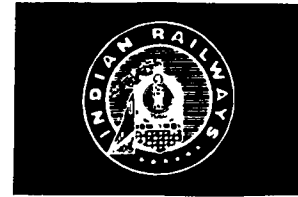


4208

Rail Coach

Annual number:
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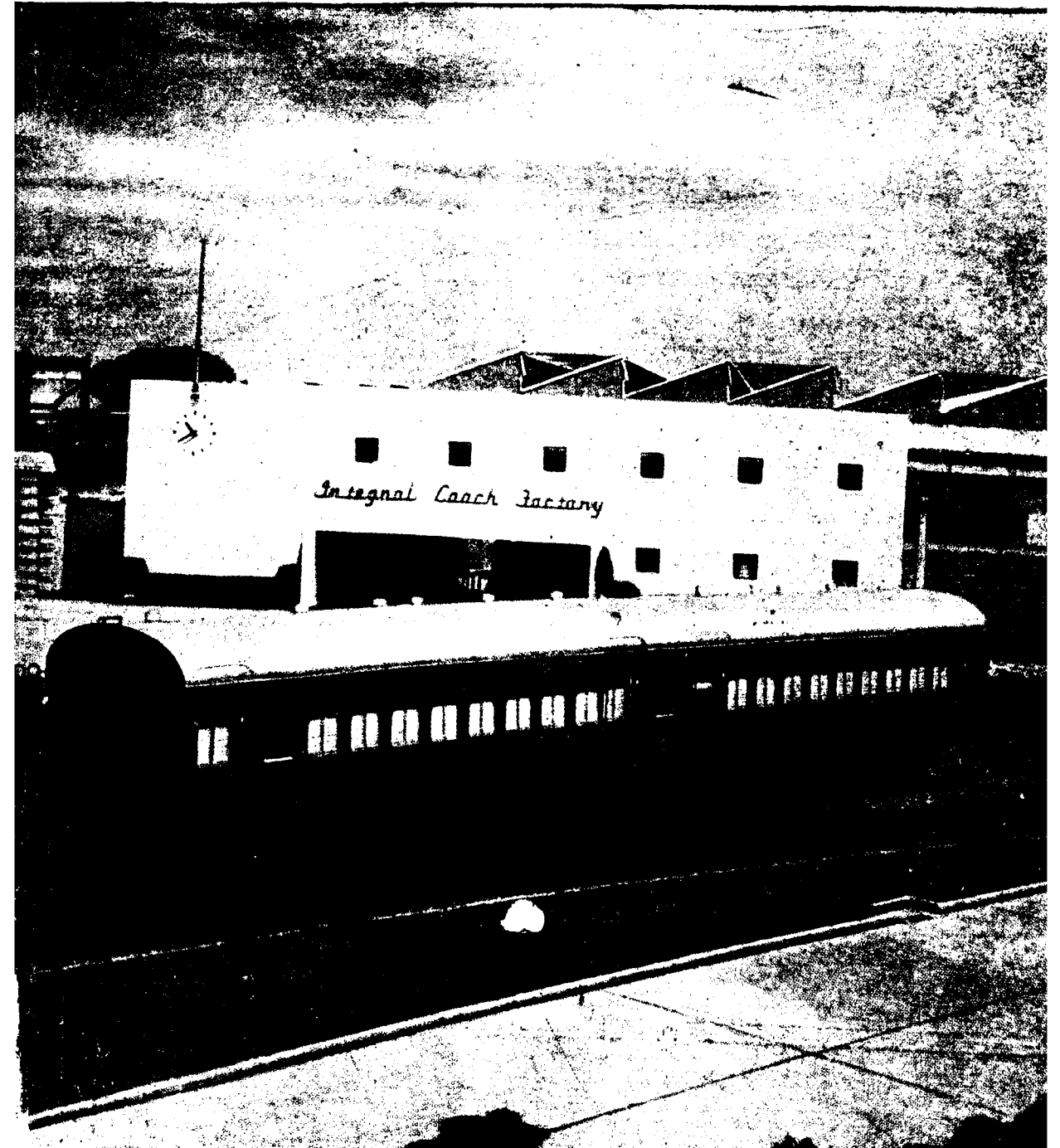
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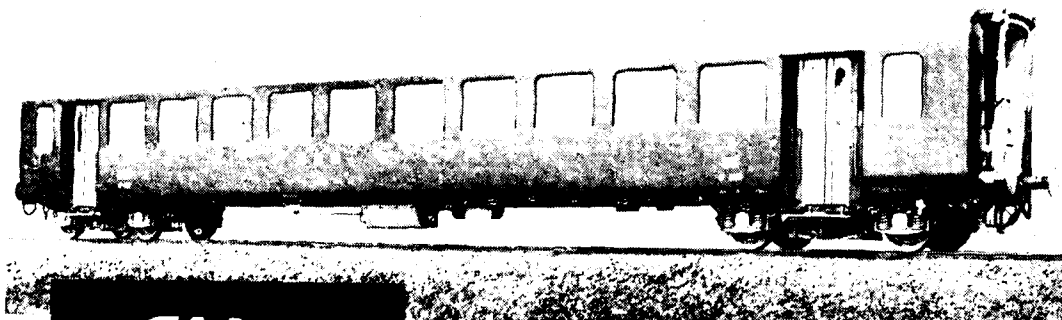


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RAILCOACH

ANNUAL NUMBER 1960





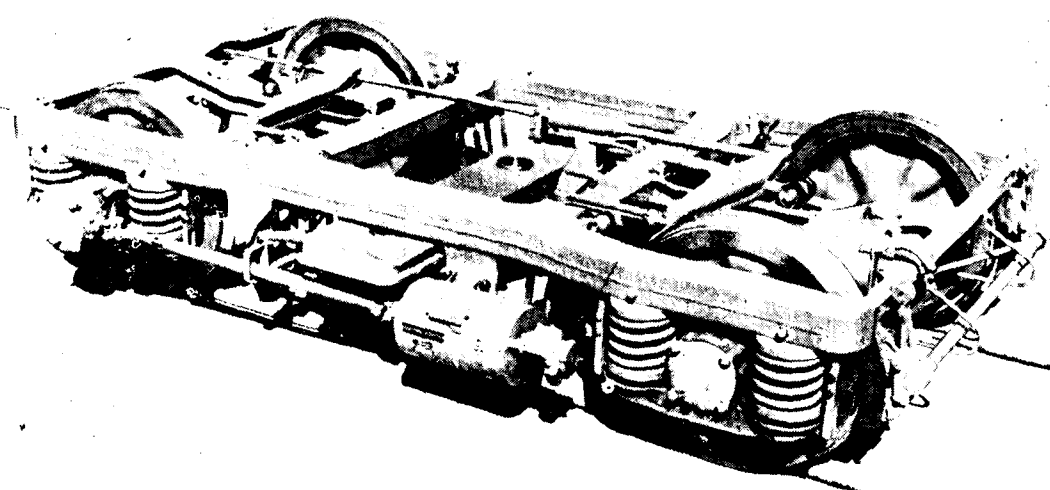
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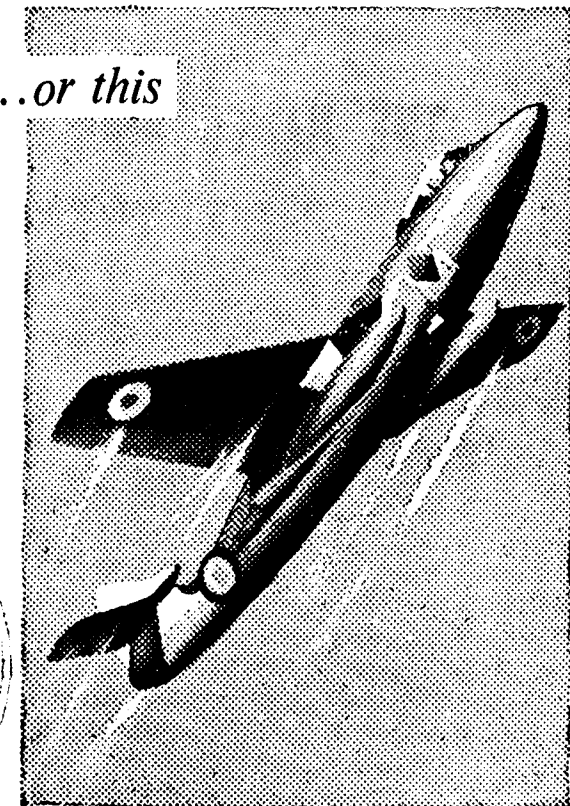
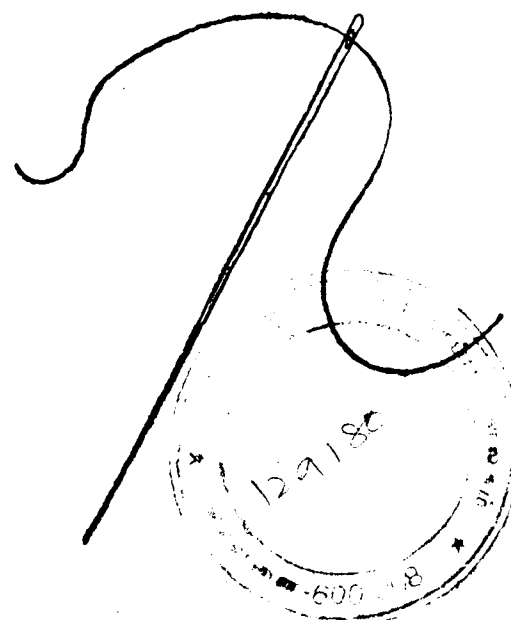
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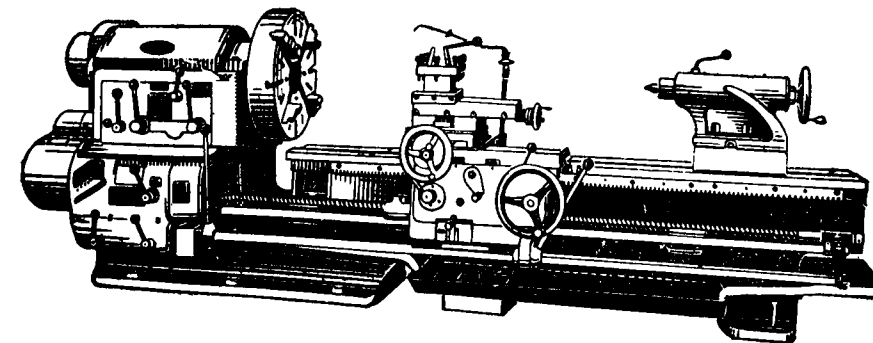
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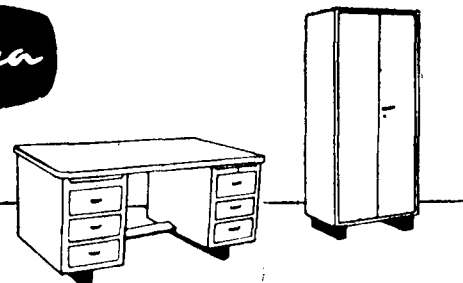
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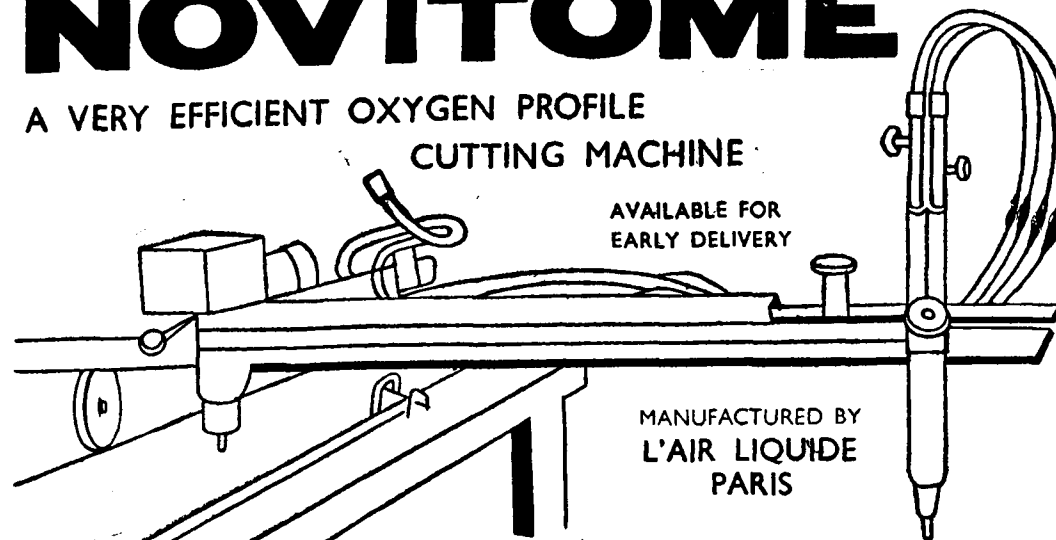
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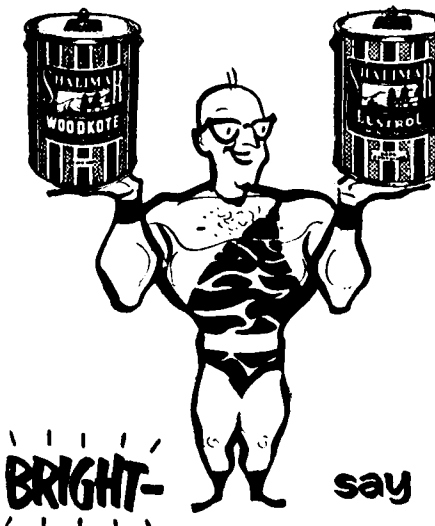
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(INTEGRAL COACH FACTORY MAGAZINE)

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Manuscripts and photographs, not accepted for publication, will not be returned unless the sender so requires. Intending contributors from outside our Factory, if they intend to get back unaccepted articles and photos, should send a suitably stamped and self-addressed envelope along with the material sent by them.

Contributions should be addressed to the Editor, not by name, and reach him not later than the 25th of every month for consideration for publication in the next month's issue.

The Editor does not assume any responsibility for the accuracy of the news supplied by correspondents or for opinions expressed by contributors. Opinions expressed in the “RAILCOACH” whether editorially or by contributors should be regarded as having no official authority.

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Do You Know?

THREE are at present 110 electric locomotives and 177 diesel locomotives on the Indian railways.

* * *

THE weight of non-ferrous metal scrap sold by the Railways during 1959-60 was approximately 877.3 tons.

* * *

THE number of persons arrested, fined and imprisoned for ticketless travel during 1960 (up to September) was 1,66,973, 54,615 and 80,919 respectively.

* * *

AT present there are 26 co-operative credit societies and 170 co-operative consumer societies on the Indian Railways.

* * *

THE total number of railway employees who have opted for pension-cum-gratuity scheme up to September 1960, was 28,375. The number of persons, who retired after exercising option in favour of the scheme was 6,254. The time-limit for exercising option has been extended up to March 31, 1961.

* * *

LICENCE fee realised during 1958-59 for refreshment rooms was Rs. 2,38,730 and for vending on platforms Rs. 13,88,004.

* * *

It has been proposed to provide transit accommodation hostels, for railway employees on transfer, at 43 places on the various zonal railways. The maximum number (16) would be on the Eastern Railway.

* * *

BOOKS, newspapers, periodicals, etc., worth Rs. 55,56,543 were sold in railway bookstalls, except those on the Southern Railway during the calendar year 1959. The Southern Railway bookstalls sold them for Rs. 20,80,359 during 1959-60.

* * *

THE construction work of the metre gauge line, the Khandwa-Hingoli line, between the north and the south metre gauge networks took six and a half years to complete and the expenditure made up to September 1960 was Rs. 11.38 crores.

editorial

EXPORT OF COACHES

“This Coach Factory probably is the nation’s most favourable exhibit” wrote Mr. Frank R. Ford, a leading journalist from America after a visit to the Integral Coach Factory, in Scrips-Howard Newspapers throughout America. He also said that this Factory so modern in its conception rivals anything in the world for equipment and labour saving systems. Coming from a man of Frank R. Ford’s calibre the above opinion is indeed a major compliment to this Factory and the work done here. Not only Mr. Frank R. Ford but many distinguished visitors who have visited I.C.F. have been equally spontaneous in their mighty compliments. This establishes beyond doubt that, given requisite facilities, industries in India can come up to the high standards expected of them to bring India in competition with highly developed industries. I.C.F. has in fact in the past five years made phenomenal progress; in the fifth production year the I.C.F. has produced 502 coaches as against the target of 350 coaches per year.

With the passenger transport problem in the country easing with the production of more coaches, an export market has to be exploited for I.C.F. to play a newer role later as one of the country’s foreign exchange earners. What with an excellent record of production and the name it has earned by hundreds of visitors from all over the world for excellent workmanship, I.C.F. may not face much difficulty in entering into foreign market.

As this plan of export gets underway, I.C.F. will be able to programme how to cater to this requirement. Let us hope that the combined effort of one and all in the I.C.F. will soon usher in this new era, in the history of I.C.F., of export of coaches produced by the I.C.F.

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**FIRST FIVE YEARS OF PRODUCTION AT
THE INTEGRAL COACH FACTORY**

BY

K. SWARUP

(Chief Administrative Officer, Integral Coach Factory)

2nd October 1960 marked the completion of First Five Years of production at the state-owned Integral Coach Factory. This article deals briefly with some of the salient features of the I.C.F. and its progress during First Five Years.

Introduction

The Integral Coach Factory, a production unit of the Indian Railways is located at Madras in South India. As a commitment under India's First Five-Year Plan, this factory was set up with a project cost of Rs. 7.35 crores to achieve self-sufficiency in matter of passenger coaches for the Indian Railways. The factory spreads over an area of 50 acres in which are built 10 sheds covering about 20 acres, the largest shed being the Main Assembly Shop which is 1,000 feet long and 260 feet wide. More than 1,000 items of machinery/plant and also more than 1,000 items of special jigs, fixtures and other equipment have been installed in the factory. The project expenditure also included other ancillary works like Adminis-

trative Office, Canteens, fully equipped Technical Training School and the township. The township has about 600 staff quarters and is provided with playgrounds, parks, schools, institutes, open air theatre, etc. The factory was built and equipped within a record period of three years starting from September 1952. The production was inaugurated on an auspicious day, Gandhiji's birthday, i.e., 2nd October in the year 1955. During the first five years of production 1,427 coach shells (i.e., about 50 per cent more than the original targets) have been produced at unit costs which are presently even less than half the cost of similar imported coaches. The production efficiency has been steadily increasing and the quality in manufacture kept to a very high standard. Few factories have achieved greater significance and importance in the context of fast growing productivity than this State-owned Integral Coach Factory, thanks on one hand to the successful Swiss-Indian Technical Collaboration and on the other to the skill, the high sense of duty and the team work of all I.C.F. workmen.

Manufacturing Activities

Integral Design of coaches which was originally developed and successfully tried out at Switzerland was adopted as future standard for the coaches to be built for the Indian Railways. A third class integral coach design for the Broad Gauge was accordingly developed in India with the assistance of the Swiss Designers. For the proper planning and establishment of production of this special type of all-welded light weight steel coach, a Technical Collaboration Agreement was also made with the Swiss Firm—Messrs. Swiss Car and Elevator Manufacturing Corporation, Switzerland to give the 'Know-How'. This Coach Factory was thus planned initially to produce only third class integral coach shells during its first five years. Soon after the establishment of production however, this factory was recognised as an ideal industrial unit for the manufacture of all-welded rolling stock and was given to design and produce other types of integral coaches. The factory has already designed and started production of Passenger-cum-luggage cum brake vans (TLRs), Third class Sleepers (TCNs) and First class (Fs) coaches. The diversified coach production activities of this factory programmed till the end of Second Five-Year Plan (until March 1961) are indicated below in Table I.

TABLE I

Type of Coach	No. Programmed	Remarks
'T' (Integral)	1047	All produced and turned out
'TLR' (Integral)	121	Do.
'TCN' (Integral)	150	Production nearly completed.
'T' (Conventional)	115	Do.
'TLR' (Conventional)	185	Turnout being commenced.
'F' (Integral)	155	Do.

Besides these Broad Gauge coaches the manufacturing activities of this factory have covered the following other rolling stock :—

- (a) Prototypes for BOX Mark II and Low Sided Iron Ore Wagons
- (b) Bogies for Refrigerated Fish Vans
- (c) Bogies with improved riding qualities for high speed De Luxe train coaches.
- (d) Bogies with improved riding comforts for air-conditioned twin car sets.

During India's Third Five-Year Plan period commencing from April 1961, it has been proposed to produce a total of 3,735 coaches at this factory. This programme will further diversify production activities at I.C.F. as it includes coaches for the Metre Gauge for Electrical Multiple Unit Stock and also Diesel Rail Cars apart from B.G. Passenger Coaches. The rolling stock programme for the Third Five-Year Plan is given in Table II.

Productivity—Shell Production

Output : Three hundred and fifty coach shells per annum (30 shells per month) in single shift was the planned production capacity of this factory. Originally as per the Technical Collaboration Agreement it was scheduled to achieve this target production of 350 coach

Type	B.G.	M.G.	N.G.	Total
Ts	23	1198	...	1221
TLR	235	...	...	235
Fs	462	...	...	462
FTs	592	...	...	592
Motor and Parcel Vans	...	343	...	343
Motor Vans	...	73	...	73
EMU (12' wide trailers)	612	...	...	612
Railcars	57	120	10	197
	1991	1734	10	3735

TABLE II

shells per year during the 5th year of production. Starting humbly with the assembly of coach shells from components received from Switzerland this factory has repeatedly beaten its production targets, has achieved its single shift capacity production much ahead of schedule and is now producing coach shells from almost all Indian-made components. The comparison of the targets and the actual output during the five years of production is indicated below :

Production Year (October-September).	Original target.	Actual output.
1	20	43
2	100	150
3	200	308
4	300	424
5	350	502

Second Shift

A second shift has been introduced in this factory from April 1959 to meet the increasing requirements of coaching stock as well as to obtain further utilization of machinery and

plant. Work during the second shift is being increased as and when additional technical manpower and materials became available. It was due to this partial second shift during the fifth year of production that it was possible to produce 502 coach shells. The present production rate is 52 coach shells per month which will soon be increased to 60 per month by intensifying work in the second shift.

Unit Manhours : The efficiency of the shops has been increasing from year to year as the men have been gaining skill and experience. The manhours spent on each coach shell have come down from about 19,600 at the start of production to about 8,600 in the latest batch. The present manhours compare very favourably to those taken for similar coach production in European countries.

Production cost : The unit production costs have similarly been coming down steadily from initial Rs. 186 thousands to present Rs. 78 thousands inclusive of the overheads and depreciation. The ex-works cost of a similar coach imported from Switzerland was about Rs. 107 thousands, its landed cost in India working out Rs. 187 thousands. With production of each coach shell we are thus saving at present more than Rs. 1 lakh. During this short span of five years, such savings

would amount to nearly twice the capital invested in the Shell Factory.

Incentive System

To eliminate all wasted time, to obtain still better utilisation of our plant and equipment and to stimulate greater effort from our workmen a bonus system of payment has also been introduced in this factory from the beginning of the year 1960. As a result of this incentive system it is expected that the production will further improve in the years to come.

The Furnishing Unit

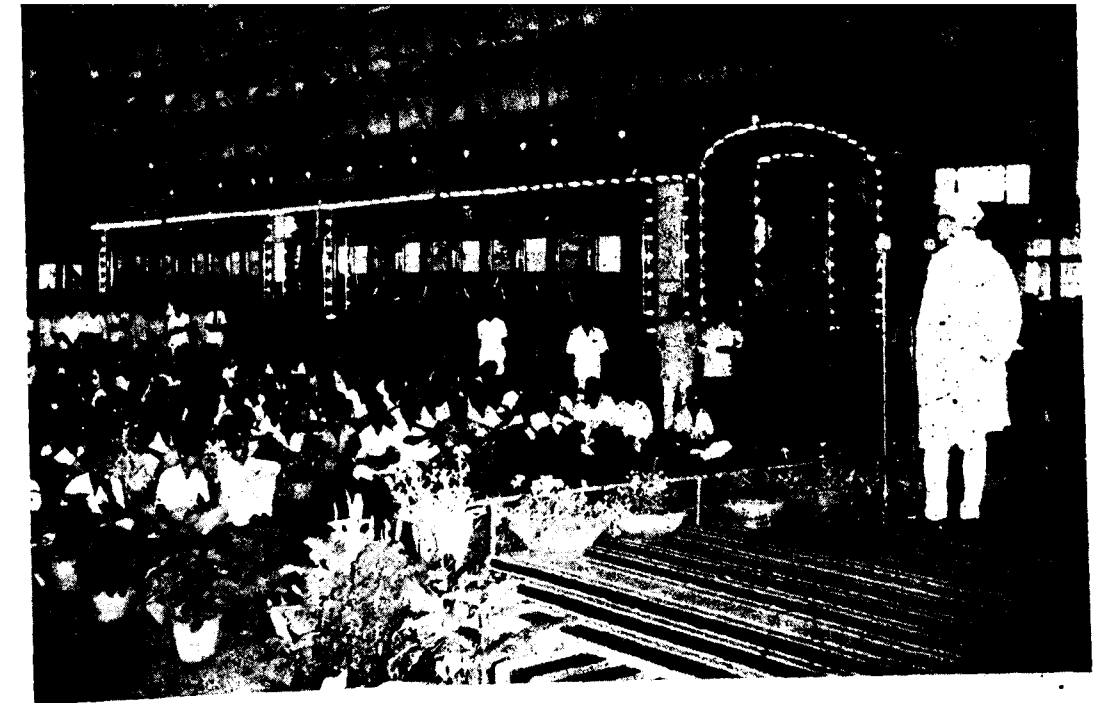
The original intention was that this Integral Coach Factory would produce only shells while they will be furnished in the Railway workshops. Due, however, to the impact of the Second Plan, it has been decided to cater for furnishing all the shells at I.C.F. itself. A separate furnishing unit, with a project cost of Rs. 3.69 crores is therefore being set up adjacent to the present Shell Unit. Construction work for this Permanent Furnishing Factory is

already in hand. All lands have been acquired and ancillary works like Railway sidings, roads, compound walls, water-supply pipelines, works entrance, etc., have already been completed. The construction of the Main Works Office is nearing completion. The workshop structures in prefabricated reinforced concrete, a technique which is being tried out for the first time in this sector, are now in hand. It is expected that this Furnishing Factory will be completed early in the Third Five-Year Plan.

In the meanwhile, furnishing of shells on a small scale has been commenced by providing temporary facilities. Starting from May, 1957, this temporary furnishing unit has gradually developed its output and is now furnishing at the rate of about 25 coaches per month. Like its elder brother, the shell unit, the performance of this furnishing unit, has also been equally impressive. The furnishing costs have come down from initial Rs. 97 thousands to Rs. 60 thousands per coach and unit manhours from 12,900 to 5,900 at present,



A New Product from the I.C.F.—The III class sleeper coach.



Launching of the 1000th coach from the Integral Coach Factory. This event symbolised the coming of age of this factory, inaugurated by the Prime Minister on the 2nd October 1935.

Staff

There are at present about 7,000 men at work in both shell and furnishing units. Manning of this factory was taken due care of from the early stage of the project. A number of Indian workers were sent abroad to our Swiss Collaborators for a specialised training and 40 Swiss Experts collaborated here during the first three years to give the 'know-how' to our Indian Technical Personnel. All these Swiss Experts (except one designer who has been given renewed contract) have completed their contracts and returned to Switzerland. The technical know-how has been completely assimilated and production is now in charge of Indian Engineers and workers whose present skill is second to none.

A fully equipped Technical Training School was also started in the factory from March 1954, i.e., eighteen months ahead of production. In addition to training skilled workmen for I.C.F. this School is providing promotional courses for various classes of staff. A training course for the unskilled staff of this factory is given to open avenues of their promotions.

There is also a refresher course for supervisors to raise the standards of their skill and supervision. Apart from these measures of betterment the I.C.F. Administration takes warm and friendly interest in its worker's welfare, amenities and cultural activities.

Appreciation

It is not for me to indulge in self-praise, but it can perhaps be said with a measure of truth that this factory has already come to be looked upon as a shining symbol of India's Industrial development in post-Independence period. Thousands of visitors from this country and from abroad vend their way through this factory in appreciation of our efforts. Some of the impressions, very well encouraging indeed, recorded by people coming from the very industrialised countries of the World are reproduced below :

- (i) *Lord Attlee of England* : 'A first class achievement'.
- (ii) *Marshal Tito, President of Yugoslavia* : 'Big enterprise which represents one of the premier industries in India's industrialisation.'

(iii) *Mr. Earl Warren, Chief Justice of U.S.A.* : 'Your achievement in this great plant is remarkable.'

(iv) *Mr. Chou-En-Lai, Prime Minister of China* : 'This is a modernised Coach Factory. It is worthwhile for the Chinese to come and learn. This factory is well built and well organized.'

(v) *Mr. F. Real, Minister of the Swiss Diplomatic Service* : 'I was very much impressed by this efficient and well-planned industrial plant.'

(vi) *Mr. William Siroky, Prime Minister of Czechoslovakia* : 'Your enterprise is a telling witness to the skills of the free and independent people of India.'

(vii) *Mr. Michael L. Hoffman, Member of the World Bank* : 'It is highly encouraging to see a project that is ahead of its planned output and clearly ready to play a big role in India's industrial development.'

(viii) *Mr. Chivu Stoica, Prime Minister of Rumania* : 'It is one of the most modern in existence, both from the point of view of conception and of technological organisation. It has a big productive capacity and has yet big reserves in raising output. The factory has the most modern equipment and also highly

skilled technical engineers and foremen.'

(ix) *Mr. Michael Dehm, Director from German Federal Railways* : 'A really splendid achievement in the development of the Indian Railway System and a sample of high productivity and factory planning.'

(x) *Mr. H. Gschwind, Chairman of Swiss Federal Railways* : 'What a friendly and good co-operation can fulfil as we see here in the I.C.F.'

(xi) *Marshal Voroshilov, Former President of the U.S.S.R.* : 'We have seen your very fine Factory.'

Looking Ahead

Since October, 1955, when this Integral Coach Factory first stirred into productive life, its story has been one of continuous development and growing productivity. The object with which the factory was set up has been more than fulfilled. Having achieved self-sufficiency in matter of passenger coaches for the Indian Railways this factory is now looking forward to building coaches for the export market. Our costs are very competitive and quality in production is of a very high standard. We are not only trying to develop export market for our integral coaches in the neighbouring and South-East Asian countries but are hoping to export some even to East European and South American countries.

POLISH PRIME MINISTER'S VISIT TO I.C.F.



His Excellency the Prime Minister of Poland being received at I.C.F. by Shri K. M. Aiana, Dy. C.M.E. (F.)—I.C.F.

His Excellency the Prime Minister of Poland, Mr. Jozef Cyrankiewicz visited the factory on the 26th September 1960. On arrival, His Excellency was received by Mr. K. M. Aiana & Mr. C. G. Devaya, Dy. Chief Mech. Engineers and the salient details of the work carried out in the factory were explained to His Excellency who was then conducted round the various shops of the factory. The Prime Minister, while driving through the Staff Colony, was warmly greeted by children who presented to him flower bouquets. In reply to a Welcome

Address given by Mr. Aiana, the Prime Minister, at the conclusion of his visit, addressed the gathering in the meeting room and said that the I.C.F. was a living example of the quick progress made in India in the industrial field. He was glad to note that India had not only reached self-sufficiency in the matter of supply of railway wagons but was also exporting them to adjoining countries. He also recorded the following in the visitors' book :—

"Congratulations on your achievement and wishes for further development."

Mr. Jozef Cyrankiewicz being presented with a coach model by Shri Aiana, during the former's visit to the factory.

The Prime Minister driving thro' the I.C.F. Staff Colony, being greeted by children.



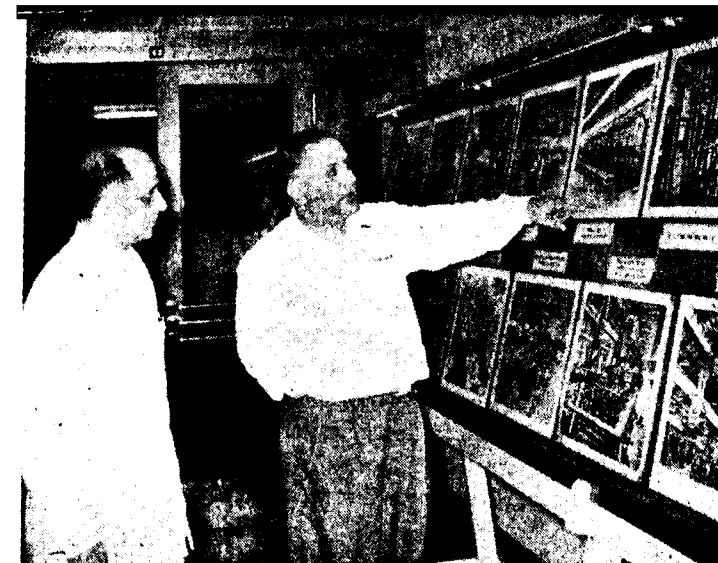


VISITORS TO

The Dy. Minister for Railways, Shri Shah Nawaz Khan, inspected the Factory on the 22nd October 1960. Photograph shows the Dy. Minister addressing the officers of the I.C.F.

THE FACTORY

Shri S. Jagannathan, Financial Commissioner for Railways, visited the factory on the 21st September 1960. After being shown round the factory, Shri Jagannathan observed that "the factory constitutes a fine achievement and richly deserves the impressive testimonials" recorded in the visitors' book by Foreign dignitaries.



Shri Shah Nawaz Khan was conducted round the site of permanent furnishing factory where civil engineering construction is fast progressing.



Lady Barbara Ward of the "Economist", a London Periodical, and Mrs. Taya Zinkin of the "Manchester Guardian" visited the factory on the 24th September 1960. At the conclusion of the visit they recorded their impressions in the visitors' book as follows :—

Mrs. Zinkin : 'The best Project in the Public Sector I have had the privilege of visiting.'

Lady Ward : 'A remarkable combination of economic efficiency and general amenity.'



Shri D. C. Baijal, Member Staff, Railway Board inspected the factory on the 22nd September 1960.

Smt. Tarakeshwari Sinha, Union Dy. Finance Minister, visited the factory on September 19, 1960. After a drive through the Shops, the Dy. Minister also addressed the Officers and Staff of I.C.F. on the "National Savings Scheme."



FUTURE TRANSPORT

In the major cities and towns of virtually every industrialised country, the transportation system, the life-blood of a nation, is being subjected to an unprecedented squeeze—the choking squeeze of passenger and traffic congestion. It poses a problem to which, ironically, the solution has been known for at least 80 years.

That solution—now being rigorously tested—is the monorail.

A monorail is a train-like system of transportation which operates on a single rail some 14-20 feet above the ground. It has no road-bed as railways do, its single track being suspended on a system of slender, eye-appealing towers, with virtually no overhead construction.

Two kinds of monorail are known. In one the coach or car runs astride the rail or on top of it. London's proposed Air Rail, linking Victoria with London Airport, is to be of this type. So also is the German Alweg system which Brazil is having constructed in Sao Paulo to solve that city's transport problems.

The second kind has its coaches or cars suspended on the rail either by wheels which are part of each coach, or by wheels mounted on bogies. The "Skyway" pilot system built by monorail Inc. of Houston, Texas, is of this kind. Others are the monorail operating successfully in Wuppertal in Germany since 1901, the new test scheme in Tokyo, and various others which are inaugurated also as pilot scheme but came to nothing.

Today, the rapid extension of road traffic due to an enormous increase both in passenger movement and goods in transit have created complex transport problems in the world cities. If solutions to these problems are not found soon, a complete transport chaos is threatened.

All kinds of solutions are being tested,

including the construction of new roads, special fly-overs at vital junctions, swifter rail transport, new underground railways, tunnels under rivers and new bridges over them, and hosts of minor improvements including systems of reversible one-way traffic at rush-hours and the staggering of passenger traffic.

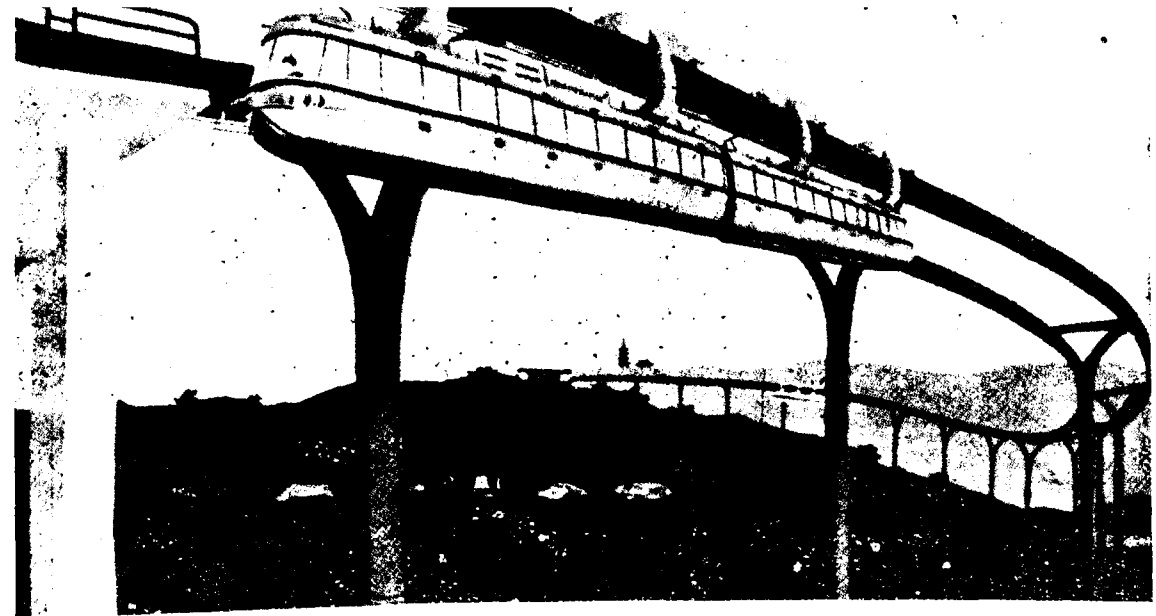
However, all these only help alleviate the difficulties temporarily. The major problem continues to loom large since any improvement is quickly swallowed up by the ever-mounting increase of traffic.

While most cities undoubtedly have many problems peculiar to themselves, there are many factors which are similar and even common to all. These include items such as access to rail and airport centres, passenger and freight handling facilities, storage, and car-parking facilities—all of which influence both travel time and cost.

In many North American cities this problem has exercised the finest engineering and transport brains and many of them think that the monorail holds the promise of a satisfactory solution. Indeed, various cities, among them, San Francisco, Los Angeles, Detroit and Sacramento, are seriously considering when and how they can embark on building some kind of monorail system of public transport to overcome existing traffic problems.

What is surprising is that the monorail is not a new discovery. As far back as 1882 a monorail was constructed on "A-shaped" supports in Algeria; in 1886 a similar one connecting Listowel and Ballybunion in Ireland was built; but neither received sufficient public support to continue.

In Britain, many monorail schemes were devised but all were shelved either through lack of foresight or funds. For instance, in 1903 there was a scheme to link Liverpool with



AN ARTIST'S IMPRESSION OF THE MEMORIAL PILOT PROJECT COMPLETED IN TOKYO IN 1957

Manchester. There were plans for monorails between Putney and Charing Cross, London and Brighton, and (in the 1930's) for a monorail link between Blackpool and Manchester.

Yet one monorail system did succeed in overcoming all the initial difficulties, and has continued to operate successfully ever since, with the exception of a period during the last war when it was damaged.

This is the "Suspended Monorail" or Wuppertal "Schwebbahn" which runs from Wuppertal-Vohwinkel to Wuppertal Oberbarmen in Western Germany. Just over eight miles long, it straddles the river Wupper for about six miles and a road for two miles, thus utilising air space without interfering with existing river and road communications.

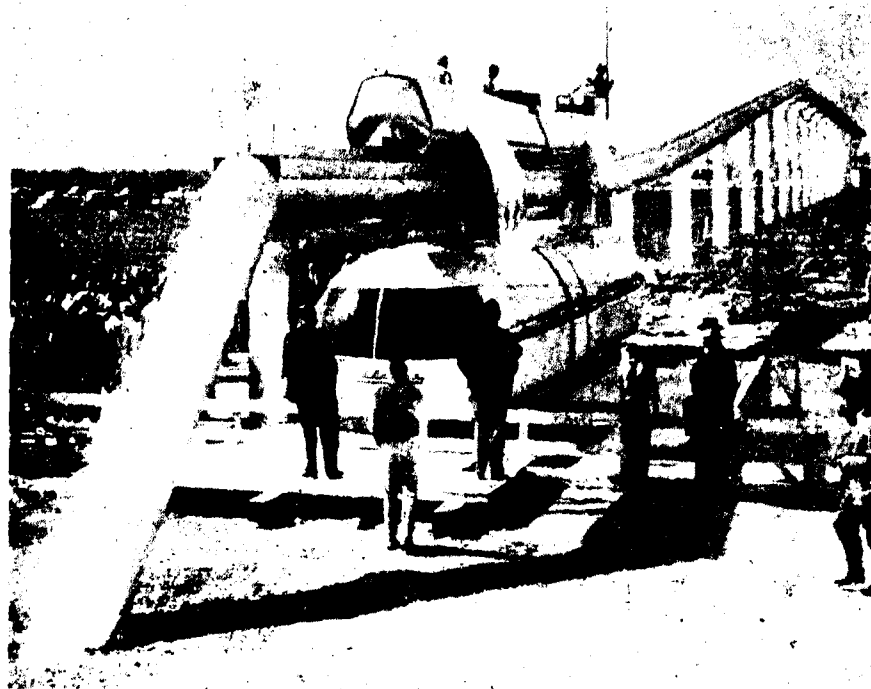
In this highly industrialised area, the "Schwebbahn" serves a vital transport need. Passengers may enter or alight at any one of the eighteen stations, and in rush hours have a three-minute service. While the maximum permissible speed is just over 37 m.p.h., the closeness of the stations brings the average down to about 15 m.p.h. Despite this restriction on

speed, the "Schwebbahn" is capable of handling some 8,000 passengers per hour. On an average about 50,000 passengers are carried every day.

What about the safety factor?

The "Schwebbahn" has never been involved in a crash. Personal safety of the individual is also safeguarded by the design of the monorail. Since its inception, it has carried nearly a thousand million people with only three fatal accidents. One safety device is a special bolting mechanism on the doors which can operate only when the train is at a station. The doors on each carriage are on the platform side only. A second safety device is the automatic daylight signalling system, which is operated by the train itself, and which will not permit a train to leave one station until the train in the next station ahead has also departed.

At this point it is well to remember that the "Schwebbahn" was planned and constructed nearly 60 years ago. Since then technical progress has enabled engineers to build monorails—particularly the kind which runs astride the rail or beam—at speeds ranging up to 200



"Trial Blazer"
Undergoes on last
minute check at
Houston, before its
trial run.

m.p.h. German rail engineers, for example, have proved with their mile-long pilot scheme "Skyroad", built at Cologne, that a speed of 200 m.p.h. is quite feasible. In their quarter-size model, which ran on a rail elevated on concrete pillars, they achieved a speed of 80 m.p.h.

In the United States, one company which has already thoroughly tested its overhead monorail in a pilot system built at Houston (Texas), is now reported to be working on the construction of a further scheme at New Orleans, Louisiana. This company's train runs on pneumatic tyres and employs a gyroscope to maintain its balance on curves. Los Angeles has also been long interested in providing a quicker link between itself and San Fernando, some 44 miles away. Their scheme when complete envisages a monorail train capable of a top speed of 100 m.p.h.

It is also known that the French Government is having a test monorail line of the suspended type constructed at Chatauneuf-sur-Loire, with a view to building full-scale systems later if trials are successful.

Indeed, such is the interest aroused by the latent potentialities of the monorail that even where orthodox rail systems are possible the monorail is being considered, not only as a substitute but also as something which will be

cheaper to build and operate. For instance, in East Africa, where mountainous terrain hampers normal commercial development, the high cost of building an ordinary railway system to bring coal from the coalfields north of lake Nyasa in Tanganyika automatically recommends the construction of a monorail.

The Japanese are likewise keen to find a means of relieving congestion in their cities, particularly Tokyo.

Hence in 1957 they completed in Tokyo a short pilot project to test every aspect of monorail operation. Suspended by a bogie chassis, their smart streamlined two-coach monorail train operates on a beam supported by pillars the wheels being equipped with sound-proof contrivances for silent running.

Yet it is on London's Air Rail link between Victoria and the London Airport that world transport interest is largely focussed. For this scheme envisages the utilisation of a single diesel-powered coach equipped with road wheels to enable it to run non-stop all the 17 miles between these two termini. Most of the way it will run on a prestressed concrete elevated beam, the rest of the way on roads or airport tarmac as needed. When required, a number of coaches can be coupled together, each coach being capable of carrying 50 passengers. Speed will be in the region of 70-100 m.p.h.

The peak capacity of the train, using 30 coaches, is put at 4,000 passengers per hour in one direction. The journey will take about 15 minutes, compared to an hour under present conditions. The project would cost about £8 million, inclusive of the compensation, payment for the right of way.

The advantages offered by the monorail system are truly impressive. These are:

1. It costs considerably less to build and to operate than conventional road and rail systems.
2. It can be built with little or no costly demolition, without disturbing many existing buildings, and without building embankments, bridges or tunnels.
3. It is virtually accident-proof.
4. It offers silent, smooth and fast travel at less cost, and
5. Its passenger-carrying capacity is much greater than that of other systems.

Hence it is able to cope better with peak hour traffic.

In passenger movement, the monorail has proved that it can adapt itself to carry anything from 2,000 to 60,000 passengers per hour on a single traffic line. It can, moreover, be constructed over existing lines of communications, over railways, roads, canals and rivers, and can thus avoid using up vitally needed agricultural and building land.

Yet without question the monorail's greatest potential contribution to the smooth-flowing economic life of any industrial nation is that of easing congestion. Since it would not share the ground space used by other land-bound traffic—buses, cars, coaches, lorries, and railways—the monorail would irrevocably and measurably alleviate the choking passenger and freight traffic which at present threatens to strangle the economic life of many of the major cities of the world.

Monthly Outturn

	Target	Actuals
September ...	30	52
Cumulative total for the first Six months of the year 1960-61 (Financial) ...	180	277

NEWS AND VIEWS

Self-sufficiency of Railway Stores & Rolling Stock-Research laboratories' contribution, Deputy Minister's address to Scientists

The Deputy Minister for Railways, Shri S. V. Ramaswamy, disclosed in New Delhi on October 6, that the Indian Railways had achieved a large measure of self-sufficiency in the matter of rolling stock and other equipment, keeping limit of imports to the bare minimum. The position, the Deputy Minister hoped, would further improve when steel and other raw materials required by the Railways were made available in the country.

Shri Ramaswamy, who was inaugurating a Conference of Representatives of various Research Institutes in India where research on Railway materials and allied equipment were being conducted, laid stress on maximising the benefits of research through pooling of knowledge and frequent exchange of ideas between the scientists and users' organisations.

The Conference was convened by the Railway Board to ascertain how best the Railways could benefit from the research now being carried out in various laboratories and how the latter could help in cutting down the present imports of some of the items required by the Railways.

The Deputy Minister also referred to the important role the Railways played in the implementation of various development Programmes under the Five-Year Plans. He said that the Railways needed better quality of coal and other specialised items for greater operational efficiency and this would be possible through 'collective thinking' on the part of those engaged in research work in laboratories scattered throughout the country.

The Conference discussed a number of subjects of railway interest, in respect of which the previous research institutes have developed processes. The subjects discussed included a new design of electric bulb for use on headlights, signal glasses, glass for welders' goggles, im-

proved refractories, adhesives for use in coaches, oils for foundry use and insulating materials.

Shri E. W. Isaacs, Member Engineering, Railway Board, and Chairman of the Conference, other Board officials and representatives of various Research Institutes and National Laboratories attended the Conference.

Doubling of Howrah-Delhi Railway line

The Deputy Minister of Railways, Shri Shah Nawaz Khan, informed the Lok Sabha during September 5 that 732 miles of the railway track between Howrah and Delhi had been doubled so far. Of the remaining 170 miles, doubling of 55 miles between Faizullahpur and Manauri on Kanpur-Allahabad section was in progress and was expected to be completed by March 1963.

Shri Shah Nawaz Khan said that partial doubling of 63 miles out of 115 miles single line portion between Ghaziabad and Tundla had been approved. He added that the doubling of the balance 52 miles of the Ghaziabad-Tundla section would be taken up at a latter stage when the traffic developed.

Container Service on Indian Railways

The Container System has been introduced on the Central, Southern and South-Eastern Railways on an experimental basis and the extension of the service to other Railways would depend upon the results of experiments now being conducted on these Railways.

Lending Scientific knowledge to neighbouring countries

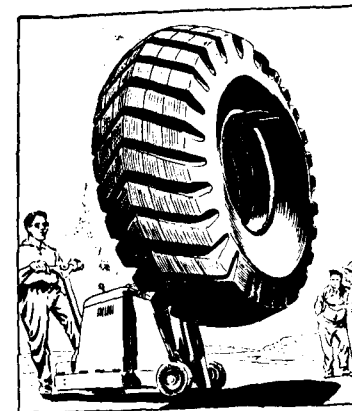
The Railway Minister, Shri Jagjivan Ram, said in New Delhi recently that the Indian Railways' research organisation had now reached a stage where side by side with meeting the railways' own needs, it should aim at making available its knowledge and experience to the railway systems of the neighbouring countries which operated under conditions largely similar to those of the Indian Railways.

The Railway Minister, who was speaking at the inaugural meeting of the Central Board of Railway Research, said that the object of setting up this Board was to bring together at one place eminent scientists working on the railways and outside under Government as well as under private auspices so that they could exchange amongst themselves their ideas, achievements and even mistakes.

Shri Jagjivan Ram said that a consideration

which research workers on the railways and outside in India should bear prominently in mind was that the practical application of this research should be devised in a manner most suited to India's limited resources. In other words, economical use of cheap indigenous materials should be found which would result not only in increasing operational efficiency but at the same time in reducing the costs of operation.

DID YOU KNOW



A tire that stands 10 feet high and 4 feet wide is described as the biggest in the world. It contains enough rubber to produce 3,200 passenger car tires and enough nylon cord for 7,000 of ladies' stockings. Built by the Good-Year Tire & Rubber Co., the tire is a research model of special-purpose tires for huge construction machines.



The United Nations Educational, Scientific and Cultural Organisation (UNESCO) reports that every day some 293,000,000 copies of daily newspapers and 335,000,000 radio receivers bring news and information to the world's peoples, while more than 140,000 cinemas bring them entertainment. The U.S. prints twenty percent of these newspapers, and has about 48 percent of the radio sets and 14 percent of the cinemas.



Guano is more precious to Peru than gold. Collecting the droppings of sea birds from the rocky islands strung along the Peruvian coast of fertilizer is a major industry. Peru's Guano Islands and walled nesting grounds on the mainland are the largest bird sanctuaries of their kind in the world.



By Scio

"GANDHIJI" FATHER OF OUR NATION

BY

M. P. BALAGOPAL

October 2nd of every year is a most important and memorable day for Indians. On that day the people of India celebrate a great man's birthday with much respect. On that day one could hear about his nobility, courage, sacrifice and his philosophy through speeches and articles by eloquent speakers and eminent writers. The distinguishing quality of this great man was that he practised "what he taught" to the people, himself. With great affection he loved people and naturally people too loved him. This great Mahatma who kindled the lamps of freedom in every Indian was born on October 2nd, 1869.

Gandhiji's father was a Diwan in Porbandar. Gandhiji spent his childhood in Porbandar with his father. In olden days child marriages were very common among the Hindus. Gandhiji's marriage was also settled very early, and it took place with Kasturbai at his age of thirteen. After his high school and College studies Gandhiji decided to go to England to study law. But his mother was against it. In that period there was a staunch belief among the Hindus, that the people who go abroad might neglect their religion. But Gandhiji was adamant and with much difficulty and persuasion he made his mother permit him to go to England. He made a vow, that he would not touch wine, meat, etc. After completing his studies in law, he returned to India.

He had then an offer from an Indian Company to attend a case in the Court of Porbandar. Accepting the offer he sailed to Africa. That was the time in the South Africa, when other than white people were treated as slaves by white men. Most of the Indian workers were labourers. Indians were treated very badly by the English. One day while Gandhiji was

travelling in a first class compartment an European rebuked him as "black Indian" and treated him very badly. From that day onwards Gandhiji with a determined effort resolved the fight for these unfortunate people and rescue them from the clutches of the foreign rulers. He worked in South Africa for the upliftment of the minority and his efforts to an extent were successful.

Gandhiji returned to India from South Africa in 1915. Indian National Congress was the main organisation then for Independent movement. Gandhiji closely associated himself with the Congress in Amritsar Session, and after that took the stewardship of the Congress. Gandhiji began to teach his philosophy of "Satyagraha" and non-violence in political field which proved very successful in his future activities.

He suffered much in the beginning stages to free India from foreign clutch and make India an Independent Nation. The problem was great "How could we get freedom from the Britishers? Are we capable to fight against them with gun and bionet. Are we that strong?" These questions ruled the mind of every Indian and of course the Government took all steps to smash the ambitions of these freedom lovers. But the flame could never be extinguished and even the mighty Britishers could not curb the movement for freedom under the leadership of Gandhiji, who taught his people to fight in a different way—the non-violent way.

Gandhiji taught the unarmed Indians how to fight with Britishers and led the national movement against the imperialist Government. Some of his famous movement were Swadeshi Prasthan, Salt Satyagraha and Quit India. In the beginning stages the Britishers used to

call Gandhiji as a "half naked Fakir" and had scant respect for him. That half naked Fakir went to England and attended the "Round Table Conference" and created a stir and an awakening in them.

Several times he was arrested, and for years he was put behind the iron bars. But day by day the struggle became more and more hard. In 1942 the "Quit India" movement started. Gandhiji and other leaders were arrested. But the struggle went on. It proved very difficult to the foreign rulers to put out the flames of this movement. The struggle for freedom one way or the other continued. At last, thanks to the leadership of Gandhiji, on August 15th, 1947, India became a self-ruled country. After that Gandhiji devoted his time more for the Hindu-Muslim unity, and worked for the stability of the new Independent nation. He refused to take any Government post.

His most important literary work was his Autobiography "The story of my experiments with truth." Every Indian, especially, youths of this country should read this valuable book. They will then understand his love towards his mother, the fulfilment of his vow, self control, devotion to God, above all his courageous attempt to make his countrymen follow the path of truth.

After Navakhali tour, Gandhiji returned to Delhi on January 30th 1948. He had a discussion with Sardar Vallabhai Patel on some important matters at the Birla House. The time for prayer meeting approached and it was in fact a bit late. He left Birla House with his hand on the shoulders of his grand daughters Abha and Manu and went to the prayer meeting. As soon as he returned the greetings with folded hands to the audience, a young man ran towards him and tried to touch his feet. Abha obstructed his first attempt. But suddenly three bullet shots were fired continuously by the same youngman. Abha and Manu were stunned. Gandhiji trampled down to the ground. He uttered three times "Hare Ram! Hare Ram! Hare Ram!" And that was the end.

The man who fought for the Indian independence, who fought for the removal of untouchability, who suffered much for the sake of Hindu-Muslim Unity, who lived like a saint, who was the very example of Buddha and Jesus and who always fought for the right and upheld the truth became a victim of the forces against which he had fought. There ends the tale of the great Mahatma but his name will be ever be remembered by every Indian.

Indian culture is neither Hindu, Islamic nor any other wholly. It is a fusion of all. I want the culture of all lands to be blown about my feet as freely as possible. But I refuse to be blown off my feet by any.

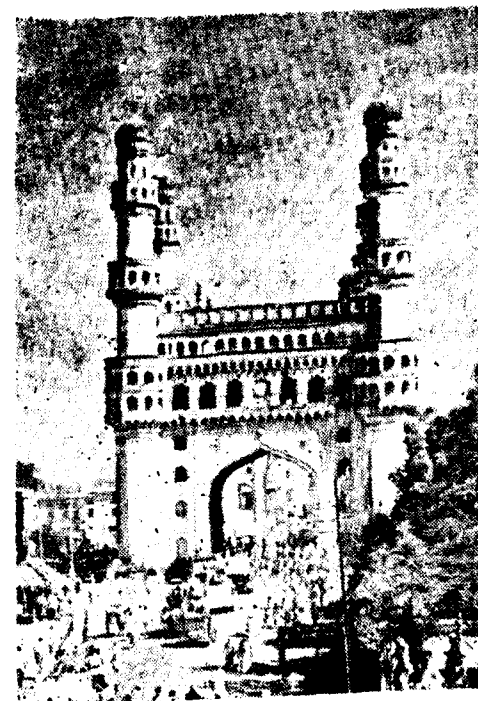
—MAHATMA GANDHI



From (L.R.) Shri R. Rajagopalan, Director, R.D.S.O., Mr. Braem, Shri K. Swarup and Mr. Feuschlin.

C. A. O(R) IN SWITZERLAND

Shri K. Swarup, Chief Administrative Officer, I.C.F. and Shri R. Rajagopalan, Director, R.D.S.O., who were recently abroad exploring export market for coaches produced by the I.C.F. visited the Swiss car and Elevator Manufacturing Corporation Schlieren, Zurich.—I.C.F.'s collaborators in the manufacture of light weight coaches in India. The above photograph taken on that occasion comes to us from Mr. Braem and Mr. Fueschlin with many greetings and regards from them to officers and staff of the Integral Coach Factory.



Char Minar, Hyderabad.

PLACES OF INTEREST IN ANDHRA PRADESH

BY

P. U. C. CHOWDARY

(Public Relations Office, South Eastern Railway)

The Tourists, holiday-makers and pilgrims travelling either from North India to the South or *vice versa* often skip Andhra Pradesh, though on their way they travel over several hundred miles in the State. Besides a lack of knowledge about the State's place of interest, the other restraining factor seems to be the location of some of the important places, like Hyderabad, Nagarjunakonda, Golkunda, Tirupati, Srisailem, Bhadrachalam and Lepakshi, away from the main railway lines or trunk roads connecting the major cities of India. And also, until a few years back, the need for developing these places as tourist attractions was not adequately realised.

Notwithstanding these handicaps, there are several places of importance in Andhra Pradesh which will interest the tourist, the holiday-maker the pilgrim, the archæologist, the artist and the sociologist alike. The magnificent capital city, Hyderabad, with its architectural beauties in and around, will make you forget the tediousness of your journey. The novel spectacle of ancient and modern Indias existing side by

side, as represented by the mighty Nagarjunasagar Dam and the remnants of an ancient civilisation and a Buddhist monastery at Nandikonda, will be a feast to your eyes strained by the scorching heat of the region. You will not mind a metre-gauge train journey for a few miles or an exciting bus travel over seven hills at Tirupati to have a *darshan* of Lord Venkateswara (Balaji), supposed to be the greatest dispenser of boons. You will be allured by the scenic beauty of the Araku Valley, Papikondalu and Horsley Hills, and the bracing climate of Waltair and Visakhapatnam. Nor you can ignore towns like Vijayawada, Rajahmundry, Kakinada and Guntur—Andhra's political, social, cultural and educational nerve centres.

HYDERABAD: The beautiful city, Hyderabad, is the capital of Andhra Pradesh. With wide roads and huge lakes, with exquisite buildings of Decan architecture, and with a pleasant temperature rarely exceeding 100°F, Hyderabad is an ideal city and a tourist's paradise. Hyderabad and Secunderabad are called

the 'twin cities' and together occupy an area of 96 square miles. The total population is about 11 lakhs. It is the fifth largest city in India, and is the southern camp of the Union President, who stays here, for about a month every year. It is a cosmopolitan city—a meeting place of the North and the South, with a mixture of the Hindu and the Muslim cultures, having among its population people of varied mother-tongues.

Hyderabad, on the bank of river Musi, was built in 1580 by Nawab Mohammed Quli Qutubshah, the fifth king of Golkonda, and was originally known as Bhagyanagar after Bhagmati, a favourite mistress of the founder. It was developed to its present stature by the Nizams, who paid their whole attention to it, to the detriment of the rural areas and other small towns.

The following places and structures in the city are worth visiting :

Charminar : Built in 1590, it is a 180 feet high square edifice in the heart of the city. It was built with masonry and carved with stucco. There are four arches facing the four directions.

Falaknuma Palace : Noted for architectural beauty and jewellery. It has a beautiful facade in the grecian style, the cornice resting on a double row of corinthian pillars. The staircase is of marble with beautifully carved balustrades with marble figures and candelabra at intervals. The ballroom, the dining room and the smoking room are richly and artistically furnished. It has a library containing a valuable collection of manuscripts and printed books. A picture gallery and a luxuries reception room with cabinets containing, crystal diamond and emerald objects are the other attractions.

Ajanta Pavilion : Copies of Ajanta wall paintings are displayed here. These coloured copies were made from actual tracings of the original paintings. There are also plastered casts of some specimens of Ajanta sculpture.

Assembly Hall : An imposing building in Indo-Saracenic style situated in the Public Gardens.

Char Kaman : The four 50-feet high arches on the four sides of a plaza in the heart of the city were built in 1593.

High Court : A majestic building with Deccan architecture constructed on the right bank of Musi at a cost of rupees twenty-eight lakhs.

Hussainsagar : Is a pleasing expanse of water, 11 miles in circumference, connecting Secunderabad and Hyderabad. The dam was built in 1575. A fine promenade runs along the lake.

Mecca Masjid : Situated south of Charminar. Built in 1614, the Masjid is a fine specimen of oriental architecture. Though the work was started by Mohamed Qutubshah VI, the structure was completed by Aurangazeb. It is 225 ft. in length, 180 ft. in breadth and 75 ft. in height.

Naubat Pahad and Fateh Maidan : The hill, 300 feet high, was used as a health resort in the 16th and 17th centuries. The maidan, on which Aurangazeb camped after capturing Golkonda, is now used for sports and public meetings.

Osmania Hospital : A picturesque three-storeyed building in Indo-Saracenic style with main and subsidiary domes. Built on the bank of the Musi at a cost of Rs. 21 lakhs, it now houses a well-equipped hospital with over 2,000 beds.

Osmania University : The buildings, constructed in 1918, are of great architectural interest. The Arts College is the most impressive structure.

Public Gardens : It is a big enclosed park with a number of lakes beautifully studded with lotus, children's playgrounds, vast open green patch for citizens to relax upon and a number of big and small trees. Some important public buildings, including the Assembly Hall, are situated here.

Salarjung Museum : Reputed to be one of the finest individual collections in the world. The exhibits have been arranged in 80 big and small rooms. Besides jewellery and jades,

there are paintings, statues, wood-carvings, chinese porcelain, ivory carvings and pieces of furniture from Japan, China, France, Italy and Britain.

Hyderabad Museum, Observatory, Mushirabad Mosque, Sitarambagh Temple and Mir Alam Tank are also worth visiting.

GOLKONDA : Five miles from Hyderabad. There is an ancient fort built on a picturesque granite hill by the Rajas of Warangal. The ramparts of the fort are strengthened by stone and mortar. The elevation is 400 feet and circumference four miles. The Qutubshah dynasty ruled here from 1518 to 1687. Under the shadow of the fort is an imposing group of Zenana palaces, built for the mistresses of the Golkonda kings.

NIZAM SAGAR : The largest artificial lake in the State and the second largest in India, covering an area of 50 square miles, situated about 100 miles from Hyderabad.

HIMAYATSAGAR : A dam was built on the Musi river and the water is used partly for irrigation and partly for drinking-water purposes. About 14 miles away from Hyderabad, it is an ideal picnic spot.

VIKARABAD : Fifty miles from Hyderabad. It is a popular health resort, situated on an elevation of 2,000 feet above sea level. About 3 miles from Vikarabad are the Anantagiri Hills noted for their scenic beauty.

HANUMAKONDA : Four miles west of Kazipet junction. Was the capital of the Kakatiyas. A famous Hindu temple known as the 'Thousand Pillared Temple' is here. Commenced in 1162 by a ruler of the last Hindu dynasty but never completed, it is nevertheless a remarkable example of Chalukyan architecture. Beautiful sculptures adorn the perforated and ornamented stone-screens on the doors. There is a big stone Nandi (bull) before the temple on an open platform.

WARANGAL : Six miles from Kazipet. Is surrounded by two walls ; the outer one, 25 miles in circumference, is of mud and only traces of it are there. The inner wall is of stone and is pierced by four arches and gateways of great strength. Both walls date back to the 13th

Century. Warangal is famous for its silk carpets and fine handloom cloth.

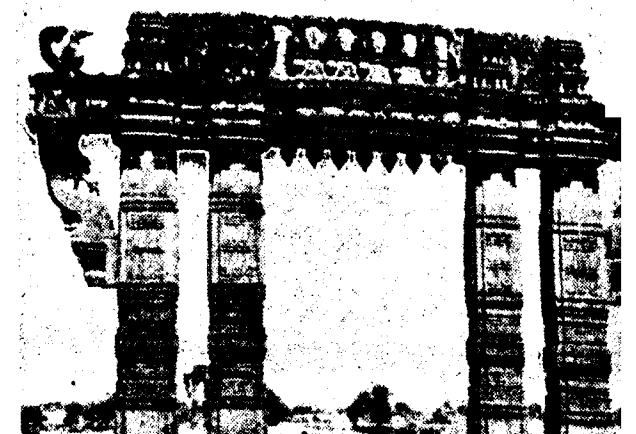
PALAMPET : Forty miles from Warangal. The Ramappa temple here has been described as "the brightest gem in the galaxy of mediaeval Deccan architecture". On the temple can be found large dancing figures in black basalt, brilliantly polished and having a dynamic beauty of rhythm and grace.

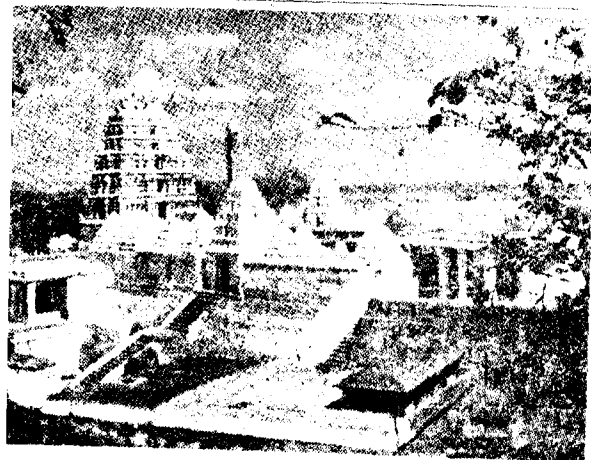
KONDAPALLI : Near Vijayawada. There are ruins of a once celebrated fortress built in 1360. The old palace of the Qutubshahi kings stands on an elevation above the valley. Kondapalli is noted for its beautiful toys.

BHADRACHALAM : Great pilgrim centre on the bank of the Godavari. There is an ancient temple of Srirama, renovated by Ramadas, an employee under the Tanisha of Golkonda, at a cost of rupees six lakhs. It is stated that Ramadas used that money from the Government exchequer and when he was arrested for that, Srirama himself came in disguise and repaid the money to the Tanisha. Srirama is said to have crossed the river Godavari near this spot on his journey to Lanka in search of Sita. Efforts are being made to renovate the temple at a cost of rupees twenty-five lakhs.

NAGARJUNAKONDA : About 50 miles from Vijayawada and 100 miles from Hyderabad. Ancient seat of Mahayana Buddhism. Acharya Nagarjuna was in charge of the Sangrahamam here. Later it was the capital of the Ikshvakus under the name of Vijayapuri. There are great

Stone gate-way near Warrangal





Temple of Srirama at Bhadrachalam.

architectural ruins of stupas, monasteries and a university, belonging to 300 B.C., which are now being excavated as the valley will be submerged under the Nagarjunasagar project. An archaeological museum has been built at the site and excavations have been completed on 2,500 acres of land. A mighty dam of 330 feet height is fast coming up on the river Krishna here.

AMARAVATI : Forty miles from Vijayawada via Guntur (Masulipatam—Marmagao line) on the right bank of the Krishna. It was once the capital of the Andhra kingdom, under the name Dhanyakatakam. It was an ancient centre of Buddhist religion and the side of a great tope. The relics were removed from here to the Madras and Calcutta Museums. Lord Amareswara's temple here draws many pilgrims on the Sivarathri day.

GUNTUR : Important educational and trading centre.

LEPAKSHI : About 10 miles from the Hindupur station on the Bangalore-Guntakal line. It has a temple built in the 16th century in which Sri Papanasa Lingeswara and Sri Raghunathaswamy smile at each other in juxta position—one of the few temples in India where Siva and Vishnu are together. Sri Virabhadra is also installed here, indicating a fusion of Vaishnava, Saiva and Veerasaiva concepts of faith.

It has numerous life-size paintings of scenes from the *Mahabharata*, the *Ramayana*, and other Puranas. There is a colossal stone bull, about 20 feet high and 27 feet long. A hanging pillar supported from the top is an intriguing

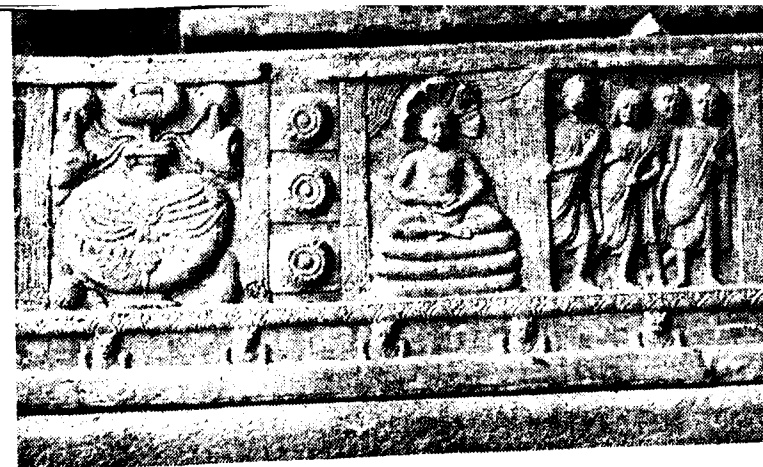
piece of construction. The temple is in the Vijayanagar style of architecture.

SRISAILAM : Via Nandyal on the Vijayawada-Guntakal section. It is known as the 'Kailasam of the South'. The Siva temple here is said to enshrine one of the twelve 'Jyotir Lingas' in India, and is one of great antiquity. The unique feature in this temple is that the devotee himself may offer puja to the lingam without the help of the priest. The Goddess here is known as Bhramaramba and is supposed to be one of the 18 leading Saktis. Sivarathri is the biggest festival here.

TIRUPATI : About 100 miles north-west of Madras on the Gudur-Katpadi line.—This shrine is held in high reverence by the Hindus all over India. The idol of the deity here is supposed to have the attributes of both Siva and Vishnu, appealing at once to the Vaishnavites and Saivites alike.

The temple on the hill is an example of early Dravidian architecture and is one of the richest in India with a monthly average income of nearly rupees eight lakhs. Lord Venkateswara, the deity (known as Balaji in North India), is believed to be a great dispenser of boons. Tiruchanur, two miles from Tirupati, is the abode of Padmavati Devi, the consort of the Lord. There is a perennial flow of pilgrims to Tirupati, which has won for it the saying that "Everyday is a festival day at Holy Tirupati." The beautiful scenery, the sacred waterfalls and the pure mountain air make Tirupati ideal throughout the year. Papavinasam, Gogarbhya Thirtham and Akasha Ganga, the waterfalls not far away from the

Srisailam Temple.



An architectural relic from Nagarjunakonda

temple, are worth visiting. *Brahmotsavam* and *Garudotsavam* are the important festivals here.

KALAHASTI : On the Katpadi-Gudur railway line. Situated on the bank of the river Swarnamukhi, a few miles from Tirupati. According to popular belief Siva manifested himself in the Kalahasti temple in the form of a mysterious and unperceptible current of air and the object of worship is Vayurlinga. The flickering light in the sanctum sanctorum is said to prove the existence of this mysterious air. Thousands of people gather here on the Sivarathri day.

There is a story that here, at Kalahasti, Siva was pleased with the devout attentions jointly paid by a spider, a cobra and an elephant and that it has given to the shrine the present name of Sri Kalahasti (Sri—spider, Kala—serpent, and Hasti—elephant). The Siva Lingam combines the bodily form of these three devotees—a spider at the base, two tusks of elephant on either side and a five-headed cobra at the top.

MADANAPALLI : On the Dharmavaram-Pakala line. Is noted for its dry and salubrious climate. It is a hill station and there is a T.B. Sanatorium.

HORSLEY HILL : A small hill with a charming valley in Chittoor district. The climate is delightful.

VIJAYAWADA : The most important political and commercial centre of Andhra Pradesh. Situated in the apex of the Krishna delta, it is a big railway junction and handles brisk trade.

The Sivalingam at Lepakshi Temple.

Pilgrims bathe in the holy Krishna river and worship at the Siva shrine and the Durga temple on the hill opposite the railway station. Two miles from Vijayawada, on the other side of the Krishna river, are the Undavalli rock-cut temples. There are an anicut and a road regulator on the Krishna river here.

RAJAHMUNDY : On the Madras-Calcutta main line. The second largest railway bridge in India spans the Godavari here. The river is held in great sanctity and once in twelve years a Pushkaram is celebrated. It is a great cultural and industrial centre.

PAPIKONDALU : Near Rajahmundry. Also known as Bison Range, it is a beautiful gorge through which the Godavari passes. Scenery here is really enchanting.



KAKINADA : On the Samalkot-Kakinada branch line. Seaport and educational centre. It is one of the beautiful towns of Andhra Pradesh. .

ANNAVARAM : On the Madras-Calcutta main line. There is, on a hill top, a temple dedicated to Lord Satyanarayana Swami.

VISAKHAPATNAM : Has assumed great importance with the establishment of a ship-building yard and an oil-refinery. It is a natural port and there are facilities for large ocean-going vessels. Bracing climate throughout the year.

WALTAIR : Seat of the Andhra University, which is situated conveniently away from the town's din and bustle. The University campus commands a beautiful view of the sea, hardly a furlong away.

SIMHACHALAM : Ten miles from Waltair, it is called the "Dakshina Kasi". There is a temple of Lord Varaha Narasimha Swami on a hill surmounting a flight of 1,120 steps provided by devotees as pious offerings. The temple has inscriptions dating back to the

twelfth century on almost all the pillars and walls. *Kalyanam* in April and *Chandana Yatra* in June attract thousands of visitors.

ARAKU VALLEY : Ninety miles from Visakhapatnam. Picturesque place with thick forests and orchards. Salubrious climate.

MACHKUND : Hundred and twenty-eight miles from Visakhapatnam. There is a multi-purpose dam.

BHEEMUNIPATNAM : Thirteen miles from Waltair. A small port and an attractive seaside and health resort.

Almost all the places of interest mentioned above have good facilities for accommodation and boarding. While Hyderabad and Visakhapatnam have Western style hotels or restaurants, all other places have good Indian style hotels or spacious choultries. Tourists or pilgrims can get everywhere wholesome food at cheap rates. The Directorate of Information and Public Relations at Hyderabad has a Tourist Information Bureau, whose assistance and guidance can be sought by people visiting the places of interest in Andhra Pradesh.

(Courtesy from South Eastern Railway)

A Broadway agent and his client decided to produce a play together. After the partnership was formed and the papers all signed, the agent turned to his ex-client and said, "Son, now that you're my partner, for the sake of the business, let me give you a little advice. For God's sake don't let anyone do to you what I've been doing to you for the past five years!"

* * * *

Cordell Hull was extremely cautious in his speech, striving always for scientific accuracy. One day, on a train, a friend pointed to a fine flock of sheep grazing in a field. "Look—those sheep have just been sheared," he said.

Hull studied the flock. "Sheared on this side, anyway," he admitted.

PRODUCTIVITY THROUGH INDUSTRIAL MAINTENANCE

BY

L. N. MISRA

(Chief Mechanical Engineer, Bhilai Steel Project)

India is on the threshold of industrialisation. Machines are most important wheels of industry and modern industrial production operation is largely dependent on the continuous performance of electrical and mechanical machines. Therefore, well-managed operations demand much attention to developing practices which keep efficient and economic production operations from breaking down as a result of equipment failure. This work, called maintenance, is yet an undeveloped technique in India.

National Productivity Council of India, with the help of International Co-operative Administration of U.S.A. has been sending out teams of Indians abroad to learn methods of increasing productivity prevalent in those countries. Rightly, therefore, the N.P.C. sent a team of maintenance Engineers to study the prevalent maintenance practices in Germany, England and America. The team left India in the middle of May, 1960, spent in all seven weeks in Germany, England and U.S.A. visiting various factories and having discussions with maintenance men, engineers, technicians and managers. The team has just returned. I am glad I was associated with the team as its member.

Generally speaking, men who buy equipment, including I and you when we buy a car, decide to spend money on the machine and its driving personnel. We don't even care to see whether there is a good workshop around or maintenance facilities are available. More often it is forgotten that when a machine has to be run properly, it has to be maintained so that it does not break down. What actually happen is this: in spite

of clear instructions that for the first 500 miles the car should not be run beyond a certain speed, the engine and gear oil should be changed at such and such mileage, none of these instructions are carried out. In fact, the driver, and sometimes the owner, in an effort to try the capacity of the car, runs it or at least spurts it at its full power, the oil is not changed and tuning is not done in time, with the result the parts get affected even before running in and its adjustments. Starting with bad operations combined with lack of maintenance, so much of damage is done in the beginning itself that more often an equipment cannot be brought back to the original condition any more.

Almost the same happens to the wheels of industry. When a plan is started, the first effort is to get it going some-how and in the condition of 'some-how', maintenance, which is at times considered only an expensive evil, is generally forgotten. New operators only add to the damages.

A car could, however, be for a joy-ride for somebody for whom time is not important or it could be for someone whose every second is precious. It is here that the technique of maintenance and type of maintenance differs. Rightly therefore, maintenance is a combined art and science of keeping machinery running. If an equipment is for a man for whom it only means a joy-ride, it does not matter if it gets struck on the road. He should be satisfied with repairs to the equipment when it breaks down, irrespective of the time taken, because probably this type of maintenance is the cheapest, no storing of spare parts, no planned shut-downs, no inspection. Whenever a break-

down does occur, it is set right at convenient time. This kind of maintenance is called breakdown maintenance.

On industry side, probably the very first type of maintenance was capital replacement. An equipment, let us say, a farmer's implement—was used till it broke down and completely finished its life, and then was changed. The nearest solution to this was to have a standby equipment. When one broke, the one lying idle was used. At some places this method is common still. As industry grew and bigger size of plant and machines locked up more and more of capital, huge standby plants became uneconomical. Probably at this stage breakdown maintenance caught in and equipments were set right when they actually broke down.

Complex Job

Modern industry, however, has become more complex. Most of the continuously operating plants, more so Iron and Steel, which use large number of heavy machines that are generally of major size and cumbersome, involving large capital investment and continuous processes, every minute of downtime of any single equipment now only renders this equipment out of operation but affects operation of the rest of the plant. Here such breakdown maintenance is inadequate and once it is accepted that an industry is of a type which cannot afford unwarranted breakdown, steps have to be taken to adopt methods which ensure continuous operations of the plant. And this leads to new maintenance procedure, like 'Scheduled Maintenance' 'Planned Maintenance' 'Preventive Maintenance' and now 'Productive Maintenance'.

"Scheduled Maintenance" is best suited to service plants such as small boiler houses and compressed air stations where the plant does not run continuously or is subject to being idle due to change of load, product or completion of orders. Maintenance of such of the major items of the plant as may require attention are scheduled to fit in with production programme. The plant may be inspected during

nights or week-ends when it is not in operation, and scheduling maintenance helps to utilise efficiently the down periods of the plant for maintenance work.

"Planned Maintenance" is employed with great advantage in plants operating continuously at high rates of output. As a preliminary step, schedule maintenance for all major items, serves as a basis for planning the details of actual volume of work, enabling tentative estimates to be made for labour and material required. Records of actual performance form basis for estimates in making a forecast more appropriate. Planned Maintenance, to that extent, helps planned allocation of material and equipment, aims at better utilisation of material and labour besides ensuring reliable and constant production. Naturally it also calls for highly skilled supervision to obtain full benefits of the scheme. This method, not followed scrupulously, however, is likely to lead to increase in paper work which then becomes worse. With proper follow-up planned maintenance reduces both maintenances and production costs and frequencies of breakdown.

Insufficient

With growing use of more automatic machines in continuously operating plants, even "scheduled" and "planned maintenance" is not sufficient. For this, the American industries have developed properly scheduled and planned schemes to prevent instances of breakdowns and reducing quantity of maintenance, calling it 'preventive maintenance' system. The preventive maintenance system is directed not merely towards planned maintenance but towards upkeep, replacement, and modification rather than a repair. The Maintenance Engineer inspects machines or pieces of equipment and schedules in great detail in respect of maintenance, replacement and modification as may be necessary in its lifetime. The intervals at which such work should be undertaken and also the time it will take are all studied to obtain better performance and improved methods. All and complete records are kept to help long

range planning. Most plans are thus prepared and work done so as to carry out at regular intervals an overall plant 'maintenance programme' to fit with planned production schedules. This ensures continuity and regularity of maintenance of plants.

More important within 'preventive maintenance' is, however, the idea of doing maintenance for 'preventing maintenance'. I will clarify. Very often suppliers of equipments and their designers in an effort to sell their machine and methods and to be able to compete with competitors, are apt to forget the maintenance aspects of the machines. Frequent inspection of certain parts may need lot of bolts to be opened—an over-head bearing may be causing too much worry on work. This may be an achievement from design point of view, but is a very great disadvantage from maintenance point of view. Under preventive maintenance will fall the procedures which may spot out places requiring more frequent maintenance and methods introduced, if necessary, be even changing the design of the equipment to reduce such quantity of maintenance. Preventive maintenance, therefore, is really reducing quantity of maintenance and even designing out maintenance. Bearing of motors lubricated for a lifetime, permanent lifting tackles in places where maintenance is done very often, rightly fall within this.

Problem of labour

Naturally reduction in the number of men on the job is one of the constant practices, because it has been realised that putting more men on the job itself causes complication. With more men employed on a machine the idea that the other man will take care of the work takes greater root and is unhealthy. Simultaneously, inspection records and job study combine to find methods for mechanical gadgets and machines to work under a man's control and reduce his physical work. One of the great differences among supervision of work in this country and the West is that unfortunately a supervisor here is most of the time busy in seeing that men do their work.

In the West, a man fixed for certain job has to do it during duty hours, working all the time on the job or has to clear. He will be appointed only if he can deliver the goods. Work of supervision is to make constant improvement in machines, equipment and more important improvement in working conditions, so that machinery does the work under man's control. This is the one important feature missing in our supervision here. In India, the common man has still not developed independent industrial habits and needs more and more guidance, check and follow-up. Supervisor also carries his own weaknesses. This one fundamental has to change and each one has to take care of his part of the job. With that done alone can preventing maintenance or even planned maintenance be successful. The workman does the work planned, supervisor gives him plans, tools and spares and simultaneously, by job study and comparison of records constantly, reduces quantity of maintenance.

In India, it looks 'preventive maintenance' is referred to, only vaguely. Most of the industries only follow breakdown, Schedule or planned maintenance. We, in Bhilai, are lucky that we are following 'scheduled' and 'planned' maintenance and preparing ground for 'preventive maintenance.'

Preventive maintenance can, however, be carried too far by enthusiastic maintenance engineers and this may be overdone. Therefore, to divert maximum effort, time and money on that part of machine and equipment which holds up production maximum, 'productive maintenance' has come in the field. Preventive maintenance takes time to show up the results but productive maintenance is immediately effective as is getting more common in America also.

To be able to do right plant maintenance, workshop facilities are very important, Mechanical handling equipment and mechanised transport are the first necessities to the maintenance man if the maintenance work is to be done with accuracy and speed.

The more advanced countries, where industrialisation is already at a certain stage, have rightly given a proper place to 'maintenance'. In the beginning however, all pass through a stage of indifference to maintenance. The British Institute of Management indicated that only 15 years back, scheduled or planned maintenance was not thought a factor deserving consideration in British industry. The production somehow was the only criterion. As production increased in other countries and competition set in, England also had to find its own methods to increase productivity. Now regular inspection, proper records and constant study of job methods are employed and constant improvements are being made to keep the wheels of industry running better and economically.

State of Infancy

India is possibly passing through the stage of infancy where production and not productivity is aimed at. In general, Indian industries feel the same as Britain felt 15 years back. In its report dated November 16, 1956, Ramsay Miller Co., consultants on steel plant maintenance to the Government of India, indicated that 'repairs and maintenance' are already a problem in existing steel plant in India in the private sector and if the Government steel plants do not plan in advance, repairs and maintenance may soon become a problem in the public sector too. Time alone will show whether we have learnt by this timely suggestion. As a young construction engineer, I was told by my officer, who had spent years in America, that on any job, services should be erected first. This should include pipe lines, electricity accesses and approaches and workshop facilities. This not only helps operation to come up fast when started, it reduces cost in construction. You go to any industry under construction. The operating units get ready but the services are not touched. Repair facilities which should have been completed first are not finished even though main machines are in operation. Repair facilities have been given second priority. What is the result? For the first few months no trouble. Simultaneously construction going

on along with operation leaves operation surroundings dusty and machines deteriorate fast. Then resources of spares do not remain sufficient to meet the challenge of the industry to keep its wheel running. Like the new car, the damage done may not be repairable in the lifetime of the equipment and in any case the life of the plant is affected.

These are some of the general points. Some other relevant points that came to light during the course of study tour are as follows :—

Personnel

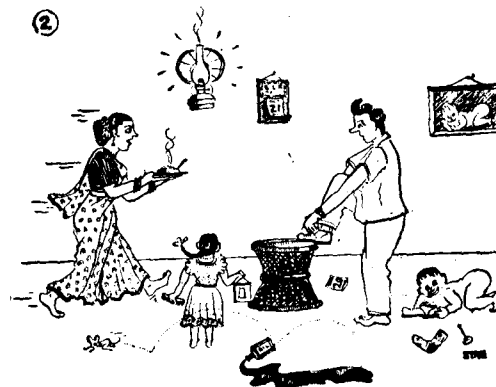
In Halskesiemens Karlsruhe, it was stated that some time back for every 6 men on operation they had 1/2 man for maintenance. Operation has been mechanised with more machines in position. The position now is that for every one man in operation there are 2 men in maintenance. The men required for maintenance as mechanisation takes shape only increase. You remember the cause of the lady who wanted to mechanise her kitchen as she was tired of the whims of one cook. After mechanisation, soon to her horror, she found she now had to deal with two men—a mechanic and an electrician.

Another thing that came to light in the West was that men working on the production lines need not be technical men and can be trained from people who have no technical education. They have to develop only the ability to do some repetitive work. Maintenance men, however, have to be from trained persons, have to develop skill, have to do new types of work independently every day, and are, therefore, paid higher than production-line men. In the Hoechst Chemical plant, we were advised that an unskilled man can become an operation man on the production line but never a maintenance man.

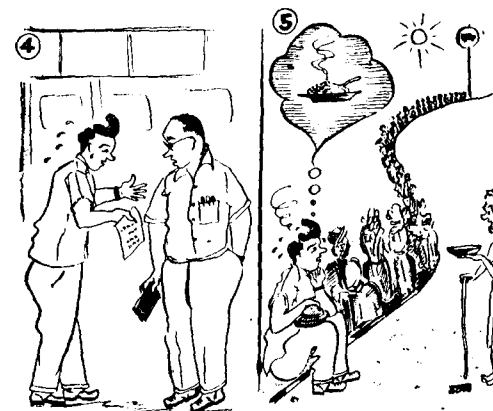
The tendency today to train everybody on the job when starting new plants may go too far. It is more likely that trained boys will pick up job faster and develop the ability and confidence

(Continued on page 42)

A DAY IN THE WORKER'S LIFE.....

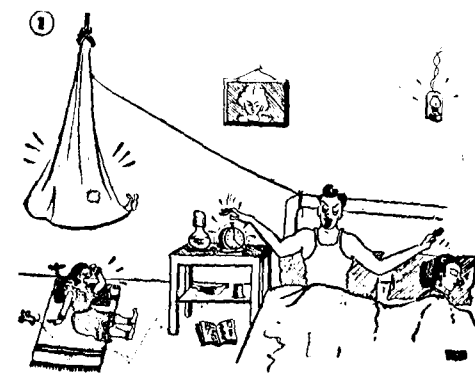


Breakfast now?...For heaven sake No!...I must be going...its already late...Shouts our friend.

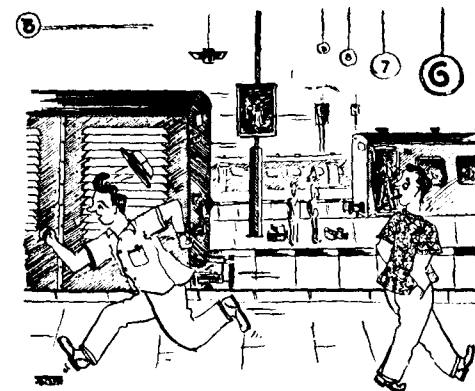


Well ! he is really late to the Factory. As it is very late, he decides to take leave for the day—and with a lame excuse he approaches the boss for a day's leave and gets it. But now to go back home? No trains...So...in the "Q" for bus...Time passes...Oh how hungry he is feeling? No breakfast either. He eagerly looks forward to his lunch.

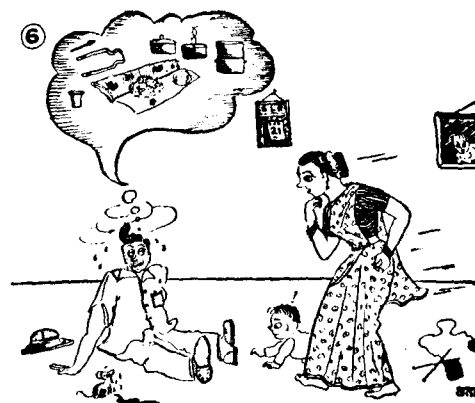
CARTOONS BY
K. RAJENDRAN



Disturbing others !...but well he can't help it...It is already 5 a.m. and he has to be in the Factory by 7 a.m.



He rushes out to catch a leaving train. Oh how late ! how late !!...he laments.



But what happens at home??? Well, well...that's too bad...His wife not knowing that he is coming back has sent his lunch as usual to the Factory!!...Is the rat pitying our friend?

TO BE A GOOD SUPERVISOR

BY

ARNOLD D'CRUZ

The role of the supervisor is not only to supervise over work of his fellow workers but is also to be responsible for creating a healthy atmosphere on the working spot. They should take a lively interest in the welfare of the staff. Supervisors usually take as many complaints as possible against the workers under them, to the higher authorities and fail to put forward complaints from staff as regards their welfare and upliftment. This results in the senior subordinates failing to know these facts and grievances of the workers.

If the supervisor takes a lively interest in the welfare of the staff, all problems even technical can be solved. Preliminarily, a supervisor is responsible for the outturn (as far as his side of work is concerned) and has to see that the men under him give their best. It is equally important that he creates a healthy atmosphere for the men to work in. A supervisor must be a real leader. He must educate men under him, look after them and see that they are contented and have as few grievances as possible. It is only then, that he will be able to win their confidence and get utmost co-operation. If the worker finds that the supervisor is interested in his welfare and that he can go to him for guidance and for the redress of his grievances he will be willingly give his best and this results in better output naturally. If each supervisor makes an effort to know each of his men under him as best as

he can and if he could impart that personal touch to each directive of his to his workers better relations with far reaching results in production will be there. Care should be taken to see that very little difference exists between the supervisor and worker on the working spot. Any worker should have the privilege to tell the supervisors what his difficulties are and should be given a good hearing. There may be instances where some worker may blow up! On such events the party should be heard in a cool and calm attitude and be given patient hearing, even though some of the grievances may not be genuine. There may perhaps be a feeling among the workmen that the supervisors are only interested in getting them charge sheets. The practice of dealing with the cases against workers must be done with consideration and utmost sympathy. There are cases where a supervisor deals with certain worker in accordance with his relation with that worker outside the factory. Perhaps in their social or private life. And there may be cases where misunderstanding created outside the factory continue still on the working spot. Such things should not prevail. The supervisory staff should only look upon themselves as brothers of the workers and work hand in hand and surely this will result in better work. The progress then would be in a most satisfactory manner and the goal to be attained accomplished as per schedule and the labour involved considerably less, much less.

NEWS FROM SWITZERLAND

A new Swiss sweetener

Synthetic sweetening substances are not solely used as substitutes for sugar in times of penury; a great many people are obliged to abstain from the use of sugar, either because of their health or else for aesthetical reasons. A Swiss firm has put on market a new synthetic edulcorative preparation, called "Assugrine", the principal component being pure sodium cyclamate, and not containing—as is the case with other similar products—any admixture of saccharine. "Assugrine" is a product that is fifty times sweeter than cane sugar, is absolutely harmless and does not suffer any deleterious effects from cooking.

A Swiss innovation in the field of radio reception

Swiss manufacturers of wireless sets, directed and supported by the specialised laboratories of the P.T.T. and by the Swiss Broadcasting Corporation, have just perfected an ultra-short wave receiver, which eliminates the increasingly large number of atmospheric disturbances, caused more particularly by the starting of the engines on motor cars. These apparatuses, which are being sold at a moderate price, are similar to others, in so far long and medium waves are concerned. On the other hand, the reception part of the radio for the ultra-short waves has been considerably improved; this solution seemed to be a better one than a campaign for the elimination of interferences, the results of which would, of necessity, have only been partial. Thanks to this new receiver, those inconveniences which prevented a perfect reception of ultra-short waves in Switzerland have now been completely done away with.

A Swiss contribution to business technique

The new instrument for recording dictations called "Fi-Cord", which is produced by the Swiss watchmaking industry with the precision for which it is famous, represents a valuable contribution to the modern technique of business. This apparatus, which is pocket size,

can be easily held in one hand for purposes of recording, as it only measures 6, 3 inches in length, 3, 3 inches in width and 1, 7 inch in thickness. Nevertheless, it is capable of holding reels which make it possible to make a recording totalling 30 minutes. This little instrument which functions in an absolutely autonomous manner by means of two dry batteries, which ensure 20 hours of recording can be used alone, in the form of a single unit for recording purposes, or it can also be provided with diverse accessories, such as a miniature microphone, a telephonic recorder, etc. When required for transcription, the "Fi-Cord" is fitted into a stand which has a pedal remote control and an earphone; there is also a stand suitable for work in an office, which makes it possible to record conversations or dictations while having both hands free.

New motorway leads into Switzerland's Land of 150 Valleys

Switzerland's longest "semi-motorway" has just been completed in the Rhine Valley, between the town of Maienfeld and Chur (Coire), some 12 miles upstream, capital city of Canton Grisons which is nicknamed "The Land of 150 Alpine Valley". The 25 feet wide road is bordered on either side by an 8 feet safety shoulder and is entirely free of inter-sections. Each kilometer cost 920,000 Swiss francs to build. The new motorway is fed by two major traffic flows, one originating in the Lake Constance area, the other coming from Basel and Zurich. It links the Swiss lowlands to the world famous holiday regions of the Grisons, as well as Northern Italy, reached either over the main trans-Alpine highway of the Julier and Maloja passes which stay open all year round and are the life-lines of such well-known resorts as Lenzerheide and St. Moritz, or over the picturesque San Bernardino, Splügen, Fluela and Bernina roads. Special care has been taken to make all structures of the new motorway harmoniously fit into the unique river and mountain setting.

Productivity. . . .

(Continued from page 38)

to run a job quicker but in the beginning it is very essential that at least a few experienced men must be available to lead the work, to start and commission it. Once the plant is commissioned and has run for some time, the newly trained personnel would have developed the confidence and would do better therefrom.

On the question of incentives to labour, now that incentive schemes have been working for some time, there seem to be varying views. More people are now in favour of fixed hourly wages rather than incentive schemes. Incentive tends to reduce quality and since generally incentive schemes are difficult for the common man to understand, workman is suspicious and gets dissatisfied. By a fixed hourly-wage, workman knows precisely what he is to get for a whole day, gets it and is satisfied. Hourly wage can, however, be effective in those places where the workman works a whole day efficiently in the work he is employed for, efficiency should have come up to certain level so that he does not have to be chased for his part of the work. In such places, where men have still to be chased for doing their legitimate jobs, for a while it may delay putting incentive schemes limited only to places where work can directly be measured. This also should be on temporary phase. When workmen have achieved the standard and they realise that working for the prescribed duty hours is a part of their job, straight way higher hourly wage is the best method to keep workers' minds satisfied. America and the West achieved productivity by incentive bonus. They have reached a stage where they can start giving it up. We are still in infancy and to make our men production-minded, incentive can be profitably introduced in places where work can be measured.

Material

On the question of spares, it will not be exaggeration, if I say, that we were laughed at our situation when we asked for how many

months, spare parts are stocked with them. Their simple answer was that spares are available on phone 24 hours of the day. Still in places where spare parts do become a problem on machines bought from other countries, worn out parts are built, and building worn-out parts is already a good technique. It is felt, however, that built up worn-out parts are uncertain in their behaviour. Therefore, unless emergency really exists such parts are not used very much. It was also stated that very often spares are not stored properly and when required they are most not usable and they have only to be scrapped at a later stage. Therefore, unless costly and efficient storing services are at hand, spare parts should not be stored. This recommendation, however, does not apply to Indian conditions at present.

Firms supplying machines generally give recommended life of the machines and their spares for a certain time. Such recommendations are based on general conditions rather than particular conditions existing in a certain plant. A cold dry place may need one kind of preventive maintenance and spares, but a humid and hot place may need entirely different spares and maintenance. If the place is dusty it may have more maintenance requirement. This itself puts us at a comparative disadvantage. The manufacturers may have in view, factories which have no dust problem, and where the temperature is not high. Therefore, recommended life and period of changes should be studied in every factory and each factory should develop a basis for its own use.

It has been found that every equipment has some kind of troubles in the beginning for a year or two and this can be called infancy stage. Then 2 to 25 years is normal working life of most of the machines. If at the end of working life, the machine is not thoroughly repaired due to old age it may start showing failures and give troubles. If at proper time, the machine is thoroughly overhauled and renovated, the life can be made longer.

In Daimler Benz it was pointed out that

labour in Germany is costlier than material and parts, and there is no difficulty in obtaining parts in time. Parts are, therefore, changed in time or even before time to save down-time and costly labour.

Bottlenecks of Maintenance

In breaking down 'maintenance work' in smaller basic units, it is seen that 30 per cent of the men are all the time busy opening bolts and nuts for inspection only. It is here that job study can eliminate extra maintenance.

It is also found that 48 per cent of the breakdowns in industry are associated with lubrication. Thus lubrication alone, if taken care of can save half the unwarranted down-time. Therefore, tendency should be not to leave lubrication to unskilled men any more, but to put suitable skilled workers on the job.

Problem of transport of hand tools is no less costly. Maintenance men going around from place to place need tools. Lot of time is wasted in men running about from store to work-site for tools only. Men should be trained to have most of the tools in their pockets, provided in their pants, otherwise tools should be carried in special carrier.

Loss of tools is yet another problem. The American factories have a very nice way of controlling this. There the man brings his own trade tools and owns them. When a fitter is employed, he is employed with his own tool box. Loss of tools is unknown because every fitter recognises his tool anywhere. Also as the mechanic gets known by the type of tools he keeps, every one tries to keep his tools better than others. One of the mechanics repairing a small lathe indicated to me that his tool box cost him about 500 dollars and he was proud to own it. We on the other hand just have no habits of keeping tools. Right from the technical institute, people selecting a trade should take pleasure to keep their own trade tools. This will give them pride of profession and will make them suitable in their own jobs.

Communication is another bottleneck. For efficient maintenance, the maintenance man must have the fastest means of communication.

Mechanised transport, telephones and radio communication have all come up. In one plant the maintenance men all carried small transmitter sets in their pockets and communicated through the Head Office wherever they were. We look forward to the day when we could have these facilities for our maintenance men.

Cost

In the most industrialised countries, maintenance cost has been controlled in various ways by industries and they consider maintenance important. Some, for whom down-time is not an important factor still consider maintenance as an auxiliary function. Others who run heavy equipment and down-time of equipment affect their operation and other equipments have introduced better maintenance methods. Some of them allow any cost to be incurred on maintenance. One company went to the extent of saying that they did not have any control over maintenance cost because maintenance must be done in the greater interest and whatever was necessary in that direction was done. Only when the cost of maintenance amounts to more than 10,000 dollars, it is brought to the notice of the General Manager. It will be a happy day in India when immediate expense on maintenance is not made the criterion and long view of things is taken. In any case, those who have budget control have found out a method of correct index of maintenance. They consider cost of insurance, plus cost of maintenance, plus cost of down-time compared to total operating cost as a very good yard stick to know whether or not maintenance is doing fine.

The relative position of the maintenance man in an organisation is that the facilities manager is at par with the production manager. Facilities manager generally helps maintenance work in the plant and is directly answerable to the General Manager whose decisions are more important than Financial Directors.

As India is getting more and more industrialised, we will also sooner or later have to reach our goal. I am only glad to say we are heading towards it faster and very much faster than many others did.

LANDMARK IN I.C.F. 1960

Men and women assembled in many a hundred,
In B Shed on Friday, January the 22nd,
To watch launching of coach one thousand,
Comprising of components nearly a thousand

The initial cost of Shell was Rupees 1,86,000,
Now it has come down to Rupees 81,000,
Sure, it will go down still further,
When the incentive scheme is spread over.

Now the staff on rolls in I.C.F. is seven thousand,
Machinery and Plant exceed one thousand,
One Coach comes out every 6 hours,
And I.C.F. will produce 700 coaches per year in
coming years.

The Chief paid tributes to workmen,
For contributing towards rapid production,
The Deputy Minister pressed a button,
When the 1000th Coach rolled out in slow
motion.

March, March, 1000th Coach,
I.C.F. will turn out many a more coach,
I.C.F.'s work is not to end with the 1000th
Coach,
Soon on the production line will be the 2000th
Coach.

—A. R. VENKAT

BENGALI

I. ANCIENT AND MEDIAEVAL PERIODS

S. K. BANNERJI

In order to offer to our readers an insight into the vastness, variety and richness of our great literatures, we are presenting a brief history of literatures in various modern Indian languages. Each of these articles, will be divided into two parts—one part dealing with the ancient and mediaeval periods and the other modern period. We start this new series with the Bengali literature. These articles are produced here by the kind courtesy of the Editor—South Eastern Railway Magazine.

THOUGH the Bengali language reached its present form through long and varied processes of change, Bengali literature emerged almost in its full maturity at a single stride. The first extant Bengali MSS—The *Charyyapadas*—has been assigned approximately to the Tenth Century A.D. Though related exclusively to a sectarian form of religious thought and meditation made up of a fusion of Hindu and Buddhist elements, it is surprisingly mature in its secure grasp of ideas and unfaltering rightness of expression. The poets who obviously belong to an esoteric religious creed, glorify a rapt spiritual exaltation, a beatific state of mind in which a pervasive sense of the unreality of the material world is blended with an infinite feeling of pity. They deprecate the observance of all prescribed rituals and forms of worship and insistently proclaim the futility of the orthodox scriptures in showing the path to salvation. The poems attain high poetic excellence in their complete mastery of thought and form, their terseness of style, their imaginative presentation of deeply felt religious experience and apt choice of similes and metaphors drawn from real life. The *Charyyapadas* illustrate that close and intimate connection between poetry and religion which has been a recurring and permanent feature of all glorious epochs of Bengali literature.

Period of Lull

Yet, after this promising, almost glorious start, Bengali literature presents an almost complete blank for the next three centuries. This sterility is partly accounted for by the Muslim conquest of Bengal. The violent impact shattered the old fabric of ideas and dried up the old springs of inspiration and created a prolonged lull in which the creative impulse readjusted itself to the changed conditions and sought new avenues for expression. During this period of lull the *Gita Gobinda* of Jayadeva, written in Sanskrit at the beginning of the twelfth century with new and varied metrical patterns and an unsurpassed sweetness and melody of diction, indicated how the mind of the race was changing over to a new religious emotion embodied in the love of Radha and Krishna, in which extreme sensuousness serving as a symbol for the ecstasy of spiritual passion found a supreme lyrical utterance. When Bengali literature reappeared after three centuries of silence, it flowed along three main channels: Vaishnava lyricism reinforced by the tidal passion of Shri Chaitanya and biographical literature dealing with Chaitanyas' life; second, the adaptation of the great Sanskrit epics and scriptures, the *Ramayana*, the *Mahabharata* and the *Bhagabat* in the Bengali language and, third, the Mangal Kavyas celebrating the advent of new divinities hitherto regarded as being beyond the orthodox fold.

Vidyapati and Chandidas

The Vaishnava lyrical stream directly emanating from Jayadeva's *Gita Gobinda*, was carried forward by Vidyapati and Baru Chandidas in the pre-Chaitanya Era. Vidyapati, a Court poet of Mithila and a scholar of versatile

talents and taste, was the first to give a definite form and orderly sequence, a narrative and dramatic frame-work, an emotional variety and culmination and, finally, the right sort of blend between eroticism and spiritual devotion to the purely religious appeal of Vaishnava poetry. All subsequent Vaishnava poetry followed his model with an added poignancy and a more pronounced devotional fervour contributed by the example of Sri Chaitanya. Baru Chandidas, the author of a mutilated poem, *Sri Krishna Kirtan*, generally assigned to the fourteenth century, presents a vulgarity of taste with a most exquisite command over pathos and poetic power of a high order, if of a rather narrow range. He is in the nature of an anomaly, for he has no link with the main body of Vaishnava poetry and tradition, but can, nevertheless, claim the credit of having first introduced the rich leaven of Vaishnava sentiment and outlook in Bengali poetry.

Sri Chaitanya

The birth of Sri Chaitanya in 1486 A.D. may be designated as the central event in mediaeval Bengali life and literature. No one man has left a more indelible stamp upon the social and emotional life of Bengalis and exerted a more lasting influence on the very elements of the Bengali racial character. The Bengali mind, as it shows itself today, has been largely shaped and moulded by Sri Chaitanya and his associates. He released the tidal waves of emotion, faith and the ecstasy of mystic vision that lay dormant in the Bengali mind, all its poetry and pathos, and high strung emotionalism. The Post-Chaitanya Vaishnava lyrics, known as the *Padavali*, represent, in a way, the best and most sustained achievement in Bengali poetry. For upwards of two centuries the stream flowed with hardly an ebb and poets of the first order like Chandidas, Jandas and Gobindadas poured forth a witchery of melody blended with an ardent yearning for union with the Infinite. In their poetry, sense and soul are fused into one and words that breathe and burn in the telling of human love are subtly attuned to an ethereal import that carried us

right into the bosom of the Absolute. Nowhere is there a more complete synthesis of the various elements of the Bengali mind, of its worldliness and its other-worldliness, of its delicate sensitivity to beauty and love and its passionate desire to pierce into the heart of the Transcendent Reality.

Vaishnava Religious Doctrine

The biographical literature centering round Chaitanya and his comrades is an off-shoot of that resurgence of the spirit that Bengal experienced in the wake of Chaitanya's advent. So great was the all-round mental expansion that the historical sense was for the first time awakened out of the enfolding miracles that formed the stuff of the life of Chaitanya. These miracles and trances that led Sri Chaitanya into the very heart of divine communion are set into a solid historical frame work, a connected narrative and presented against a real background. The *Chaitanya Charitamrita* of Krishnadas Kaviraj, the most authentic of these biographies is an encyclopaedia of Vaishnava religious doctrine and metaphysics. It is a wonderful blend of philosophy, religious devotion and poetry. In the midst of abstruse dialectical reasonings and an entire pre-occupation with the things of the spirit, one suddenly comes upon exquisite poetry, all the more surprising because of the metaphysical cast of the mind of the author who never seeks beauty of image and style for its own sake. The historical sense revealed in these biographies sets more store by fidelity to the inner spirit than to other facts and details, which are often distorted in the interest of a general harmony of idealised presentation. But they serve the real purpose of biography in giving a vivid, authentic account of Chaitanya's inner life, and of his incessant efforts to pierce the veil of life and also a faithful picture of the age with its eager spiritual curiosity, its many-sided overflow of social energy, and its swift response to the call of humanism and love.

Two famous translations

Of the translations from the epics and reli-

gious scriptures, the number of which was legion, and which continued right up to the 18th century, the most famous are the *Ramayana* of Kirttibas, and the *Mahabharata* of Kasiram Das. These are by no means examples of literal, word-for-word translation, but free adaptations of the originals suited to the genius of the people. Through these renderings the distinctive spirit of the Bengal showed itself in a modification of the Indian mould of the originals. The spirit of Bengali works is entirely different. The situations are given a new colouring and set in a new context. The reflections embody a new devotional spirit and an ideal of life, though substantially the same, yet with a changed emphasis. The very conception of the characters is transformed and marks an advance in sentimentalism and an over-proneness to devotional self-surrender as the expense of firmness and strength of character. The marital strain of the epics and the heroic ideals in them are saturated with a moist, tearful sentimentality that has softened the hardness of their core. The shadow of Sri Chaitanya and of his cult of devotion and love is all over the epics. The battle-field is bedewed as much with tears of sensibility as with the drops of blood shed with a most reluctant hand. The most hardened criminal is suddenly discovered as a devotee in disguise and the descriptions of war give way to devotional hymns. The final impression left by these epics is the apotheosis of the virtue of self-surrender and a philosophy of life that exalts pity, forgiveness and the softer domestic feelings over the sterner virtues. Self-abnegation is pushed to quixotic excesses and the vanity of all earthly ambitions is the recurring moral burden that closes every canto. In short, Kirttibas and Kasiram Das have shaped the mould of Bengali life out of the clay drenched to the core by Chaitanya's gospel of love.

The Mangal Kavyas

The Mangal Kavyas illustrate another curious feature of the somewhat composite religious life of Bengal. It is well-known that the Bengali race is not a homogenous unit but is composed of diverse racial elements, some of which are

pre-Aryan. These aboriginal tribes, though Hinduised, carried with them in their new habitat their old-world tribal customs and religious rites which became gradually Aryanised. The three main varieties of the Mangal Kavyas are: first, the *Dharma Mangal* representing the most antique phase of a Hindu-Buddhistic fusion; second, the *Manasa Mangal* which celebrates the worship of the Serpent Goddess, whose symbolical divinity had been recognized in early Hinduism, but whose worship must have received a new urgency and impetus owing to the natural terrors inspired by its ferocity in the deltaic regions of lower Bengal; and third, the *Chandi Mangal* which somehow came to be associated with the aboriginal fowler tribe, though the worship of Chandi with some of her adjuncts and attendant ceremonies can be traced back to the Vedic age. Whatever might have been the originals of these old-world forms of worship, there is no doubt that the Mangal Kavyas owe their inspiration to the proselytizing zeal of the votaries, of these obscure divinities, who wanted to instal them in the newly reorganised Hindu society and invest them with something of the status and dignity of the traditional deities. While Dharma is sought to be affiliated to either Siva or Vishnu, by disguising his Buddhistic origin, his worship does not rouse any hostility and his claim to homage is based upon his power to endow his worshipper with supernatural prowess, even involving a suspension of the laws of nature. Chandi also rather easily slips into the fold owing to her Vedic original and partly to the rising tide of mother worship, though the introduction of her worship through the fowler caste seems to imply an aboriginal origin of the Goddess and a certain amount of opposition to her recognition. But the fiercest contest rages round the worship of Manasa, who rouses the most inveterate repugnance and contempt in her would-be votary, and it is through the most vindictive reprisal, backed by a domestic schism, that the opposition of Chandi is at last worn down, though the Goddess must need be content with a left-handed offering.

True picture of Society

These Mangal Kavyas represent the major poetic effort of the Bengali language for about three centuries and they give a true picture of society in the Middle Ages as also of a spirit of timid opportunism and of a bidding for safety at all costs that degraded the religious life of the people during the period. Here we have neither the bold philosophical speculation of the *Charyyapadas* nor the spiritual ecstasy of the Vaishnava faith, but a sort of sober, everyday devotion that prays for favour, protection and worldly advancement as a price for worship offered. In them we have, for the first time, a realistic portrayal of home life with its squalid poverty, and equally squalid squabbles among co-wives, the envy of neighbours, business usually practised at once too high a level of morality, commercial sea-voyages with the object of exchange and barter, intrigues in court and camp and tortuous diplomacy. But we have also, in the midst of this squalid background, wifely devotion rising to super-human heights, heroism in low places, a simple faith in divine providence and in the life beyond, when our poor days work is done and earthly life with its petty worries and self-seeking flows back to the eternal fount. We have here an epitome of Bengali life, the solid stuff of which it is made, moving in its somewhat narrow orbit and living close to the earth, but never forgetful of its ultimate purpose and ever lifting its eyes of prayer to the gods above. The greatest poet of the Middle Ages is Mukundaram, the author of a *Chandi Mangal*. In his realism and humour, in the delineation of life-like characters from all social layers, and in his arch and apt comments on the irony of life, he is comparable to Chaucer. The highlights of the *Manasa Mangal* are the towering personality of Chand, the merchant with his indomitable strength of will and the tender grace of Behula, sublime in her conjugal piety, who wrests her husband's life from the very jaws of death and reverses the decree of fate, whereas *Dharma Mangal* gives us a picture of the tangled political life of western Bengal and the martial exploits of men and women in humble places.

Religious and narrative

Over and above these main streams, there are other minor currents of religious and narrative poetry, such as the *Songs of Gopichand and Maynamati*, the *Sivayan* and the *Mymensinha Ballads*. The *Gopichand and Maynamati* songs, relating to the yogic discipline of the body for the attainment of immortality, were orally preserved and recovered from the lips of tribesmen in the nineteenth century by Grierson. They are rather grotesque in their recital of superhuman achievements attained through the practice of Yoga, but contain moving passages of deep pathos in Gopichand's renunciation of the world and the appeals of his young wives not to forsake them and, moving through it all, is a haunting sense of the hollowness of earthly life and the enigmatic truth about the spiritual life conveyed through words of mystic import. The *Sivayan* presents Siva in a grotesque and somewhat ridiculous light as the victim of chronic want and of connubial brickerings and forced to resort to agriculture as a last expedient to keep the wolf from the door. This Siva is clearly a god of primitive society, somehow identified with the sublime God of the Hindu imagination, and the centre of the primitive folk-dance still prevalent among people of lower castes. The *Mymensinha Ballads* are folk-songs some what refined and sophisticated through conscious literary art. They describe the wild love-adventures and unorthodox social customs of a community but imperfectly subdued by the rigours of Hindu religious discipline. The similes and imageries have an unconventional freshness occasionally there are exquisite outbursts of passion coming straight from the heart of a people unrestrained by any sense of formal propriety.

End of pre-modern period

The middle of the eighteenth century marks the close of the pre-modern period. Interspersed through more formal efforts, there are songs and lyrics of popular origin and inspiration, both secular and religious. There are

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I.C.F. HOCKEY TEAM ANNEXES SIX TROPHIES THIS SEASON

The I.C.F. Hockey Team created a record, unparalleled in the history of Madras Hockey Association, by annexing six trophies this season —by winning four major tournaments in the City and two at outstations—all in a row.

Earlier this season, they won Sri G. Kuppuswami Naidu Memorial Hockey Tournament, Kovilpatti, the M.H.A. Invitation Hockey Tournament and the City Hockey Tournament. During August they retained the first Division League Championship by defeating Southern Railway in the deciding match.

At Palayamcottai, I.C.F., the holders for the last two years, again showed their real potentiality by winning this year too the Paul Thangiah Edward Memorial Hockey Tournament and a permanent cup as well.

In the Ever Merry Hockey Tournament again I.C.F. came out in flying colours. They had a tough time with the State Bank team in the finals, but I.C.F. succeeded in defeating them by two goals in the third reply and annexed the sixth trophy this season.

I.C.F. would have added one more to their winning list if they had won the Donovan Andree Memorial Cup Invitation Hockey Tournament conducted by the Ceylon Hockey Federation, but they were very unlucky to loose to Mercantile XI, Ceylon, in the semi-finals.

Our hearty congratulations go to one and all the members of the I.C.F. Hockey Team for winning six trophies this season and let us wish that they will maintain this record in future also.

A. R. VENKAT

The Victorious Hockey Team with the Six Trophies they have won this Season with the happy team are seen (sitting middle Row) Shri D. R. R. Sastri, ME/TS, Shri K. Swarup, (CAO) Shri C. G. Devaya, Dy. CME/S and Shri Sharma, AEE.



THE INDIAN RAILWAYS

BY K. SARVOTHAMA RAO

The railways of India represent a great engineering works, the constructors of which encountered enormous physical difficulties. Broad rivers had to be spanned and the mighty mountain walls of the ghats had to be surmounted by the railroads, before Bombay could be brought into railway communication with Gujerat, Calcutta and Madras. Still greater were the natural obstacles that had to be overcome in the construction of the military railways on the North-Western Frontier for the protection of the country against foreign aggression. No doubt it is a good policy to defend India by building railways for strategic purposes. A country with a good railway communication has a great advantage from a military point of view. When a threatened frontier has no railways, all the practicable passes have to be defended by strong forces, as it cannot be known beforehand where the enemy will deliver his attack. But if the defenders have the command of railways leading to these passes, it is enough to assemble a strong army at some central point from which troops can be rapidly conveyed in trains to the part of the frontier towards which the enemy is reported to be directing his march. Thus by the help of the railways, an army of fifty thousand men may do the work that would otherwise require twice or thrice as large an army. Also the railways built for military purposes are not thereby debarred from being useful in time of peace, so that even if there be no war, the money spent of them is far from being wasted.

The railways that would be a defence in war, are trade routes in peace and so perform their more natural function. How much Indian commerce has increased by the introduction of railways can be seen in a numerical form by comparing the goods moved from one place to other now and what it was several years ago. The railways by bringing the interior of India into easy communication with the seaports and through them, with foreign nations, have marvellously helped and developed the economic conditions and the productive industries of the

country. If the only means of communication had been by carts and boats, the corn and cotton from the interior of India could never have found a market. Thus it is mainly due to the power of the locomotive that the Punjab and the North-West Frontier Provinces have become great corn producing districts. Formerly it was possible that famine could be raging in one district in India, while another was producing an abundant harvest than its inhabitants could consume. Now such a state of things is hardly possible. The surplus harvest of one part of India can be easily and rapidly conveyed to any district suffering from deficient crops. The advantages of improved communication are that it stimulates the productive energy of the people and also affords greater security against famine. Wherever the railroad goes, production flourishes and wealth increases.

Material prosperity is not the only effect produced. Railways have a powerful effect in overcoming the barriers between different sections of the community and between man and man. Members of different castes going on a pilgrimage or on a pleasure or on a business trip, unless they are rich enough to afford reserved compartments must either give up their intentions to travel or consent to come into close contact with one another in crowded railway carriages. The railways tend to do away with the exclusiveness of caste and promote the doctrine of the equality of mankind. They also do much to educate the people of India by enabling them cheaply and with comfort to leave their native villages and visit the great cities that are the headquarters of civilization and progress. In this way they gain by their travels refreshment and rest for their minds, satisfaction to their intellectual curiosity or artistic tastes, and increased knowledge of the world and its inhabitants.

Thus the money spent on the railways in India, may be regarded as a premium paid to ensure the country against famine and foreign aggression.

heard this one...?

Traveller : "What's the use of having a time-table if your trains don't run to it?"

Porter : "Now, now, you're all excited. How could you tell they was running late if you didn't have a time-table?"

The prairie tourist, marvelling at New England's scenery, finally asked a New Hampshire farmer where all the rocks came from.

The native replied : "The great glacier brought them here."

"Well," demanded the stranger, "where's the glacier now?"

"It went back for more rocks," the farmer drawled.

A noisy bunch packed out of their club one night and up the street. They stopped in front of an imposing residence. After considerable discussion, one of them advanced and pounded on the door. A woman stuck her head out of a second-storey window and demanded, none too sweetly ; "What do you want?"

"Ish thish the residence of Mr. Smith?"

"It is. What do you want?"

"Ish it possible I have the honour of speaking to Misshus Smith?"

"Yes. What do you want?"

"Dear Misshus Smith! Good Misshus Smith! Will you...hic...come down an' pick out Mr. Smith? The resh of us want to go home."

"How did you break your leg?"

"I threw a cigarette out of my office window and absent-mindedly tried to step on it."

When Gladstone finished a long speech in which he attacked the policies of Prime Minister Disraeli, the latter rose and said : "The man needs no reply. He is inebriated by the exuberance of his own verbosity."

The doctor had just become enthusiastic

about the theory of early ambulation and planned to try it out on a male patient who was scheduled to have an appendectomy.

On the way to the operating-room, the doctor explained to the patient that, a few hours after the operation, he expected him to sit on the edge of the bed and dangle his legs; later, in the afternoon, the patient was to walk to a nearby chair and sit up for at least five minutes.

The patient listened attentively, though a bit surprised, then asked : "Doctor, do you mind if I lie down for the operation?"

Man : "Can you direct me to the Fifth National Bank?"

Kid : "Sure, if you give me a dollar, I will."

Man : "A dollar!" dont you think that's too much money to ask for?"

Kid : "No, Sir, not for a Bank Director!"

A long-haired youth entered a music publisher's office, carrying under his arm a small roll of paper.

"Good afternoon," said the publisher. "What can I do for you?"

"Well...er...I have a song here," he began, "and I was wondering if you would publish it. Er...shall I sing it?"

"Oh, yes, let's hear it," said the publisher, and the youth stood up and burst forth.

"Well," asked the young man, "what do I get for it?"

"Oh," replied the other, with an air of resignation, "I'm a publisher, not a magistrate."

THE Editor of a Vermont weekly sent to one Hiram Sparks a notice that his subscription had expired.

The notice came back with the laconic scrawl : "So's Hiram."

Bengali...

(continued from page 48)

the verses of Dak and Khana embodying the wisdom and experience of an agricultural society and a close, if somewhat cynical, observation of rural human life. They belong, in substance, to a more primitive age, but their language testifies to the refinements and additions of a later time. The Sahajiya songs are an offshoot of the Vaishnava lyric with the mystic and doctrinal exposition triumphing over the spontaneity of human emotion.

The Baul songs, with their exaltation of the intuitions of the heart over the formal injunctions of the Shastras, are the joint product of Hindus and Muslims who are at one in their repudiation of orthodox authority. The spirit of the people sings through them, untrammelled by rigid religious observances.

Revival of lyrical spirit

The revival of the lyrical spirit is apparent in the *Sakta Padavali*, closely modelled on the Vaishnava Padavalis, in which the religion of fear and expediency set forth in the Mangal Kavya, Sakti cult gives way to a pure strain of mother worship for release from the snares of the flesh and a beautiful identification with the primal cause of the universe. The Mother, the Goddess Kali, frightful to behold, decked with human skulls and with streams of blood running all over her dark body, naked and dishevelled, chastises man. But there is love and tenderness behind her chastisement. Ramprasad, the most famous of the worshippers of Kali, speaks with a child-like innocence and insistence and surrenders with unreserved faith to the will of the Mother. Nowhere does the devotional spirit of Bengal, face to face with the trails of life and the hindrances in the way of supreme self-realisation, sing in a purer or tenderer strain. The songs of Ramprasad, simple and deep at the same time,

speaking of the intricacies of the inner life with the transparent clarity of immediate intuition, reach the high water-mark of religious poetry in Bengali.

A link between old and new

The Middle Ages in Bengali literature close with Bharatchandra, a belated follower of the tradition of *Chandi Mangal*. Bharatchandra is a precursor of the modern spirit and a conscious artist with important metrical innovations to his credit. In his *Ananda Mangal*, the old fountains of spontaneous devotion have run dry, and in their stead we have a mocking satirical spirit that criticises and makes fun of contemporary society and indulges in a depravity of taste under the disguise of urban refinement and polish. Its devotion is worked up through rhetoric and literary artifice instead of being a natural flow from the heart. Bharatchandra's style is chiselled and polished like that of Dryden and Pope and there is nothing of the inartistic effusiveness and gushing overflow of sentiment of the earlier Mangal Kavyas. He compresses great worldly wisdom in terse, memorable lines and is an adept in tracing the psychology of youthful, unspiritual amour. The Goddess Kali is invoked to shield guilty love and afford immunity against the violation of moral and social laws, and his picture of Hira Malini, the professional pimp and go-between has the brilliant incisiveness, the hard immoral glitter that rests upon the women of Restoration comedy. Bharatchandra's is an alert and wide-awake mind, which plays upon the many-coloured surface of life, and adapts old conventions to a new artistic purpose. Thus, even before the advent of English rule and the inauguration of the modern age, Bharatchandra stands as a link between the old and the new, illustrating the exhaustion of the old literary impulses and turning the soil in which new seeds were to be sown for reaping the harvest of the future.

"WELFARE NEWS"

Staff benefit fund: A meeting of the sub-Committee of the S.B.F. was convened by the SLWI/General on the 22nd September, 1960 to scrutinise the applications received from the employees for educational assistance, i.e., reimbursement of school fees and cost of books in respect of their children. This Committee held its session from 22nd September 1960 to 26th September 1960. It was resolved by the Committee unanimously to sanction a sum of Rs. 2,964.09 towards educational assistance for 261 employees in all who applied for grant from S.B.F.

Training course for Class IV Staff: With a view to afford facilities of training to Class IV staff as are eligible for promotion to Class III service a regular training course for Class IV staff was inaugurated by our Personnel Officer on the 1st September 1960. Nearly 50 Class IV employees have enlisted themselves for this course. This scheme is, however, a purely non-official one designed to equip the Class IV staff with the necessary grounding in drafting and other departmental work so as to stand them in good stead while appearing for promotion to Class III service.

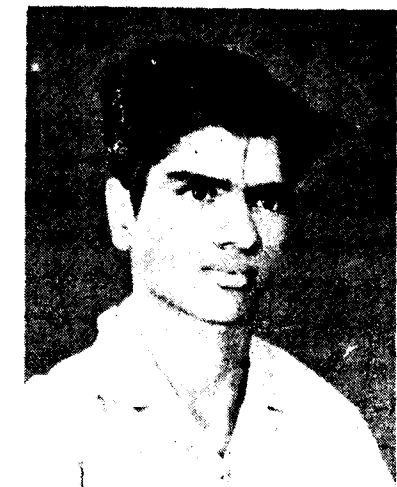
Variety Entertainment: A 'Variety Entertainment' was sponsored by the Welfare Wing of this Administration on the 26th September, 1960 in the I.C.F. Institute for a span of about three hours. The participants in this entertainment were none else than the staff of this Administration and their families. The programme of variety entertainment included a series of interesting items such as Classical and Light Music, Mimicry, 'Mock Kathakalakshepam' and Quiz. This entertainment was the second of its kind, the first one having been sponsored by the Welfare Wing on the 2nd October 1959. The All-India Radio, Madras have also tape-recorded this programme and relayed the same over the A.I.R. on the 20th September, 1960.

Visit to Railway Hospital: The Welfare Inspectors have visited the Southern Railway Hospital, Perambur on 9th September 1960 and 24th September 1960 to contact the employees of this factory undergoing treatment as in-patients in the Hospital.

Confirmations of Staff: Thirty-three confirmations have been made during September 1960 bringing the total number of confirmed employees in the Factory to 3,865.

Hindi Examination: The undermentioned employees of this Administration who have passed the Hindi Examination (Prabodh) conducted by the Ministry of Railways in June 1959, securing the first and the third rank were given cash awards of Rs. 300 and Rs. 150 respectively.

1. Ari A. V. Varadarajan,
Clerk, Dy. CME's Office (Shell).
2. Sri S. Subramanian,
Steno to DCOS/Depot.



Shri A. V. Varadarajan, Clerk, Dy. C.M.E.'s office (shell) who secured the First prize of Rs. 300, by taking First Rank in the Examination (Prabodh) conducted by the Ministry of Railways.

INDUSTRIAL NEWS

Press-Button Soldering Iron

Particularly suited to underdeveloped areas is a new British export—a soldering iron which requires neither flame nor electricity—offered by Jenelite Ltd., 13-17 Rathbone Street, London, W. 1. It is heated by a cartridge, fitted inside a detachable copper tip which generates at over 86° for six to eight minutes when fired by the operator. The cartridges are non-explosive and safe to handle.

Soldering tips for the iron are interchangeable. Apart from the standard $\frac{5}{8}$ inch pyramid tip, there is a $\frac{3}{8}$ inch pyramid and chisel tips of $\frac{3}{8}$, $\frac{7}{8}$ and 1 inch.

Ready-Made Lift

A new type of goods elevator—which is fitted to its shaft and delivered as a complete unit, ready for immediate installation—is being produced by Barron and Shepherd, Ltd., 315 Kennington Road, London, S.E. 11. Because of the constructional method employed, a specialist is not required to install the elevator and structural alterations to the building are cut to a minimum. All that is required is for a bricklayer to knock a hole in the ceiling, through which the steel shaft and enclosed elevator may be passed. The shaft is secured to its base, the section of the ceiling repaired and the elevator is ready to convey its first load to the floor above.

The elevators have a capacity of up to 15 cwt. and are powered by a three-phase electric motor driving through chains and sprockets. The elevator and motor are both housed inside the sheet metal shaft which has interlocked lattice-type gates at each level. The unit is constructed according to the specifications of the building in which it is to be used and the company have already manufactured an elevator which is being used to convey goods to three levels—ground, first and second floors.

Portable Blast Cleaner

A completely self-contained portable blast cleaning unit, no bigger than a small hand

vacuum cleaner, has been produced in Britain by Hedge Clemco Ltd., New Road, Rainham, Essex, England.

Known as the Educto-Matic, it weighs only seven pounds and contains its own vacuum pick-up and dust extraction unit, so that the only connection required is an airline. There are no electrical connections.

It can be used, for instance, in welding shops for cleaning welds or for cleaning before welding; in areas where dust would be a nuisance such as in canneries, automobile factories, chemical plants and in highly mechanised factories.

It is small enough to fit through tank manholes and is ideal on small jobs that can be cleaned without dismantling. The blast head can be swivelled for use at any angle.

The abrasive is continuously recirculated so that there is very little wastage. A full charge of four pounds will normally blast for 15 to 40 minutes according to the skill of the operator.

High Speed Cutting Nozzles

A range of oxy-acetylene nozzles, which are said to give faster machine cutting speeds than existing models, have been developed in Britain by British Oxygen Gases Ltd., 27, St. James Place, London S.W. 1, England.

These can cut 7-inch-thick plate at 45 feet per hour and 1-inch plate at 100 feet per hour. They are available in four sizes: 45, 50, 60 and 73—the size numbers indicate the diameter of the throat passages in thousands of an inch.

The new nozzles are claimed to lower the production costs of machine cutting and reduce the time spent on finishing and machine work. They are of one-piece construction and, apart from the conical seating surface, are chromium plated.

The cutting orifices, which are machined to exacting limitations, are of convergent-divergent form. This allows the cutting oxygen supply

to expand to atmosphere pressure within the nozzle. The cutting oxygen leaves the nozzle at high speed in a parallel stream, resulting in a high linear cutting speed.

Machine for Holloware

A new machine intended to replace the spinning lathe for many of the operations needed to produce large-diameter metal pressings has been designed and made by Moon Brother, Ltd., Beaufort Road, Birkenhead, England. It is a semi-automatic trimmer and beader.

The operation will save time in the manufacture of Saucepans and many other sheet metal bowl-shaped pressings and spinings—one complete cycle takes 3.2 or 6 seconds. The machine will handle a range of sizes from 12 to 28 inches diameter.

The design is basically a horizontal deck with a vertical overhead clamp to hold the pressings. There is an automatic clutch for starting and stopping and two independent cam-controlled tool posts carried on robust slides so that, with suitable tooling, all combinations of the following operations can be carried out: flange-trimming and square-trimming; curling and beading; rilling and flanging; double seaming.

All components are readily adjustable and change cams can be provided to control the movements of the tool posts. The machine uses a 5 h.p. motor working at 960 r.p.m. or 200 r.p.m. Its overall size is 53 by 70 inches wide and 99 inches high.

A new small fire pump

A new lightweight fire pump will be shown for the first time during the U.K. annual conference of the Chief Fire Officers Association and the Institution of Fire Engineers.

The unit weighs only 170 lb. and will pump 120 gallons per minute. It is being introduced to meet the expanding needs for an ultra-light yet powerful pump and will be inspected by fire officers at the conference which takes place at Bournemouth, Hampshire. It is made by Coventry Climax Engines Ltd., who are the

largest manufacturers of portable and trailer fire pumps in Britain.

It is powered by an overhead camshaft engine, which is developed to ensure high efficiency, economy of operation and long life without attention. All pumps are fitted with a spring-loaded carbon face shaft sealing gland which is self-adjusting and needs no attention.

Flexible rubber hose

A new flexible rubber hose with a range of push-in end fittings has been announced by a U.K. firm. The hose is of Neoprene and of flax-braid construction, and offers maximum resistance to swelling and ageing. The construction is such that the push-in end fittings will "hold" without the use of conventional clamps or clips. The combination of rubber hose and these specially-designed inserts—fitted without tools in five seconds—is a development which, the manufacturers (B.T.R. Industries Ltd., of London) claim allows maximum cut in replacement time.

The one braid hose, suitable for use with push-in fittings, is available in bore sizes up to one inch and will give a working pressure of 300 lb. per sq. in. Crimped end fittings are recommended for use with two braid hose allowing working pressures up to 800 lb. per sq. in. These are factory fitted and are supplied to suit customers' individual requirements. The push-in fittings are supplied complete with plastic end caps to protect the hose ends and give the unit an extremely neat finish.

One inch thick car spare wheel

A revolutionary type of car spare wheel, which is only one inch thick when not in use, easy to handle, and can be stowed in a very small space, was exhibited at the Motor Show held in London recently. It consists of a special pneumatic tyre mounted on a modified type of wheel about one inch wide. This means that the combined tyre and wheel can be stowed away in very little space and handled with ease during an emergency.

When needed, the tyre is inflated by a small cylinder of carbon dioxide, about nine inches

long, and containing sufficient gas to inflate the tyre to the correct pressure. If necessary, inflation can be carried out by conventional methods. Once inflated, the tyre becomes nearly circular in cross-section and in this condition is used conventionally, being bolted on in the usual way after removal of the punctured tyre/wheel assembly. It should be driven at reasonable speeds, and will then normally be adequate for all emergencies likely to be met during the life of the car. After the punctured tyre has been repaired, the wheel is removed. The tyre, when deflated, regains its former shape.

Cold forging installation

A complete cold-forging installation, claimed to be the first of its kind in the world, has been developed by a British company after extensive research and field trials. It takes the form of a complete production line capable of accepting raw barstock at one end and ejecting the finished article at the other end.

Fine Display by Louis Jayasekaran at 20th Coimbatore Olympic Sports Meet

The I.C.F. Athletic Team consisting of six members left for Coimbatore with Shri R. A. Keshaviah, Principal, Technical Training School, as Manager, on 7th September 1960 to partake in the 20th Coimbatore Olympic Meet which was held on the 9th and 10th of September 1960.

Although the number in the team was very limited, our Athletes distinguished themselves in some of the events. Louis Jayasekaran, very well of I.C.F. came first in both 800 Metres

The equipment shown at the exhibition is being manufactured by two companies, one in the United Kingdom and the other in Germany—both members of the Camp Bird Group, London. Altogether seven machines of the range were shown including the essential basic units required for a complete cold-forging system. These are the cropping machine, the performing unit, the combined de-burring and chamfering machine, the complete automatic cycle surface treatment plant and the actual cold-forging machine. Cold-forging techniques make accurately controlled use of the plastic flow properties of metals in a complex shaping process. This not only requires machines of exceptional rigidity but also tools designed to withstand the enormous forces of cold-forging in continuous operation. Although it will not completely displace chip-forming machining methods, there is a wide range of components in general demand which can be mass-produced by cold-forging at costs which are substantially lower than those of conventional systems.

and 400 Metres. V. Rajamanickam secured the second place in 100 Metres and Satoor third place in 400 Metres. Subramaniam tried his best, but he got only fourth place in hop-step and jump and in high jump (bracketed).

The I.C.F. Relay team earned second places in 4×100 and 4×400 Metre Relay as well.

Shri Keshaviah was given the honour of taking the salute at the march past, declaring the Meet open.

—VENKAT

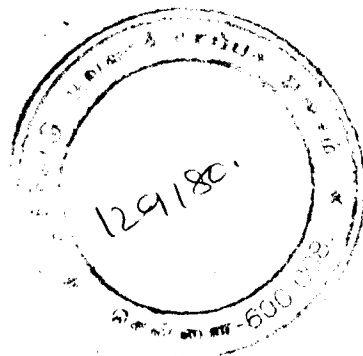
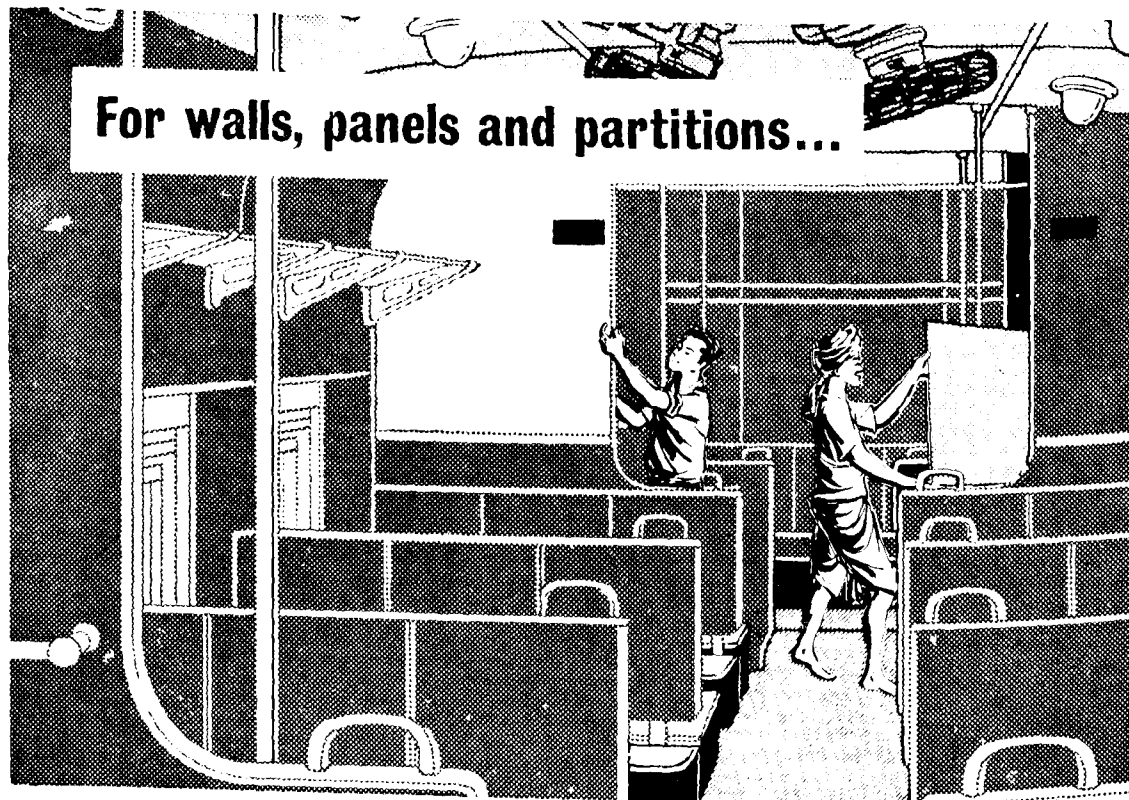


PHOTO ON THE OPPOSITE PAGE
SHOWS THE ASSEMBLY LINES
IN I.C.F.



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Insulation Board will be available soon