon the flow of tourist traffic. While India's contribution may be small, yet it is quite obvious that Indian nationals do, in some measures, contribute to the wellbeing of such foreign countries and nations, on reciprocity, such foreign countries also liberally permit their nationals to spend foreign exchange in our country. The total exclusion of Indian tourists from such foreign countries would certainly influence those countries in adopting measures that may be necessary to discourage travel to India. This will naturally affect adversely India's tourist trade and the general economy of country in relation to its earnings of foreign money. It is hoped that the Government will review the position early and relax its policy in this matter and allow some basic quota for travel abroad. **

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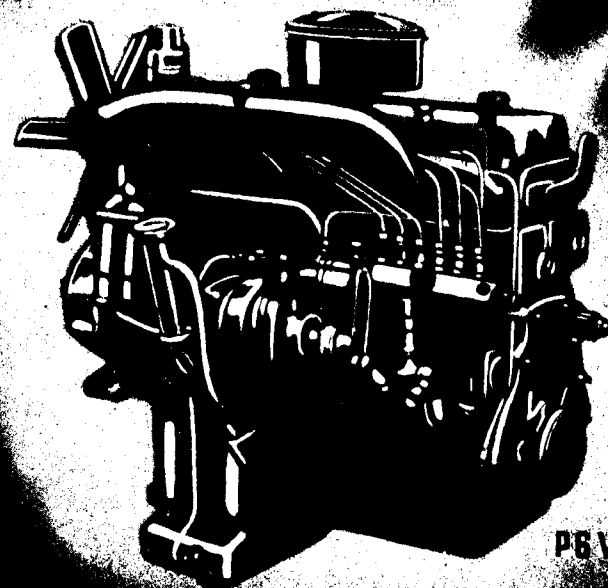
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