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Rail Coach

vol. 1

1957



no. 7, 8.

April.

May 1957.

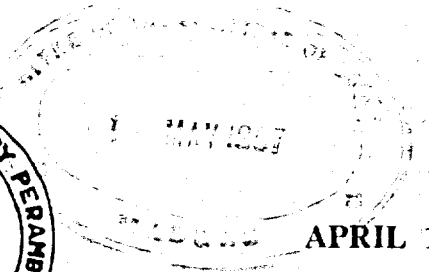
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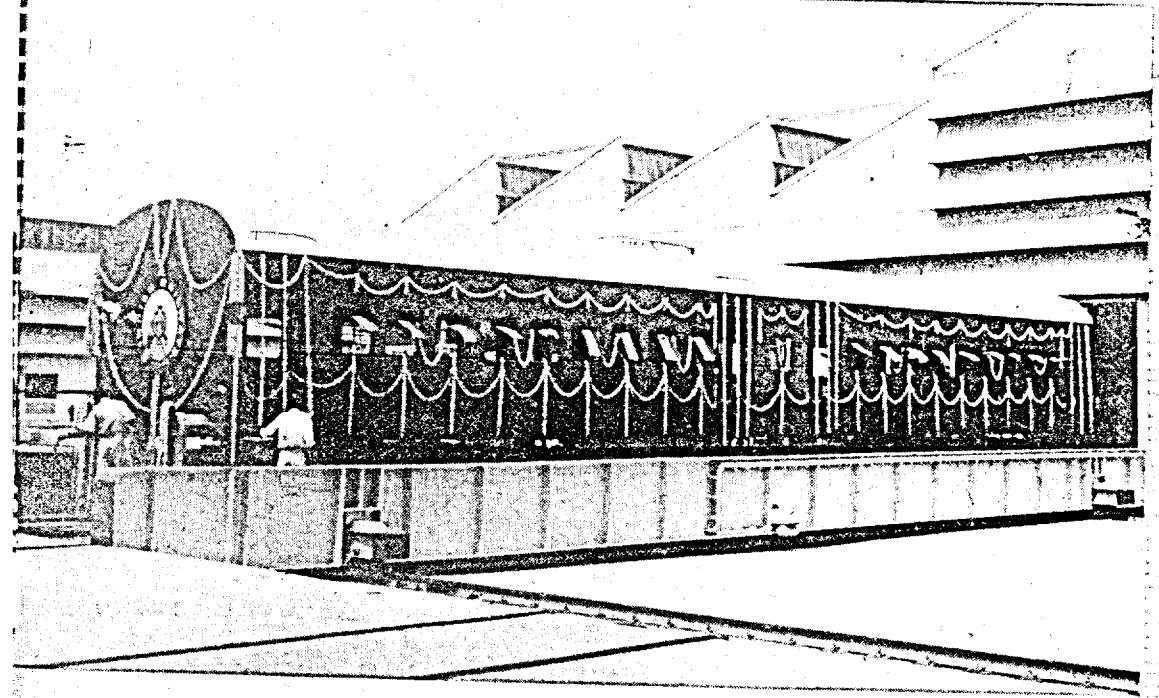
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RAILCOACH

OL. I, No. 7



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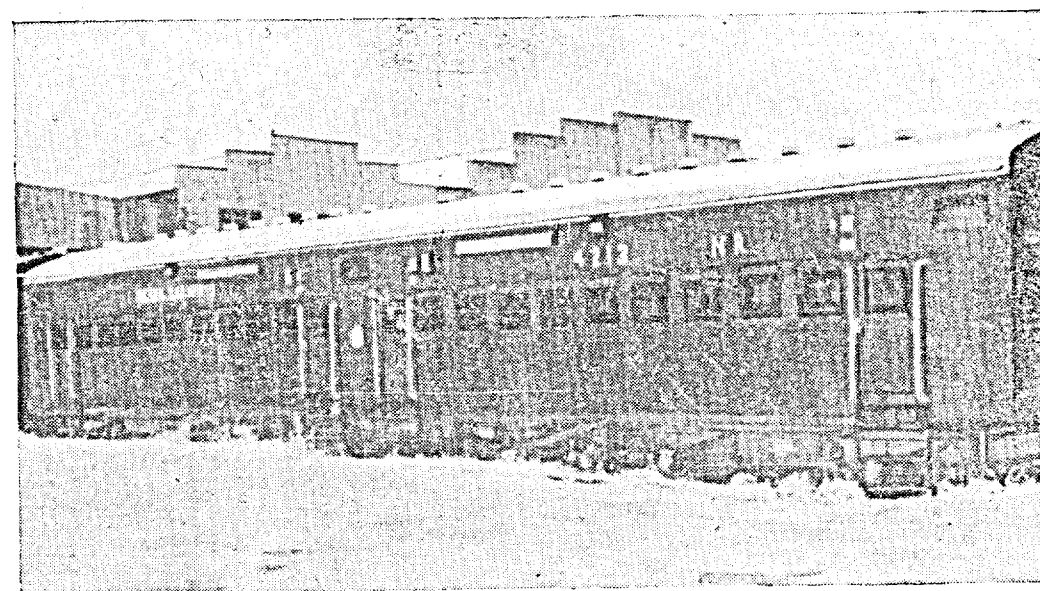
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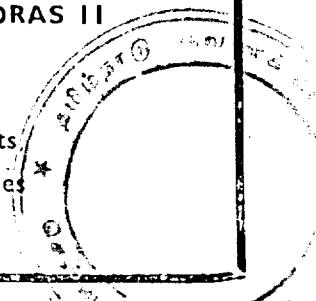
That is the slogan of the Railway Board during the Second Plan period to the millions of travelling public who use Railways.

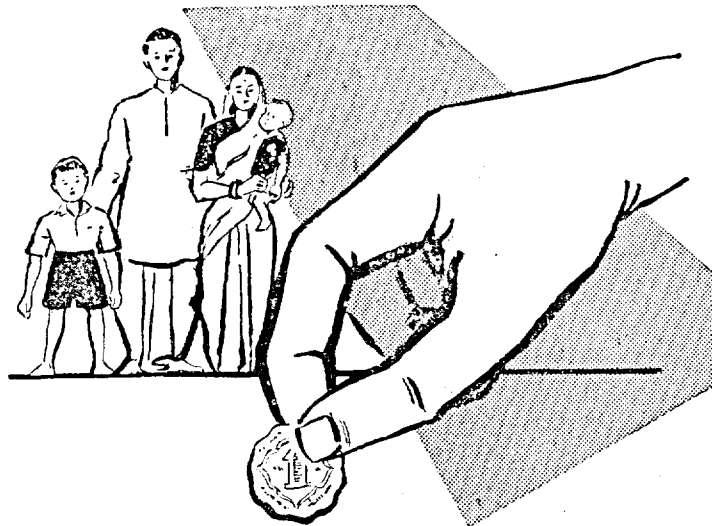
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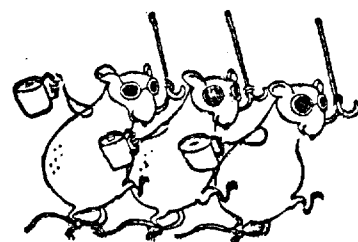
We Wish

A Very Happy and Bright New Year

to all our

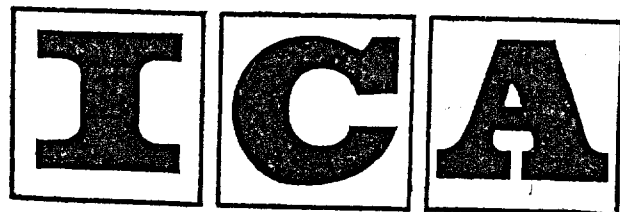
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EDITORIAL NOTICE

All contributions must be clearly typed and doublespaced on one side of the paper only, and signed, not necessarily for publication, but as a guarantee of good faith.

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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Annual Subscription

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FROM THE EDITOR'S DESK

RAILWAY WEEK

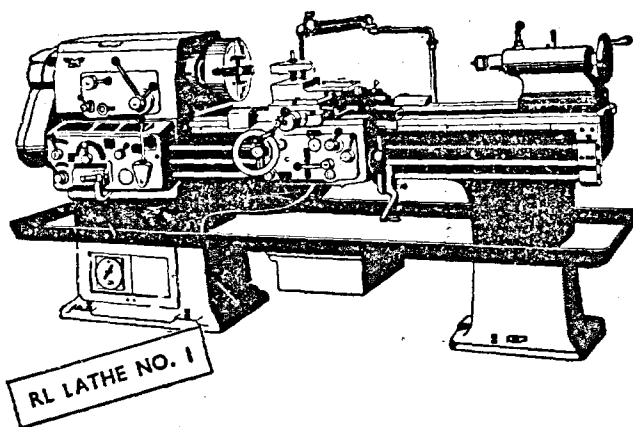
In this vast country of ours, practically everyone is familiar with railway transport. But of the public only a negligible few have any idea of the vast machinery that keeps the transport system functioning and still a lesser number know of the highly responsible work put in by the railwaymen in this connection. It is primarily with a view to bringing the public into direct contact with the activities of the staff, so that the public may appreciate the magnitude of the work involved and the manner in which the railway servants discharge their duties, the celebration of 'Railway Week' came into existence. When the public get an idea of the work expected of the railwaymen and how they discharge their duties, they will have greater confidence in railwaymen and the work turned out by them.

The Railway Week also serves the purpose of a courtesy week.

Further, the celebrations provide an opportunity for the railwaymen to get together. The staff of one department mixing with those of another paves the way for a better understanding between them and results in their working in close co-operation, which is essential for the efficient functioning of the organization.

A noteworthy feature of the celebration is that staff of all ranks are given equal opportunities to participate in the celebrations. Just as the smallest cog is as important as the biggest cog for the efficient working of a huge machine, each member of the railway organization, whatever be his rank, has an important part to play in this, the biggest national undertaking. Fortunately in the I.C.F. the feeling of working for one common objective, viz., to make India self-sufficient in respect of coaching stock, prevails and the "one family" spirit, which has been so assiduously built up by our Chief Administrative Officer and his Assistants has made each worker feel that he is an honoured member of the I.C.F. family and that his work in the factory is no less important than that of any other.

During the 10th to 16th of this month we will be celebrating the Second Railway Week. As was done last year an elaborate programme, which brings out the full significance of the Railway Week, has been drawn up and we are confident that the celebrations will be a success and the purpose for which they are being held will be fully realised.



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In this connection we have done our humble bit by bringing out this special number. We trust the changes made in the get up will meet with the approval of our readers and that the increased fare provided will be appreciated. Design-minded readers will find the article entitled "Design aspects of the Integral Light Weight Coaches" very informative and interesting. We are thankful to Shri K. Swarup for presenting the vast technical information in such a simple language. Our thanks are also due to Mr. Sieber for his thought-provoking article on "Automation" and Shri Upadhyay for his well presented article on "Welding."

* * *

SPORTS

Last month was a very successful one for the I.C.F.

In the Soccer field, the I.C.F. Team annexed the prized Palghat Trophy.

In Cricket, the I.C.F. Team set up a record by winning all the matches played in the League, in the very first year of its appearance.

We offer our congratulations to the members of the teams. These victories are no doubt heartening but it should be realised that the I.C.F. has yet to make a name for itself amongst the Indian Railway teams. We trust that, emboldened by the victories gained so far and supplemented by strenuous practice, our team will do better in the next season.

* * *

MONTHLY OUT-TURN

In his letter to the Editor, Shri A. R. Venkatachalam, Typist, Production Office, writes that particulars regarding the out-turn in each month will be read with interest by all staff. This suggestion has been accepted and commencing with this issue the monthly out-turn will be published in these columns.

Month	Target figures		Actual figures	
	Knocked down coaches	Indigenous coaches	Knocked down coaches	Indigenous coaches
March	7	3	7	6
Cumulative total for the first year of the Second Plan period.	65	7	71	17



K. SADAGOPAN
Chief Administrative Officer

C. A. O.(R).s MESSAGE

On the festive occasion of the "Railway Week", during which also falls the Tamil New Year Day, I feel it my pleasant duty and proud privilege to convey to one and all of the workers of the Integral Coach Factory, my warmest appreciation of the excellent work they have put in and my heartiest good wishes to them for a happy and prosperous New Year. It is a matter of common knowledge that the I.C.F. Workers are getting on as a happy well-knit family: our relations with one another have been most cordial. There is amongst us, a spirit of healthy competition in the attainment of professional competence, in making the best use of our time, and in the execution of our respective tasks.

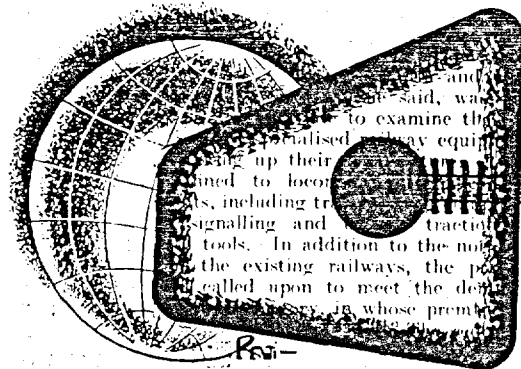
We are proceeding on sound lines, building up sound traditions and high standards of work, and to-day in the I.C.F. there is an atmosphere of mutual help and cheerful co-operation. The relations between our Swiss friends and ourselves have been entirely satisfactory and there is perfect mutual understanding. On the production side, notwithstanding international developments, such as, the Suez Canal issue, over which there could possibly be no control, we have made excellent progress and in this, our second production year, we are confident that we would not only attain the increased production targets but do still better. On the new Furnishing Project, we are making steady progress in building up the organisation and the construction of the Interim Furnishing arrangements.

We are fully aware of the arduous tasks ahead, which we are confident of fulfilling in more than ample measure, and we look upon it as a rare privilege and a glorious opportunity to share in this great and exciting adventure of building up this industry and seeing it grow to its full stature as one of the largest and best Railway Coach Building Factories in the World.

Jai Hind

K. Sadagopan

Chief Administrative Officer



NEWS AND NOTES

Linking Chinnasalem with Chingleput

A traffic survey for a line linking Chinnasalem on the Salem-Vriddhachalam Section with Chingleput, has been sanctioned by the Railway Board.

The length of the proposed metre-gauge line is about 120 miles. The traffic survey has been taken up from January 14, 1957, and is now in progress, under the supervision of the District Commercial Superintendent (Surveys), Chinnasalem-Chingleput Railway Traffic Survey, with headquarters at Tiruvannamalai in the first instance. The survey is expected to last about ten months.

Metric System on Railways

The Committee set up by the Railway Board to study the introduction of metric system has concluded its deliberations and a report will be placed before the Board shortly.

Broadly, the Committee, has concluded that difficulties of transition were not likely to be so great as had been expected. It is pointed out on behalf of the Board that they have planned to have a preparatory period of three or four years during which all personnel would gain familiarity with the metric system. All fares, distances and tariffs would be recalculated and all indenting done, on the basis of the metric system of weights and measures.

The Railway Administration expect that at the end of 1960 all Railway weighing

machines would have been recalibrated. The Railway Board's technical experts feel that much of the machinery of general nature would require no conversion at all.

Southern Railway Works

A provision of Rs. 15 lakhs has been made in the current year for the multi-storeyed air-conditioned general offices building of the Southern Railway to be constructed at Madras. This work is estimated to cost about Rs. 48 lakhs.

Among other works included in the White Paper are: Remodelling of the yards at Jalarpet and Bezwada costing Rs. 28 lakhs and Rs. 86 lakhs respectively, conversion of the Renigunta-Gudur Section into broad gauge costing Rs. 218 lakhs, for the proposed Central Signal and Tele-communication Workshops at Podanur, Rs. 26 lakhs: construction of quarters for staff at Bezwada, Olavakkot and Guntakal, Rs. 29 lakhs, Rs. 27 lakhs and Rs. 27 lakhs respectively: doubling of the track between Mukundarayapuram and Latteri on the Arkonam-Tiruppur Section, Rs. 91 lakhs; doubling between Vinnamangalam and Tiruppur, Rs. 128 lakhs; doubling between Ulavapadu and Surareddipalem, Rs. 146 lakhs; remodelling of the Hubli Workshops, Rs. 92 lakhs and Tiruvarur Junction remodelling, Rs. 28 lakhs.

The White Paper presented Parliament recently along with the Railway Budget contains three new works on the Southern Railway:

They are:—(1) The laying of diversionary line Hamsavaram bank from mile 417 to 421 which is estimated to cost about Rs. 38 lakhs. Of this a provision of Rs. 26 lakhs has been made for 1957-58.

(2) The doubling of broad gauge track from Ongole to Surareddipalam. This work is anticipated to cost Rs. 29 lakhs and a provision of Rs. 20 lakhs has been made for 1957-58.

(3) The re-grading and alignment between Kalipatti Road and Mavelipalaiyam costing Rs. 55 lakhs. Provision made in the budget for 1957-58 for this work is Rs. 55 lakhs.

Fatehpur Shekhawati-Churu Railway Line

Shri Mohanlal Sukhadia, Chief Minister, Rajasthan opened the Fatehpur Shekhawati-Churu Metre Gauge Railway line on the 1st March 1957. This 26-mile rail line constructed at a cost of Rs. 65 lakhs was completed in about 15 months' time.

Shri M. Ganapati, General Manager, Western Railway, welcoming the gathering stated that it was a historic day for the people of Fatehpur Shekhawati-Churu area in Rajasthan, as a long cherished desire of the people was being fulfilled with the construction of Fatehpur Shekhawati-Churu Line. Shri Ganapati stated that the first step in the construction of the line was taken on 16th February 1955 when Shri O. V. Alagesan, Deputy Minister for Railways, turned the first sod at a function at Fatehpur Shekhawati.

Speaking on the occasion Shri Mohanlal Sukhadia, Chief Minister, Rajasthan stated that the new rail link, the first major Railway construction in Rajasthan since Independence, would contribute greatly to the development of Rajasthan. He stated that though economically the line would not be profitable immediately, it would pay in the long run. By the



G. M., Chittaranjan

Shri K. Ramachandran, M.E., A.M.I., Loco. E., born in 1901, started his Railway career in 1930 as probationer in the Mechanical Engineering department of the Bengal Nagpur Railway, and after two years of training, was confirmed as an Assistant Locomotive and Carriage Superintendent. In 1942 he was promoted as District Locomotive and Carriage Superintendent and was confirmed in that post in October, 1943. He became Deputy Chief Mechanical Engineer in March 1947, and in September the same year he was placed on special duty by the Railway Board, with the rank of a Chief Mechanical Engineer, for standardising the maintenance procedure in Loco Sheds. On completion of the special duty, Mr. Ramachandran was posted as the Chief Mechanical Engineer, Bengal Nagpur Railway, in June 1948. In April 1952 he became the first Chief Mechanical Engineer of the integrated Eastern Railway. He was promoted as Additional Member (Mechanical), Railway Board, in 1956 and in March 1957 took over as General Manager, Chittaranjan Locomotive Works.

He is a keen sportsman and his favourite game is tennis.

construction of this line, the Chief Minister continued that Bikaner, an important city in Rajasthan had been connected by a straight route with Jaipur, the capital of Rajasthan.

Shri Sukhadia congratulated the Railway

Administration for completing the work in a very short time.

After the speech, Shri Sukhadia pulled the lever which lit the green line-clear signal for the first passenger train to enter the new section.

Shri Mohanlal Sukhadia pulling the lever to inaugurate the new Shekhawati—Churu Railway line on the Western Railway.



Railway Minister's Budget Speech

The Union Railway Minister, Shri Jagjiwan Ram, presented the Railway Budget to the Parliament on March 19, 1957. In his Budget speech, the Railway Minister announced the appointment of a high-level committee of engineers headed by Dr. A. N. Khosla, ex-Chairman of the Central Water and Power Commission, to prescribe appropriate designs and formulae for waterways and other instructions for the upkeep of bridge structures and protection works.

Shri Jagjiwan Ram pointed out that the question of reviewing the freight structure in the Indian Railways was remitted in July 1955 to a high-level committee headed by Dr. A. Ramaswami Mudaliar, and said, "It is expected that the committee will finalise its recommendations and submit its report shortly. It is the intention of the Government to consider and implement the recommendations as far as practicable within the next financial year. It is hoped that when the budget is presented again to the new House it would be possible to give an indication of the recommendations of the committee and the effect of the implementation of these recommendations."

In his brief budget speech, which he supplemented with a White Paper placed before both Houses of Parliament, the Railway Minister made a promise to Class IV employees. "It has been noticed", he said, "that in the matter of promotion of Class IV employees to higher classes, the present rules are rather restrictive and, for certain categories, there is no avenue of promotion at all. I shall have this matter examined to see how the opportunities for advancement could be improved for these employees, consistent with efficiency."

"In the year 1955-56, which is the latest year for which completed accounts are available,

the actual surplus was Rs. 14.22 crores against Rs. 9.58 crores anticipated in the revised estimate. This improvement in the surplus was due to the receipts being Rs. 2.19 crores higher and the expenditure Rs. 2.45 crores lower than the anticipations in the revised Budget. The additional surplus earned has been credited to the Development Fund.

"In the current year, the revised estimates of gross traffic receipts have been placed at Rs. 5 crores more than the Budget, this increase being primarily due to higher earnings from passenger traffic. Under working expenses, there is a net increase, compared to the Budget of Rs. 5.04 crores due chiefly to the increase in the statutory prices of coal and in building materials and labour rates, etc., not anticipated at the time of the Budget. This increase has partly been covered already by supplementary demands, voted by the House in the December session, and as regards the balance, fresh supplementary demands will shortly be presented by me for the consideration of the House.

"The dividend payable to general revenues is Rs. 1.98 crores less than the Budget, and this, along with other minor variations, has resulted in an increase in the surplus of about Rs. 4 crores. It is proposed to credit this extra amount to the Development Fund.

"Turning now to the estimates of the coming year, the total gross traffic receipts have been placed at Rs. 368.50 crores, on the basis of the present level of fares and freight, including the 6½ per cent supplementary charge on parcels and goods. In framing this estimate, an increase of 3 per cent in passenger traffic and 5 per cent in goods traffic over the current year has been assumed in the light of the present trends and future anticipations. The working expenses are expected to increase over those of the current year, by Rs. 14.82

crores, of which Rs. 4.6 crores are due to the increased cost of operation reflecting the anticipated increase in passenger services and goods traffic, about Rs. 3.32 crores due to more repairs to rolling stock and the balance mainly on account of additional expenditure on staff, which includes a provision of Rs. 2.20 crores for the payments, with retrospective effect from April 1, 1956, arising from the readjustment of cadres for certain categories of staff, which was recently announced.

“Under miscellaneous expenditure, an increase of about Rs. 3 crores is expected, mainly on open line works chargeable to revenue.

“The dividend to general revenues is expected next year to be Rs. 43.8 crores, against Rs. 37.69 crores in the current year. The surplus will come to about Rs. 21.43 crores which is proposed to be credited entirely to the Development Fund.”

The Minister said : “The earnings estimate taken in the financial statement for the next year is only tentative. The question of reviewing the freight structure of the Indian Railways was remitted in July 1955 to a high level committee which includes two members of the House, and it is expected that they will finalise their recommendations and submit their report shortly. It is the intention of the Government to consider and implement the recommendations as far as practicable within the next financial year and this, as the members will appreciate, may affect the earnings estimate which has now been incorporated in the Budget for the next year. The extent to which the level of rates of different commodities will be modified by the recommendations of the committee, and to what extent the earnings estimate will be affected thereby cannot obviously be anticipated at present. It is hoped, however, that when the Budget is presented again in the new House, it would be possible to give an indication of the recommendations

of the committee and the effect of the implementation of those recommendations.

“Turning now to the works, rolling stock and machinery budget, the Railways expect to spend Rs. 178 crores in the current year against Rs. 193 crores originally provided or a shortfall of Rs. 15 crores. The shortfall on the works expenditure is of the order of about Rs. 12 crores, which would have been much more but for the inclusion of certain new items in the revised estimate for the current year, such as the additional payments to TELCO in the current year amounting to about Rs. 3½ crores, etc. This year has been one of constant anxiety due to acute shortage in the availability of essential materials like steel, cement, track materials, etc. The next year's budget for works, rolling stock and machinery has been fixed at Rs. 218 crores, which provides for all new lines and important line capacity works required for carrying the additional traffic connected with the increased production of steel and coal. The extent to which the works programme for next year can be carried out will again depend a great deal on the timely availability of critical materials in sufficient quantities. This is a vital question for the railways, and the Railway Board, in conjunction with the other Ministries concerned, are considering measures for improving the procurement of rails, sleepers, etc., and, while certain steps have already been taken to economise on the use of steel, cement, etc., further investigations are going on in this direction as also on the use of alternatives where possible and economical.

“The introductory note to the White Paper brings out in a concise manner the achievements of the railways in the first Five-Year Plan and the progress already made in the implementation of the Second Plan. The Second Plan provides for the construction of about 842 miles of new lines at a cost of Rs. 66 crores, which would involve the construction of a

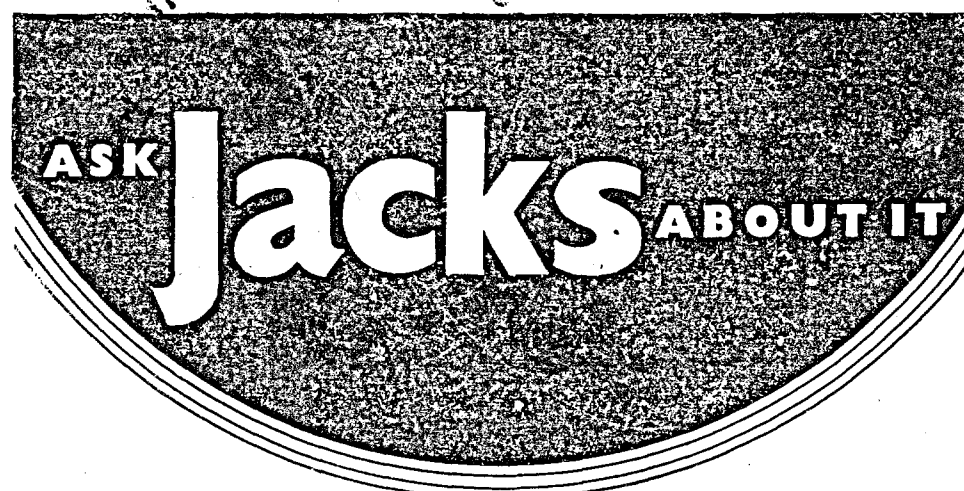
number of bridges. In addition, there is a separate provision of Rs. 15 crores for the construction of new major bridges. There is also the provision of about Rs. 350 crores for rehabilitation of which Rs. 118 crores are for rehabilitation of track and bridges. With this substantial provision in the Plan for rehabilitation of existing bridges and construction of new bridges, it is essential that in executing these works, the fullest advantage is taken of the latest achievements in the science of hydrology. Indian railways have to their credit pioneer works in the field of hydraulic engineering, specially in the branch of hydrology, concerned with the determination of water-ways, in the design of bridges and of river training and control. This branch of the science, as many others, has progressively advanced and a considerable amount of information and data has now accumulated in various regions of the country. Lately a number of big river valley projects has also been undertaken all over India, which also would have a bearing on the subject. The time has, therefore, been considered opportune to collect and compile all the knowledge now available in the science of water engineering and hydrology and make it available to railway engineers engaged in the task of bridge construction and bridge rehabilitation as envisaged in the Plan. The Ministry of Railways have, therefore, appointed a high level committee of engineers with Dr. A. N. Khosla, Ex-Chairman of the Central Water and Power Commis-

sion and now Vice-Chancellor of Roorkee University, as Chairman in order to prescribe appropriate designs and formulae for waterways and other instructions for the upkeep of bridge structures, protection works, etc.

“In the White Paper, mention has been made of our endeavours for attaining some degree of self-sufficiency in the production of the railways' requirements in the country. As the designs for these are constantly improving and no self-sufficiency can be achieved without a proper technological background, there was need to further strengthen the present research, design and standardization organisation and I am taking suitable steps to do so.

“In the sphere of railway operation, in the current year, one satisfactory feature is the increase of about 10 per cent in the originating tonnage handled by railways over the last year and the relatively freer movement of traffic all over the country, particularly through most of the break-of-gauge transshipment points. There has been a steady increase in passenger and goods train miles, and net ton miles per wagon per day on the broad gauge have increased to the record figure of 541 never attained before in the country.

“I am glad to be able to say that staff relations have generally been satisfactory during the year. The responsibility which has devolved on them under the impact of the Five-Year Plans is enormous, but I am confident that they will rise equal to the task set before them.”



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Indian Railways and the Five-Year Plans

First Five-Year Plan

The White Paper presented by the Union Railway Minister to Parliament on 19-3-1957 points out that the railways had actually spent a sum of Rs. 423.73 crores during the First Five-Year Plan period, compared to the original allocation of Rs. 400 crores. The increase had taken place under rolling stock and machinery. There was a small shortfall of expenditure on track and bridges, mainly due to shortage of materials. Even at the end of the Plan period, track renewal was in arrears to the extent of about 7,000 miles each for rails and sleepers.

As a result of various measures taken during the Plan period, there has been a general improvement in the operational efficiency of the railways.

The Plan period had seen an increase of Rs. 69 crores in traffic receipts, which rose from Rs. 247 crores in 1950-51 (excluding the freight on railway materials) to Rs. 316 crores in the last year of the plan. The increase was made up of Rs. 10 crores in passenger earnings, Rs. 4 crores under other coaching earnings, Rs. 53 crores under goods and Rs. 2 crores under sundry earnings.

Ordinary working expenses during the Plan Period rose from about Rs. 165 crores in 1950-51, excluding freight on railway materials, to Rs. 212.95 crores, an increase of nearly Rs. 48 crores. The main reasons for higher expenditure were an increase of about Rs. 34½ crores in the cost of the staff and Rs. 3½ crores in the cost of fuel.

Of the total expenditure of Rs. 423.73 crores in the Plan period, a sum of Rs. 284 crores

was provided by the Railways from their own current resources, which was Rs. 36 crores short of the original figure of Rs. 320 crores planned to be found by them. The balance of about Rs. 140 crores was met from the general revenues.

Second Plan Schemes

The White Paper refers at some length to the progress already made under the Railways' Second Five-Year Plan during the first year, and the development proposed for the second year of the Plan.

A number of new lines and several important line capacity works provided for in the Railway Plan and required for carrying the additional coal and steel traffic have either been taken in hand during the current year or have been included in the programme for 1957-58.

Orders for Rolling Stock

The procurement of rolling stock envisaged in the Plan is proceeding satisfactorily. Orders for 557 locomotives, 1,931 carriages and 27,184 wagons (four wheelers) have been placed in the current year while 411 locomotives, 2,346 carriages including 68 EMP coaches and 17,729 wagons (four wheelers) are proposed to be ordered against the 1957-58 programme. The locomotives already ordered include 100 diesel locos of 2,000 H.P. each for working main line goods traffic.

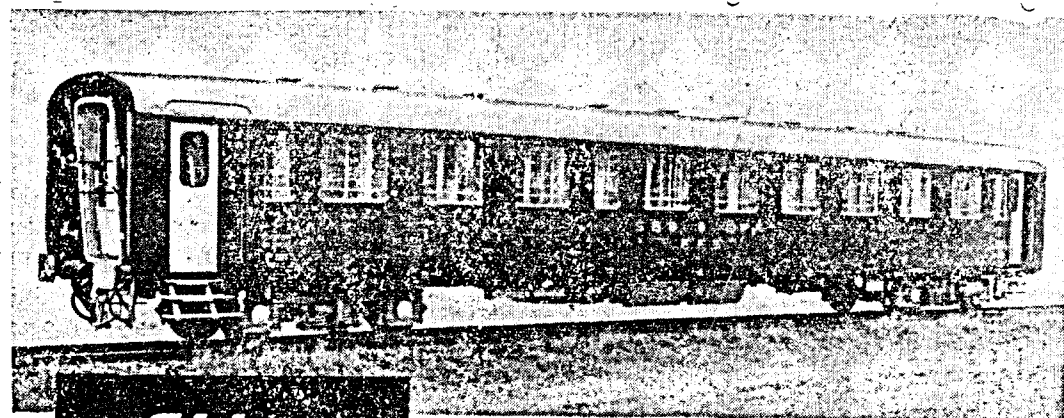
To cope with the repair work of the increased rolling stock holdings, which will also be put to more intensive use in the coming years than in the past, large-scale expansion and modernisation of the existing repair shops as well as the establishment of a few new shops have been or are being taken in hand.

Electrification Programme

In the Second Plan there is a provision of Rs. 80 crores for electrification. In addition to the lines originally provided for, the electrification of the sections between Gomoh and Moghalsari, and Asansol Raj Kharswan and

Barajamada is now under active consideration.

Three new lines totalling 87 miles on the South Eastern, Western and Southern Railways have been completed and opened for traffic in the current year, while eight new lines are under construction.



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Railways' Rolling Stock Production

A Review

The Chittaranjan Locomotive Works, the capacity of which was initially rated at 120 average size locomotives, equivalent to 97 locomotives of the W.G. type, actually produced 129 W.G. locomotives in 1955-56 and are expected to turn out 156 this year and 168 next year (this last figure being equivalent to 200 average size units), the cost per locomotive being Rs. 4.98 lakhs approximately inclusive of interest on capital investment. Schemes were prepared for the expansion of capacity to build 300 locomotives per year at the end of the Second Five-Year Plan, but in view of the curtailment of the Plan allotment and the proposed electrification and dieselisation of certain sections of the Railways, it has now been decided to stabilise production at 14 W.G. locomotives, reducing to the maximum extent possible the importation of components.

The Tata Locomotive and Engineering Works attained their target production of 50 metre gauge locomotives last year and are raising the target in the course of the Second Plan period to 100 per year.

The Integral Coach Factory turned out 12 coaches in 1955-56 and is expected to increase its production to 80 coaches in the current year and 181 next year. Of these, 10 in the current year and 81 next year are expected to be coach shells made of components manufactured indigenously. The furnishing of these coaches, which is at present done at selected railway workshops, has now begun in the Integral Coach Factory itself with the provision of temporary furnishing arrangements. It is also proposed to provide a separate permanent furnishing section adjoining the Factory, at a cost of Rs. 3.70 crores, capable of furnishing all the 350 coach shells to be built here per

year towards the end of the Second Five-Year Plan according to the present target.

The Railway Ministry have recently entered into an agreement with the Hindustan Aircraft (Private) Limited, under which the latter are developing capacity in collaboration with MAN, the reputed coach building firm of West Germany, for the construction of the integral type of coach in place of the conventional type of coach they have been manufacturing for the railways hitherto.

The capacity developed in the country for manufacturing wagons is already of the order of 20,000 wagons per year and covers wagons of all except certain special types. This is planned to be increased to 36,000 wagons a year, and sixteen new Indian firms distributed all over the country have been selected for the development of extra capacity. Efforts are also being made for the installation of capacity for the manufacture of special types of wagons in the country. With the creation of capacity for manufacturing electrical rolling stock mentioned earlier, there are good prospects of the country becoming practically self-sufficient in the production of rolling stock by the end of the Second Plan period.

The capacity of the Railway Staff Training College, Baroda for the training of officers was increased by April 1956 to thirty officers at a time and arrangements have subsequently been made to increase this further to 110 officers at a time to meet the requirements of officers for the Second Plan. The additional capacity will be used after these recruits have been trained for refresher courses for serving officers.

Working of Indian Railways

Appreciation by World Bank Mission

Mr. J. E. Slater, leader of the team of railway consulting engineers sent by the World Bank, has expressed the opinion that the Indian railways were "headed in the right direction."

In a radio interview in All India Radio's programme, "Matters of the Moment," Mr. Slater pointed out that the quantum of goods lifted by the Indian railways would increase by about 50 per cent during the Second Plan period.

He remarked: "That is a task which is formidable for any organisation and I really very much admire the courage with which the problem has been faced. Beyond that, I admire the ingenuity and the care and the planning which have been directed towards

meeting it. I think it is quite clear that the basic problems are recognised."

He said: "Quite frankly I have been very much impressed with the great effort and care which has been taken by the Railway Board, the General Managers and their staffs towards these problems."

Speaking on the purpose of the team's visit to India, Mr. Slater said that two of the important objects were, firstly, to consider the soundness of the Second Five-Year Plan in so far as it applied to the railways and, secondly to go into the financial ability of the railways to provide that portion of the funds which would be called for under the Plan itself.

Dr. Burgess, a member of the World Bank Railway Consultants inspecting relaying work on the Western Railway



Mr. Slater said: "The World Bank has asked us to give our independent opinion as to the ability of the Indian railways to provide their portion of the funds which, under the Plan, they would have to provide—in other words, the total amount needed by way of new capital improvements. It was anticipated that, with their reserve funds, and other funds of the railways, they would carry on certain works themselves, largely of course those which could be done in India, such as doubling of the track and the construction of coaches, wagons and locomotives.

"In addition to that, there is the question of import of equipment. This is where the Indian Government apparently has approached, amongst others, the World Bank. It is a question of foreign exchange when you come to additional locomotives in order to build up the supply more rapidly, in connection with the demands of certain types of steel or rail for which the capacity in India is not quite up to the needs of a very rapidly expanding programme. It is here that foreign exchange would be needed. The Bank itself would make its own decisions in due time for its discussions with the Indian Government."

Referring to the railway electrification programme during the Second Plan period, Mr. Slater had the following remarks to offer: "Here some interesting studies have been made which indicate that in India the electrification problem is different from that in the United States, or even elsewhere, because you are rapidly getting into availability a large

amount of cheap hydro-electric power. And that is going to make things easy, especially with the elimination of the handling of coal which would give added capacity for other things to be handled; and hydro-electric power costs less than coal itself.

"So it would appear—and it has appeared to the planners—that certain lines beyond those electrified could be electrified with advantage. That generally has the advantage of reducing expenses and also has the advantage of utilising this power and of adding to the capacity of a line.

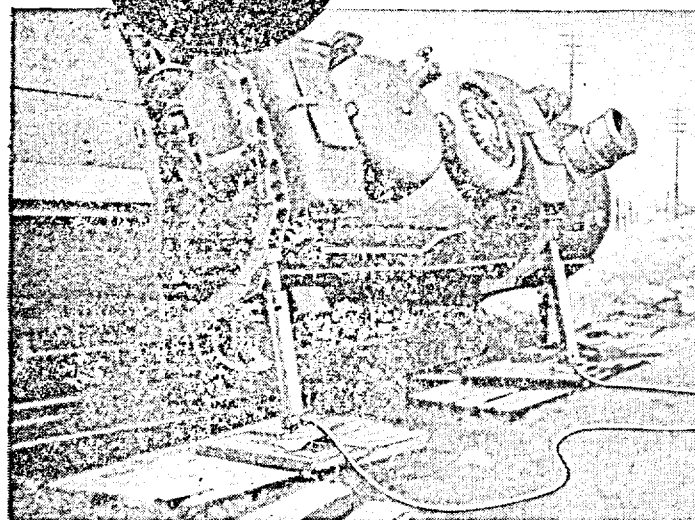
"In the various countries of the world—these include the United States—the use of diesel electric power has become of tremendous importance. In the United States, at the present time, I do not think steam locomotives are even manufactured.

"The problem in India is quite different, because until India finds her own resources of petroleum, it will have to import diesel fuel. That creates the problem of foreign exchange and costs and that sort of thing. That is why she may be more justified in using electric traction to a greater extent than she would be if there were ample resources of fuel in the country.

"On the other hand, I do feel that because of the greater efficiency of either the electric or the diesel electric locomotives, she must look forward to a long period for the gradual change-over, if not entirely, to a major use of electric and diesel electric traction."



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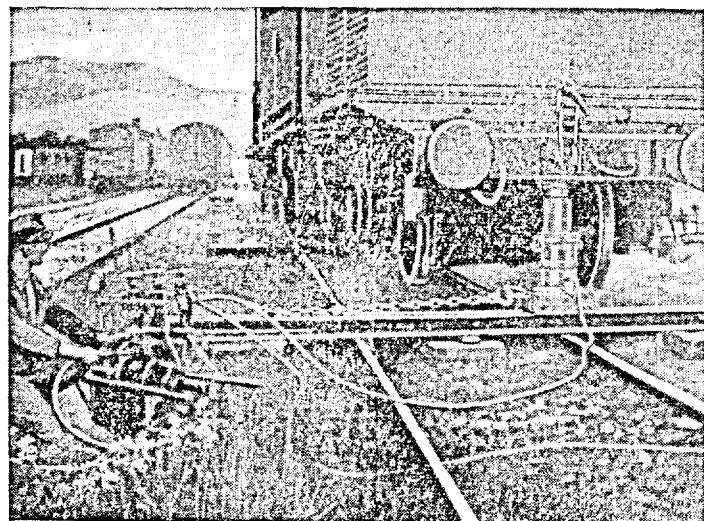
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Design Aspects of the Integral Light Weight Coaches

BY

K. SWARUP

Deputy Chief Mechanical Engineer

The conception of a rail coach till early 1920's was that the body provided shelter to the passengers travelling in a coach, while the underframe took all the stresses and strains. A new concept of an all-steel tubular design coach was foreseen in 1929, first in Switzerland. Both the underframe and the body in this type of coach carried stresses and strains, and it was, therefore, possible to make it much lighter than the old design carriage. Besides, the body provided all the amenities to the passengers, whose demands were becoming more and more exacting.

In India we first had wooden body coaches on steel underframes. In 1925-26, steel bodies were also built on underframe as an experimental measure. During the period of war, as is well-known, Indian Railways were badly depleted of their coaching stock, and the problem in 1949 was to standardize a modern carriage which will answer the future requirements satisfactorily.

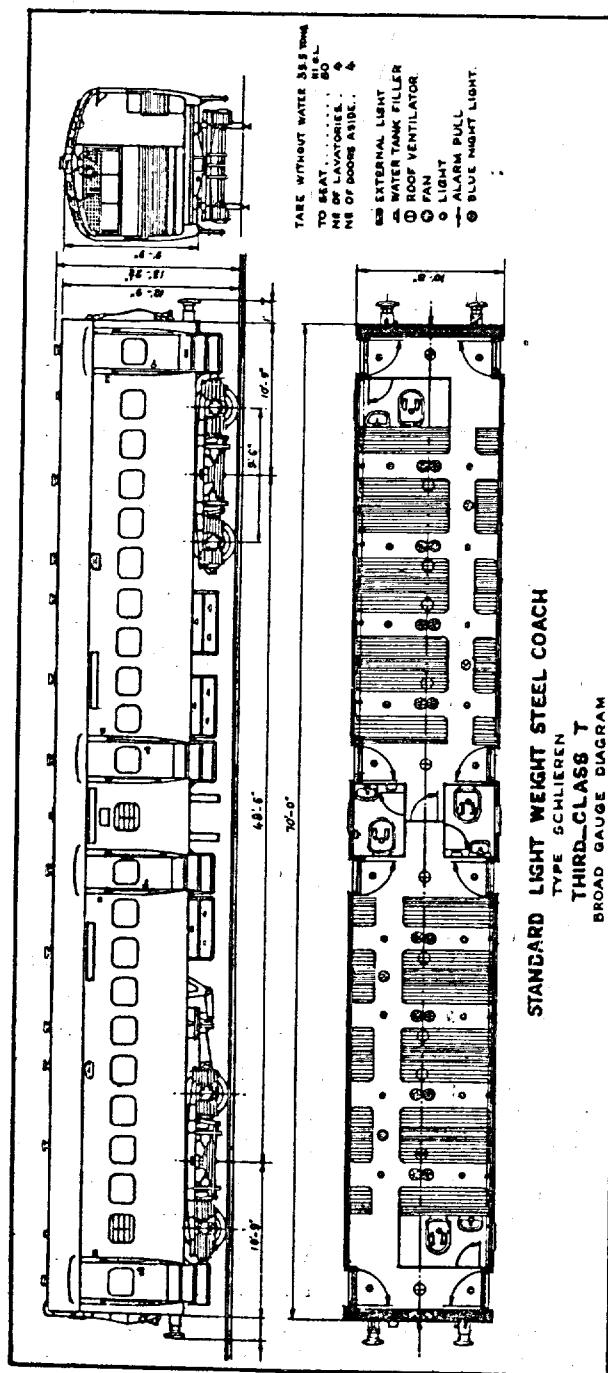
In pursuance of this policy the Railway Board decided to select the all-welded steel lightweight tubular design coach which was the most modern type of carriage in Europe, and it was in 1953 that they finally decided to build these carriages in the Integral Coach Factory at Perambur. This design of coach has several new features and is generally not well known in India. This article therefore describes the design aspects of this coach in detail for the information of railwaymen.



Shri K. Swarup

Specification of the Perambur built coaches :—

Gauge	...	...	5' — 6"
Length over Body	...	...	70' — 0"
Length over Buffers	...	...	73' — 1-13/16"
Buffer centres	...	...	6' — 5"
Width over Body	...	...	10' — 8"
Drawbar height from Rail Level	...	...	3' — 5 1/2"
Buffer height from Rail Level	...	...	3' — 7 1/2"
Overall height of coach from Rail Level	...	...	12' — 9"



Floor height from Rail Level	...	4' — 3-5/16"
Distance between bogie centres	...	48' — 6"
Rigid wheel base of bogie	...	9' — 6"
Tare weight	...	35 tons.
Seating capacity	...	80
No. of Lavatories	...	4
No. of doors aside	...	4
Passengers per lavatory	...	20
Passengers per door aside	...	20
Lighting	...	I.R.S. Double Battery system.

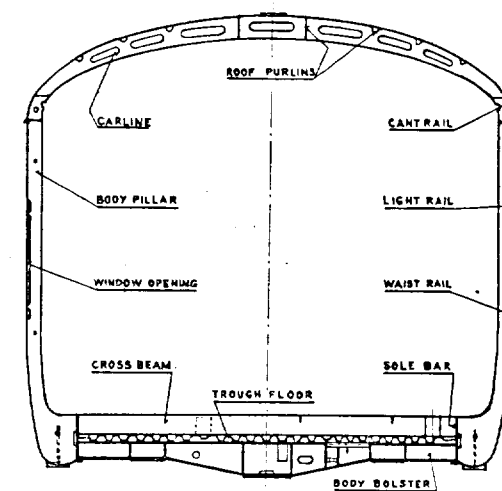


FIG. 1. SECTION OF BODY SHELL

Specified loads

(i) Vertical load of 45 tons uniformly distributed over the whole floor area of the coach and simultaneously horizontal compression load of 100 tons on each buffer. Under this condition, the deflection at the centre of the body shell shall not exceed 3/8".

(ii) Horizontal compression load of 60 tons at one foot above buffer centre, distributed over the whole width of the end construction.

(iii) Horizontal compression load of 30 tons uniformly distributed over the end construction.

General Constructional Details

The skeleton of the shell is made up of a series of hoops consisting of the floor cross beams, body side pillars and roof carlines as shown in Fig. 1. The sole bars, waist rails, light rails, cant rails and roof purlines are the members that hold the hoops together in a rigid framework which is then covered over by the roof sheets on top and the panels on the sides and ends.

The cross beams rest on a "trough" floor so called on account of its section which has been adopted so as to pack in the necessary cross-sectional area in a limited space, with a view to keep the stresses occurring within the permissible limits. It offers considerable resis-

tance to crushing loads in the longitudinal directions, although its ability to carry vertical loads is practically negligible. At each end of the trough floor is welded on a specially designed headstock as shown in Fig. 2, which initially receives the draw and buffing loads and then imparts the same to the trough floor. The trough flooring and the sole bars together with the headstocks virtually take the place of the conventional underframe.

To the underside of the trough floor are welded the body bolsters which then rest directly on corresponding units of the bogie trucks as well as all the beams and supports for the vacuum brake equipment, the brake rigging and the electrical apparatus and dynamo.

The ends of the coach are again of special interest, as it is in them that the anti-telescopic structure is incorporated. This consists of four vertical stanchions each of box section 10" deep and 4-5/16" wide manufactured from 5/32" thick material. These stanchions are transversely connected by 10" deep Z-Sections, and are welded to the headstock beams at the bottom and to the roof longitudinals at the top. Thus, any shock received through accident is resisted by these end-stanchions and if the shock load is high enough it is

absorbed by them during their plastic deformation. Still any further load is then imparted to the periphery of the shell which may then buckle at the door-ways, these being designed as the weakest sections in order to safe-guard the compartments.

The thicknesses of steel used for some of the more important members are given under :—

Sole Bars	...	3/16"
Headstock Beams (Outer).	...	3/16"
Trough floor	...	3/32"
Pillars	...	3/32"
Car lines	...	5/64"
Side Wall Panels	...	3/32"
Roof sheeting	...	1/16"
Headstock beams (Inner).	...	3/8"
Cant Rail	...	1/8"

Design Features

In designing the Integral Coach, the following loads are taken into account :—

Horizontal Loads

Load on each Buffer ... 100 tons.

Load applied on end walls at a height of 12" above buffer centres and distributed over the whole width of the coach ... 60 tons.

Load distributed over complete end walls ... 30 tons.

These loads are adopted hypothetically as loads that may arise when one coach overrides another during end-on collision.

Vertical Loads

Weight of body shell excluding bogies ... 24.6 tons.

Pay load (Passenger + luggage + 10% overcrowding) ... 12.9 tons.

Gross weight of the coach excluding bogies ... 37.5 tons.

Gross weight of the coach + 20% shock ... 45 tons.

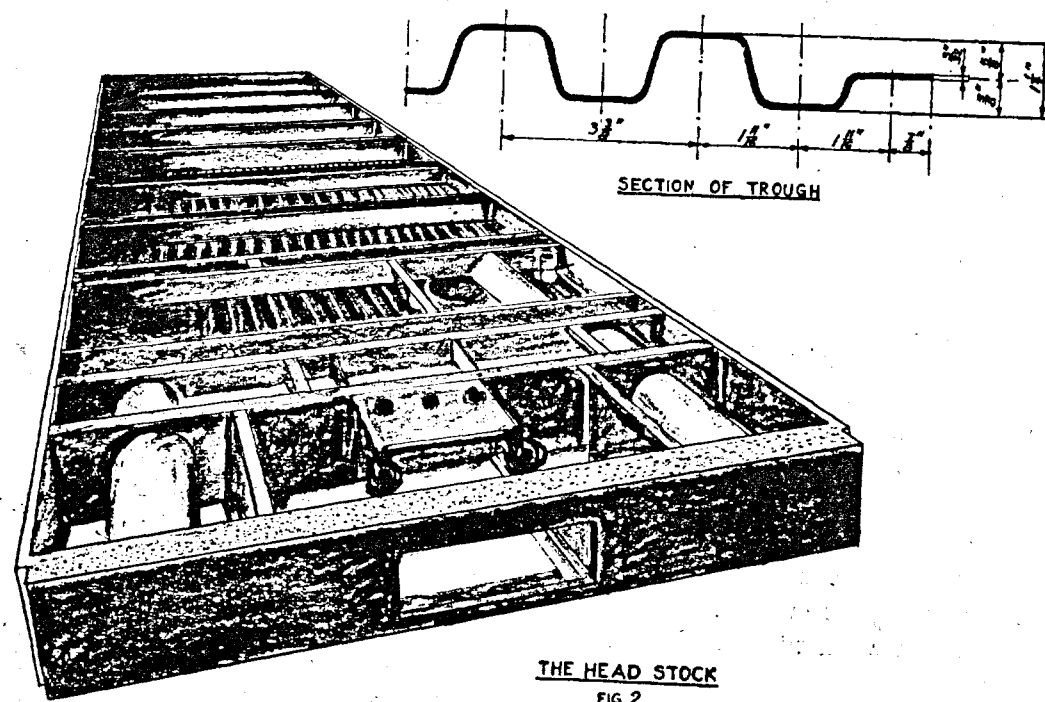


FIG. 2.

Case (1)—Horizontal load of 100 tons

As has already been mentioned, the headstocks, sole bars and trough floor virtually take the place of the conventional underframe. Thus, the 200 tons on buffers has to be received by these 3 structures between which, however, the trough floor is decidedly the weaker, as may be seen from their respective slenderness ratios (L/K). The case of the trough floor together with the sole bars is, therefore, alone considered here.

Assuming that the load of 200 tons is shared by the trough floor and the sole bars in proportion to their respective cross-sectional areas,

Compressive stress in each of the Sole Bars = Compressive stress in trough floor.

$$\frac{200}{6.128 + 14.38} = 9.75 \text{ tons per sq. inch}$$

where 6.128 sq. inches is the area of cross-section of each sole bar and 14.38 sq. inches is the area of cross-section of the trough floor.

Calculating the critical stress for buckling according to the formula—

$$F = 19.7 - 0.0724 \times L/K \text{ where } L/K \text{ is the slenderness ratio,}$$

$$\text{Critical stress for buckling in side longitudinal} = 19.2 \text{ tons/sq. inches.}$$

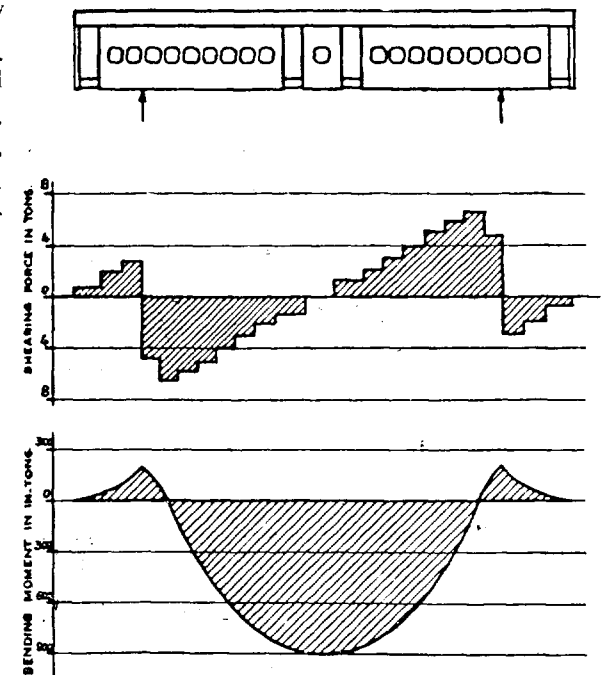
$$\text{and Critical stress for buckling in trough floor} = 15.32 \text{ tons/sq. inches.}$$

$$\therefore \text{Factor of safety against buckling in side longitudinal} = \frac{19.2}{9.75} = 1.97$$

$$\text{and Factor of safety against buckling in trough floor} = \frac{15.32}{9.75} = 1.57$$

During actual tests conducted on the coach, where a load of 100 tons was imposed on each

B.M. & S.F. DIAGRAMS.
FIG. 3



buffer, it was found that once the load distributed itself, i.e., in the areas below windows V and VI (Fig. 3), stresses of only 5 to 7 tons per sq. inch occurred. This is due to the side walls also taking a share of the buffer loads. For the same reason at the door openings in the centre of the coach where there is no panel or waist-rail and light rail to convey further the load taken by the side wall, the load flows back into the trough floor setting up a maximum compressive stress of 10 tons per sq. inch, which it will be noticed is even slightly higher than the calculated value. It should also be remembered that there is a further (+) or (—) inherent stress value already present due to the initial sheet metal operations, welding, etc., which, however cannot be measured.

Case (2)—Horizontal loads of 60 tons and 30 tons

The end construction is designed to withstand the shock load of 60 tons applied 12" above the buffer centres or 30 tons distributed over its entire surface. For purposes of calculation

the 30 tons are taken as applied along the horizontal centre line as it simplifies calculation and at the same time is safer to adopt, as it presents a more severe case than if the load is distributed over the centre end wall. In dealing with this case, therefore, the anti-telescopic stanchions are considered as beams for which maximum bending moment has been taken as $WL/6$ being the mean between beams simply supported ($B.M. = WL/4$) and beams with fixed ends ($B.M. = WL/8$).

Treated in this manner, it is found that a greater bending stress is reached with the 30 tons applied at the centre than with 60 tons applied 12" above buffer centres. On the other hand, a greater shear stress is reached with the 60 ton load than with 30 tons.

Thus :

Bending stress with 30 tons applied at centre = 9.7 tons/sq.in.

Shear stress with 60 tons applied 12" above buffer centres = 2.4 tons/sq.in.

The factor of safety in each case is approximately 2.

Case (3)—Vertical Load of 45 tons

(a) The vertical load of 45 tons distributed over the whole length of the coach has to be carried by the floor members, but since, as mentioned previously, the trough floor is weak in this direction, the cross beams have been designed to meet this load fully.

In the prototypes and upto the 130th coach manufactured by Schlieren, 45 cross beams of 1/8" thick steel were used.

Thus :

Load carried by each cross beam = 1 ton.

Maximum bending moment = $WL/10$ taken as an average between $WL/8$ and $WL/12$ due to the uncertainty of the ends support

$$= \frac{1 \times 100.63}{10} = 10.063 \text{ tons/sq.in.}$$

Maximum bending stress = $\frac{10.063}{1.33} = 7.56 \text{ tons./sq.in.}$

where 1.33 is the 'Z' value of the members.

Also maximum shear stress

$$= \frac{0.5}{0.907} = 6.55 \text{ tons/sq. in.,}$$

where 0.907 sq. inches is the area of cross-section of each member.

In the present design of the coach the number of cross beams have been reduced to 23, but the section has been increased to 3/16" to maintain the same strength.

(b) In calculating the strength of side walls, the structure is treated as a Vierendeel girder bearing the following vertical loads :—

	Tons.
Weight of body shell (furnished)	24.6
Maximum pay load (Passengers + luggage + 10% overcrowding)	12.9
Gross weight of coach	37.5
Gross weight of coach + 20% shock	45.00

It is assumed for the purpose of calculation that this load of 45 tons is shared by the sole bars, the side walls and part of the roof up to the first longitudinal rail only. Also initial stresses set up due to sheet metal operations, welding, etc., are not taken into account as being indeterminate.

The side wall section is divided into three parts. The portion extending from the first roof longitudinal to the top of the window openings referred to as the "top boom"; the part from below the window openings till and inclusive of the sole bar referred to as the "lower boom", and the portion connecting the top and lower booms referred to as "Girder Pillars." (Fig. 4).

In order to ascertain the likely loads that are carried by the upper boom and lower boom, it is assumed that the weight of the body shell (18.7 tons) is distributed over the periphery of the shell, whereas weight of fittings such as

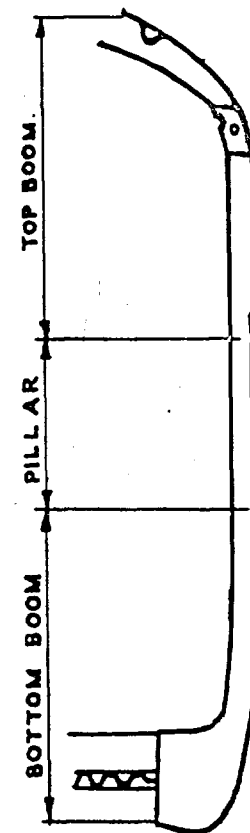


FIG. 4.

brake rigging, battery boxes, decolite flooring, etc. (total 5.9 tons) as also Pay Load (12.9 tons) is carried only by the lower boom.

Divided, thus, in proportion to their respective peripheries,

	Tons.
Load carried by upper boom ...	10.8372
Load carried by lower boom ...	34.1628
	45.0000

Treated in this manner and assuming that the reaction of the Centre Pivot is conveyed only to the pillars on its either side, a shearing force diagram and a bending moment diagram as shown in Fig. 3 are arrived at.

Further calculations reveal that at the following points the maximum direct stresses are reached as shown :

	Direct stress Tons/tons sq. in.
Upper boom : At window opening III ...	0.316 (tensile)
Upper boom : At window opening XI ...	2.595 (Compr.)
Girder Pillars : At Pillar 12... Do. 4...	0.611 (tensile) 1.626 (Compr.)
Lower boom : At window opening XI ...	2.581 (tensile)
Lower boom : At window opening III ...	0.238 (Compr.)

It will be found that the maximum tensile stress is reached in the lower boom as is to be expected (though of a small magnitude) and compressive stress in the upper boom.

For calculating the factor of safety due to compression, the following formula is applied for the panel sheets, with the assumption that the edges are rigidly held all round :

Critical compr. stress

for buckling, accord-

$$\text{ing to Schaptiz.} = K \cdot \frac{E}{1-V^2} \left\{ \frac{S}{b} \right\}^2 \text{ tons/sq.in.}$$

Where E = Modulus of Elasticity

V = Poisson's Ratio.

S = Thickness of sheet in inches.

b = Breadth of sheet in inches.

K = Corrective factor depending

on length

of sheet

breadth

Results from this formula show that the weakest panels lie over window openings XII where—

Critical buckling stress = 2.98 tons/sq. in.

But max. Compr. stress

reached in this area = 1.92 tons/sq. in.

∴ Factor of safety in this panel (least factor of

safety) against buckling
due to compression = 1.6

In a similar manner critical shearstress in panels for buckling is calculated but assuming here the worst condition, that is, with the edges of the panel freely supported. This gives the following as the weakest points :

Position	Factory of safety.
Upper boom : At window opening VII	3.8
Girder Pillar* No. 8	7.0
Lower boom : At window opening VII	5.5

* Girder Pillars 5, 6 and 7 are additionally strengthened against buckling and therefore their factors of safety have not been computed.

In all the above calculations the roof members are not taken into consideration though due to the Mono-type of construction a certain amount of load is shared by members of this structure. Actual tests, however, justify neglecting these members for purposes of calculation since the stresses measured were all in the region of 2 tons/sq. in. (tensile) only.

Tests also revealed that with the load of 45 tons distributed uniformly over the full length of the coach, a deflection of only 0.28" is reached and a similar figure (rise) when the load of 200 tons is applied over the buffers. This shows that this coach is a very rigid structure.

(to be continued)

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Welding in I.C.F.

BY

G. N. UPADHYAY

District Electrical Engineer

In early days the term Welding was used for jointing together the pieces of metal by hammering while at high temperature sufficient for the metal to be in soft state. This was generally done by a forge, commonly known as forging, the term derived from 'forge.'

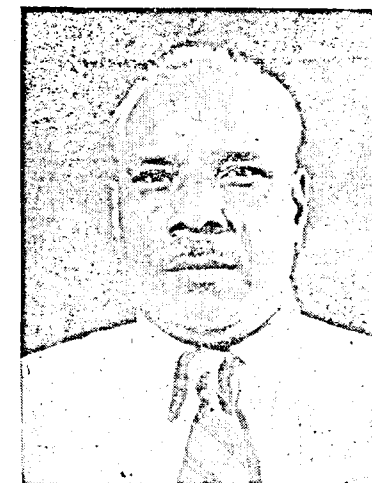
With the advent of electricity and its extensive uses in different spheres of utilisation in the Industrial field, Electrical welding has become very popular and is gradually replacing rivetting and bolts and nuts assembly.

A welded joint is a union of metal parts made by localised heating, without pressure in Arc welding and supplemented by pressure in resistance welding. The development in the welding process and technique has been considerably rapid with the advent of modern alloys.

In all modern industries dealing with fabrication, manufacture and construction of metal work, the application of welding has become inescapable and is commonly used in two main forms :

- (i) Arc Welding/Fusion welding, i.e., welding without pressure (Oxy-Acetylene welding, arc-welding, Atomic Hydrogen welding, Thermit welding, etc.).
- (ii) Resistance/Forge Welding, i.e., welding under pressure (Blacksmith welding, Resistance welding like Spot Welding, Seam Welding, projection welding, flash butt welding, etc.).

Welding is a complex technique involving various branches of sciences and engineering.



Shri G. N. Upadhyay

Design, testing and research on welding equipment and technology involves complex problems in mechanical engineering, electricity, metallurgy, chemistry, X-Rays and electronics, etc.

It is impossible to expect an Industrial Engineer to be an expert on all sides. However, as he has to deal with various problems, he cannot but interest himself considerably in the complexities of design, operation and maintenance which knowledge is invaluable for good production and control methods.

Welding has special significance to Integral Coach Factory as this organisation is engaged in the production of light weight all metal coaches involving extensive and varied welding operations in all stages of production.

The types of welded joints, length and size of joints and their positions—horizontal, vertical and so on—the metals to be welded, etc.,

govern the adaptation of special techniques particularly to suit the modern mass production methods.

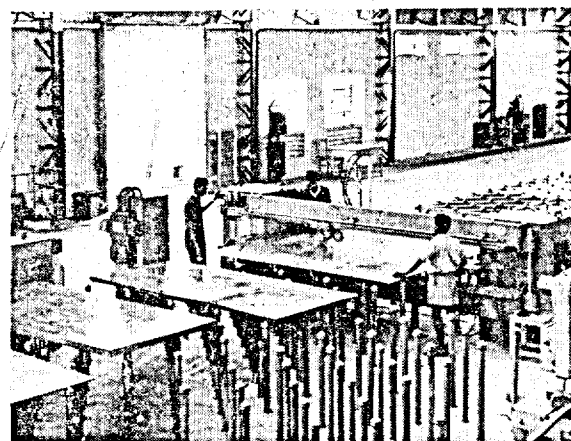
There has always been, and would continue to be, difference of opinion over D. C. Versus A.C. Arc welding; but fact remains that both are in the field to suit the convenience and pocket of the Trade. The salient features and some of the arguments are briefed below :

- (1) The efficiency of A.C. apparatus is rather higher, 80 to 85% while that of D.C. is 60 to 65%.
- (2) No-load losses in Transformer is much less than single operator D.C. unit.
- (3) Power Factor in A.C. Arc welding circuit is much low.
- (4) The magnetic deflection of arc is not so pronounced in A.C.
- (5) Maintenance is low in Transformer than rotary machine.
- (6) D.C. wells are rather generally preferred.

Electric Arc Welding

This method of welding consists of jointing two or more metal pieces by the use of heat of an electric arc between the base material and the electrode. The most generally employed process of arc welding is the metal-arc process where the arc is drawn between the filler metal electrode and the plate material to be welded. Localisation of heat in a small area concentrated at the point develops temperatures of the order of 3000/3500° C, melts the base metal and filler metal and the pieces get welded.

The electric arc in arc welding is a low voltage, high current discharge maintained by the thermionic emission of electrodes. First, when electrode is touched to the base metal the maximum current passes at the junction of the electrode and plate and heat developed raises the temperature of junction to produce thermionic emission resulting in the phenomenon of



Automatic butt seam welding plant—The electrical gear and water chilling units are also seen.

“arcing” in the ionised gap when the electrode is withdrawn. Influenced by the magnetic forces due to flow of current, the arc is deflected from the shortest line of action and the flame flutters. This phenomenon called “Arc Blow” mainly occurs in D.C. Arcs only, as the magnetic influence in the A.C. arc welding is not uni-directional. Larger the electrode, higher is the current and longer the arc, greater is the arc blow. The skill of maintaining an optimum length of arc, usually kept equal to the diameter of electrode can only be achieved by sustained practice.

Standard welding generators and welding transformers are employed for arc welding. The open circuit voltage for the plant shall be high enough to strike an arc and at the same time be not dangerous to the operator, the voltage ranging up to 45 volts. Variable current settings and welding plants with drooping—rapid voltage drop with increased current—characteristics are generally used for obtaining different requirements of arc.

A.C. and D.C. Arc welding have both general and particular applications. In D.C. Arc welding, more concentration of heat occurs on the positive pole, which phenomenon may be utilised either to melt greater base metal

or filler metal as it may be required. The absence of magnetic ‘arc blow’ and low initial and maintenance costs of A.C. welding sets are specific advantages while A.C. welding becomes totally unsuitable for certain non-ferrous metals.

The transformer type Arc welding plants are generally of :

- (i) Three phase multi-operator type.
- (ii) Single phase single-operator type.

If single phase sets are connected to three phase electric supply mains serious difficulties of unbalanced load conditions have to be encountered. The use of 3 phase multi-operator sets does not, to any considerable extent, remedy this problem since large diversity of loads between the operators exists. Instead, the use of 3 to 1 phase single-operator welding transformers was considered an improvement, but this also is being gradually abandoned as the sharing of the single phase load on the primary side of the transformer will be in the ratio $\frac{1}{2} : \frac{1}{2} : 1$ but at different power factors, thereby presenting difficulties for power factor correction; moreover, the rating of such transformer should be higher than that of a single phase transformer by 15%.

In view of all these difficulties and considering the desirability of elimination of mutual interference, and consequent inconvenience of multiple-operator welding sets, the use of single/multiple and transformer type arc welding sets for Production shops in I.C.F. has not been favoured and instead, portable M.G. sets for single operator welding are employed extensively.

Resistance Welding.

The heat required for any resistance welding process is produced by the resistance offered to the passage of electric current through the work pieces. Since the ohmic resistance of any resistance weld is low, high welding currents are required to develop necessary welding

heat. The heat developed shall be sufficient to obtain fusion of metal parts. Undue rise of temperature will cause squeezing out of metal from the welding zone. The rate of rise of temperature and quickness of resolidification and cooling, decide the commercial welding speeds. Selection of equipment for resistance welding, therefore, depends upon the nature and physical properties of work, desired quality of welds and production requirements. The functional aspects of any plant can generally be divided into :—

- (i) The electrical circuit with necessary current regulating device for supply of welding current,
- (ii) Electro-pneumatic or electro-mechanical arrangements to hold the work pieces at required welding pressure, and
- (iii) Control or timing apparatus.

The resistance welding plants are generally of the transformer type. Single phase A.C. Transformers suitable for operation across phases on three phase mains are usually employed. While the principle of welding transformer is the same as the standard transformers they differ in their design, inasmuch as the secondary voltage is very low (2 to 20V) and current rating vary large (5,000 to 1,00,000 Amps) and the robust design should allow for heavy current impulses, large overloads and mechanical forces.

One of the most serious handicaps in the use of resistance welding is the characteristic of short time heavy load and very low power factor. The common method of improving power factor is the use of capacitors. The capacitor being a low leading power factor device, the series connection with the inductance of the machines results in good correction of power factor up to unity. With use of series capacitors, the voltage across welding transformer gets increased. This increased voltage



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will be supplied by the capacitors and not taken by supply lines. The capacitors operate at voltage higher than line voltage and therefore it is essential that the transformer, control panel and inter-connecting cables, etc., are designed for high voltage service. A discharge resistor and a contactor are incorporated on all series capacitors for automatic discharge when the main switch is opened.

Parallel capacitors are also workable in some types of welding machines. In the absence of series capacitors for use with welding load, improvement of power factor to meet the requirements of the supply system may be achieved by the use of capacitors in parallel. They are considered particularly favourable for welding involving long welding time.

The use of three to single phase welding transformers for balancing of load on three phase system is also out-moded for reasons already stated, under arc welding. Stored energy welding machines—electro-static, electro-magnetic and electro-chemical—accomplish good balancing of load on three phase A.C. mains and each of these have special applications to spot, butt, flash and projection welding operations.

Asymmetrical phase loading in three phase mains leads to undesirable influences of unbalancing, losses, current distortions, etc., in the supply. To avoid these consequences, balancing the load as symmetrically as possible on all the three phases, is always to be aimed at when single phase welding machines have to be connected up.

The rotating phase convertors are, of course, known for a long time as a satisfactory technical solution. Unfortunately, such units cannot be considered suitable for higher capacities due to prohibitive, initial and also recurring maintenance costs.

Further alternative is the use of static load balancers such as Inductance coils, zig-zag connected or combination arrangement with

condensors. These again are found suitable only where the load conditions are fairly steady. But where the loads vary as in the case of welding machines, they cannot be successfully employed since it would not be possible to vary the inductance and capacitance settings according to the load and power factor conditions.

Electric Resistance welders are becoming more and more indispensable for modern manufacture. On the other hand, single phase power in-put of these welders present serious problems on the power supply system as already referred to. Electronic load balancers have now been developed as a successful solution to this problem. These do not need any constant adjustments and guarantee steady and symmetrical three phase load balancing for single phase plants with varying load conditions. These are particularly suited for electric spot, seam, flash and projection welders. Further, the frequency of supply to the welding transformer is electronically reduced which, due to consequent and considerable decrease of reactance of the transformer, will improve the power factor of the welding plant. This reduction of frequency of welding current has a very favourable influence for improving quality of weld. The rise of welding current being slow consequently avoids explosive fusion of weld negget and metal-splashing.

The cost of a welding machine with electronic load balancing device is naturally high. For this reason the electronic load balancing could be considered only in exceptional circumstances.

The details of welding sets in use in Integral Coach Factory are given under Annexures I and II.

Portable Arc Welders.

The reasons for going in for single operator M.G. Set type portable arc welders are already dealt with. The welding sets in use at I.C.F. are mono-block type and specially designed to obtain trouble-free welding. There are

two types—One 250 Amps. and another 375 Amps.—in use. The welding generator and motor are mounted on a common shaft running on roller bearings. A dual fan draws in air separately and rotors are ventilated axially.

Adjustment of the welding current is achieved by rotating the brush rocker in relation to the stator, thus dispensing with regulating resistances, auxiliary brushes, etc., and rendering current regulation easy, simple and trouble-free.

The scale is graduated in welding amperes for given voltage values, i.e., upto 250 A uniformly 25 V and from 250—375 A evenly rising to 35 V.

Should it occasionally be found necessary to operate with a current which is beyond the range of the particular type, two sets can be connected and operated in parallel.

A thermal device combined with an acoustic signal affords protection in case of inadmissible over-loading, or if the duty cycle percentage given on the rating plate is not adhered to. When the motor is overloaded either due to single phase operation or otherwise these thermostats actuate an acoustic alarm. This alarm persists until the temperature is normal again.

This signal warns the operator who should run the machine in such circumstances on light load until the machine cools down and alarm ceases.

For parallel operation of two machines, they should be adjusted first for same polarity, and terminals of like polarity connected up by a cable of cross section similar to that of normal welding cables. The generators should each be adjusted for approximately similar currents.

Maintenance.

Machines should be cleaned regularly. The roller bearings are packed with grease, lasting for about a year and should not be opened

during this period. The temperature of bearing housing should be checked from time to time and the temperature should not be allowed to exceed 80° C. If, after a long service, the commutator becomes uneven and segments project, it should be trued on a lathe. The mica between the segments should be removed to a depth of about 1.5 mm.

Worn out brushes shall be renewed in good time, always using the good quality of brush to run smoothly and lubricate commutator. Worn out brushes should be changed one at a time and *not all at one and the same time*, since artificially ground brushes do not achieve good contact surface until after long running on the commutator.

Submerged Arc Welder.

Submerged arc welding is a process wherein coalescence is produced by heating with an electric arc between bare electrodes and work, the welding shielded by a blanket of fusible material and work. The process is characterised by the arc of high welding currents with consequent higher welding speeds and greater depth of penetration. The quality of such welds are generally stronger, more ductile and uniform in appearance.

In I.C.F., submerged arc welders—automatic and manually operated types are both in use. The supply of welding current to the welding head is by single or double unit motor generator sets.

Granular flux is first deposited on the joint to be welded deep enough to cover the weld metal. The electrode is power-fed into the blanket of flux, its rate of feed being controlled manually or automatically at correct arc length, producing a hidden arc between electrode and parent metal, causing the weld. The flux adjacent to the arc melts and solidifies as a slag on the weld, protecting the weld from atmospheric action and consequently improving the quality of weld. The welding head in the automatic type is self-propelled

travelling carriage type, the carriage being motor driven along a beam. The equipment includes highly responsive direct current control circuit including an excitor control on the welding generator, a D.C. motor for feeding electrode from the electrode reel and simple rheostat adjustment of arc voltage, welding current and travel speed. The control has obviated the use of delicate electronic controls, relays, rectifiers, etc., and has consequently inexpensive maintenance.

The preparation of joints for this method of welding is rather simple. Only the joint edges must be cleaned so as to be free from foreign matter, like moisture, dust, rust, oil, grease and paint, etc.

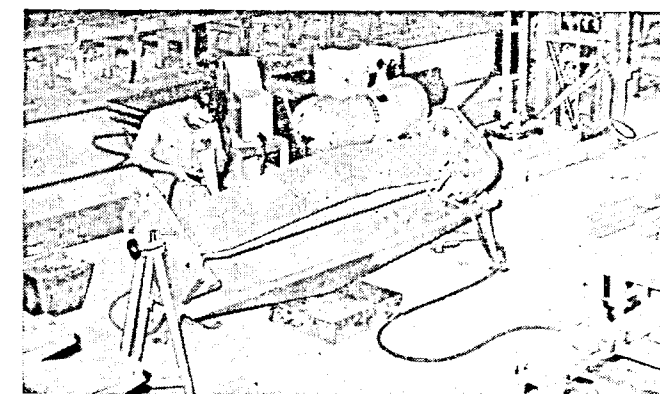
For obtaining welding generator currents higher than the rating of a single unit, two M.G. sets may be operated in parallel to obtain the desired output.

The current control contacts on the welders are self-lubricating type and should not be greased. They need to be kept clean. The bearings provided have sufficient grease to last for one year under most severe service. They are also well sealed from dirt and frequent inspection is not necessary and routine maintenance is considered adequate.

The commutator and brushes require no special attention. The replacement of worn out brushes should be done in time. New brushes shall be properly ground before actually used on the machine. It is desirable to check the brush spring-tension occasionally to enable proper pressure on the commutator.

Spot Welding Machine.

The simplest form of spot welding machine is generally the rocker arm pedal operated type with current setting and regulating device and weld timer. The quality of spot welds depend mostly upon the pressure between the work and electrode. The usual arrangements



Semi-automatic Submerged Arc Welding Machine

in a spot welder comprises of a single phase welding transformer, upper and lower electrode arms and pressure devices, necessary pressure and time control equipment water circulating and cooling arrangements to cool the transformer and the electrodes.

The spot welders in use are pneumatically operated and electronically controlled. Tappings on the primary side of the welding transformer are dispensed with and smooth regulation, electronic time and precision current limiting devices are the main features of design. Electro-pneumatic valves and safety interlocks guarantee obtaining of the desired pressure and also working the plant only when the water pressure switch is open and requisite air and water pressures are maintained.

The welding transformer is provided with a motor driven fan. The connections between the transformer secondary and the electrodes are of electrolytic copper capable of taking welding load of 15,000 to 50,000 Amps. The equipment is complete with cooling water arrangement and the compressed air operating device provides necessary welding electrode pressure 300 to 3,000 kg., depending on the range of equipment.

The advantage of electronic precision control can be summarised as increased weld quality,

accurate control of current and weld time, simplified choice of weld conditions, dispensation of mechanically moving parts, smooth and noiseless operation and compactness of equipment.

Maintenance of the plant is quite simple and is limited to periodical cleaning, by blowing compressed air free from moisture, oil and dirt at moderate pressure (7 lbs./sq. in.) to remove accumulation of dust. A smooth brush should be used for periodical cleaning.

Attention during breakdown requires a check up of the compressed air, and cooling water arrangements and electronic circuits for which considerable experience and skill is involved for location of faults and quick rectification.

Flash Butt Welding Machine.

This machine is pneumatically operated and is rendered fully automatic; this can also be operated semi-automatically. The welding process consists of preheating, flash, upsetting and current interruption. During preheating the work pieces are heated upto 2000° F. in such a way that the heating is uniform at all cross sections. To achieve this, the contact surfaces are brought in touch and preheating current cut-in; after a lapse of a few seconds the ends are separated again and brought together repeating this process as often as necessary till the required heating is obtained. This process and the to and fro movements are rendered fully automatic when set for automatic control.

When the desired preheating temperature is reached flashing operation starts under necessary hydro-pneumatic pressure and the work pieces now develop welding temperatures and after flashing upsetting sets in. The welding current is then interrupted after a lapse of adjustable interval.

Compressed air and water cooling arrangements form important part of equipment.

The maintenance of the machine starts with daily frequent and thorough cleaning of the machine between movable and stationary parts due to flashing remainders and sprays. The electrical contact surfaces shall be kept absolutely clean.

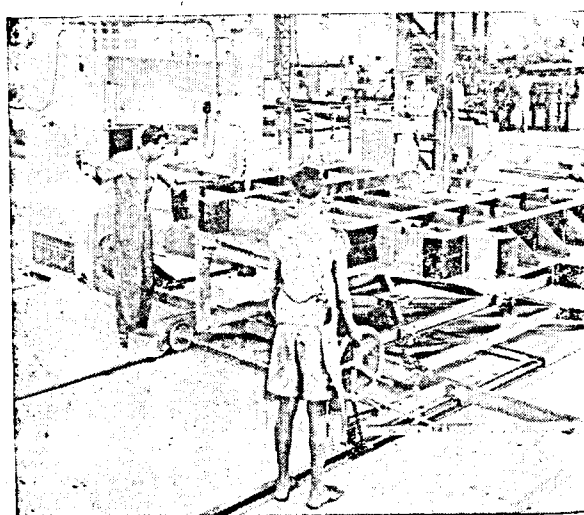
The welding transformer is recommended to be cleaned quarterly by means of dry and clean compressed air, to obviate accumulation of dust. The oil level of the hydraulic brake and clamping devices should be checked from time to time. It is not required to change the oil periodically. Greasing and lubrication of movable parts should not be ignored.

Cross Bar Butt Seam Welding Machine.

Seam welding is a process which makes a series of either spaced or overlapping spot-welds by rotating-wheel electrodes. The cross bar butt seam welding plant in use is used to achieve butt welding without lap-welding for obtaining large butt-welded sheet steel for the walls and roof sub-assemblies of the coach shells.

The plant is designed for use on 400 V single phase mains and is equipped with two welding transformers operating in conjunction with

Spot Welding Machine



ignitron tubes and electronic seam welding timer. The work is held to the welding table electro-magnetically and the welding operations are fully automatic.

Some interesting details of the seam welding process have recently appeared in the article "Foil Seam Welding" in the March, 1957 issue of the Rail Coach.

Satisfactory working of the machine requires efficient cooling water system for the plant. Under tropical conditions, by actual experience, it was found that inadequate cooling caused pitting of electrodes and difficulties in achieving satisfactory weld quality. Hence an auxiliary water chilling plant with a 5 H.P. condensing unit is installed exclusively to supply chilled water to the water circulating system of the machine.

Coated Electrodes.

Modern applications of welding in recent years have lead to development of many new types of metal electrodes and welding rods each designed for specific jobs and with maximum efficiency. In addition to reckoning the class of electrodes on the basis of tensile strength of deposited weld metal, the type of current, welding positions and types of coating, etc., they may principally be classified as :

- (1) Bare Electrodes,
- (2) Coated Electrodes.

Coated electrodes have a jacket of either combustible organic or inorganic material or both to serve as gaseous shield to resist access of atmospheric oxygen or nitrogen to molten metal to retard the cooling of the weld and to stabilise the arc circuit. The coating in some cases is used for adding alloying elements to weld metal. The selection of electrodes—size and type of coating, etc.—is a major aspect of welding practice. The physical properties of welds made with coated electrodes are considered far superior to those obtained

with either bare or lightly coated electrodes and hence the use of coated electrodes on arc welding is favoured and is becoming increasingly popular.

In I.C.F. too, special quality coated electrodes are being used for arc welding. The requirements of these electrodes for a large production unit like ours, are considerably large and adequate stocks of the same have to be kept and recouped from time to time. The quality of welds is found to deteriorate quickly if the electrodes are exposed to humid atmosphere and are subjected to large temperature variations.

It has, therefore, become imperative to store the electrodes under steady temperature and humidity conditions. A specially built room 50' × 18' (16' feet high) has been allotted for storing of electrodes and the room is equipped with dehumidifying plant of 5 ton capacity to maintain constant humidity of about 45% and temperature of 70° F to 80° F. Besides electric ovens are also in use to heat the electrodes and eliminate moisture before they are actually used.

Power Supply.

With all the electric welding plants, and in addition, a large number of other machine tools, sheet metal presses, and other inductive and non-inductive loads in the factory, the resultant power factor of the electric distribution system will naturally be poor. Therefore static condensers to the tune of about 2200 KVAR are provided at various sub-stations and load centres. Besides the provision of 6 Nos. auto-synchronous motors each of 350 H.P. to work the large compressors, augment power factor correction of the entire system. The large spot welding machines are being provided with suitable series capacitors also.

Large welding sets are connected to independent Low Tension feeders direct from the sub-

stations and they are also being provided with O.C.B. control.

Three phase power plugs distributed all over the production shops and located on the shop columns and assembly lines are used for connecting up the portable welding sets, wherever and whenever required. Special trailing cables with bare earth core are used for the connections from the plugs to the portable equipment.

Auxiliary Services.

The compressed air for the pneumatically operated welding equipment is drawn from Central Compressor House which has adequate capacity to meet the requirement of these plants and besides of the large pneumatic hammers, presses and various number of portable tools.

The cooling water requirement of the welding plant is also considerable and the water that gets hot during the circulation process has to be re-cooled again and re-circulated at requisite pressure. For this purpose a Forced Draught Cooling Tower with necessary water circulating pumps has been installed to handle

the cooling water of the welding plants and the air compressors as well.

Conclusion.

It would be a matter for careful consideration to reduce the maximum demand of the Factory as much as possible and build up a good Load-Factor in the interest of reducing the electricity bills. Proper staggering of heavy equipment like furnaces and other plants including the heavy welders will prove a great advantage in that line.

Inspection and testing of welded bogie bolsters and underframes is very important for which a non-destructive method of testing is invaluable. Radiographic inspection, i.e., by adopting X-Rays, is proposed and the necessary equipment is being processed through, besides magnetic crack detectors, etc.

With the latest equipments we have in our factory and the technical skill being developed locally in the Integral Coach Factory Basic Training School, there is ample scope for more perfection and advancement in not only the technological aspects of welding but also its allied electrical and other problems.

ANNEXURE I

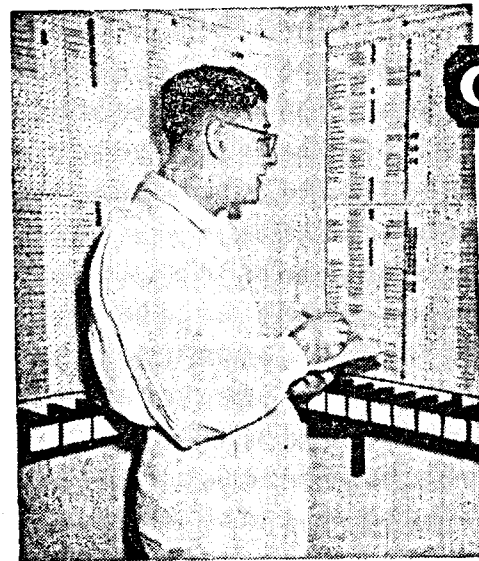
Sl. No.	Description.	Type.	Nature of Load.	Control-gear.
1	D.C. Portable Welding Machine 250 A.	Arc Welding.	Three Phase M.G. Set.	Star-Delta.
2	D.C. Portable Welding Machine 375 A.	Do.	Do.	Do.
3	Argon Arc Welding Machine 350 A.	Do.	Single Phase Transformer.	...
4	D.C. Semi-Automatic Submerged Arc Welding Machine 600 A.	Do.	Three Phase M.G. Set.	Star-delta.
5	D.C. Automatic Submerged Arc Welding Machine 800 A.	Do.	Do.	Do.

6	Automatic Flash Butt Welder ...	Resistance Welding.	Single Phase transformer.	Hydro-pneumatic.
7	Cross Bar Butt Seam Welding Machine.	Do.	Do.	Electronic and pneumatic.
8	Spot Welding Machine. (Size 1) ...	Do.	Do.	Do.
9	Do. (Size 2) ...	Do.	Do.	Do.
10	Spot Welding Machine with series Capacitor 300 KVA. (Size 3).	Do.	Do.	Do.

ANNEXURE II

Sl. No.	Description.	Capacity of each (continuous).	Nos.		Approximate cost of each.	Remarks.
			250 coach phase.	350 coach phase.		
					Rs.	
1	D.C. Portable Welding Machine 250 A.	6.5 KW	250	150	1,900	Used for fabrication of sub-assemblies, underframe and body assembly.
2	Do. 375 A.	10.0 KW	60	20	2,400	Do.
3	Argon Arc Welding Machine 350 A.	10.0 KW (approx.)	...	1	8,000	For light alloy sheets of aluminium base up to 3 mms.
4	D.C. Semi-Automatic Submerged Arc Welding Machine 600 A.	40 H.P.	2	1	9,300	For mild steel for fabrication of underframe sub-assemblies.
5	D.C. Automatic Submerged Arc Welding Machine 800 A.	80 H.P.	2	1	16,500	Do.
6	Automatic Flash Butt Welder.	75 KVA	1	1	41,000	For Forge welding un-alloyed steel up to 4.65 sq. in.

7	Cross-bar Butt-Seam Welding Machine.	160 KVA	1	1	1,11,000	For Butt Seam welding without lap welding for steel coach panel sheeting.
8	Spot Welding Machine.	208 KVA	2	2	53,000	For Welding Pillars and stiffeners to side wall assembly.
9	Do.	240 KVA	2	...	53,000	For spot welding end-wall assembly.
10	Spot Welding Machine with series Capacitor 300 KVA.	260 KVA	1	2	61,400	For welding of light alloys and steel for manufacture of doors and windows.



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Proper Operator Judgment Reduces Operating Cost of Fork Trucks

(This article is digested from the September, 1956 issue of "Distribution Age" and reprinted with the kind permission of the United States Technical Co-operation Mission to India—Ed.).

The human element is one of the greatest factors in the cost of fork truck operations. Everything has been engineered into a fork truck with the exception of the skill and expertness of the operators. Thus, operator judgment becomes as important to a job as good truck design, material, and workmanship. Lack of proper judgment can result in considerable property damage, severe injuries, or even loss of life.

The attainment of this objective can be aided by observing certain rules which, when tailored to individual requirements, will guide the fork truck operator to more economical and safer material handling operations. Following is a list of suggestions on proper fork truck operation :—

1. Permit only qualified operators to drive the fork truck. Whenever the truck is left idle, the key should be removed from the cutout switch, rendering the truck inoperative and preventing unauthorized use.

2. Trucks should not be left parked in narrow aisles or other confined areas where they will obstruct the movement of other handling and production equipment.

3. Reverse gear should not be used as a substitute for brakes. If the brakes are faulty, this condition should be reported to the maintenance department and the necessary repairs effected immediately.

4. Each unit-load should be securely piled before attempting to move the load. When this is ascertained, the operator should drive

the truck under the pallet as far as possible to avoid spilling the load.

5. The truck forks should be located centrally under the pallet. Off-centre loads reduce the stability of the truck and also exert unnecessary strain on the parts of the lifting mechanism.

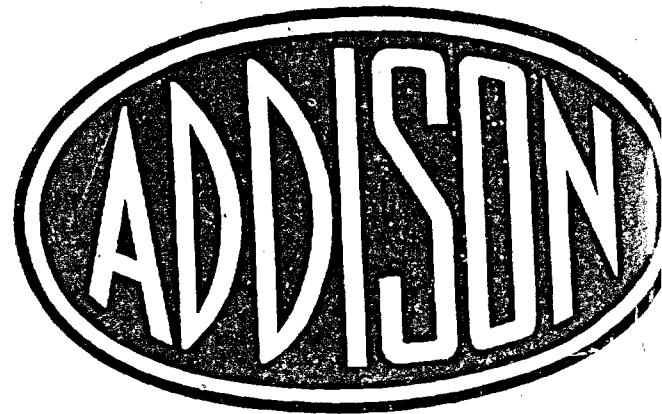
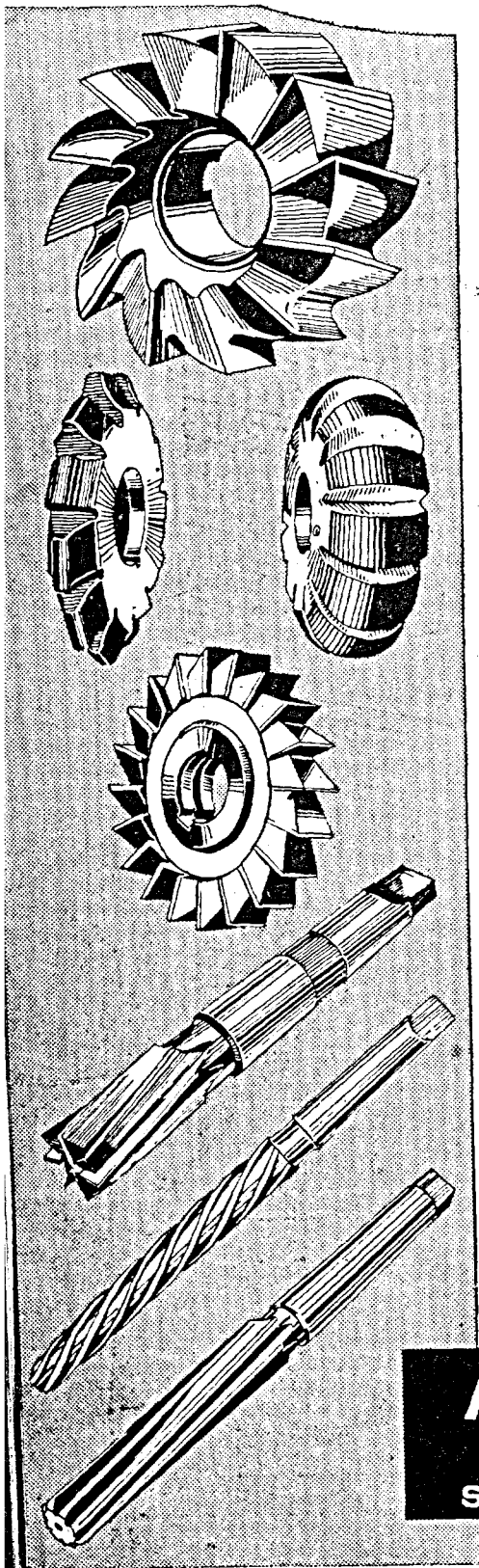
6. The operator should be aware of the maximum safe-loading capacity of his unit and take care not to exceed this established safe limit.

7. When carrying loads at or near this maximum limit, or when loads are being transported at high-lift on telescopic trucks, extreme care should be taken in manoeuvring the fork truck. Only first or second speed should be used and the floor should be smooth and level.

8. When loading into highway trucks or trailers, be sure that the receiving unit brakes are set and wheels are blocked. If the springs are weak, the body should be supported with jacks and braces. Also inspect all car, truck and trailer floors carefully before entering with a lift truck. The operator should be certain that the floors are strong enough to support the combined weight of the fork truck and the load.

9. When starting to move the fork truck with a load, all speeds should be used. The controller handle should not be thrown into top speed immediately.

10. The truck should not be driven in an unsafe condition. Any mechanical or electrical deficiency should be reported.



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Is Automation Coming Our Way?

(This article gives a short analysis of the Basic Facts of Automation without going deep into technicalities but with the object in view of finding out just how we will be affected by it in the near future.)

The word automation is being used with increasing frequency during the last few years and everyone has his own definition for it. Some operators and supervisors on the shop floor are wondering if it will put them out of their job, while others have started imagining themselves sitting in an armchair and getting things done by pressing buttons. Actually things are not so simple as imagined by the armchair Optionist.

Experts say that automation is definitely going to spread even to the smallest shop : we have no reason not to believe them, as a matter of fact, automation has been steadily progressing ever since someone decided to mechanically operate the otherwise manually operated inlet and outlet valves in the stationary steam engine. It is the natural evolution of our mechanical processing methods. Over 25 years ago, safety pins were being made automatically at over 150 pieces per min. per machine. They fell into a box, already closed, so that nobody would prick themselves while handling or packing. Even in the past, Bolts and nuts were being made automatically, then fed into another machine for having a nut screwed on to each bolt as per customer's specification. There were cases of parts being drilled, tapped, milled, reamed and slotted and automatically transferred on to an indexing table from one station to another with one operator looking after 4 machines. Raw material in the form of coil strips fed by rollers and step down dies gave 'presses' the same advantage. Numerous other examples could be cited and they would all fall under the heading of 'automation.' Expressions such as hopper-feeders,



Mr. M. Sieber

feeder-chutes and indexing-feeders were most common at that time, yet nobody used the word automation till Mr. D. M. Hader, Executive Vice President of the Ford Co., coined the expression.

Electronics is new

It would however not be correct to say that there is nothing new in automation since then, as the basic element of automation at that time was—Cams, either one or a whole set rotating with reference to each other, generally all at the same speed, giving the machinery the necessary movements through a system of levers. Cams are still being used on a large variety of machines to-day. Later Hydraulic pressure came into the picture as a medium for automation. Pressure is built up by a pump and the fluid pushes one or more tools or machine parts usually to the pre-set

limit of their travel. A subsequent rise in pressure displaces one or more spring loaded valves to permit the fluid to carry on with its next function till the desired functions have been carried out in the correct sequence.

To-day electronics is lending a hand to hydraulics and mechanics in solving some interesting problems of automation, a typical example being the punched card or tape system. Ordinary push-buttons could also be substituted at any time, two buttons—or space for two holes on a punched card giving 4 distinct different orders by permitting electrical contact through the holes; both holes can be punched in a given order. None of the holes can be punched by a different order, then the left hole side and right side hole respectively can be punched giving two more distinct orders for one or more small motors to start and actuate valves permitting oil to push tools to their destination. Tools however do not go to their limit against a stop. This system is replaced, for example, with space for 10 holes on a card, giving 210 or 1024 possibilities or orders. Any number of these possibilities as desired are stored with ordinary telephone-style relays and as the tool moves, say every 1/100th of an inch, a signal is returned the other way, should the order comprise of 900 digits, then the tool will move 900 times 1/100th of an inch, or 9 inches, in other words when the added impulses coincide with the given order, the tool will stop, on the same basic principle many more movements can be performed till the desired sequence has been concluded. Into the bargain we have the photo-electric cell and our well-proven compressed air as further help. Let us just conclude that the Engineers of to-day have electronic-hydraulic-pneumatic-mechanical elements up their sleeves that can astonish the non-engineer with their ingenuity. However, our greatest advantage over our counterparts of 30 years ago is the fact that we can now go to firms who will study auto-

mation problems? On a pay-as-you-go basis, while at that time they often had to develop and build their own equipment which if successful was kept as a closely guarded secret from the competitors.

Degrees of Automation

Automatically conducted operations that we are conversant with is really only partial automation. Full automation would necessarily include feeding the raw-material, loading machinery, inspecting, correcting the machine for subsequent pieces when necessary, unloading, transferring, assembling the parts and packing, this may be possible for tooth paste but it is hard to imagine our coaches being manufactured like that, yet the Massachusetts Institute of Technology has stated that it is now feasible to build a complete motor car without manual labour, obviously meaning that fabrication can now be carried out without manually lifting heavy pieces, loading machines, turning wheels, or operating machines, fitting or doing other manual work. They will however still have to check the performance of the machine, make necessary adjustments, carry out repairs and set up work. It is this degree of automation that must be accepted as full automation. It can be taken for granted that we will be up against partial automation for many years to come so nobody need think that now in the middle of the 20th century automation is creeping up on him. We are concerned with partial automation as indeed our counterparts were a long while ago. It is true that they were concentrating on smaller and medium sized parts, not because producing large parts automatically was not possible then; it was just because people bought more vacuum cleaners and bicycles than steam engines. It will be seen that quantity is an important factor in automation.

Where to Automate

The answer to this question is really simple, automate wherever it is technically feasible

and where costs can be cut by saving wages, but to find out where costs can be cut is a complex issue, all the factors involved would have to be considered advantages, such as eliminating scratches and dents on parts because machines are more consistent than human, minimising Monday morning depressions, using less precious floor space, getting more accurate parts because of rejects would prevent feeding and loading, overcoming shortage of operators, all these advantages would put some weight into the positive side of the scales. On the other hand raw materials would have to be more accurate and necessarily cost more, workmen would generally have to be more skilled, machine repairs should preferably be done after working hours to minimise keeping expensive machinery out of commission. Then as already mentioned feasibility is an important factor, not all parts can be fabricated automatically, but even here the design engineer can help considerably, generally speaking one would have to pick out pieces where large quantities are required and where time booked seems to be on the high side, if Rs. 5,000 can be saved per annum on wages and the automation costs are Rs. 20,000 then the machine is paid for in 4 years and every one would be happy. But obviously as raw material, design, quantity, time-factor and feasibility play such important roles only the closest co-operation between all departments in general and production, design and manufacturing Engineers of the mechanical department in particular could successfully investigate and submit the pros and cons for each part.

Quantity a Prime Factor

Naturally the management of the I.C.F. carefully investigated all aspects of partial automation with regard to detail manufacture when the factory was being planned, and apart from a few exceptions it was a decided advantage to use conventional machines. The reason is quite obvious as hardly any of our parts

load even conventional machines fulltime because the quantities required are comparatively small. Yet technically it would be quite feasible to automate many pieces.

For example the bolster spring suspension pins of which there are 24 of two slightly different sizes per coach, could easily be manufactured at $\frac{1}{2}$ min./piece, but 8,400 pieces per year is only good on load our conventional machine for a fraction of the year then they are used for other parts, but the automated system would not permit any other parts to be manufactured on it, with the result that the machine would stand idle eleven months of the year.

With regard to hanger blocks, 11,200 pieces are required per year and production would be 2 mins per piece by this method, this means that this machine would be loaded for only 2 months in the year, obviously not a paying proposition, in addition raw material would have to be very accurate and the procurement of such material would in itself be difficult, as a result all other advantages would be nullified.

What now?

This type of automation will therefore not be introduced as long as machines available have no more flexibility in handling different sorts of jobs. This means that our drilling, milling and shaping sections will not be affected to any great extent; perhaps, a feeder system could be introduced in a few cases, but apart from that conventional machines will be doing this type of work for many years to come.

The turning section however could be automated with punched card guided lathes or turrets, as setting up time is not larger than on our present type of machines, loading would mostly have to be by hand because of the small quantities and entirely different types of jobs, but one operator could look after several machines this way. At the time of planning the I.C.F., this type of machine was still in its experimental stage, but it will seriously have

to be taken into consideration when lathes and turret lathes are due for renewal.

On the smithy side of extension to smithy at least one hammer builder is experimenting with automated furnace-hammer-trimming machines for medium sized parts such as we are manufacturing, to date however the success required to permit the introduction of such a machine has not been achieved, but it would not be a mere prediction to assume that simpler parts will be automatically forged in the next

15 years, while the more complicated pieces will be manufactured in very much the same way as today.

The facts point to the conclusion that automation is coming our way, slowly but steadily and a centralisation of similar manufacturing departments for the whole of the Indian Railways as well as extensive standardisation of parts would necessarily accelerate its introduction, but in any case, we would not be able to count on that arm-chair job in our lifetime.

THEY SHARED BATTING AND BOWLING HONOURS



Shri S. Padmanabhan topped bowling averages



Shri T. Dakshinamurthy topped batting averages

(Please refer to page 65)

News from Switzerland

(Published through the kind courtesy of the Consulate-General for Switzerland)

The 75th Anniversary of the St. Gotthard Railway

Lucerne ; Switzerland :—An ultra-modern 15-unit Swiss Federal Railways train is to leave Lucerne in the early morning of June 18th and whisk 600 guests of honour to Switzerland's sunshine balcony, the Ticino Canton, where the official festivities of the 75th anniversary of the St. Gotthard Railway are to be held at the capital city of Bellinzona. Among the South-bound travellers will be 240 to 250 members of the two houses of Switzerland's federal Parliament. Other invited dignitaries include representatives of the cantonal governments as well as cities and towns in the vicinity of this important trans-Alpine trunk line, the Swiss and foreign press, public and private transport companies, chambers of commerce and several European railway companies. The St. Gotthard cantons are preparing special welcome celebrations for the occasion. Uri, for instance, is to greet the guests of honour at its lakeport town of Fluelen on the southern end of Lake Lucerne and will give them a chance to marvel at the authentic "puffing bill" train creeping out of the almost 10 miles long St. Gotthard tunnel at Goschenen, its southern gate, as it did on June 1st, 1882. It was on that day that the St. Gotthard route was opened as one of Europe's outstanding North-South rail links. At Airolo, at the southern entrance to the tunnel, a salute to the 117 victims of the St. Gotthard tunnel project will take place in front of the memorial which was erected for them there. The piercing of the tunnel was achieved on February 29th, 1880, after 2,726 days of hard work inside the mountain.

Expansion of the St. Gotthard Railway Station at Goschenen

Goschenen, Switzerland :—A large-scale expansion programme for the railway station at Goschenen, the northern gate of the St. Got-

thard tunnel, opened exactly 75 years ago, has been approved by the Swiss Federal Railways. It will cost more than 16 million Swiss francs, a total of 6 million francs being earmarked for the extension of the motor-car loading ramps. It is pointed out that far more than 100,000 motor-cars including busses and trucks were sluiced through these ramps last year before or after travelling through the tunnel by rail. Expansion works on a similar scale are nearing completion at Airolo, the southern gate of the tunnel. The urgency of these expansion projects becomes evident from the enormous growth of the St. Gotthard rail traffic. In 1938 a total of 22,572 trains with a mere 999,106 axles passed through the Tunnel ; last year's record was 48,385 trains totalling 2,096,765 axles.

The Great St. Bernard Road Tunnel Project

Lausanne, Switzerland :—Promoters of the Great St. Bernard Road Tunnel Project comment on the recent decision to start construction of the Mont Blanc tunnel between France and Italy that this latter project will in no way interfere with their own plans. It is emphasized on the contrary that a speedy realization of the Mont Blanc scheme is liable to create public interest in new trans-Alpine links and quite naturally focus it on the necessity of a direct tunnelled highway through the historic St. Bernard Pass to improve road traffic between Switzerland and Italy. It is reported from official sources that the Swiss Government, prior to the 'go' signal given to the Mont Blanc tunnel project by the French National Assembly, had decided to "take steps" in Rome in favour of the Great St. Bernard plans which have been examined and approved technologically by the Federal Inspection Board of Public Construction.



Some Practical Hints on Gardening

BY

M. V. B. MENON

The most interesting aspect of gardening is the propagation of plants. There are two kinds of propagation :

(1) Seed propagation.

(2) Vegetative propagation which again consists of (a) by cutting, (b) laying, (c) Division by budding and (d) by grafting.

The most common method of raising plants is by means of seeds. Success in the annual or seasonal gardening depends upon the quality of the seeds. Seeds often fail to germinate due to defective storing, careless sowing, namely sowing too early or too late in the season, etc. For cold season annuals, the most appropriate time to sow is September or November.

Seeds should be sown in shallow pans or boxes in a light porous soil. The soil emptied from the pots in which annuals were grown in the previous year is good provided it is exposed to the sun for sufficient days. The soil should be passed through a sieve in order to get a uniform texture. The more minute the seeds, the finer must be the soil. Nearly, half the depth of the seed pan should be filled with potsherd and sand to ensure good drainage. After filling the seed pan, it should be firmly and evenly pressed down and thoroughly drenched before sowing. The surplus water

in the pan must be drained off before sowing of the seeds. The seeds should be sown evenly in the prepared pan, the top soil pressed down and the surface covered with a thin layer of fine soil. The pan should be watered again with a rose can and covered with a glass or thin wooden board to prevent the drying of the top soil and to ensure an evenness of moisture and temperature. When the seed shows signs of germination, the cover may be removed. When the seedlings are firmly established, they must be exposed to the direct rays of the sun except during midday. Care should be taken to protect the seedlings from heavy rain. When they grow 3 or 4 leaves, they have to be transplanted to small size pots. After one or two weeks, they will be ready for planting in beds.

Another method of propagation is by cuttings. Any portion of a plant, a piece of stem, leaf or a part of a leaf, a part of root, or root stock, which has been removed from a plant with the object of making it strike roots and thus start an independent existence is called "cutting." Plants raised from cuttings come true to type, true to the parent plant. Propagation by cutting is a cheap and very convenient method of raising several plants.

Cuttings are taken from healthy plants free from diseases and of moderately firm texture. The bottom cut should be immediately below a node and the top immediately above the node except where terminal cuttings are needed. The leaves on the lower portion of the cutting which is inserted into the soil should be removed very carefully so as not to injure the stem. If the cuttings have large leaves or dense foliage the leaves should be cut back to a third of their size. Pruning also helps to avoid overcrowding in the propagating pan or bed, which sometimes causes fungus growth. Cuttings from strong and sturdy stems with short internodes give better class of plants than those taken from weak shoots with long internodes. The length of a cutting is generally 6 to 9 inches with 3 or 4 nodes. As a general rule, the best

time for putting down cuttings is the growing time of the parent plant which is generally in August and September. Plain river sand is the best medium for cuttings to root. In the case of hard wooded cuttings, the sand should be mixed with a little leaf mould or light loam to secure a more retentive soil. The cuttings should be set in to a depth of one third to half of their lengths and the soil or sand above the stem should be firmly pressed down. They should be kept in the shade with plenty of diffused light for a few days and gradually to the direct sun-light. They must be watered once in a day with a rose can. When the cuttings are well rooted they may be potted off in 4 or 5 inch pots and thence grown on like seedlings.

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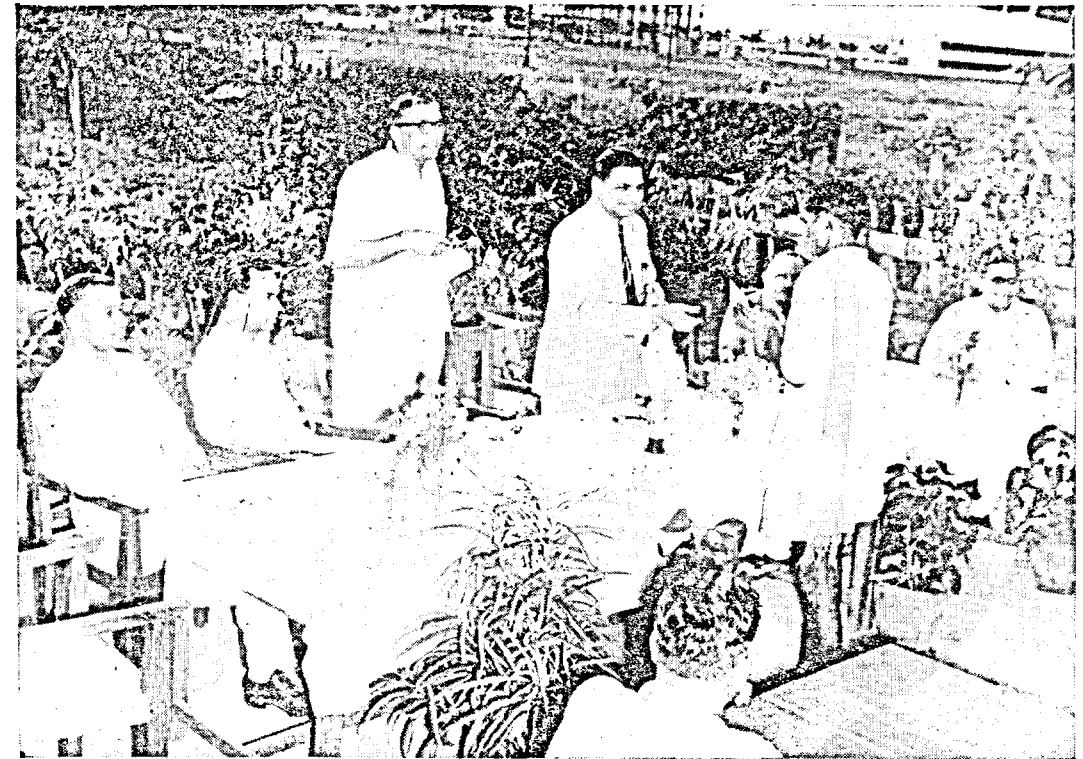
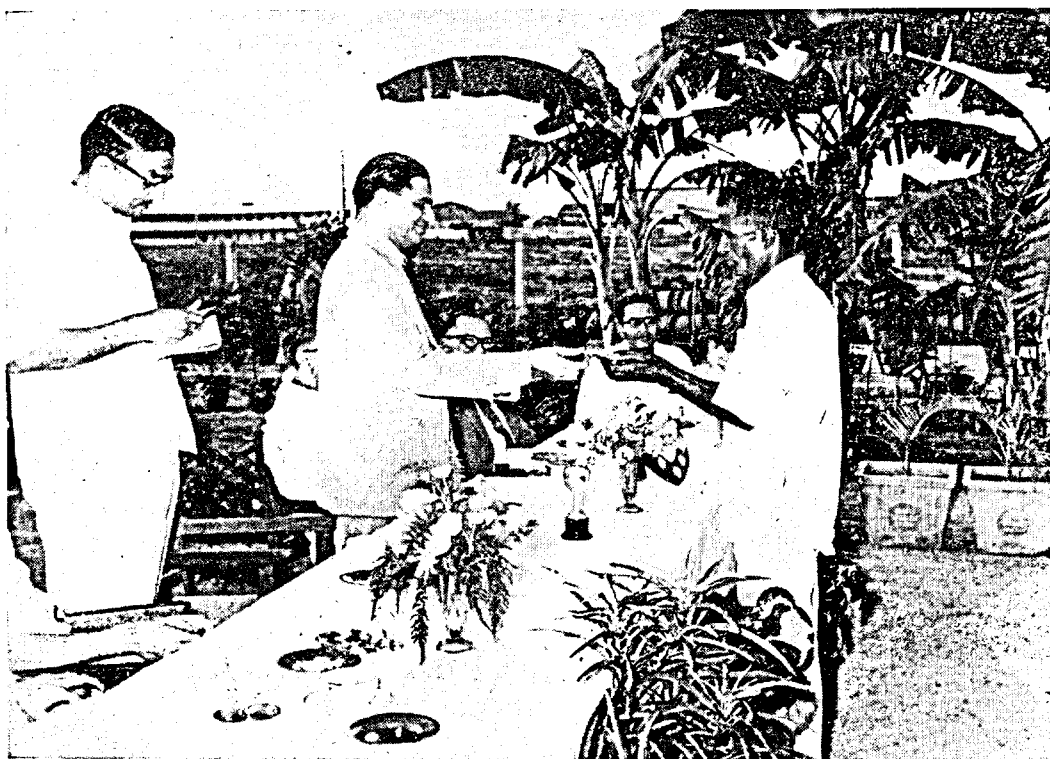
Distribution of Prizes to the Garden Staff

In recognition of the very good work done by the I.C.F. garden staff which culminated in our winning the first prize for Industrial Gardening in the City of Madras, for the second year in succession, Administration decided to award cash prizes to members of the garden staff who had put in outstanding work during the year 1956. It was considered that this would not only be a source of encouragement to the recipients of the prizes, but also be an example to the other workers to emulate and produce better and still better results.

The Chief Administrative Officer very kindly consented to distribute the cash awards at an

informal function held at 5-15 p.m. on 5-3-57 at the I.C.F. Nursery which was tastefully decorated for the occasion. The Chief and the principal officers of the Administration were taken round the nursery by Shri R. M. Sambamoorthy, Superintendent, Works and he explained to them the various aspects of work such as raising of plants, propagation of seedlings and the gradual repotting of the plants at various stages. The cool and refreshing atmosphere of the place, the variety of crotons and other plants collected therein and the neat execution of the various processes were greatly appreciated by them.

Shri A. Subbarayan, Horticultural Mistry, receiving the cash award from Shri K. Sadagopan



Shri M. Subbarayan, Garden Khalasi, receiving the cash award

Shri S. G. Iyer, XEN/I.C.F., while requesting Shri Sadagopan to distribute the prizes, advised the garden staff to appreciate the interest taken by the administration in their work and to deserve its confidence in every way by putting in greater and greater efforts.

Shri Sadagopan, after distributing the prizes, congratulated the workers on the results achieved by them and exhorted them for bigger and better results in the years to come which would go to build up the reputation of this great I.C.F. family in this attractive field of horticulture also.

Below is the list of prize-winners and the cash prizes awarded to them.

		Rs.
Shri A. Subbarayan	Hort. Mistry	15
Sri Vellaswamy	Gardener	9
Sri Munuswamy	Do.	9
Sri Ezhumalai	Do.	9
Sri Manickam	Do.	9
Sri Subbarayan	Garden Khalasi	6
Sri Ramulu	Do.	6
Sri Mari	Do.	6
Sri Vedachalam	Do.	6

Visitors to the I.C.F.

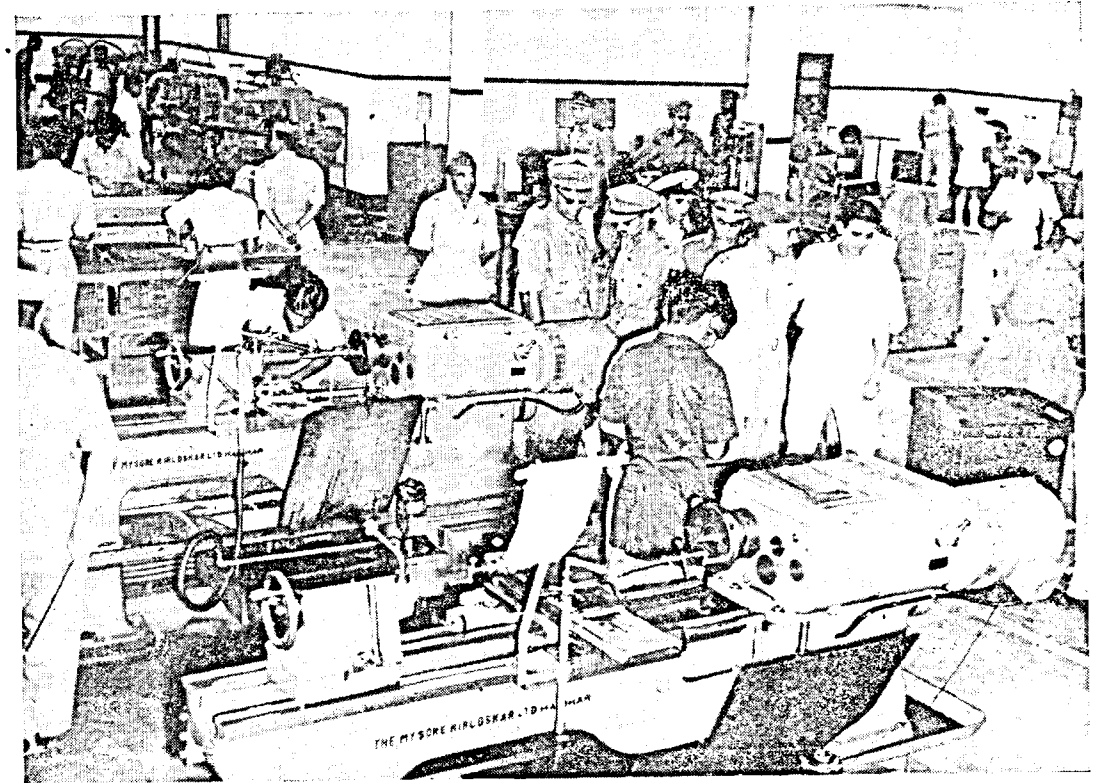
Shri J. A. Thivy, Indian Ambassador in Italy, visited our works on the 1st March, 1957. He was shown round the Technical School and the Workshops. At the conclusion of his visit he recorded his impressions in our Visitors' Book :—

“ Very happy indeed to see that we are producing such ultra-modern coaches, more so because, as I know that Italy is manufacturing coaches and locomotives for us, I am now satisfied that this is not because we cannot do the job ourselves but only because we need more than we can produce ourselves.”

Brigadier S. P. Vohra, Dy. Director, Mechanical Engineering, Army Headquarters visited the factory on March 2, 1957.

Mr. Alfred F. Kickbusch, Trade Commissioner in the Consulate of the Federal Republic of Germany, Madras, accompanied by the Consuls at Calcutta, Bombay and Madras, visited our Works on the same day. The Trade Commissioner expressed his view that this was “ the most modern factory ” he saw in India and appreciated the well-arranged production flow in the factory.

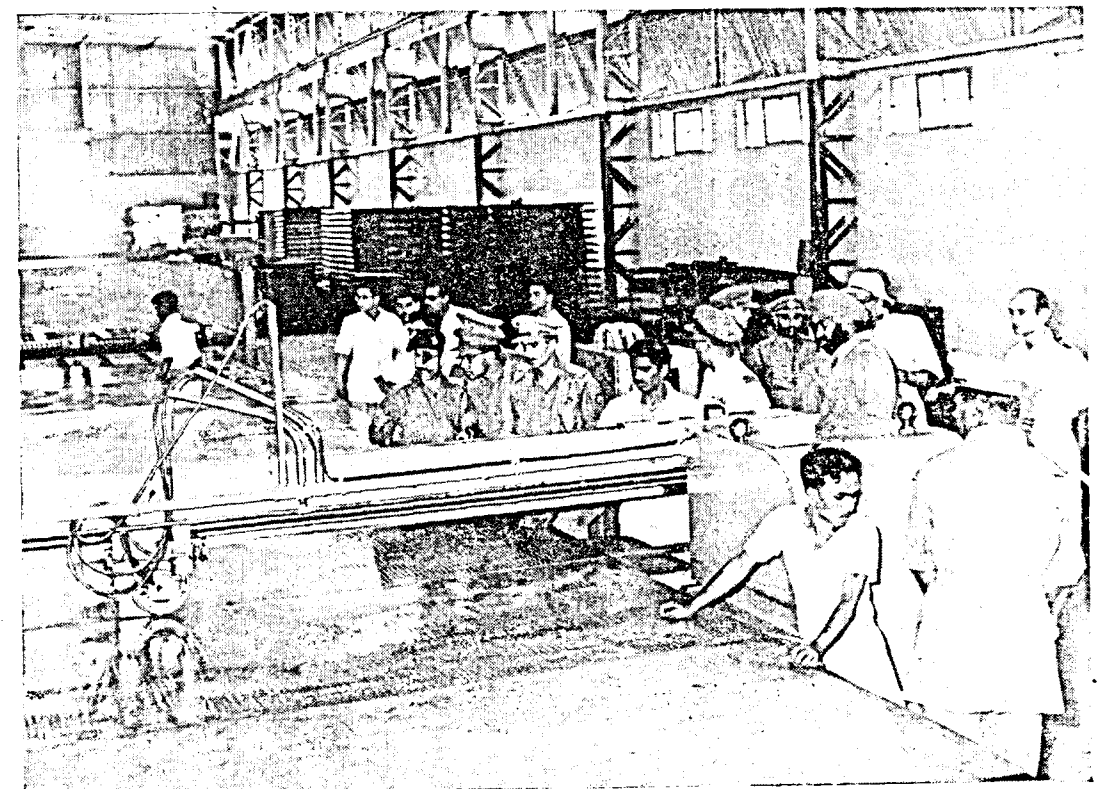
A Trade-cum-Goodwill Delegation from Finland, led by Mr. Leo Tuominen, visited the factory on 11-3-57. They were taken



Officers of the Staff College, Wellington at our Technical School

Officers of the Staff College, Wellington in our Workshops

Trade-cum-Goodwill delegation from Finland in our Workshops



round the Technical Training School, the Staff Colony and the Workshops. At the conclusion of the visit the leader of the Delegation extended his sincerest congratulations to the Workers and Officers of this "modern and beautiful" factory and said that it was a victory of India's first Five-Year Plan.

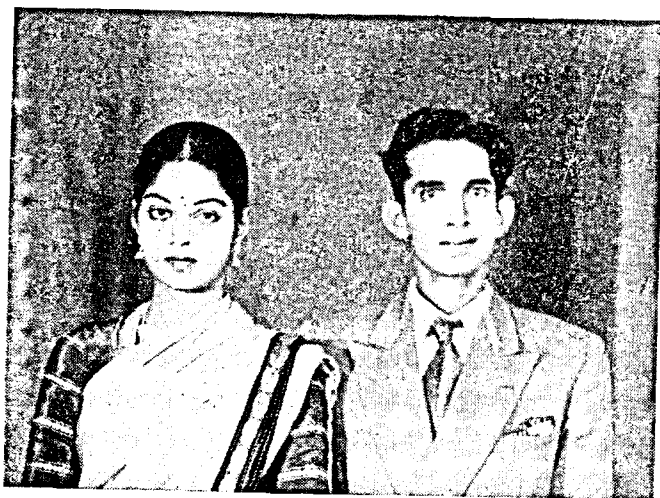
Shri V. S. Hejmadi, Chairman, and members of the Union Public Service Commission and Shri G. H. Po Saw, Additional Dy. Comptroller and Auditor General (Railways), visited our factory on the 16th March, 1957. The party evinced keen interest in the various aspects of the work done in the factory and expressed their view that it was "excellent" and "an eye opener for any critic of India's progress."

A group consisting of about 120 students of the Defence Services Staff College, Wellington, visited our factory on the 18th March, 1957. At the Technical Training School of the factory the Dy. C.M.E. gave them a lecture about the factory. Later the documentary "For Better Travel" was screened for them.

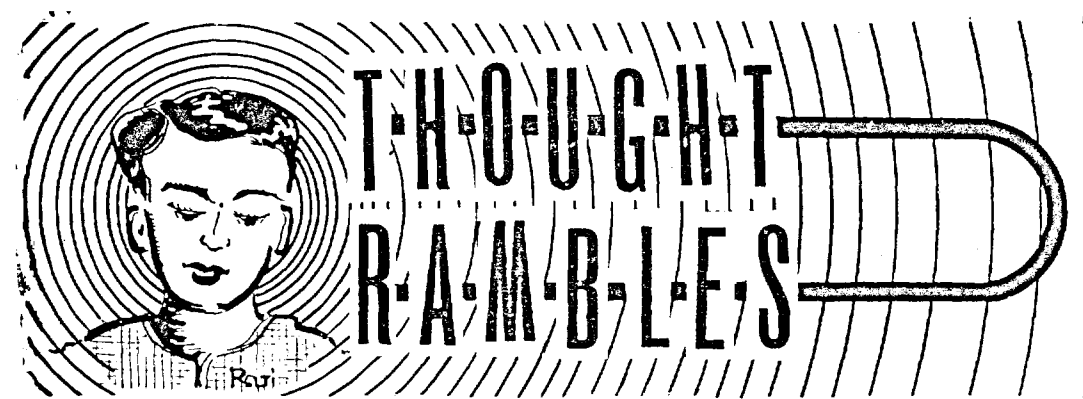
Four Ethiopian Police Officers who are undergoing training in police administration in this country visited our Works on the same afternoon.

Dr. Hungsberg of Messrs. Wagner and Co., Germany, visited our Works on the 22nd March, 1957 and was shown round the various shops.

WEDDING BELLS



Our best wishes to Shri M. S. Srinivasan, Stores-checker, X E N Division and Sow. Seemanthini who were married on 17-3-57.



Side-Lights of a Festival

BY

S. R. SRINIVASA RAGHAVAN

I had the good fortune to attend the Kamban festival held recently at Karaikudi. It is a festival that is conducted every year at which giants of Tamil literature, of the old and new order, mix with each other to expound the grandeur of Kamban's works. I have been receiving invitations every year since the inception of this festival at Karaikudi, but this was the first time I could attend, at least one day of the festival.

Let me quote here a few sentences on Kamban written by a Professor friend of mine (part of a classical preface written on the Tamil poet Bharati) :—

"The great epic poet, Kamban, inherited this three-fold heritage of Sanskrit thought and philosophy, Sangam simplicity, and Sangam ethical leanings and the mystical symbolism and intensity of the religious poets..... Kamban chose Rama's life as his theme and got the details of the story from Valmiki's Sanskrit epic, the Ramayana, but the whole story was recreated by him in Tamil and his long epic of some 42,000 lines enshrines all that is significant in Tamil tradition and culture. He is the most learned of Tamil poets and a study of his epic is 'the last reward of consummated scholarship.' With a remarkable knowledge of human nature, an unfailing sense of the dramatic, a keen mind reaching out towards profound truths with ease and precision and a diction, rich, multitoned and singularly poetic, Kamban has created a spacious allegory

of human life and, while expressing the highest achievements of the Tamil race, has at the same time tried to justify the ways of God to man."

That is Kamban in a nut-shell.

I met a great scholar in "Kamban", a ripe old individual, who is a very close friend of this Professor. He referred to the Professor as an embodiment of art. I shed a few precious tears. I fear that the world is heading fast towards materialism and the values of the past two decades are nowhere to be found about us. Culture has been uprooted and in its place a vandalism of the worst order has been substituted. Simple living and high thinking have been replaced by "high" living and practically no thinking. The connoisseurs of art in all their forms have, as it were, lost citizenship and in their places third-rate and pseudo-artists and art-lovers are parading themselves as saviours.

* * *

The Kavi Arangam organised this year as part of the Kamban festival was a little political in colour and did not breathe of the essence of the beauties of Kamban's poetry. Perhaps the occasion warranted such a colour being put into the assembly of poets! Anyway the outer forms of the assembly of poets were all in the traditional form reminding one of the "Sangam" age.

The dance performances held at the close of the day were highly artistic and had a soothing effect on the nerves after a tiring day.

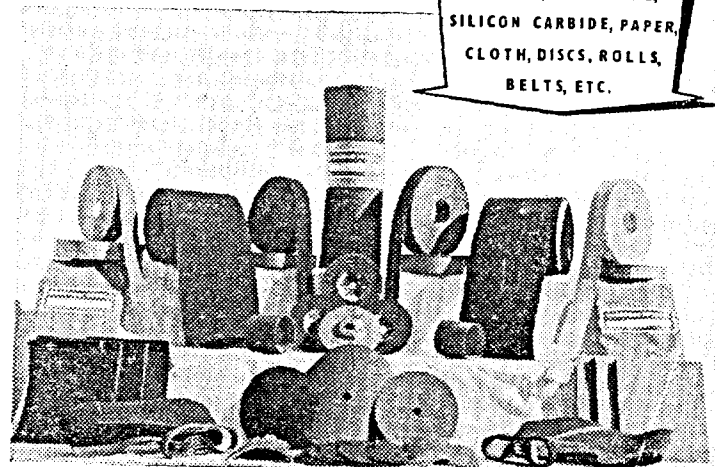
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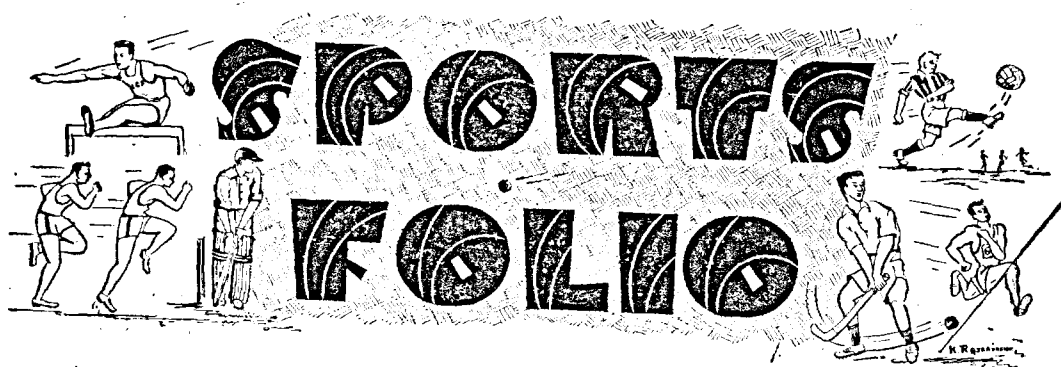
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"CHIEF" WINS A PRIZE IN INTER-RAILWAY MEET

The Inter-Railway Athletic Meet was held at Delhi in the Northern Railway Sports Ground on 8th, 9th and 10th March, 1957. The most interesting event on the concluding day was the Officers' Race at which Members of the Railway Board and Heads of Administrations took part. Shri Karnail Singh, Member, Engineering, ran like an athlete in form and won the first Prize. Our Chief Administrative Officer, Shri K. Sadagopan, won the Second Prize. The prize distribution ceremony was held on the evening of the 10th March, 1957. Shri Jagjivan Ram, Railway Minister presided and Shrimathi Jagjivan Ram gave away the prizes. The photograph below shows Shri K. Sadagopan receiving the prize from Shrimathi Jagjivan Ram.





Value of Recreation

BY

A. D. PARTHASARATHY

Recreation is a fundamental human need. It has been a human activity from ages past, and will remain so for ever. The ancient civilisation of the Greeks, which is a source of inspiration even to-day, was a result of the pursuits of leisure. Culture and civilisation are built on the foundations of the leisure of people.

Recreation is nothing else than what a person chooses as an activity in which he feels a sense of freedom and ease, participates whole-heartedly and derives satisfaction and joy. These activities reinvigorate one's body, mind and spirit and enable him to lead a contented life. Recreational activities can be classified as :

- (1) Sports, Games, Gardening, Indoor Games, etc.
- (2) All the arts and crafts.
- (3) Hobbies.
- (4) Studies for pleasure.

Modern civilisation, with its complex life, is in need of recreation more than any other civilisation in the history of the human race. The present mode of living of the people in modern cities with large populations has created many problems. Industry has produced "Goods and Leisure." The tempo of life is at its highest and the time at our

disposal is filled up with various activities connected with the wherewithals of life. Leisure calls for proper education which will enable people to live happily and efficiently. Leisure should be of two varieties : (1) Play in order to relieve the strain of the tired body and the jaded nerves (This must take the place of any artificial escape) and (2) Recreation to build up our bodies so that they will be prepared to meet strain later on.

Recreation is motivated by pleasure and is a diversion from the daily occupations of life. It helps people to grow physically and mentally and its values and importance are as great as those of education and health. Recreation does not consist of what one actually does ; it is rather the attitude behind the task performed as recreation. Choice of a suitable recreation depends on the physical structure and character. A person with a speculative temperament may choose games of chances, while an individual with aggressive tendencies may participate in competitive Athletic events and games. Every individual has his own reasons for selecting and participating in one particular type of recreation. Recreation to the individual may be classified as those activities that serve as complementary experiences, as having compensatory values, as serving to

discharge aggression, as patterns of regression, and as satisfying social hunger.

Recreation enables one to have powers of insight and an ability to deal with people. Since recreation is an important phase of human activity it must be provided for all people.

Recreation should be of such quality that it results in the growth of personality and character in the individual. Emotional health, physical health and mental health are outcomes of good recreation. Those who participate in recreational activities regularly develop a sense of appreciation towards life. Of course recreation depends on various factors, such as suitable jobs, adequate income, facilities for recreation, etc. These factors influence the personality of the individual. It promotes maturity and enables one to shoulder responsibility. It also teaches democratic living and community solidarity. Working in a group and the experience of give and take are necessary for the growth of a society.

Prevention of crimes and increase in human happiness through self-expression are also pos-

sible through proper recreation. Recreation develops morale as can be seen from statistics of war, and the quality of people in areas where good recreation is available and where it is not available. Recreation is a great asset to the social and economic welfare of a people.

Recreation can go a long way towards bringing people together on a common platform. There is plenty of opportunity through recreational activities to create understanding amongst the people and make them realise that race, caste and creed are no barriers in building unity, friendship and social understanding.

In concluding this article I request the Railway authorities that sufficient provision may be made in the Second Five-Year Plan for a comprehensive recreation scheme for Railwaymen's prosperity and development. Besides, the authorities should include community recreation as an important activity in every Railway organisation. People should also realise that recreation being an integral part of their life, should be supported by them and that they would be the beneficiaries.

SPORTS NEWS

The I.C.F. Football Team made up of 18 men left on the 28th January 1957 with Shri A. D. Parthasarathy as Manager to participate in the Football Tournaments held in the West Coast of South India.

The team first entered the Palghat Football Tournament. This is one of the important tournaments in the South and the trophy offered is a much coveted one. Our team came out successful after having to play on 6 occasions. Both the Semi-Finals and Finals had to be replayed and our team was pitted against powerful teams. In this tournament 12 goals were scored by our team and 5 against.

At the end of the tournament, the public of Palghat arranged a function to honour 10 players adjudged best amongst those who participated in the tournament. The I.C.F. team was conspicuous at the function as the undermentioned 6 of its members were the recipients of the special awards given at the time of the party.

1. Sri Janakiraman.
2. „ Devadasan.
3. „ Rajaraman.
4. „ Thomas.
5. „ Arumainathan.
6. „ Chandramohan.

Sarvashri Janakiraman and Devadasan added one more feather to their caps by receiving a silver shield each, as special awards from the Tournament authorities. In the party arranged by the Tournament Committee, the team spirit and discipline that was displayed by our team came in for special mention.

Out congratulations are due to Skipper Janakiraman, the other members of the victorious team and our able Manager and Coach, Shri A. D. Parthasarathy.

Our team had a few days to spare between the Quarter-Final and Semi-Final rounds of the

Palghat Tournament and this they utilised to advantage by taking part in Chokkola Tournament held at Ernakulam, Sait Nagjee Amarsee Memorial Tournament at Calicut and the Rising Sun Football Tournament at Madurai. In the Chokkola Tournament and the Rising Sun Football Tournament our team lost by narrow margins to the teams, which eventually won the tournaments. In the Sait Nagjee Amarsee Memorial Tournament also our team suffered a reverse, but the experience gained was helpful in annexing the cup in the Palghat Tournament.

Our Football Team—Winners of the Palghat Trophy



Well Done Cricketers

Our Cricket Team entered the M.C.A. League for the first time in 1956 and as per rules was allotted to the Third Division. The Team created a record by winning all the matches played in the league and topping the list in its first appearance. Special mention is to be made of the able manner in which Shri Yuvarangam captained the team and the good support given by his team mates, particularly by Shri Dakshinamoorthy and Shri Padma-

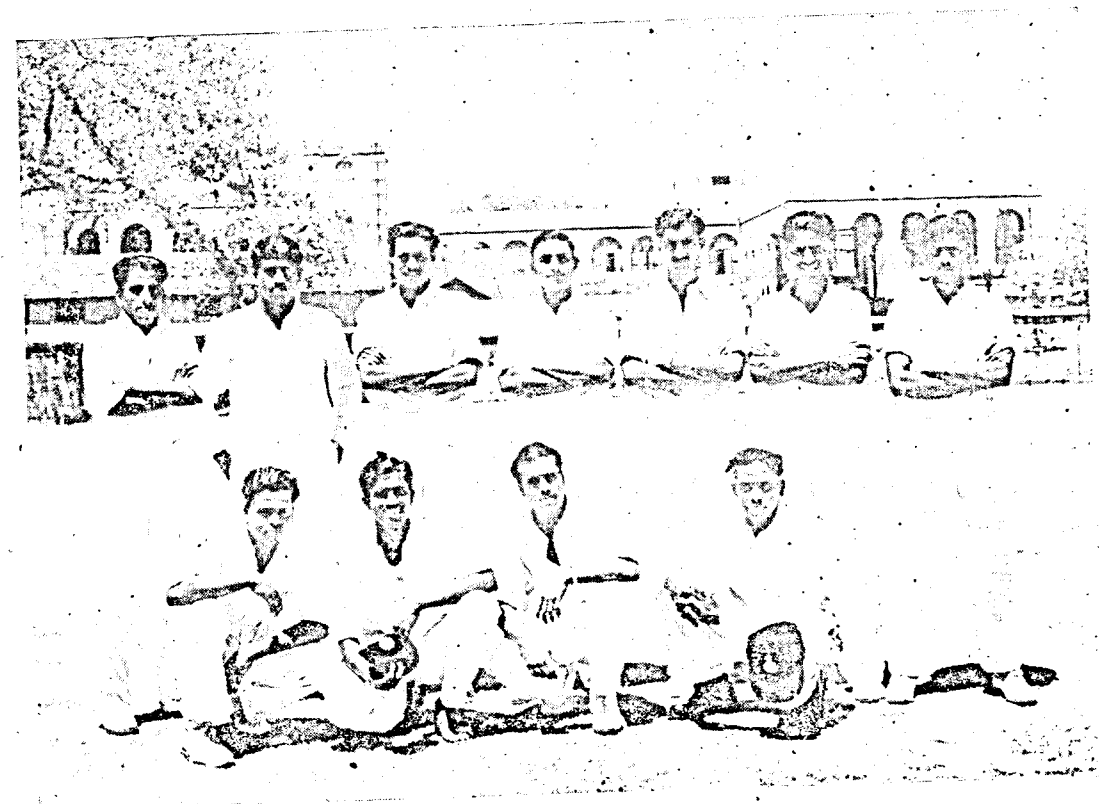
nabhan, who topped the batting and bowling averages respectively.

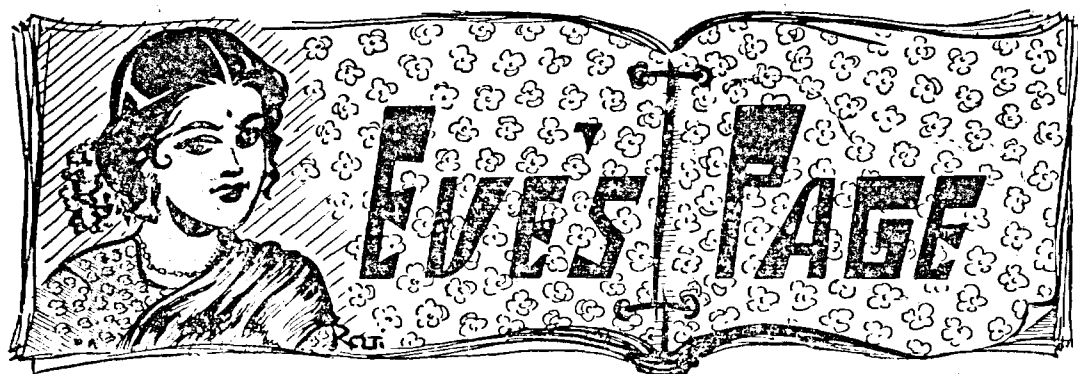
Shri Dakshinamoorthy played 11 innings, scored 352 runs and finished up with an average of 32 runs. He was not out once and his highest score was 88.

Shri Padmanabhan bowled 97.4 overs of which 30 were maidens and took 31 wickets at 5.6 runs per wicket.

Keep it up boys!

Our Cricket Eleven





An Idea for a Model Women's Club

BY

AMBUJAM

I wrote a short story some ten years ago the central theme of which was related to a Women's Club ideally conducted by a bevy of aristocratic ladies. This particular Women's Club was a "Club of Silence", where the ladies did not talk but moved about in a dignified sort of silence. Somehow women have been accused of talking too much in general and, as you know, people of the opposite sex accuse us of being tale-mongers!

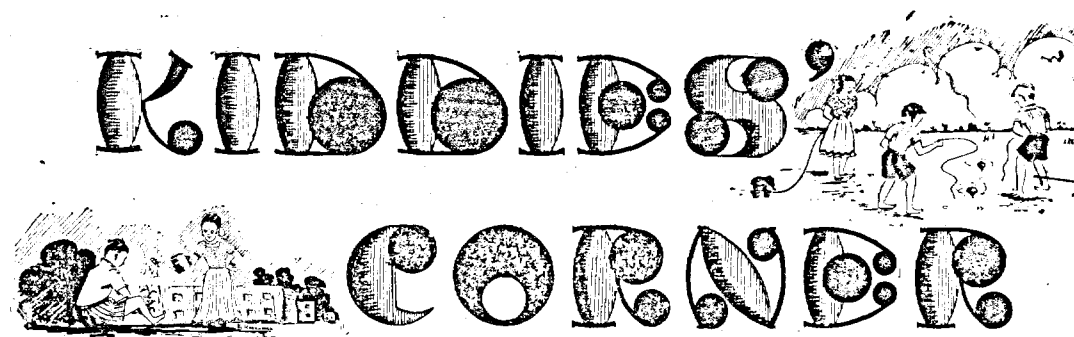
I for one have for long been picturing an ideal Women's Club in my mind where forms and formalities occupy an important position and no particular business is conducted. Dress is very important in this club and the more exotic the sartorial embellishments the better. The ladies should assemble at a particular hour every week at the club premises and then begin to move about as if they were divine damsels, who had mistakenly set foot on earth. Being strong in imaginative faculty, they should think of days gone by which were rich in art and mythical in the mode of living. Light music flowing down in flourishing but subdued tones should be an accompaniment

to the meandering ways of these beautiful damsels.

Oscar Wilde, the great dramatist, who was for a while most famous for the art form he introduced, is said to have switched on the blue lights in his room even during day time after closing all the doors of his room while he was at Cambridge. "The picture of Dorian Gray", a masterpiece of his, reflects the love of the non-existent he cherished. It is a novel in which a picture comes to life and undergoes the soul-transformations of a human individual.

Realism in art is the trend that prevails to-day, but Wilde said that even nature copied the pieces produced by eminent artists in a desire to imitate the best forms of art.

I do not know how many votaries there will be for the Club I imagine. More than everything else, keeping silent at a time most opportune for chit-chatting, I know, is a really stringent condition; but that is the essence of my ideal club. Just think about it, meditate (note the word) the sacredness of such a club and let me know if it is possible.



The King and the Saint

BY

"HARSHA"

Long long ago, there was a king named Surya, who ruled over a vast kingdom. He had many ministers but he did not like saints. In his opinion saints brought calamity to the royal household by their pronouncements which, on many occasions, foretold bad happenings in the family.

The king ruled the country well with the assistance of his ministers who were all wise men. But there was no rain for a long time and the wealth of the state was steadily going down. All the lands became arid and with famine all around, the coffers of the palace were almost empty. The king called for a conference with his ministers and discussed the situation with them. All of them told the king in one voice that the unhappiness of the people was beyond the powers of the king to quell. One of them suggested that it was an act of God that the country was fated to suffer so much and it would be better if a saint were consulted. The king became thoughtful but he was not quite willing to accept the suggestion. A second minister also said that that

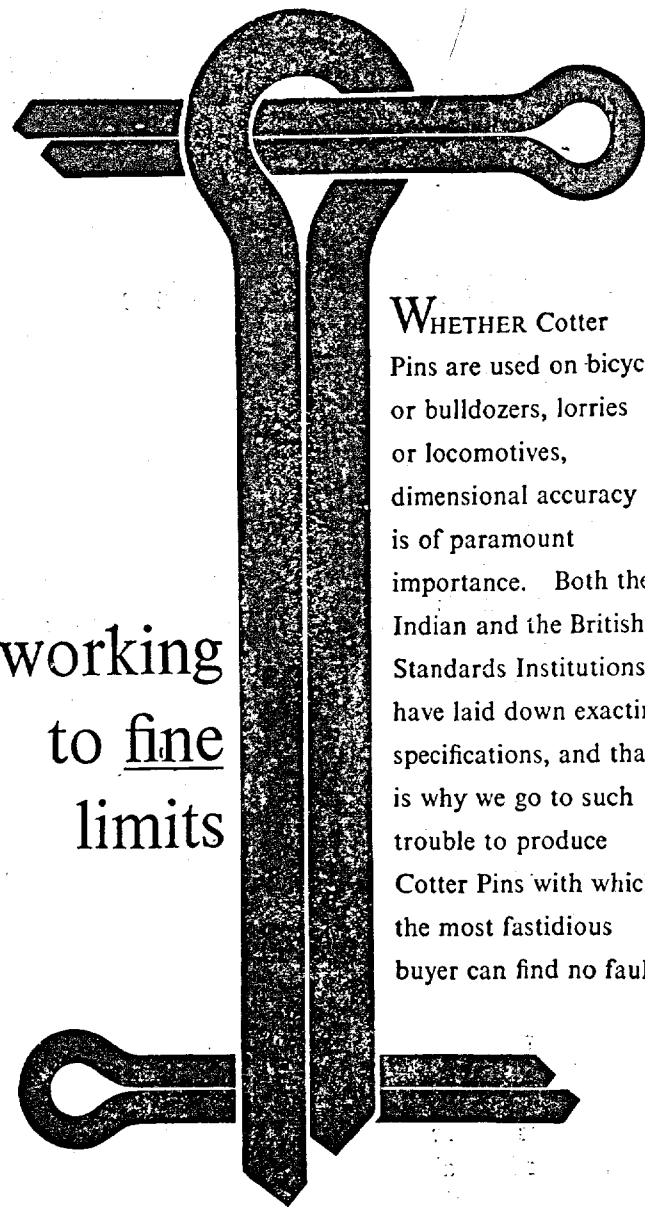
was an occasion when a saint should be consulted. The king at last agreed to the suggestion.

A messenger was sent to the forest and a saint was invited to the palace. The saint was an apostle of wisdom and highly disciplined. He asked the king about the cause for which he had been invited. The king told the saint that the country was suffering from draught and the people were unhappy. The saint said that rain could not be made to order and that the king should plan and provide for bad times while the country enjoyed affluence. He added that big dams should be built across rivers, to store water which otherwise drains away so that it could be useful during periods of draught.

The king immediately ordered his men to build large dams in the country. Luckily for him there was good rain. Soon after the dams were filled. People never more suffered from draught.

The king thought that after all a saint was not a foreteller of evil but a wise adviser.

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OUR FAMILY



Twenty-five year old KALAPPA MUDALIAR NARASIMHAN was born in a family of Handloom Weavers in Conjeevaram.

After Matriculation, he underwent five years apprenticeship in the B. & C. Mills and then joined our Technical Training School as a Fitter apprentice on 11-10-1954. On successful completion of his apprenticeship he was posted as Skilled Artizan in 'B' Shop on 13-4-1956, which post he continues to hold today.

He is a good Table-Tennis player.

Being the first skilled worker to join 'B' Shop, he was chosen to hand over the 100th shell assembled in 'B' Shop to 'C' Shop for further processing at the function held in that connection.



Twenty-three year old NATESAN BALARAM was born in St. Thomas Mount, Madras, in a Painter's family.

After receiving elementary education, he had training in Letter Painting and Painting. He joined the Technical Training School, I.C.F. as a temporary Painter on 16-1-1954 and was transferred to 'C' Shop on 18-7-1955 in the same capacity.

He was absorbed as Brush Hand on 2-1-1956 and promoted as Skilled Painter on 1-2-1957.

He is good in Hockey and Football.

Being the first skilled worker to join 'C' Shop he was chosen to receive the 100th shell from 'B' Shop for painting and finishing at the function held on 22-2-1957.

Southern Railway VISIT SOUTH INDIA AND SEE

BADAMI	Famous for Jain excavations and cave temples of the 6th Century A.D.
BIJAPUR	For the Gol Gumbaz, a perfect whispering gallery and the second largest dome in the world.
CHIDAMBARAM	The famous temple dedicated to Sri Nataraja or Siva in His aspect as the Cosmic Dancer.
COURTALLAM (Via Tenkasi)	Well-known for its waterfalls. A famous bathing place and health resort.
HUMPI (Vijayanagar)	Marvellous ruins of the old capital of the Never-to-be-forgotten Hindu Empire, Vijayanagar.
KODAIKANAL	The charming hill station near Madura.
MADURA	Capital of the Ancient Pandya Kings, noted for its great Meenakshi Temple.
MYSORE	The city of lights. The enchanting Brindavan Gardens are only ten miles from Mysore.
OOTACAMUND	The queen of hill stations in India.
RAMESWARAM	For a holy bath and its famous temple.
TIRUPATI	The seat of the Lord Venkateswara or Balaji. Here every day is a festival day.
TRICHINOPOLY	Noted for its shrines at Srirangam and Tiruvanaikaval.
TRIVANDRUM	For its famous art gallery, museum and zoo.

Chief Commercial Superintendent



1. In settling a bill for Rs. 1.25 a customer using naye paise coins, each being of lesser value than quarter rupee, found that he can pay in two ways : the number of coins by the first method in each denomination in the order of value bears a reversed order in the second method ; but the total number of coins in each method remains the same. When with same number of coins he calculated in similar manner, with the anna coinage he found that there was a difference of quarter anna in reversing the order. How many coins in total did he use ?

2. Krishnan once said to his friends, "It's funny that my mother's age is half the sum of my father's age and my age but my father's age and my mother's age total 100." If the ages of Krishnan's parents were both prime numbers, what is his age ?

3. Two vessels contain equal quantities of milk and water. A teaspoonful of the milk was transferred to the vessel containing water. A teaspoonful of the mixture from this vessel was then transferred to the vessel containing milk. How does the proportion of the water in this vessel now compare with the proportion of milk in the other ?

4. If 'RAMESH' multiplied by 'M' gives 'MESHRA' which when multiplied by 'M' gives 'SHRAME', what number does 'RAMESH' represent ? (Each letter stands for a number).

5. Perumal always walks at the same pace ; he trots twice as fast and runs three times as fast as he walks. Going once to the post office three miles away, he walked a mile, trotted a mile and ran a mile. On another occasion he tried trotting all the way and found that he took six minutes less than the previous day. What is his running rate ?

6. Two men sold oranges. One sold small oranges at three for 0.10 nP. and sold thirty a day, which brought him in one Rupee. The other sold larger oranges at two for 0.10 nP. and also sold thirty per day which brought him in Rs. 1.50. One day the first vendor arranged to sell all sixty oranges. As he decided to dispose off the stock early he added up the rates in both cases and sold at five for 0.20 nP. At the end of the day when reviewing his takings for the day he found the amount to be Rs. 2.40. But Re. 1.00 and Rs. 1.50 total up to Rs. 2.50. What happened to the difference of ten naye paise ?

7. Booter, Boxer and Biller are the individual owners of three square fields lying side by side and presenting a straight continuous frontage of 1,330 feet. Booter's plot is as long as the other two together, but his frontage is only 9 feet longer than Biller's. What is the length of Biller's frontage ?

Solution to last month's Brain Teasers

1. Jimmy covered $4\frac{1}{2}$ miles.

2. Bowling figures at the end of the Season :—
 Sarathy 45 wickets for 540 runs.
 Shanker 35 wickets for 420 runs.
3. The picnic party consisted of 30 men.
4. Betty's answer : $5776 = 76^2$.
 Grandpa's answer : $CXXI = (XI)^2$
5. $17\frac{1}{2}$ miles long.
6. Prakash has Rs. 90, Nair has Rs. 75 and Venkatesh has Rs. 45.
- (NOTE.—The compiler wins! It is hoped our readers would not let the compiler get the better of the deal, anymore—Editor.)

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1. Two old friends were having a heart to heart talk.

One said, "The only defect in my wife is that she is always talking".

But the other retorted, "My wife not only talks always but thinks I am listening to her."

2. A villager: "My son left for the City to make a fortune".

Friend: "How much is he worth now?"

Villager: "I cannot say definitely. But the police have advertised that they will give Rs. 10,000 for any information about him".

3. The Magistrate questioned: "But why did you steal?"

The accused answered: "Honestly, Sir, I had no food, no clothes and no shelter."

Then the magistrate pronounced: "Young man! I pity you. Let food, companionship and shelter be yours for the next 6 months."

4. There was a girl in a certain class room who always used to monopolise discussions. The mistress wanted to do away with this bad habit. She wrote under her progress report "She is a good girl, but talks too much."

The report was handed over back to the mistress after a fortnight with an added remark by the girl's father saying, "You should meet her mother."

5. Once a suitor found himself in a tight corner while answering a barrage of questions about his personal history by the girl's father. Finally in an effort to emerge out successfully he said, "Look Mr. Shankar, I don't smoke, drink or have any desire for opium, snuff, etc."

The interested father asked him naturally in an inquisitive manner, "And you don't have any weakness in yourself?"

"Of course, I am also a human being," the suitor said in frustration, "I do not hesitate to lie when necessary".

6. Two lunatics were having a discussion between themselves about a man who was perched on top of a coconut tree.

First: I say how do you think the man must have reached the top of the tree?

Second: Oh that is easy! He must have bent the tree over first and sat on top.

First: You fool! You do not know that the tree has a growth? He must have sat over it when it was short and must have reached the top as it has grown up.

ANOTHER STEP TOWARDS INDIA'S SELF-SUFFICIENCY STONE'S TRAIN LIGHTING EQUIPMENT NOW MANUFACTURED IN INDIA

Since the introduction of the first electrically illuminated carriage on the South Indian Railway in the year 1897, Stone's have supplied thousands of train-lighting equipments to the Indian Railways and its name to-day has become a by-word in the field of train-lighting. Behind this is a story of years of research, of pioneering effort and achievement.

The first major step in India was taken in the year 1931 when a workshop was opened by J. Stone & Company (India) Limited, in Calcutta, to manufacture simple items of train-lighting such as inter-vehicle couplings, junction boxes, light fittings and fans.

These manufacturing facilities have gradually been expanded. Now, for the first time in India, and as a fitting climax to over 60 years of service to the Indian Railways, STONE'S have pleasure in announcing their latest contribution towards the country's self-sufficiency—the modern Factory at Behala, Calcutta, for the complete manufacture of Train-lighting Dynamos and Switchgear.

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Personnel Notes

Our Felicitations to

- (1) Shri M. L. Mukkerjee, Chargeman 'A' Grade in scale Rs. 260—350, promoted Foreman in scale Rs. 300—400 with effect from 28-2-1957.
- (2) Shri S. S. Chatterjee, Chargeman 'B' Grade in scale Rs. 200—300 promoted Chargeman, 'A' Grade in scale Rs. 260—350 with effect from 28-2-1957.
- (3) Shri R. C. Arokia Raj, Senior Clerk in scale Rs. 160—220, D.E.E.'s Office, promoted Head Clerk in scale Rs. 200—300 with effect from 7-3-1957.
- (4) Shri P. R. Sundarabashyam, Chargeman, 'C' Grade in scale Rs. 150—225 promoted Chargeman 'B' grade in scale Rs. 200—300 with effect from 11-3-1957.

- (5) Shri Syed Abbas, Custodian in scale Rs. 150—225, promoted Hostel Superintendent in scale Rs. 200—300 with effect from 18-3-1957.

Our Welcome to

- (1) Shri V. P. Sharma, Electrical Inspector in grade Rs. 200—300, Central Railway, selected by Railway Service Commission, and posted Electrical Foreman in I.C.F. in grade Rs. 360—500 with effect from 21-2-1957.
- (2) Shri M. D'Costa, Retired Foreman, Smithy Shop, Loco Works, Southern Railway, re-employed Foreman in Smithy Shop in scale Rs. 300—400 with effect from 26-2-1957.



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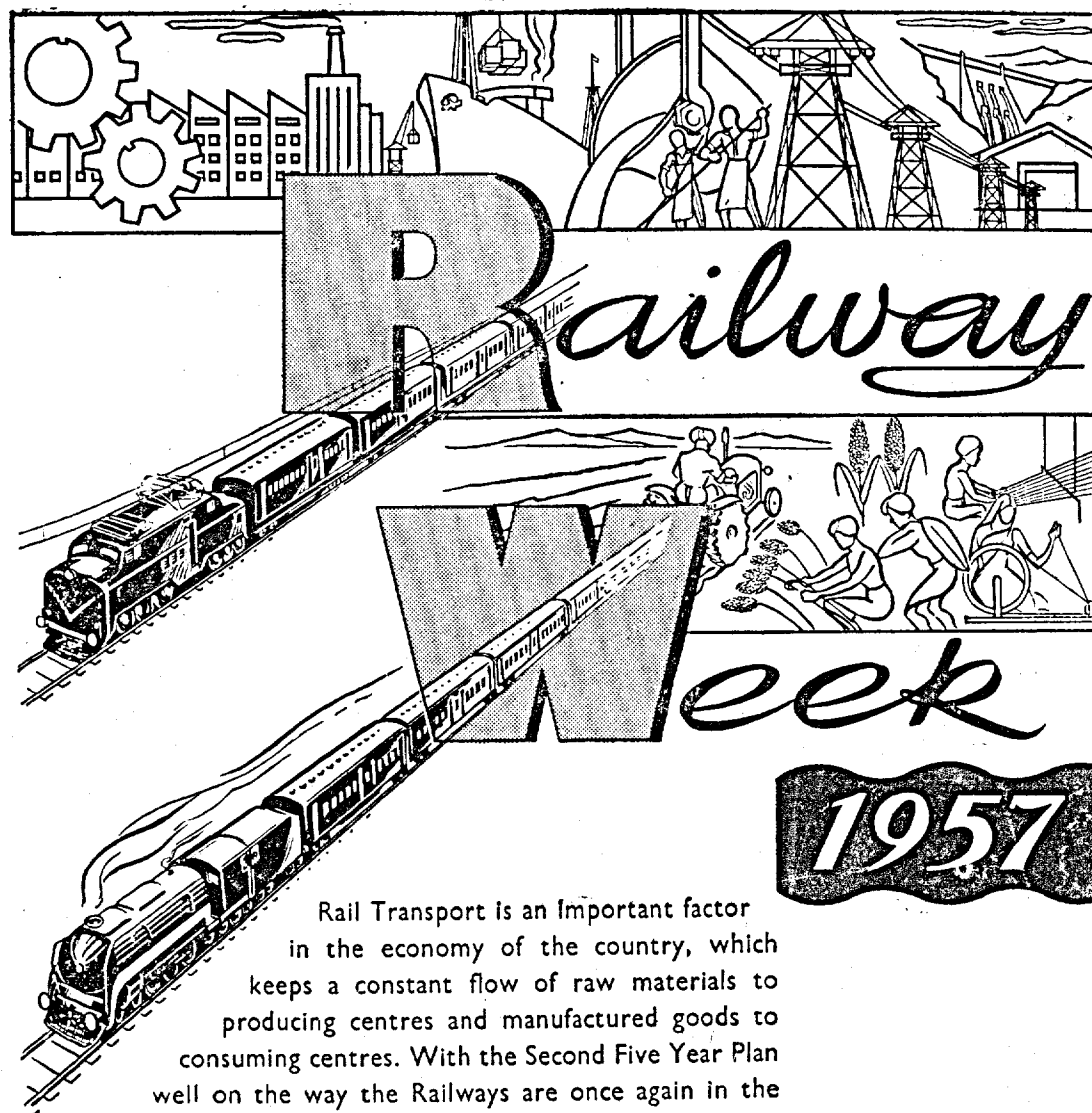
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The Central & Western Railways are in the midst of several new projects in various stages of progress, some nearing completion. Many more are scheduled for early commencement. All this is aimed at providing greater transport capacity, more conveniences and better amenities to the travelling public, so that at the end of the Second Five Year Plan a 15% increase in passenger carrying capacity and 40% increase in goods carrying capacity would have been achieved as compared to what it was at the beginning of the plan.



CENTRAL & WESTERN RAILWAYS



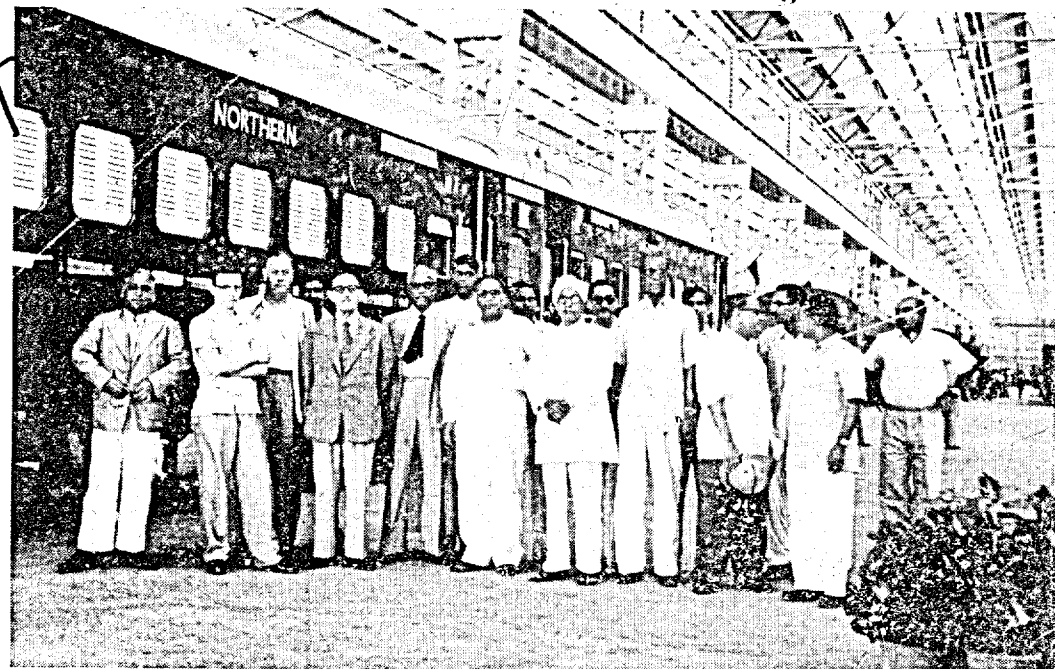
Shri K. Sadagopan speaking at the opening of the Post Office in the I.C.F. Colony.

Shri K. Sadagopan declaring open the Post Office.



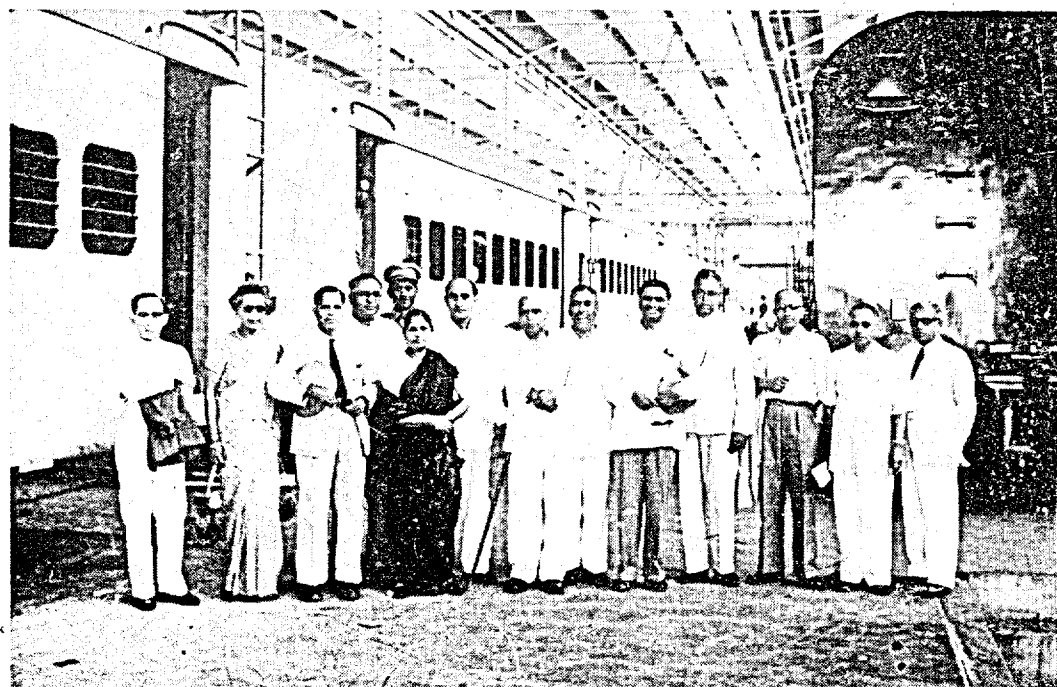
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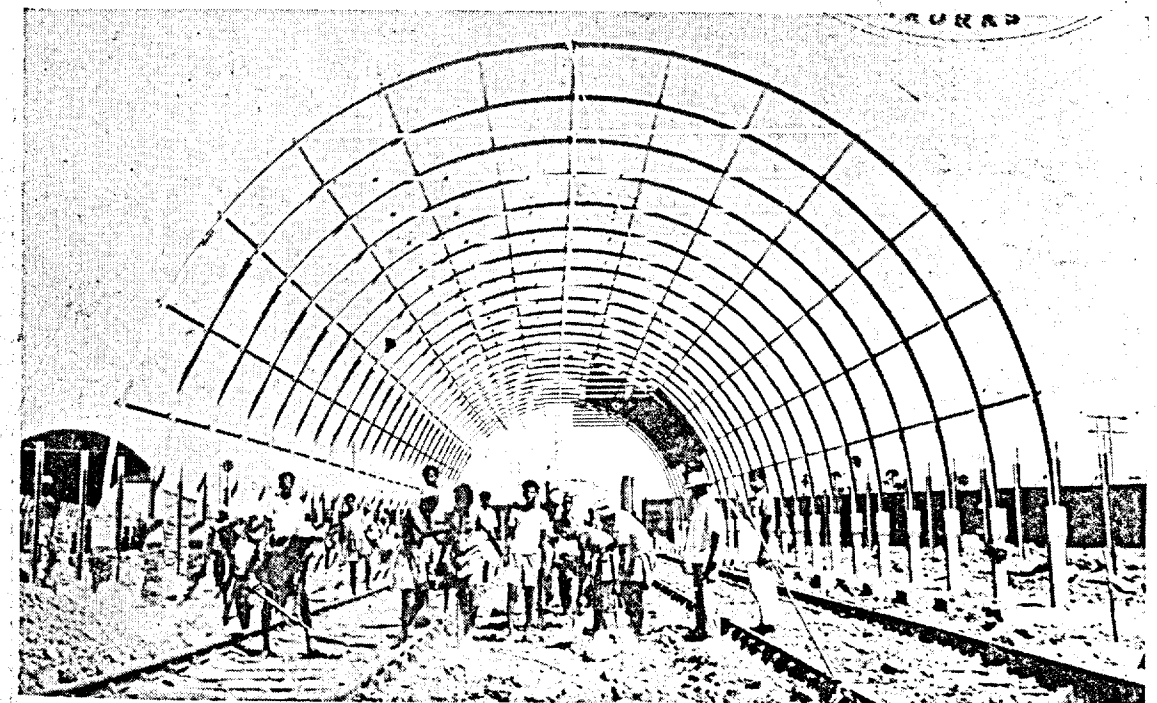
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RAILCOACH

VOL. I, No. 8



MAY 1957



A Nissen hut in the temporary furnishing factory taking shape

PRICE 25 NAYE PAISE

INDIAN RAILWAYS

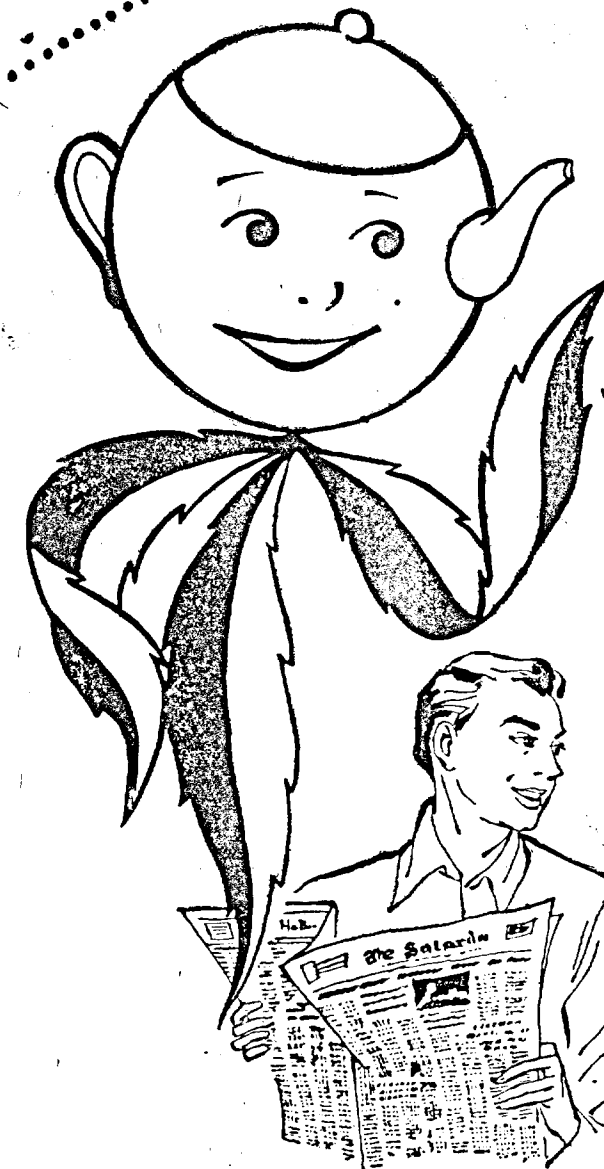
INTEGRAL COACH FACTORY (PERAMBUR), MADRAS-23 FURNISHING UNIT

The Chief Administrative Officer, Integral Coach Factory (Perambur), Madras 23, invites sealed Global tenders for the fabrication and supply of structural steel work for the workshops of the Furnishing Factory to be set up as an adjunct to the Integral Coach Factory (Perambur). Tender papers giving the detailed specifications, Conditions of Contract, etc., and the official design drawings to which the fabricated steel is required to be supplied can be obtained from the above office from 10th May 1957 on payment of Rs. 50 per set either in cash or through Money Order. This amount will not be refunded. The approximate tonnage of steelwork for the various shops will be as follows :

<u>Shop</u>	<u>Approximate Tonnage</u>
Assemb'y Shop	... 741
Finishing Shop	... 392
Carpentry, Timber Mill and Timber Ward	... 544
Fitting & Millwright Shop	... 436
Painting & Trimming Shop	... 214
Train Lighting Shop	... 214
Stores	... 268

Competitive alternative designs in Welded Steelwork, either of the Rigid frame type or with conventional roof trusses, will be considered. Similar competitive alternative designs in Reinforced Cement Concrete, either ordinary or Prestressed for such of the shops as will permit their use will also be considered. These designs must be in accordance with the current Indian Railway Standard Codes of Practice and full details of the design together with the drawings must be submitted along with the tender.

Tenders will be received up to 3 p.m. on 22nd July 1957 and will be opened the same day at 3-30 p.m. in the above office in the presence of such of those tenderers or their representatives who may wish to attend the opening.



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the morning
fresh
with tea***

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don't start the day with a grudge!
Relax, stretch out your hand for a
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given goodwill there is no human
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Regional National Savings Officer of your State.



RAILCOACH

(INTEGRAL COACH FACTORY MAGAZINE)

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All contributions must be clearly typed and doublespaced on one side of the paper only, and signed, not necessarily for publication, but as a guarantee of good faith.

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.

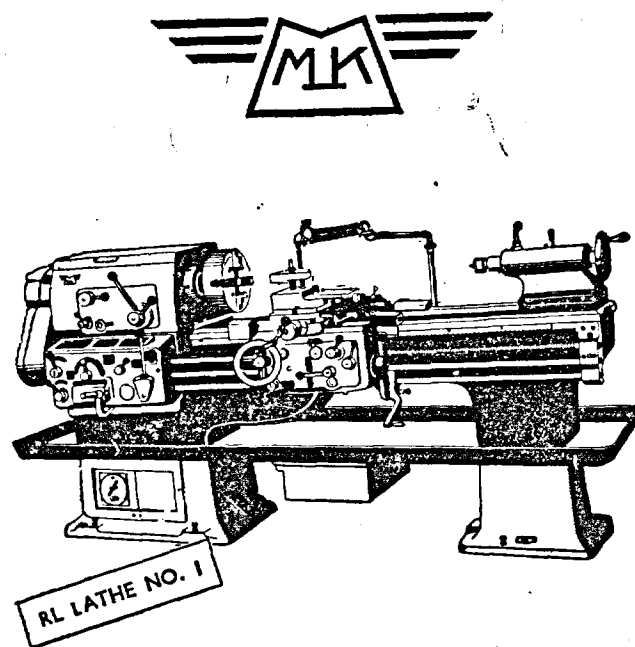
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FROM THE EDITOR'S DESK

April was a festive month for the Integral Coach Factory for, besides the Railway Week Celebrations, a number of important functions were held in that month. The Technical Training School figured prominently as, besides the Third Annual Day, which was celebrated during the Railway Week, the first and last functions to be held during April were also celebrations connected with it.

The long felt need in the Apprentices' Hostel was met when the Chief Administrative Officer inaugurated the Messing arrangements on the 8th April. As observed by Shri K. Sadagopan, the running of the mess will be an experiment in democracy as it is to be managed by the apprentices, for the apprentices.

The Third Annual Day of the Technical Training School was noteworthy in that it was a colourful function and the Integral Coach Factory and the Technical Training School evoked the admiration of Dr. A. Lakshmanaswami Mudaliar, eminent Educationist and Doctor of Medicine, who presided over the function.

The passing out ceremony of the VI batch of apprentices was equally colourful and the School was fortunate to have a Member of the Railway Board, in charge of Training, to preside over the day's function. The school has been commented upon very appreciatively and it is hoped that the staff connected with it will do their best to keep up the tradition and that the apprentices will derive full benefit from the training and live up to expectations.

One of the aims of the Railway Week is to focus as much public attention as possible on the Railways, their activities and achievements, etc. Our contact with the public is very limited, but this object of the Railway Week was well met by the Radio Talk entitled "Progress made by the Integral Coach Factory" by our Chief Administrative Officer on 13-4-57 and by the article "New Madras Factory to furnish Rail Coaches" by Shri K. Sadagopan in the special Supplement to "The Hindu", dated 16-4-57. Besides, arrangements had been made, to have our documentary film "For Better Travel" exhibited in the third class waiting halls of important stations on the Southern Railway and it is hoped that the public would have come to know the advantages of the integral coaches

and had a glimpse of the important role played by our staff in manufacturing such coaches.

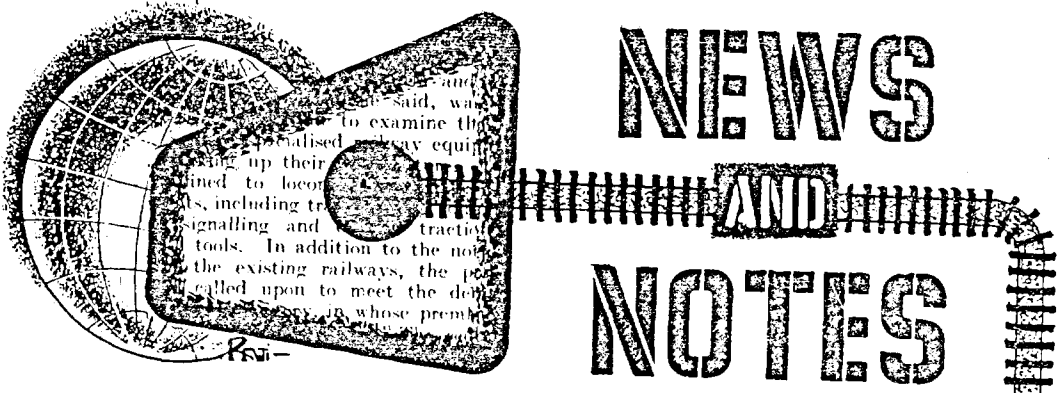
The Railway Week was celebrated in the traditional I.C.F. style. 11th was celebrated as the Children's Day and the Variety Entertainment put up by the children of the colony was greatly appreciated. The children of the staff colony were also taken round on an excursion to places of interest in the city of Madras. As many as 150 children took part in the excursion and it is very pleasing to note that the children enjoyed themselves thoroughly.

Yet another mile-stone of progress was reached when the 100th coach was launched by our Chief Administrative Officer on 12-4-57. The completion of the 100 coaches before the targeted date goes to prove that the 4 year period scheduled for reaching the maximum production of 350 coaches a year can be reduced considerably. It is hoped that the staff of the Integral Coach Factory, encouraged by the past achievements, will not only keep up the tempo but also aim at stepping it up further.

The function celebrated by the staff of the Stores depot on the 15th April brought to light that the staff of that department are not only "good house-keepers" but are also talented in other arts.

The other important object of the Railway Week Celebrations of getting together all grades of railwaymen to mix freely with one another, was well-served by the Community Dinner arranged on the 15th night. The Dinner, which was held on the colourfully lit lawns in front of the Apprentices' Hostel, was a fitting end to a week of celebrations. Members of the Integral Coach Factory family mixed freely with one another and enjoyed the function. Wholesome food was served and the scouts of the I.C.F. District richly deserve the credit for the excellent fare provided and the efficient service. The Dinner was a proof of the prevalence of the "One family spirit" and we pray that it should grow from strength to strength in the years to come.

MONTHLY OUT TURN				
Target figures			Actual figures	
	K.D. Coaches.	Indigenous Coaches.	K.D. Coaches.	Indigenous Coaches.
April 1957	9	3	5	8



Efficiency of the Railways

Shri Jagjivan Ram, Union Minister for Railways, exhorted railwaymen to maintain the maximum efficiency and punctuality in the national railways, while inaugurating the Railway Week at the Western Railway headquarters in Bombay. He said railway workers should always remember that service to customers came first. A nation could not make progress unless its transport system worked efficiently. In a country like India where the transport system was inadequate to meet her growing needs, it was incumbent on railwaymen to do everything to remove the transport bottleneck, he added.

Earlier, Shri M. Ganapathi, General Manager of the Western Railway, said that the Railway Week was being observed to focus the attention of the railway workers on the need for maximum efficiency, courtesy and punctuality in order to serve the public well.

Medical Aid to Railwaymen

Shri Jagjivan Ram, Union Minister for Railways, suggested that the Railway Board should investigate possibilities of securing some kind of co-ordination between the Railway hospitals and other hospitals in the country while considering schemes for expanding medical and health facilities for the Railway employees.

Shri Jagjivan Ram who was declaring open the new 130-bed Central Hospital of the Nor-

thern Railway in Delhi on April 13, said that such co-ordination was necessary in view of the limited resources available to the Ministry and the urgency of expanding medical facilities to railwaymen. He suggested that efforts should be made to secure reservation of beds for railwaymen in large public hospitals in out-stations so that special cases needing expert attention for which no facilities were available in existing railway hospitals could be treated locally without having to go to Central Railway Hospitals in distant places. The Ministry, he said, if necessary, consider giving financial assistance to public hospitals for providing such facilities.

The Minister also advised the Board to expedite schemes for providing increased medical facilities to railwaymen suffering from tuberculosis.

New Wagon-building Units proposed

The Railway Board has completed plans for a major expansion of India's 35-year old Railway wagon-building industry in order to raise its present installed capacity by about 80 per cent.

Whereas the present wagon-building industries are located in Calcutta and Kanpur, the new manufacturing units will be scattered over Delhi, Rajasthan, U.P., Saurashtra, Madras, Bihar and Bombay.

India has already the largest wagon-building industry in the whole of Asia, excluding Japan.

The Railway Board is making efforts to manufacture in India special types of wagons which are now being imported.

Transport of Coal

Mr. H. G. Balch, Member, American team of Surveying Engineers, who has come here to study the rail-cum-sea transportation of coal on the Southern Railway and through the ports in South India, had a discussion with the Chief Operating Superintendent and other officers of the Southern Railway on April 15.

Atomic-powered Locomotive

The Rio Grande Railway, which has been seeking to develop an atomic-powered locomotive, has been successful in using coal irradiated with atomic energy as diesel fuel.

Mr. Ray McBrien, head of the Railway's research laboratories, said that finely-ground coal had been treated with waste products from atomic reactors, mixed with oil and burned as fuel. The impact of the radiation, he said, was to reduce the coal to a dust so fine that it floated in the air like smoke. When mixed with oil it increased the energy content as diesel fuel.

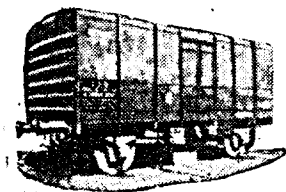
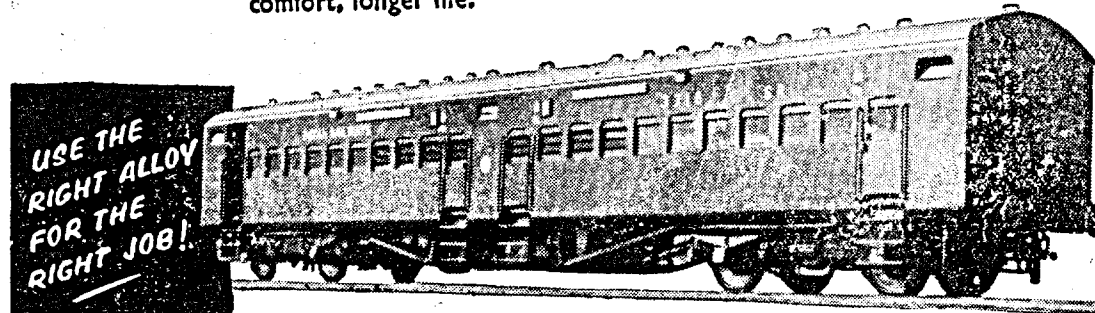
Madras Central Station Parking Area to be widened

Steps are being taken to relieve traffic congestion in the Madras Central Station yard. The inward parcel service office has been shifted to Basin Bridge and this has reduced considerably the congestion in the station.

It is proposed to widen the parking area in front of the station to about 12 feet westwards and shift the entrance gate further west. The Corporation and police authorities are being consulted in the matter.

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Railways Fully Geared to the Second Plan Task

BY

P. C. MUKERJEE

Chairman, Railway Board

The progress already made during the first year of the Second Plan warrants the conclusion that the Indian railways are fully geared to the heavy tasks of the Plan. The author, the country's top railway executive, says here: "Our objective is to go firmly ahead, with unflinching determination that we shall execute the task we have before us."

We have now completed the first of the five years of our second plan and it would perhaps be appropriate to take stock of the position. I will here try to give some idea of the picture as it appears to emerge, though of course it is difficult to say whether the same trend will continue in future.

We should, I feel, have no doubts in our minds that our objective is to go firmly ahead, with unflinching determination that we shall execute the task we have before us. It will not do if we either keep doubting our ability or waver over our difficulties. There is also another danger we should avoid, and that is to keep changing and chopping, unless this is absolutely imperative.

Our task is to set the railways in a position to carry all the traffic for quite some years to come. In the past we have not been completely successful. Although there may have been free and easy movement in some areas, this has not been the general rule everywhere. We, railwaymen, have been the first to appreciate that our carrying capacity must increase, if the expansion of the country's economy—increased industrial and agricultural production—is to be facilitated.

Perhaps it would not be out of place here to say a word about the first Railway Plan. Actu-



Shri P. C. Mukerjee

ally this Plan was not out till towards the end of the first five years and a substantial quantity of overage rolling stock had to be retained in service, inspite of an expenditure of Rs. 240.81 crores on purchase of new rolling stock. The reason was that very much more traffic had to be

carried in 1956 than in 1951, and this was possible only by the retention of extra overage stock in service.

Second Plan Objectives

Our objectives are: (a) to carry the increased production of heavy industries like coal, steel, cement and other commodities as far as possible; (b) to rehabilitate track, bridges and rolling stock in order to maintain these satisfactorily to carry without restrictions the load that would be offering; and (c) to try to become self-sufficient in railways' own equipment through greater manufacture in the country.

In order to achieve these objectives as far as possible, and yet be within the bounds of the total possible Plan outlay, the railways were given a reduced allotment of Rs. 1,125 crores and this covers:

- (a) the construction of about 842 miles of new railway lines mainly to serve the requirements of the coal and steel industries;
- (b) the renewal of about 8,000 miles of existing track which has fallen into arrears due to shortage of rails and sleepers;
- (c) the doubling of about 1,607 miles of track where the existing single line is already working to capacity and cannot possibly carry any more traffic which will be generated;
- (d) the conversion of about 265 miles of metre gauge lines into broad gauge; and
- (e) the electrification of about 1,343 route miles of existing railway lines where density of traffic is such that steam traction cannot possibly move all the traffic offering.

For this allotment of Rs. 1,125 crores, funds will be provided from the following sources: Rs. 750 crores from the general revenues, Rs. 225

crores from railway revenues by way of current appropriations to the depreciation reserve fund at the rate of Rs. 45 crores per year; plus a further sum of Rs. 150 crores from railway revenues.

As the electrification programme may take a little longer to be completed, we have gone in for 100 diesel locomotives, the idea being that these will be used in the areas where the traffic is heavy and, later on, as electrification is introduced, they will be shifted to other areas where meanwhile the traffic density increases and where there would be no option but to dieselise.

The rolling stock we propose to purchase in the second plan is: locomotives 2,364; coaching stock (in units) 11,575; and wagons (in 4-wheelers) 107,247.

There will be a large number of line capacity works such as major remodelling of important marshalling yards, improvement of goods facilities, opening of new crossing stations, provision of additional loops and extension of the length of existing loops, etc., and of course a great expansion in the railway workshops, sheds and sick lines to help to get the most out of the rolling stock.

I will now give some idea of the position at the end of 1956-57, the first year of the second plan.

First Year's Record

In the annual works programme for 1956-57, provision for an expenditure of Rs. 318 crores was made for the following items:—

Item	Anticipated cost (in crores of Rs.)
Rolling stock ...	142
Workshop, plant and machinery ...	36
Track renewals ...	19
Bridges ...	7
Line capacity works ...	38
Electrification ...	31

New lines ...	19
Staff quarters and staff welfare ...	12
Railway users' amenities ...	2
Other works ...	12
Total ...	318

Budget provision for the plan works, both in progress and the new works, for 1956-57 amounted to Rs. 193 crores—Rs. 88 crores for rolling stock and Rs. 105 crores for other works. In spite of severe handicaps of shortage of steel and cement, further aggravated by the Suez crisis, the railways expect to spend a total of Rs. 178 crores during the first plan year.

Our President, Dr. Rajendra Prasad, administering the oath of office to Shri Shah Nawaz Khan, Deputy Minister of Railways, at a ceremony held at Rashtrapati Bhavan, New Delhi, on the 17th April 1957



Actual deliveries of rolling stock up to end of January, 1957 and the anticipated deliveries during the full year are indicated below :—

	Actual deliveries to end of January 1957	Anticipated total deliveries to end of March 1957
Locomotives ...	516	624
Coaching stock (in units) ...	1,167	1,406
Wagons (in units) ...	27,132	31,759

New lines, surveys, doublings

A total of 2,800 miles of surveys was approved during the year, and the work in the field is actually in progress on about 2,000 miles.

Work on three new lines was completed during the course of the year and they were opened to traffic. These are the 37-mile metre gauge Ernakulam-Kottayam line on the Southern Railway, the 24-mile Champa-Korba broad gauge line on the South Eastern Railway and the 26-mile Fatehpur-Churu metre gauge line on the Western Railway.

In addition, the seven-mile line from Gandhidham to the new Kandla Port was opened for goods traffic only.

Work is in progress on about 556 miles of new railway lines, the important ones being Rourkela-Dumaro, Bhilai-Dhalli-Rajhara, Etah-Burhan, Indore-Dewas-Ujjain, Phusro-Muri, etc.

Work is also in progress on the Rohtak-Gohanna section of Northern Railway (20 miles), and will be started shortly on the Akbarpur-Tanda section (11 miles) of the same Railway.

Also in hand is the conversion of the Renigunta-Gudur metre gauge section of the Southern Railway into broad gauge, a total of 52 miles, at an estimated cost of Rs. 2 crores. It is expected that the work will be completed and opened to broad gauge traffic during the course of the year.

Work is in progress on 677 miles of doubling, of which about 350 miles lie on the South Eastern Railway alone. A few of the important sections where doubling work is in progress are : Delhi-Mathura, Saharanpur-Moradabad, Kanpur-Allahabad, Delhi-Rewari, Arkonam-Jalarpet, Bezwada-Gudur, Manchampur-Rourkela, Rajkarswan-Barajamda, and Rourkela-Durg.

Electrification in full swing

Work is in full swing on the Howrah-Bandel main line and Sherophuli-Tarakeswar sections of the Eastern Railway. It is planned that the first electric train will run in this area this year.

Tenders to cover all the sections proposed for electrification during the Second Five-Year Plan for Ac/Dc electric traction have been received and are under consideration. The works will be let out on a priority basis after a final decision is taken—as this is a matter of considerable importance these may first be settled before arriving at a decision.

A large number of workshops and loco sheds on the Indian Railways are being expanded and modernised to meet the maintenance requirements of the increased holdings of rolling stock.

As many as 67 goods yards are being remodelled including major remodelling of marshalling yards at Moghalsarai, Ondal, Tatanagar, etc. Work on providing modern marshalling yards at Bhilai and Rourkela is in progress. As many as 52 new crossing stations are being opened to increase the line capacity. At about 100 stations the length of existing loops is being increased and additional loops are also being provided, depending upon the requirements of individual stations.

Users' Amenities

Railway users' amenities are also receiving close attention. A large number of works

are in progress at various stations. About Rs. 3 crores were earmarked for such works during 1956-57. It is proposed to spend about the same amount during 1957-58.

Some of the amenities with approximate proposed expenditure during 1957-58 are : improved facilities in existing carriages, Rs. 60-91 lakhs; improved facilities on platforms, Rs. 75-66 lakhs; improved waiting and other facilities at stations, Rs. 39-09 lakhs; and better and improved water-supply facilities at stations, Rs. 21-86 lakhs.

Staff quarters and Amenities

During 1956-57, the railways provided a total Rs. 8-6 crores for staff quarters and amenities. Of this, about Rs. 97-84 lakhs was for providing new hospitals, health centres, maternity centres, and improving the facilities in existing ones and Rs. 6-85 crores for the construction of new quarters and improving existing ones, providing electric lighting in quarters and streets, etc.

During 1957-58, a total of Rs. 10-42 crores has been earmarked for such works, of which about Rs. 114-4 lakhs would be spent on providing new hospitals, health centres, etc., and improving the facilities in existing ones, while Rs. 8-09 crores would be spent on providing quarters, improving the existing ones, providing electric lighting etc.

Goods Traffic Up

It is significant that even up to November 1956 goods traffic had already recorded an increase of about 10-1 per cent over the figures for the corresponding period of 1955-56 as the following figures will bear out :

	1955-1956	1956-57
	Tons	Tons
Broad gauge ...	52,654,893	58,354,755
Metre gauge ...	14,305,130	15,388,063
Total ...	66,960,023	73,742,818

During 1955-56, the total tonnage of goods moved on the Indian railways was about 114 million tons which figure will increase to about 125 million tons during 1956-57 or an increase of about 9-65 per cent.

The Second Five-Year Plan proposals provide for the lifting of a total of at least 161 million tons of goods at the end of 1960-61.

The line capacity and other works proposed take a long time to develop. In the meantime, we are resorting to improved operational methods leading to better utilisation of wagons by running block trains and express goods services, running good trains to a time table, reducing the time allowed for loading and unloading of wagons, round the clock working in important transshipment yards, reducing the number of disabled rolling stock, etc., to keep pace with the increase in traffic.

March to self-sufficiency

The railways are fully alive to the importance of achieving self-sufficiency in the matter of stores, equipment and the personnel, and are actively working for this.

Early in 1956-57, the Railway Equipment Committee submitted its report to the Government. As a result of one of the recommendations, a nucleus Development Cell has been established in the Railway Board Office, and for the first time the development of exclusively railway items has been taken over by the Ministry of Railways.

One of the first steps taken by the cell was to augment the wagon-building and underframe manufacturing capacity in the country from about 20,000 wagons and 300 underframes per annum to an ultimate of about 36,000 wagons and 1,700 underframes per annum respectively.

Issue of licences has been recommended in favour of some of the prospective firms capable of doing the work. A number of development orders for rolling stock components as well as

electrical signalling items have also been placed during the year.

Loco and Coach Production

At the Chittaranjan Locomotive Works the rate of production has been increased to 14 WG. locomotives per month. The total number of steam locomotives manufactured during the year was 156, making a total of 504 WG locomotives since the workshop went into operation.

The monthly outturn of unfurnished coaches at the Integral Coach Factory at Perambur has been stepped up to 10 per month. During the year a total of about 85 shells will be manufactured, making a total of 97 shells since the Factory went into operation on October 2, 1955.

The question of opening a similar factory for the metre gauge coaches is being considered. A workshop to manufacture spare parts for

locomotives and to carry out major reconditioning of machine tools is being set up. Funds have been allotted for these two units in the Second Five-Year Plan.

Training of Staff

The railways will require a large number of technical personnel to handle the increased traffic and maintenance requirements of rolling stock, etc. It is proposed to spend over Rs. 3 crores in the second Plan period to increase the training facilities on the railways. It is also proposed to recruit untrained raw hands from the market and train them on the railways for the work they will be required to perform.

The requirements of the railways are of a specialised and technical nature which can only be imparted at the moment by the railways themselves as there are no outside facilities available. The staff are being trained in the

railway workshops, loco sheds and special training schools run by the railways.

Facilities are being expanded to train over 7,000 people of different categories at a time.

Ganga Bridge Project

Before the commencement of the second working season, all works in connection with the training of the river Ganga, 8 of the 15 main piers and all the four shore piers had already been completed. During the second season which commenced from October 1956 work had been in progress on the remaining 7 piers (all water piers), earthwork in the transshipment yard on the north bank and on the raising of the formation in the river area to its final rail-road level.

Linking of track in the transshipment yard and earthwork on the south bank have been taken in hand. It has been planned that by the end of June 1957 all piers will be completed.

The fabrication of steel girders has suffered a setback due to the non-receipt of steel from U.K. It is expected that during the course of the next four or five months most of the steel outstanding will be received and it will be possible to start erection of girders at the site during the next working season from November 1957.

Fully geared for the task

I have referred to developments during the current year in some detail merely to show that the railways are getting fully geared to the task of executing the large number of works necessary for the second plan.

Arrangements have been made for training the necessary personnel, but the greatest diffi-

culty appears to be the question of foreign exchange and the shortage of steel.

In order to help with foreign exchange the World Bank was approached for a loan and earlier this year the Bank sent over a team of experts from a firm of consulting engineers to study the working of the Indian railways' development schemes and to examine whether we are in a position to handle the task. These consultants are to report to the World Bank. It is not known at the moment whether they have done so.

Foreign Exchange and Steel

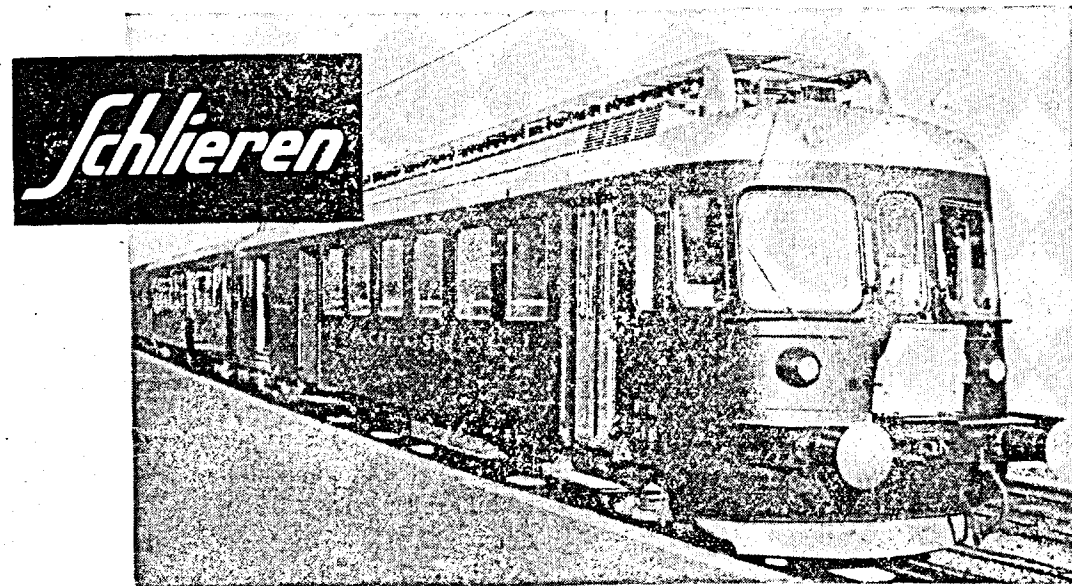
We are waiting for the World Bank decision as to the extent to which the foreign exchange required for the Railway Plan can be loaned to us.

Meanwhile, arrangements are being made for the procurement of steel that is essential for railways, such as track and track fittings. Procurement is to be handled by this Ministry, and we will try and get whatever is possible from the world market.

It is not known at what price level such procurement can be arranged, but at present we are aiming at completing the physical targets of the Rs. 1,125 crore Plan and to do this as early as possible.

As it is, we feel that this will not meet all the requirements of transport, but we are firmly resolved that there must be no delay in the execution of our Plan.

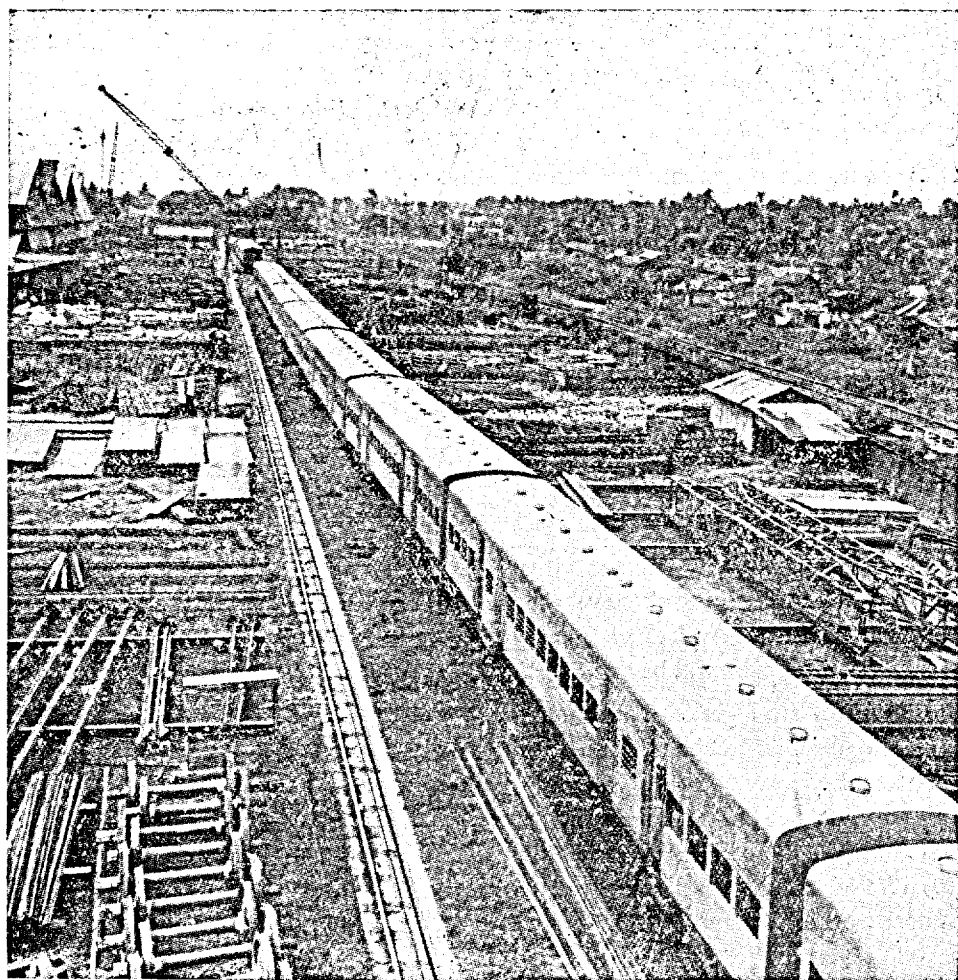
Everyone on the railways should be aware of the great responsibility that we are carrying and we are proud that we have been called upon to shoulder such a heavy task for our country.



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New Madras Factory to Furnish Rail Coaches

BY

Shri K. SADAGOPAN

Chief Administrative Officer, Integral Coach Factory

The Integral Coach factory at Perambur went into production in October 1955 to manufacture light-weight, all-steel passenger coach shells. Government has now sanctioned the setting up of a Furnishing Unit as an annexe to this Factory, so that coaches may go out finished in all respects. Estimated to cost Rs. 3.70 crores, the Unit will, as a result of advance planning, attain its maximum scheduled production in the very first year after completion. To begin with, only third class coaches will be furnished.

For the first time in India, broad gauge coach body shells of all-steel integral construction are being manufactured in the Integral Coach Factory, Perambur, near Madras.

The idea of establishing a coach manufacturing factory in India was mooted immediately after independence in order to attain self-sufficiency in coach production in India. The most up-to-date design of steel coach was selected as the future broad gauge standard. It was the one pioneered by Messrs. Swiss Car and Elevator Manufacturing Corporation Ltd., Zurich—an all-steel, all-welded and tubular stressed skin design. It incorporates special features of strength, anti-telescopic end construction and trough under-flooring. It is a light-weight coach offering the advantage of considerable saving in power and fuel.

Since the design and the technique of manufacture were new to our country, technical collaboration of the Swiss firm was obtained. On account of the standardisation of the steel shell, it was considered at the time that some timber coach-building capacity in railway workshops would be available for furnishing the steel shells. Hence, the Integral Coach Factory was designed, and has been established, for the production of steel shells only. The



Shri K. Sadagopan

shells were to be sent to different railway workshops to be furnished and put into commission by them. The Integral Coach Factory went into production in October 1955 and has so far turned out over 100 shells. Most of them have been sent for furnishing to the Central and Southern Railways.

Need for separate unit

In the context of the second plan requirements, it soon became clear that the capacity of the railway workshops would be required fully to meet the demands for additional coaches during the plan period. Again, increased rolling stock holdings would call for expansion of repair and maintenance facilities in railway workshops. Consequently, capacity would not be made available for the furnishing of steel shells, as had been originally envisaged.

It was, therefore, decided that the Integral Coach Factory itself should be provided with facilities to furnish completely the shells turned out by the Factory. Accordingly, an annexe to the Integral Coach Factory for providing additional shop accommodation and fabrication facilities to enable the full shell-manufacturing capacity of the Integral Coach Factory being covered for furnishing in all types of work has now been sanctioned by the Government. Although land is not available within the premises of the present Integral Coach Factory, a suitable site has been located adjacent to it. Provision has also been made for a small proportion of the staff to be housed in quarters there.

Thus, a compact factory has been planned with the shell-manufacturing unit on one side, the furnishing unit on the other, and the staff colonies between these two.

The cost of the furnishing unit is estimated at Rs. 3.69 crores.

'Uniflow' Production

The layout of the furnishing factory has been designed by the engineers to give a "uniflow" production. There will be seven shop sheds covering approximately 50,000 square feet. The furnishing shop consists of two sheds, 800 and 400 feet long respectively which will offer straight belts for the furnishing of a third class coach in the longer shop, and upper class coaches in the two shops together.

There will be two lines in each bay, with ample room in between, for complete sets of material required at each stage of the belt being stacked by the side, and also for the circulation and the handling of such material. The maximum possible amount of sub-assembly work will be done outside the shell in the subsidiary shops and brought ready for assembly on the stage. This will enable the shells to be completed in the shortest time possible and turned out for traffic use quickly. It will necessitate the manufacture of sub-assemblies to careful jigs and templates, which have been envisaged and provided for. The assembly, however, will allow adequate time to ensure a proper fitting of the sub-assemblies in the shell and a high standard of workmanship with the maximum economy of time.

The shops have been specially designed to give the maximum lighting, keeping in view the inherent adverse factor of the work having to be done inside the coach shells with natural light coming in only through the windows and doors.

Shop layout

The subsidiary shops and the stores supplying finished fittings have been located surrounding the assembly shops, giving short direct leads for the feeding of the assembly belt. A timber ward, a timber finishing mill and carpentry shop have been laid out in line to enable timber fabrication and assembly of seats, and partitions to move in one production flow.

The timber mill has been designed for finishing timber from rough cut scantlings of standard sizes so as to economise in providing the capital equipment and also take full advantage of the ample trade capacity available for the supply of rough cut scantlings. Two-ton overhead cranes will be provided only in the timber ward, and runways and hoists in the timber mill and carpentry shop will be provided to

enable easy handling of the light material dealt with in these shops. The fitting, train lighting and painting and upholstery shops are in one line alongside the assembly shops to the south and will feed direct into the respective stages of the assembly.

The raw material and the semi-finished fittings required to be completed in these shops will be directly supplied by rail and road connections into the southern part of the shops where they will be stored and issued as required for fabrication in the shops. A part of the fitting shop will be utilised for millwright and road transport maintenance.

On account of the large number of hand-operated tools that will be used in this factory, a maintenance section is envisaged in this shop. Train lighting batteries will be received direct, charged and sent into the assembly shops from the train lighting shop. The stores shed for holding stocks of finished and semi-finished fittings, such as locks, taps and pans is located by the side of the furnishing assembly shop on the north and is also provided with direct rail lead and road entry for the receipt of stores.

Provision has been made for the completed coaches being weighed in the normal movement from out of the assembly shop to the despatch lines where they will also be finally inspected and tested for the efficient vacuum braking and electrical equipment.

Because the factory will be dealing with timber and upholstery work involving a large fire risk, an efficient fire-fighting unit including a sprinklet fire protection system in the timber areas is envisaged. Provision has been made for the seasoning and treatment of timber for their preservation and long life. Stoving of paint work is also planned so as to give the finished internal painted surfaces a high serviceability and life. The feeding of the furnishing assembly shops will be over two traversers.

High standard of amenities

A really high standard of amenities for the worker is planned besides the design of the shop sheds which gives the maximum comfort by way of lighting and ventilation. A well-designed canteen will be provided adjacent to the main entrance. The works offices will be alongside facing the main Avadi Road.

The power required by the factory will be of the order of 5000 Kw. and will be supplied by the Madras Electricity Supply Department. It will be received at 11 Kv. and stepped down to 400 V for distribution in the shops and the staff colony.

The entry into the workshops for the shells will be by a rail siding about two miles in length from the Integral Coach Factory.

Production plans

In order to ensure a speedy execution of this project, it is planned to obtain quotations for the workshops structures, in steel or otherwise, from Indian and foreign structural engineering firms. The best design and delivery can then be taken advantage of. Machinery and plant equipment are proposed to be obtained by calling for global tenders so that the most advanced designs of equipment may be considered and obtained as quickly and economically as possible. It is expected that the project construction will be completed by 1960-61.

Another interesting feature of the project is that simultaneous development of production is also planned. Ordinarily such a project would require a period of three to four years to reach peak production after the construction is sufficiently advanced and the plant installed gets into stride. The skilled staff is trained and brought in gradually, and production developed accordingly.

In this case, however, actual furnishing work has already commenced in a small way in the accommodation available in the Integral

Coach Factory and the first completed coach was sent out on February 21, 1957. Some temporary sheds have also been sanctioned in which more furnishing work will be undertaken. The different workshop sheds of the furnishing factory will be brought into use progressively as each is completed. For instance, the saw mill, the stores, the fitting shop, will be completed on that order and brought into use as soon as equipped. The furnishing work in the temporary sheds will be increased gradually with the assistance of this capacity. The staff and technique will, therefore, be developed during the period of construction of the Factory.

It is proposed to furnish about 50 coaches in the first year, about 140 in the next year and 220 in the third year. Thus, as soon as the factory is completely constructed and machinery installed, the work will be switched into those shops fully; and the target production of 350 coaches per year is expected to be established during the first year itself.

Standard Third Class coach

The furnishing that has been taken in hand is of the standard third class coach, of which the country requires by far the largest number at present.

The design of these coaches is of the most up-to-date standard including all the amenities to be provided in this class of coach. The steel shell is well-insulated against heat and sound by sprayed asbestos of 1" and $\frac{1}{2}$ " thickness. The seats are laid out transversely giving a depth of 21" and knee-room of 21". A long bench of 6' 6" on one side seats four passengers while across the passage a single seat is provided against the side window.

There is one entrance at each end and two at the middle. Four lavatories have been provided per coach, one at each end and two in the middle between the entrances. Between the two middle lavatories is a passage from one part of the coach to the other with a door that

can be locked when necessary. The coach seats 80 passengers, 40 in each half.

Sixteen fans are provided per coach with the same number of lights, excluding the entrance lights and those in lavatories. There are also two night lights in each half of the coach which will burn during all the dark hours, while the normal lights and fans are controlled by switches operated by the passengers themselves.

The seats are contoured to give maximum comfort. One luggage rack of ample width is provided over each long seat. There is also a light luggage rack above this luggage rack and over the single seat along one side. The coach is finished in a pleasing light biscuit colour with the seats in light buff. Latrines are finished in mottled green giving a very pleasing appearance and serviceable finish.

The fittings in the lavatory, viz., latrine pans of Indian style, a fish tail flushing arrangement and a wash hand sink are of stainless steel which are hygienic and can easily be kept clean. A mirror and an aluminium shelf are provided while a separate *lotah* cock at a low level is fitted on the side wall. A towel rail is fitted conveniently. The lavatory door locks give an indication of occupancy from outside. The body side windows are fabricated from aluminium extrusions with spring loaded bolts enabling the windows to be kept open at different levels. The floor is finished with oxy-chloride cement, facilitating clean maintenance.

All these coaches have their own generator giving ample power for the electrical equipment. Embarkation lights are fitted outside the coach, two on either side, which automatically come on when the train slows into a station and remain on until the train leaves the station and picks up speed.

The entire coach when finished will weigh about 7 tons or 20 per cent less than the conventional timber body third class coach.

Railways in Parliament

Development of Railways

No procedural difficulties would be allowed to stand in the way of effecting a substantial improvement in the procurement of steel required by railways, observed Shri Shah Nawaz Khan, Deputy Minister for Railways in the Rajya Sabha on March 25.

He added that at the instance of the Ministry of Heavy Industries, the Ministry of Railways had decided to take over procurement of steel materials and an adequate organisation to tackle this question was being set up within the Ministry.

Replying to the debate on the Railway Budget he said that in view of the world-wide shortage of materials, drastic changes in the procurement procedure might be necessary. Matters like the establishment of direct contact with the producers of steel were under the consideration of the Ministry.

He said there could be no two opinions about the gravity of the position with regard to essential materials as no alternative or substitute for steel could be considered.

Referring to criticism of maintenance of bridges, Shri Khan said that on the trunk routes, the railway bridges were being built to main line standards permitting axle loads of 22.5 tons on the broad gauge, and they were fit to carry the heaviest locomotives in the country. The question whether the track and bridge standards should be increased was now the subject of very careful study, taking all relevant factors into consideration.

Shri Khan disclosed that the Central Standards Office was getting out a design for a broad gauge open-bogie wagon with higher capacity and the implications of running such wagons were under examination. The existing

screw couplings could take a maximum proof-load of 18 tons and this design, he said, had been strengthened to take a proof-load of 22 tons. For heavier loads, the couplings would have to be redesigned and this question was being studied further by the American team of surveying engineers.

Shri Khan said that it had been decided to reorganise research work and to place all work connected with research design and standardisation under one organisation. The Central Standards Office for Railways and the Railway Testing and Research Centre were being merged into one organisation called the Research, Design and Standardisation Organisation. The new organisation would be headed by an officer of the rank of General Manager and designated as Director-General. He would be assisted by three Directors.

In order to make a concerted drive for furtherance of research activities and to secure the participation of important laboratories, Shri Khan said, railway research work would hereafter be controlled by the Central Board of Railway Research, comprising the following: (1) the Chairman, Railway Board; (2) Member, Engineering; (3) two representatives to be nominated by the Council of Scientific and Industrial Research; and (4) Director-General, Research, Design and Standardisation Organisation, as secretary.

The Deputy Minister said that, to overcome the difficulty of getting suitable personnel in the research organisation, the pay scales of officers other than the Director-General and the Directors were now being regulated in such a manner as to afford necessary protection to officers in regard to the pay they would have otherwise drawn on their parent railways. The scales were devised in such a way that these would permit of the appointment of

suitable persons from outside the railways as well.

Shri Khan assured the House that, subject to the limitations of funds, the Ministry was trying to improve the situation in regard to overcrowding.

Railway Minister's winding up speech during Budget Discussions

Three or four alternative schemes in regard to pension and gratuity would be placed before railwaymen and they would be free to opt for any one of them.

The Railway Minister, Shri Jagjivan Ram, gave this promise while winding up discussions on his interim Railway Budget in the Lok Sabha on the 27th March, 1957. He disclosed that the Financial Commissioner of Railways was working on the schemes.

Shri Jagjivan Ram said that existing railway employees were free to continue under the present provident fund-cum-gratuity scheme, while future entrants could choose from alternative schemes. They could opt for a pension-cum-gratuity scheme or take half of the gratuity at the time of retirement and commute the other half as pension.

The Railway Minister also announced that he would set up a committee shortly to suggest avenues of promotion to Class IV railway employees. He assured the House that representatives of labour would be associated with the proposed committee.

The Railway Minister said that because of shortage of steel, the Railways would use more and more wooden sleepers. But there was a shortage of timber also. A team of officers would be sent abroad to explore the possibility of procuring iron and steel for the Railways.



Design Aspects of the Integral Light-weight Coaches—Part II

BY

K. SWARUP

Deputy Chief Mechanical Engineer I.C.F.

Special materials used

In the body shell, wherever steel sheeting of 3/32" or less is required such as for trough floor, side pillars, car lines, panel sheets, etc., "Armco" (Armco = American Rolling Mill Company) steel is used which has the following chemical composition and physical properties :

Chemical Composition

Carbon	...	...	0.027 %
Manganese	...	...	0.25 %
Phosphorus	...	...	0.013 %
Sulphur	...	...	0.016 %
Copper	...	...	0.2 - 0.25 %

Physical Properties

Maximum tensile stress	23 tons/sq. in.
Yield point	19 tons/sq. in.
Elongation	26 %

Due to the copper in the steel any surface rust that forms is dense and hard and not loose as for ordinary steel. Further, the copper

content produces a copper or a copper-oxide film beneath the rusting surface and thereby checks further corrosion. This action increases the resistance of the steel to atmospheric corrosion.

Armco Steel has also excellent welding properties and even lends itself well to painting work as paints adhere better to its surface than to ordinary steel.

A second metal of special interest is Aluminium which in an alloy form is used as extrusions for windows, and for door mouldings, etc. The sections of some of the more complicated extrusions are shown in Fig. 5.

For the imported coaches, a special alloy under the trade name "Anticorodal" was being used, which, however, is being substituted for Perambur-built coaches by "Indal" 51-S manufactured in the country. The chemical composition and mechanical properties of each of these is as under :

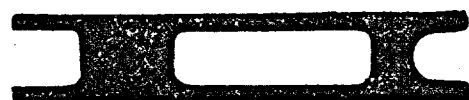
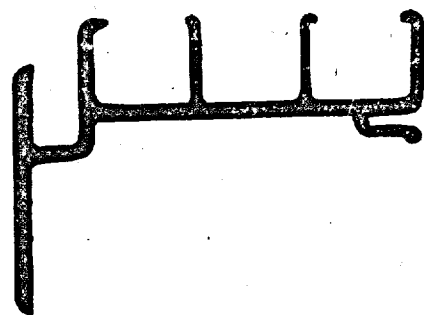
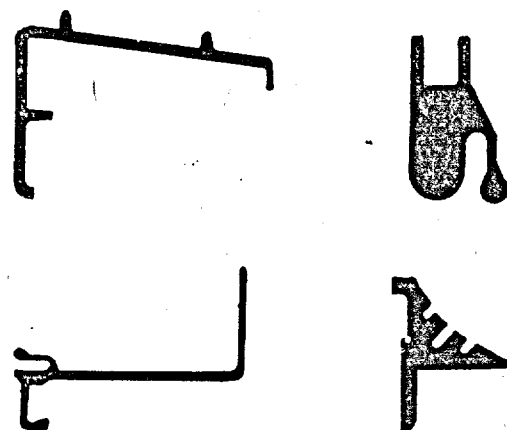
Chemical Composition

	Silicon	Magnesium	Manganese	Aluminium
Anticorodal	0.5—1.5 %	0.5—1.0 %	0.2—1.0 %	Balance.
Indal 51-S.	1 %	5/8 %	1 % Max.	Balance.

Mechanical Properties

	Yield point tons/sq. in.	Ultimate tensile strength tons/sq. in.	Elonga- tion %	Brinnell Hardness
Anticorodal B	17—24	20.2—26.2	12—20	57—76
51-S WP.	18	20	13	90

EXAMPLES OF ALUMINIUM EXTRUSIONS
fig 5



Aluminium alloy is also being used in the form of castings for Axle-box front and rear covers. In the imported coach the buffer casing was also an aluminium forging, but this has been dispensed with for coaches being built at Perambur where modified IRS buffers are to be substituted.

Special Operations

For the Integral Coach, welding in the form of electric arc hand welding, spot welding, seam welding, etc., are extensively used. Seam welding, however, is at present restricted to the welding together of panel sheets only while spot welding is gradually replacing normal hand welding. For instance, in the manufacture of the trough floor, hand electric arc welding was used for the earlier coaches, but this has now been replaced by spot welding. Similarly, whereas the covering panels were welded on to the framework of the end construction by hand welding in the imported coaches, in Perambur, spot welding is being resorted to for this purpose. Again, though the roof sheet will be hand welded on to the roof car lines by electric welding at present, it is anticipated that this also will be replaced by spot welding, for which purpose necessary provision has already been made in the design of the car lines.

It must be understood, however, that even in the present hand welding only strip welding is being done and not continuous welding as may be imagined. This strip welding has been found sufficient for the purpose and at the same time minimises the distortion that is inevitable with welding.

A word regarding this distortion may be of interest. Knowing from experience the amount of distortion that may be expected after welding, allowance is made preliminarily to counter-act the distortion. Thus in the fabrication of the bogie-longitudinals which are of I-Section (Fig. 6) the flanges are initially prepared by

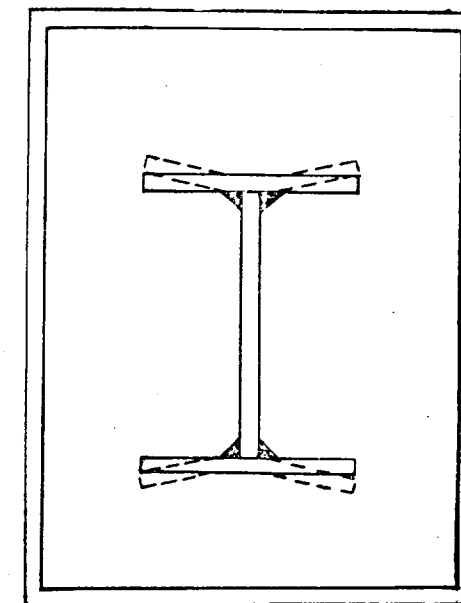


Figure 6

bending them slightly outwards, so that after welding, the contraction pulls them inwards resulting in straight flanges. Similarly, a contraction allowance is adopted on the lengths of certain components such as sole bars, trough floor, cant rail, etc., the usual allowance being 1 mm. per 1 metre.

Another operation of special interest is the levelling and tensioning through gas heating. The principle behind this operation is as follows : it is known that when a piece of metal is uniformly heated, it expands in all directions and, on cooling, resumes its original dimensions. If, on the other hand, any part of the metal is strongly heated locally and quickly, the heated part of the metal having no chance to expand uniformly, it forces layers of plastic metal to flow over the joining colder area, resulting in the heated area becoming slightly thinner and the adjoining areas becoming thicker without any visible expansion (Fig. 7). When the area is now cooled, the heated spot contracts and draws on the metal surrounding it, resulting in a general contraction of the whole surface. This, therefore, in effect, means that when steel

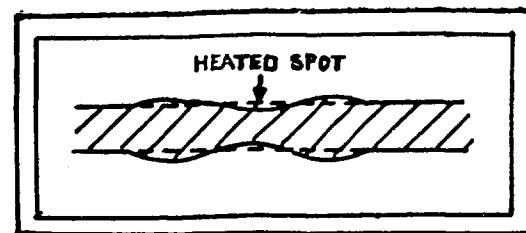


Figure 7

is strongly heated locally and at a rate which does not permit dissipation, and then allowed to cool, a greater contraction takes place than the apparent expansion. This principle is utilised in levelling items such as Bogie frames, sole bars, etc., where, if a bend is found, the area on the opposite side is heated to a cherry red

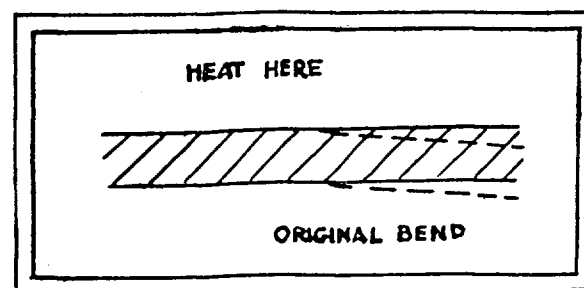


Figure 8

by gas heating. The resulting contraction on cooling then draws the bend out and the component is levelled (Fig. 8). Similarly, if any of the covering panel sheets such as for the sides, the roof, etc., are found to be bulging in places (indicating excess material) the area is heated by gas at several selected spots, and allowed to cool, which ultimately results in the excess metal being "absorbed" during the cooling process.

The same process was being adopted to provide the underframe with a double camber—another new feature of this coach. In the conventional coach, camber is measured over the extremes of the coach, whereas in the underframe of the Integral Coach a rise of $3/8" 1/2"$ over the pivot points is provided at the centre and again a rise of $1/8"$ at the ends (Fig. 9).

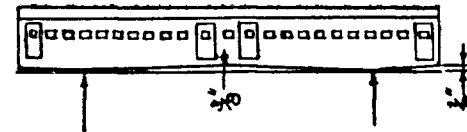


Figure 9

Sub-Assemblies of Special Interest

A totally new sub-assembly introduced in the coach is the Window Sub-Assembly. Built almost entirely of light alloy extrusions, this new sub-assembly is merely screwed into position on the coach, facilitating inter-changeability and simplifying attention during repairs. In the imported variety of coaches, tempered (non-splintering) glass was fitted as also Hera-balancers which did away with safety catches. These 2 items have, however, been eliminated in the present design for economy reasons.

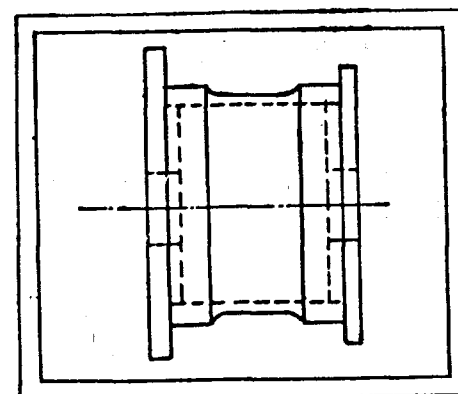


Figure 10

Another sub-assembly of interest is the buffer. In its present design, IRS buffers are being modified to incorporate a destruction tube as shown in the adjoining figure (Fig. 10). The object of this tube is to absorb any excess shock the buffer may receive, without damaging the headstock. Thus, while under normal working conditions the rubber springs of the buffer about 10 in-tons during their compression, any excess load upto 58 in-tons could be absorbed by the destruction tube through its plastic deformation.

Special Features of Painting

Being of stressed skin design where failure of a member through corrosion may have serious consequences on strength, considerable attention is paid to the painting of the body shell. As is known, the normal cause for paint failures is due to the paint which adheres to the metal not being able to expand and contract to the same extent as the metal itself during temperature variations, resulting in cracks and consequent corrosion.

This handicap is got over on the interior of the Integral Coach by the adoption of special Bituminous Paints which possess the property of remaining slightly plastic even when completely dry and therefore capable of taking up the expansion and contraction of the metal and thus ensuring the required protection.

On the exterior, on the other hand, since such plastic paint cannot obviously be used, the surface is initially cleaned thoroughly by grit blasting, using crushed angular abrasives, over which the usual primer followed by fillers and other coats is applied. With regard to the fillers, it may not be out of place to mention that due to welding and other sheet metal processes, a certain amount of unavoidable distortion takes place which can only be covered over with fillers. For the same reason 12" wide spattles and 10" rubbing blocks are being used, as these leave a more even surface than if smaller sizes are utilised. This process of wet flattening with rubbing blocks will at a later date be done by 12" electrically operated wet sanding machines which will be suitably balanced and suspended, so that there is no strain on the operator.

For the exterior of the roof, two coats of red lead zinc chromate are applied followed by the coats of aluminium. The use of aluminium for this purpose is already known in the country and, while having the disadvantage of becoming easily dirty, it has the property

of reflecting away heat and thus helping to reduce the temperature inside the coach.

Insulation

The spraying of Asbestos on the inside of the coach is again not a feature new to coaches in India, but mention is made here in regard to the difficult problem that faces the engineer in maintaining a comfortable temperature inside an all-metal coach. A thick insulation may prevent heat from entering the coach, but such as that that enters, is not easily dissipated when the outside temperature falls. In the Integral Coach, the balance has been struck after trials between these two factors and insulation is sprayed on to a thickness of 1" on the inside of the roof upto cant rail level below which a $1/2"$ thickness is adopted. It is totally avoided in the area directly below the window, since it is the surface over which rain water drains away.

A secondary purpose served by the asbestos insulation is the minimising of the drumming noise inherent in all all-metal light weight coaches.

Specialities of the bogie

Referred to generally as the Schlieren type bogie (Fig. 11), this item possesses several features new to our normal IRS standards.

The wheels which are of the disc type are 3' 0" dia. against our usual 3' 7" dia. The adoption of this non-standard wheel has been possible due to the lightweight body giving additional advantages such as reduction in unsprung weight, less wear and tear of track, etc.

The axle box spring arrangement consists of two 8-25" dia. helical springs located one on either side of the axle box, inside each of which is mounted a special arrangement. (Fig. 11). This arrangement serves as guide for the axles and at the same time damps the oscillations that are set up in the helical springs

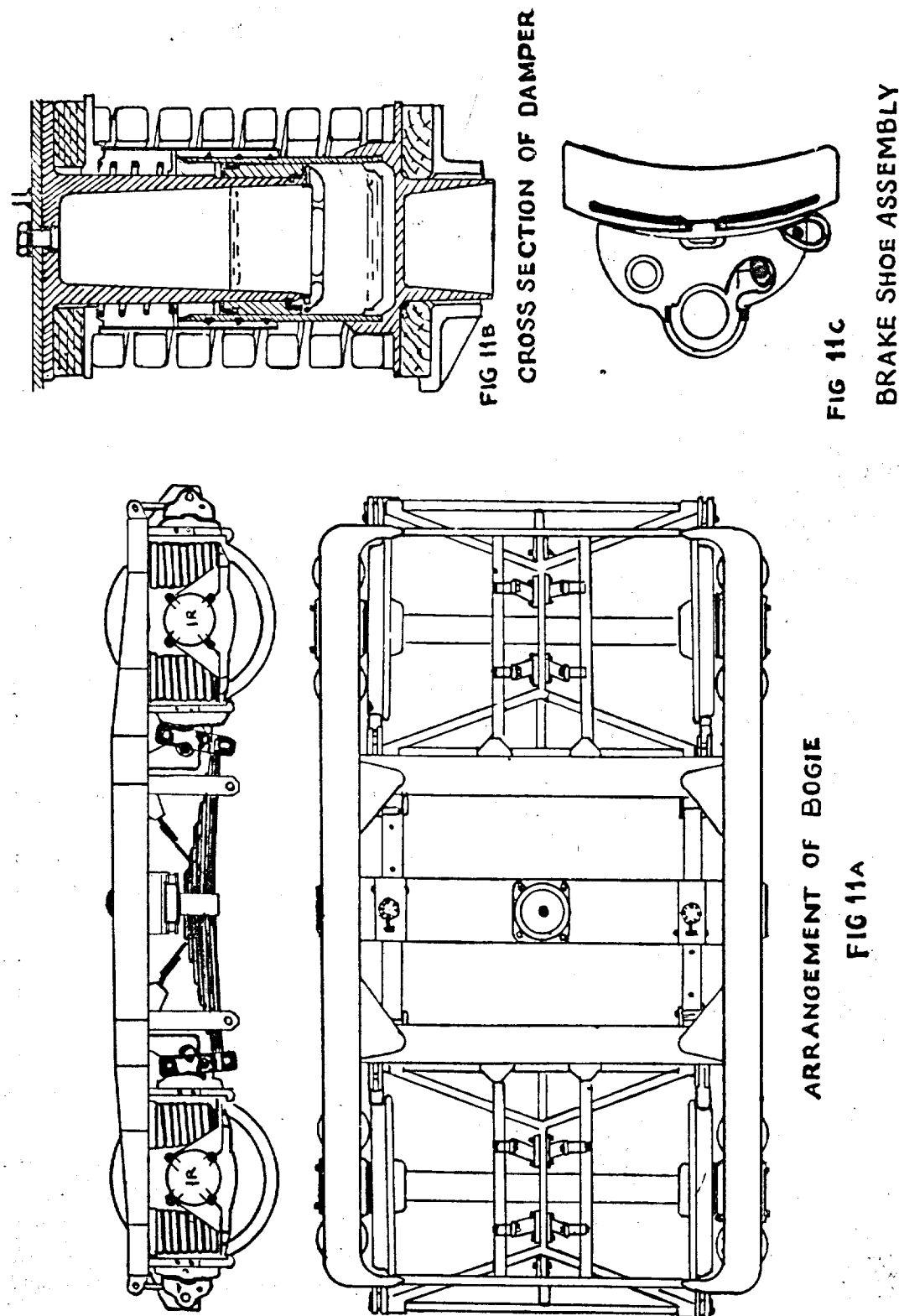


Figure 11

when the wheel passes over rail joints. It consists of a piston whose head is provided with nine $\frac{3}{16}$ " dia. holes, which works inside a cylinder containing oil with a viscosity of 57°E . at 68°F . The axle box guide has practically no clearance, the wear and tear is reduced to the very minimum and the alignment feature of the axle and wheels set is in the roller bearing itself. The action as a shock absorber is negligible since the rise and drop of a wheel is normally in the region of $\frac{3}{16}$ ", during which movement, there is an almost unrestricted passage of oil from one side of the piston to the other.



Figure 12

The body bolster is suspended on two 8 leaf laminated springs measuring 5' 5" from eye to eye unloaded. Its longitudinal position between the axle boxes permits the use of these long springs which is conducive to better riding. Besides, the spring plates are of a special section as shown in Fig. 12, possessing the following advantages :—

- (1) It provides a cavity along its entire length which is filled with a suitable grease and therefore provides an almost permanent lubrication.
- (2) The special section permits of a much higher working stress than a normal flat section and it has, therefore, an almost 30% greater working capacity than a corresponding rectangular section.
- (3) The number of leaves are less, resulting in a lighter spring.

Again, in the brake equipment, the brake shoes (Fig. 11) are not merely fitted to the brake hangers but are spring loaded and fitted into specially designed housings, in order that the brake shoes may bear evenly on the periphery

of the wheels and exert a uniform pressure. Consequently, too, the wear of the brake shoe is uniform and its life, therefore, extended.

Stability

A fear is always expressed with regard to the stability of lightweight coaches. Two cases of overturning were considered at the time of designing the present Integral Coach.

Case 1 : Overturning over the inner rail when the worst condition would be—

- (i) Coach standing on a curve with a super elevation of 5.5" and the inner rail sinking by 1" during rainy season;
- (ii) A wind pressure of 40 lbs./sq. ft. acting from the outside of the curve 40' above ground level and with the windows closed on the windward side ;
- (iii) Passenger and luggage load of 210 lbs. per passenger acting only over the inner rail ;
- (iv) Shifting of the C.G. of the coach towards the inner rail due to maximum sideplay in the axle box.

Case 2 : Overturning over the outer rail under the following worst conditions :—

- (i) Coach running at a speed of 60 m. p. h. over a 30° curve with a super-elevation of 6.5".
- (ii) A wind pressure of 40 lbs./sq. ft. acting from the inside of the curve at a height of 40' above ground level and with all windows closed on the windward side.
- (iii) Passenger plus luggage load of 210 lb. per passenger.

Taking moments over the inner rail in the Case 1 and over the outer rail in the Case 2, it is found that with all these conditions present at the same time, there is still a factor of safety of 1.2 in the first case and of 1.74 in the second.

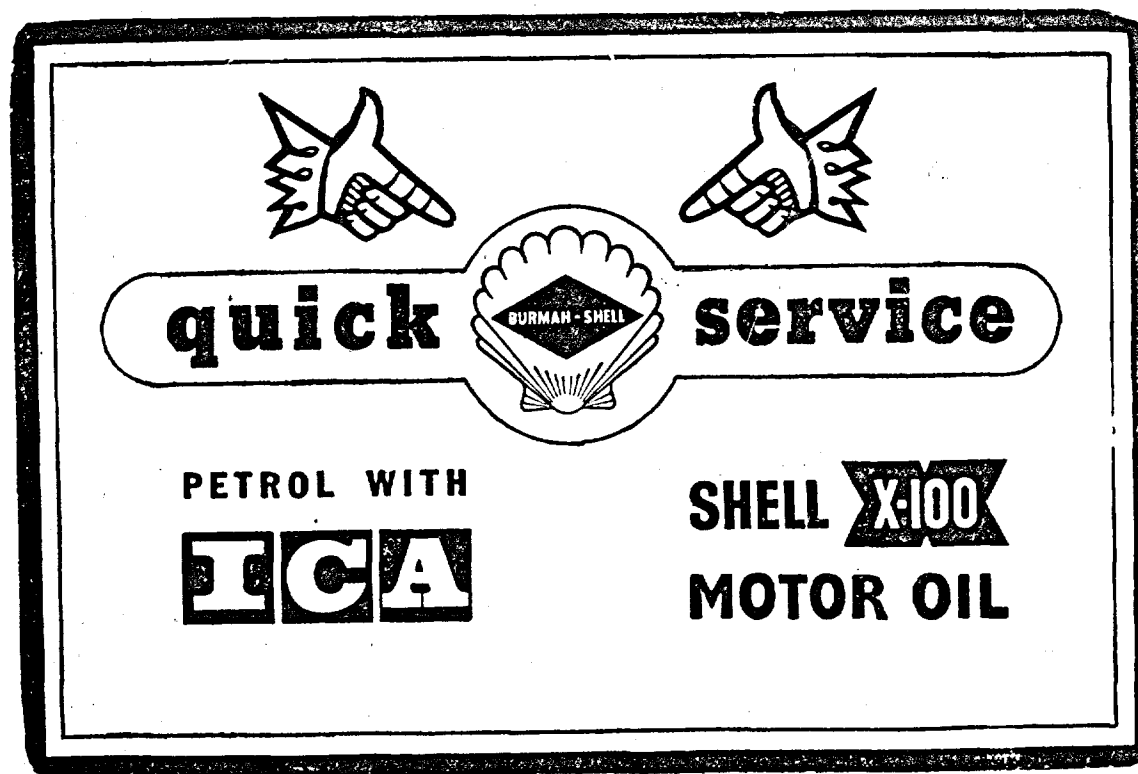
Riding qualities of the coach

The riding qualities of this coach were tested by the Railway Testing and Research Centre in 1953 with the help of Hallade Track Recorders adapted for vehicle riding sensitivity and a special test car equipped with one 12 channel and one 9 channel magnetic oscillographs complete with amplifiers, oscillators and photographic film recorders. Test results indicate that this type of coach rides better than the all metal coach in service. The ride index of the Schlieren coach as given by the comfort curves developed by Meister and other authorities is between the level of "almost good" and "satisfactory"

while the riding qualities of the all metal coach in service lie between "satisfactory" and "just satisfactory." The integral type of coach is, therefore, more comfortable than the conventional type of carriage. The integral coach is also safer than the conventional coach, because of the following factors :—

- (i) It is made of steel.
- (ii) It has anti-telescopic ends.

From the above it will be observed that every care has been taken in the design of the coach to make it safer for travel and provide maximum comfort to the passengers.



Launching of Hundredth Coach in I.C.F.

The 100th coach to be built in the Integral Coach Factory since inauguration of production was launched on April 12, 1957, at the Factory premises at a ceremonial function arranged as part of the celebrations of the Railway Week.

Addressing the large gathering of employees of the Factory and invitees, Shri K. Swarup, Deputy Chief Mechanical Engineer, said :—

"We are meeting today, on an auspicious day, when I.C.F. has the privilege of turning out the 100th coach. It was only on the 22nd February 1956 that the first 7 coaches were turned out, and within the course of the last 14 months it has been possible to achieve the distinction of being in a position to turn out the 100th coach from the I.C.F.—an achievement of which everyone in this factory can justly be proud.

"The work on the I.C.F. construction was started only in September 1952 and within a record period of less than 5 years, we have not only completed the entire project but have grown in stature from day to day to the extent that we are now turning out 15 coaches a month—an out-turn of about Rs. 20 lakhs a month. It won't be very long before we turn out the 500th and the 1000th coach.

"According to the original targets laid down in the agreement we were required to turn out 8 coaches by March 1956 and 49 by March 1957, that is, a total of 57 coaches by March 1957. These targets were subsequently revised and the target requirements upto March 1957 are 84 coaches. Against these we have, as mentioned above, turned out 100 coaches, that is, an increase of 16 coaches over the scheduled target. We have also completed today the 20th Coach body shell entirely

built in the factory but for a few proprietary items. This was required to be completed by September 1957 but we have done it today, 52 months before the target date. These results have been possible because of the co-operation that is existing at all levels and the full collaboration of the Swiss team. The goading and drive of our charming and ever-smiling Chief Administrative Officer have been in no small measure responsible for our giving our best to achieve the above results.

"We Indian Engineers have worked with a missionary zeal to achieve the above results in spite of very great handicaps, and I have to thank all my team members for their co-operation at all times.

"We will very soon be called upon to take more and more responsibilities, as the Swiss Engineers and experts leave us. We should therefore organise ourselves and develop a team spirit which would enable us to bear the burden that will come upon us by the end of this year. We, Mechanical Engineers, have a big part to play in the industrialisation of our country and I have no doubt that we will do everything possible to fulfil the confidence that our people may place in us in connection with the industrialisation of the country.

"I must thank our CAO (R) for his unparalleled leadership in getting our Coach Factory recognised as the best laid-out and equipped factory in India and his ever-lasting interest in the welfare and prosperity of every member of the I.C.F. family.

"On behalf of the Indian team I have to thank our Swiss counterparts who have tried to teach us the 'Know-how' in building this new integral type of light-weight coach. I have

to also thank all the other Departments for their ready co-operation and assistance.

“Before I conclude, I would like all my brother-workmen to take a pledge on this auspicious occasion that each one will dedicate himself to the service of the country and take his due share in this exciting and thrilling adventure of building up I.C.F., and the Welfare State, as enshrined in our Constitution.

“Jai Hind.”

Mr. W. Braem, Chief Technical Manager, paid a tribute to the efficiency of the staff and their spirit of co-operation which had enabled them to go ahead of schedule. He exhorted them to put in the best effort to reach the target set before them.

Shri K. Sadagopan addressing the gathering said :—

“Friends,

“We have today assembled to launch our 100th coach from our works as part of our

celebrations of the Railway Week which is being celebrated by the Railways all over India from the 10th to the 16th of this month. As you all know, we are celebrating the Railway Week to focus the public attention of the Indian Railways, their achievements, and their problems. We are also celebrating the Railway Week so that we Railwaymen should have an opportunity of getting together in a spirit of brotherly affection. I am, therefore, particularly grateful for this opportunity of being with you in such an atmosphere of cordiality, goodwill and affection.

“Shri Swarup has given you some arresting facts and figures regarding our achievements in the production line and I shall not weary you dwelling upon them again.

“We have now completed 18 months since the inauguration of production in our Factory by the Prime Minister. It would be no doubt a source of great satisfaction to us and a matter of pride to look back on this period of 18 months

and take stock of what we have been able to achieve. In the first production year, i.e., from October 1955 to September 1956, our original target as fixed by the Government, was only 20 coaches, as Government anticipated that we should be encountering a lot of teething troubles. But what has been our achievement? We have been able not only to double this target of 20 coaches, which we promised to Government in early 1956, but we were able to turn out actually 43 coaches.

“Examining the progress that we have achieved in terms of our official years from April 1956 to March 1957, the original target was 49 coaches. The target as increased by the Government early in 1956 at the time of the presentation of the Railway Budget to the Parliament was 72, but the actual achievement for this year, as you all know, has been a total of 88, an overall increase of 22% over even the increased targetted production. However, a point of very great importance which I should like particularly to bring to notice in this connection, is regarding the number of all-indigenous I.C.F. manufactured coaches that we have produced in our works. Our programme, according to the increased targets fixed by Government, was only 7 indigenous coaches upto March 1957. But it is a matter of supreme satisfaction to one and all of us that we have been able actually to manufacture in the I.C.F. not only 7 coaches but 17 coaches—an increase of about 150% over the original target.

“May I, on this occasion, recall to you the 14th day of August 1956, when our revered President of India, Shri Rajendra Prasad, visited our Factory, and turned out of the assembly line the first all-indigenous I.C.F. built coach. This first coach, as you all know, was programmed to be turned out only by January 1957, and I would most heartily and sincerely like to offer my warmest congratulations to all of you on having got out this first

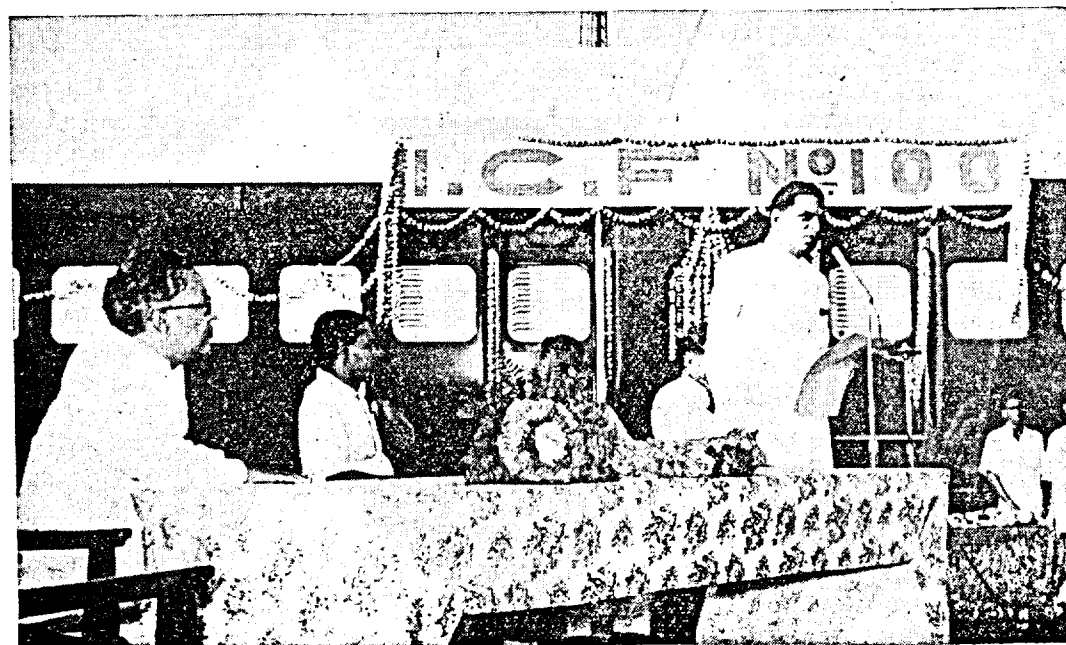
indigenous I.C.F. built coach, 4 to 5 months ahead of the programmed date.

“During the current financial year, 1957-58, we propose to step up the progress, notwithstanding the fact that we have suffered some set-backs, owing to the delay in the receipt of raw material from abroad, arising from the Suez situation, over which possibly nobody could have any control. This year also, we propose to do better than the increased targets.

“While on the one hand the I.C.F. shell production is forging ahead in the true I.C.F. style, on the other hand, we are also planning and expanding our activities. It has long been our dream that we should make the I.C.F. a complete industrial unit and that we should not be content only with the turning out of coach shells, but we should also produce fully furnished coaches, ready for service to our patrons, the travelling public. This ambition of ours is being fulfilled, and I am very happy to be able to say that the Government of India have been most sympathetic in this matter and have sanctioned our Furnishing Project at an estimated cost of Rs. 3.69 crores. We are now vigorously bending all our energies to the planning of this annexe. Pending the establishment of the permanent Furnishing Factory, we have also taken in hand the construction of temporary sheds for getting on with the furnishing of as many I.C.F. shells as possible and building up our organisation which will move to the Furnishing Factory as soon as this is completed, and take over the entire furnishing work of our I.C.F. shells.

“We have also started in a small way, the furnishing of our shells in one bay in our J Shop. In a short space of 4 months, our Stores Organisation and Mechanical Organisation on the Furnishing Side have executed a grand job and we have so far completed satisfactorily 3 coaches. The tempo is mounting up day by day, and I am sure before long we shall have

The Chief Administrative Officer, Shri K. Sadagopan addressing the gathering.





Shri K. Sadagopan launching the 100th Coach

built up capacity for furnishing 3 to 5 coaches every month.

"Experts from all over the World, eminent Engineers, and Heads of Governments have visited this Factory, and you all know that they have all been unanimous in their high appreciation of our organisation, our methods of work, the enthusiasm, keenness and efficiency with which you are all dedicating yourselves to build up this Factory and make it a model unit in every sense of the term. His Excellency, Mr. Chou-En-Lai, was pleased to call this the "Pride of Asia", and it shall be our duty to continue to live up to it. If we have been able to achieve production in excess of our targets, it is entirely due to the contribution that you have all made with such unflinching devotion

and determination. You have not lost even a minute on the shop floor in acquiring the 'know-how,' in getting on with the production, and in this matter, I may say with justifiable pride, that you have set an example to other industries in the country. The way in which you are working on the shop floor with such concentration, has won the admiration of all who have come and visited us. I must pay my humble tribute of appreciation and gratitude to the most cordial and whole-hearted co-operation that our Swiss friends have been giving to us in achieving these rather impressive results. They have been most sincere and they have spared no effort in disseminating the 'know-how' to our Indian brothers, and the result is, now we are feeling more and more confident

that we would be able to get on almost on our own, on the same glorious lines on which we had started, and do better and still better in the future production years.

"One word more and I shall have done on this occasion of the Railway Week ; I beg in all humility to address a brief appeal to the travelling public. As you all know, we are turning out a III Class coach, which is much superior to the III Class coaches that have been in commission so far, in the matter of interior fittings. We are giving our patrons a coach excellently finished, with electric fans, comfortable seats, large luggage racks and hygienically good bath rooms. When in January last our Prime Minister addressed the General Managers of Indian Railways, he referred in

passing to the subject of cleanliness, and said that it was an anomaly that people in this country were personally very clean, but socially most unclean. This, he observed, was evident on Railway premises and in the trains. He proceeded further to refer in appreciative terms, to the high standard of cleanliness prevalent on the Chinese Railways. So, on this occasion, may I appeal to the public, who will be using the coaches that we place at their service, to regard them as their own property, use them carefully, and to give them human treatment, with an eye to the maintenance of the highest possible standard of cleanliness."

The Chief Administrative Officer, Shri K. Sadagopan, then launched the 100th coach formally.

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Third Annual Day Celebrations of the Technical Training School

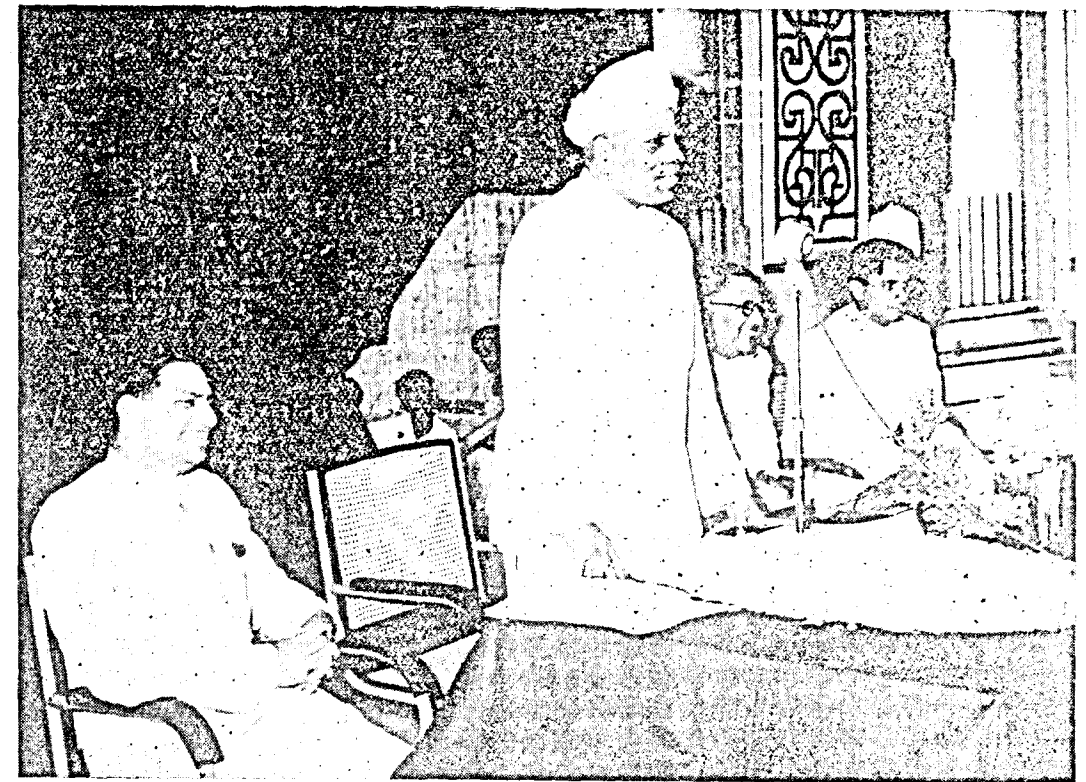
The third Annual Day Celebrations of the Technical Training School attached to our factory were conducted with great eclat on the 13th April, 1957, under the distinguished Presidentship of Dr. A. Lakshmanaswami Mudaliar, Vice-Chancellor, Madras University. Staff and officers of the factory, apprentices at the school and distinguished invitees were present on the occasion.

Shri K. Sadagopan, Chief Administrative Officer, I.C.F., welcoming the gathering, briefly traced the progress of the factory. He said that the time limit set for reaching the maximum target of 350 coaches per year had already been reduced from five to four years and the progress made so far had given rise to the hope of reducing the period still further. Practically, all the skilled staff working in the factory were those

who had taken their training in the Technical Training School, and so the credit for the most heartening and encouraging production performance now being obtained in the factory, went to this institution, he said.

Shri K. Santhanam, Principal, in his report said that this school which was established for giving six months' basic training was opened in March 1954, and had been training and turning out one batch of apprentices in May and November each year. So far, five batches of trade apprentices totalling 814 had completed basic training, he said. During 1956-57, many of their plans were achieved, including the completion of the school building and the apprentices' hostel. A number of additional training commitments were taken on. A beginning was made in the direction of extending

Dr. A. Lakshmanaswami Mudaliar giving away the National Plan certificates purchased by the Instructional and office staff as a part of the savings scheme, to Shri L. Subramaniam



The Vice-Chancellor of the Madras University dwelt in his speech on technical education

the facilities available here for training welder apprentices to other Railways also, and five welder apprentices of Northern Railway started to get training here from November 1956. More persons would be undergoing training from the next session onwards, he added.

Schemes for training boys to qualify themselves as electric fitters, plumbers and carpenters required for the furnishing factory, had been drawn up and would be introduced shortly, the Principal said. A special training scheme of two years' duration had been drawn up to train engineering graduates to fill up vacancies likely to arise in the intermediate stage of the supervisory set-up. This scheme also was to be introduced shortly. Facilities were made available to the apprentices to invest in National Plan Certificates or similar savings certificates, the Principal said.

Dr. Lakshmanaswami Mudaliar distributed the prizes and the National Plan Certificates to the students.

Addressing the gathering, Dr. Mudaliar said that as one connected with technical education, he had always been impressed by the fact that it was no use, if there were only engineering graduates at the high level. There should also be skilled men at every stage right up to the high levels like a chain. It was not that he did not value the prowess and skill of engineering graduates, but there were many things that they could not do, he said. So, in all engineering studies, there must be various grades of courses.

Referring to the work done by the Regional Committee in the South for technical education, Dr. Mudaliar said that the Committee had been able to start many institutions through private benefactions. If they wanted cottage industries

to develop, he said this was the type of education that was needed. These technically trained persons should go and settle in villages, he added. They had been fortunate in getting some Swiss friends, who, he said, were highly trained men. They might talk of nationalisation, Indian enterprise and things of that sort, but no country could be independent of other nations. Internationalisation had come to stay, and they must be citizens of this

country as well as of the world, Dr. Mudaliar said. From many points of view, this training school had set an example, which was well worth copying, he said.

Shri K. Swarup, Deputy Chief Mechanical Engineer, proposed a vote of thanks.

A programme of variety entertainment was gone through later.

Demonstration of Muscle control by Shri R. Angamuthu—fitter apprentice.



Sixth Batch of Apprentices complete Basic Training

The passing out ceremony of the VI Batch of Apprentices was celebrated with eclat under the presidentship of Shri S. L. Visvanadhan, Additional Member (Staff), Railway Board, on the lawns in front of the Technical School building.

An open air stage had been rigged up at the main entrance to the Technical School and the audience were seated on the lawn in front of it. The entire premises were gaily decorated. Besides Shri K. Sadagopan, the Chief Administrative Officer, a number of officers and staff attended the function and the gathering was about 500 strong.

On arrival Shri S. L. Visvanadhan was received by the Principal and conducted to his table.

Tea was then served and the audience were treated to light recorded music.

The function began with an invocation song by Shri A. Sebastian, a Welder Apprentice of the Sixth Batch.

Shri K. Santhanam, Principal, Technical School whilst welcoming the gathering said that the VI Batch of apprentices had been extremely fortunate right from the time they started their basic training in that they started their basic training under the best of conditions and that they were rounding it off with an address by a reputed Engineer and the Member of Railway Board in charge of training. He thanked the Chief Guest, who represented the Railway Board, on behalf of the Apprentices for having provided the very best of conditions for the apprentices to live in and learn their trade. He then furnished figures regarding the composition and performance of the VI Batch and read out the names of those who topped the lists in basic training.

The Apprentices who topped the lists were :

General proficiency :

Fitters ... Shri K. R. Krishnamurthy.
Machinists Shri N. Vidyadharan
Welders ... Shri E. V. Batcha

Proficiency in Practical Training

Fitters ... Shri P. Balakrishnan
Machinists Shri N. Vidyadharan
Welders ... Shri E. V. Batcha.

Proficiency in Theoretical Subjects

Shri K. R. Krishnamurthy.

He ended his speech requesting the Chief Administrative Officer to say a few words.

The Chief Administrative Officer, Shri K. Sadagopan, rising amidst cheers, said that he was very happy to welcome the VI Batch of Apprentices to the Factory. He, after highly commending the work put in by the previous batches of apprentices, who were in the Factory and whose work had been appreciated by all the visitors to the Factory, advised the VI Batch of Apprentices that they should also work hard and rise up to the same high standard attained by their predecessors.

The Chief Guest Shri S. L. Visvanadhan then spoke :—

"I am extremely grateful to Mr. Sadagopan, who has given me this opportunity of meeting you all. It is indeed a pleasure and I really do not know whether the fortune is yours or mine in having had this opportunity. You know the Railways are heading for only one class and after the little I have seen of the Integral Coach Factory, I think there is no hesitation on my part to say that you have established the correctness of this theory that there is room



Shri S. L. Visvanadhan, Additional Member, Railway Board went round and made enquiries of the apprentices assembled

for only one class on the Indian Railways, i.e., the top class. This is one of the very best Technical Training Institutions which I have seen and the more I saw it the more I am enamoured of it. So much so, I have taken complete details with the hope that I will be able to establish similar Technical Training Institutions for bringing forth good craftsmen for the Indian Railways, which the Railways require very badly.

"Now I understand this is an occasion where you are proceeding from theory into practice. You have had a sort of basic theoretical training to equip yourselves, to learn your trade with the basic knowledge of the trade. Now it is a vital moment, because as you know, an ounce of practice is much better than a ton of theory. You will be able to know of the hurdles you have to cross, and I am sure with the guidance that you are going to get from your

Instructors and Principal, you will be able to overcome all the hurdles and become first class craftsmen. I need not say much about the importance of the practical aspects because it must have already been put into your ears all these days. I would like to take this opportunity of saying a few more things in addition for your benefit.

"Most of you must be new-comers to the Railways; perhaps some of you are sons of Railwaymen. I must tell you that the Railway is one large family and I welcome you in joining this large family of Railwaymen. The success of any enterprise and particularly in the Railways depends upon team effort. There is no use everyone pulling in his own direction. Unless all of you join, you cannot make a success of the job. I would, therefore, like to request everyone of you to develop that team spirit. Subordinate your selfish interests and see that

you live along with your brethren in a way in which things move very smoothly as in a well-conducted family. It is a very large family indeed and I can assure you that once you become a railwayman, you are always a railwayman. On joining this family of railwaymen, you have got some obligations also. It is not all milk and honey. You have got to abide by certain codes of conduct, the primary one of which is a sense of duty. I know everyone of you has got plenty of rights. We are trying to realise and see that the path of railwaymen is made as smooth as possible. I would, therefore, request you not to think of your rights alone but also your duties. In the Second Five-year Plan we have embarked on a very big programme and the success or failure of the programme, I can assure you, depends entirely on the technical personnel and the part they play and it is, therefore, up to you, as young men, who have joined the family of railwaymen,

to play up and see that you do your duties as much as possible. On our part, I can assure you, that we will look after your interests as best as possible.

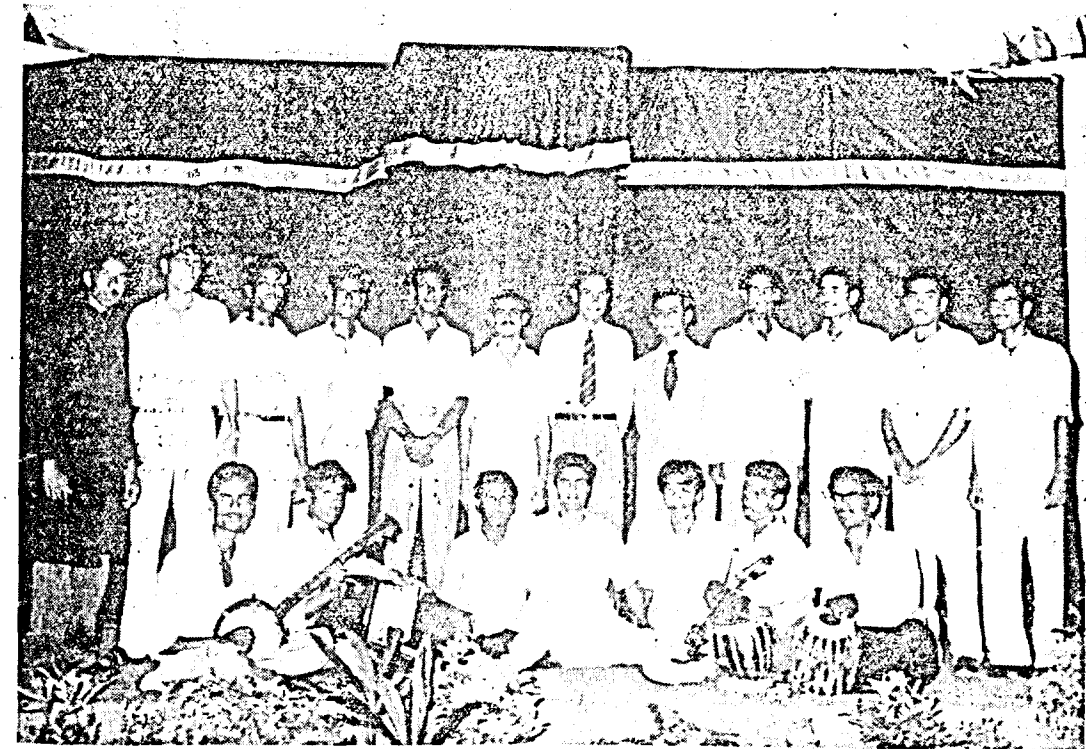
"I would not like to detain you very long, as I see you have got a Variety Entertainment to entertain all of you and I would, therefore, like to end up and wish you all success in the various trades that you have chosen."

Shri Leslie George Rodrigues, Fitter Apprentice of the VI Batch, proposed a vote of thanks.

Then a Variety Entertainment put up by the VI Batch apprentices was gone through. The items put up were greatly appreciated and the act entitled 'Self-defence' drew repeated cheers from the audience.

The function came to a close with the singing of the National Anthem.

Photo of those who took part in the variety entertainment at the conclusion of the function



News from Switzerland

Inauguration of a Unique Museum in Switzerland

(Published through the kind courtesy of the
Consulate-General for Switzerland)

Wohlenschwil, Switzerland :—An exceptional Museum is to open on April 6th at the Wohlenschwil village church dating back to the Peasants' Wars (1653). It will be called the "Swiss Peasants Museum" and is intended to be the abode of an exhibition of models, plans and pictures of all types of farmhouses existing in Switzerland and of particular interest to historians, architects and students of rural life. Furthermore there are collections of items of peasant culture, such as old ceramics, costumes, arms and banners of the Peasants' Wars, as well as products of the local strawbraiding industry and other handicrafts. Wooden statues and religious paintings are on exhibit in the choir of the church.

Swiss Industries Fair in Basel

Basel, Switzerland :—The Swiss Industries Fair has always had an eminent place among Europe's great industrial fairs. From 27th April through May 7th 1957, it is to be held for the 41st time. Some 2,300 exhibitors are going to spread out what may well be called an outstanding over-all view of Switzerland's industrial creation on an area of 1,331,500 sq. ft. The exhibition will comprise 17 sections such as Applied Arts and Ceramics; Business and Office; Paper, Industrial Art, Publicity; Textiles and Clothing; Shoes and Leatherware; Watches; Furniture; Sports, Recreation and Music; Chemistry, Pharmaceuticals, Cosmetics, Domestic Science; Electricity; Gas, Water,

Heating; Machinery, Industrial Accessories; Transport; Construction; Food. In this all-round view of Swiss productivity traditional export industries are particularly prominent. Their large-scale representation confers international significance on the National Fair of Basel. This is evident from the 30,000 foreign guests from 30 European and 56 overseas countries visiting last year's fair. The most important export branches foreseen for 1957 are: Watches (including 160 exhibitors from the watch-making industry and 60 firms from allied trades such as electric clocks, large-size clocks, jewellery, etc.); textiles (together with the special shows "Creation" and "Madame et Monsieur"); Textile Machinery, General Machinery and Electric Industry, whereas Machine-Tools will again be on exhibition in 1958 only.

The famous Alpine-Highway of the St. Gotthard was opened for the first time in many years as early as March 21st on the very day the calendar marks as the beginning of Spring. The entire pass can be made by motor-cars without snow-chains.

A new type of escalator labelled "sensational" has just come off the assembling lines at a Swiss firm specializing in the manufacture of lifts and electric motors. It solves a decade-old problem which so far has caused headaches even in the U.S.A., by coming out with a built-in electric motor, which virtually eliminates all installation difficulties.

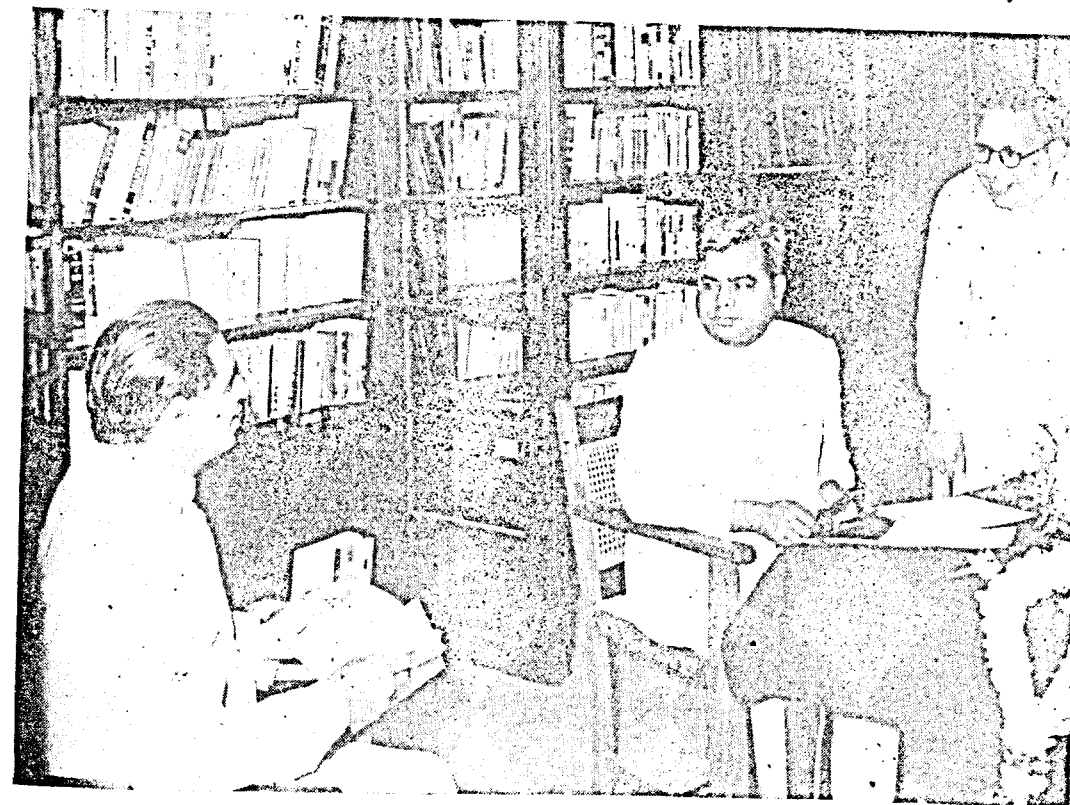
Inauguration of Library at the Integral Coach Factory Institute

The long felt need for a library was fulfilled with the inauguration of the Library Section of the I.C.F. Institute on 26-4-57 by Shri S. L. Visvanadhan, Additional Member (Staff), Railway Board. A formal function was got up that evening in the Institute premises for the purpose. The function was well attended by officers and staff of the Integral Coach Factory.

Shri A. V. Sugavaneswaran, Vice-President of the Institute, welcomed the guests on behalf of the Managing Committee and said that it was indeed fortunate that the Additional Member (Staff) should inaugurate the Library Section of the Institute and bless it, especially

as this was a welfare amenity. He dwelt on how the idea of starting a Library in the Institute emanated, and how the funds for the purchase of books were obtained by way of a grant from the Railway Board through the good offices of our Chief Administrative Officer. He explained that even though many difficulties had to be faced in the matter of selection of books by the Sub-Committee, the work was indeed very fascinating. He said that all categories of books in English like Fiction, History, Biography, Autobiography, Philosophy, Religion, Literature, Travel, etc., besides books in Regional languages viz., Tamil, Telugu, Hindi and Malayalam, found a place in the Library.

Shri S. L. Visvanadhan, Additional Member, Railway Board, inaugurated the Institute Library



He then requested Shri S. L. Visvanadhan to open the Library.

Shri S. L. Visvanadhan in his address said that the invitation to inaugurate the Library had been a pleasant surprise on him, since usually, as Additional Member (Staff) he had mostly to attend meetings with Labour Unions. He humorously remarked that the only books with which he was conversant were the Establishment Code and the General Code. He expressed the hope that the members could make the best use of the Library and be immensely benefited. He laid stress on the scheme of Adult Literacy Classes which had been sponsored by the Railway Board, and advised that a start could be made to conduct Adult Literacy Classes in this Factory also so that staff employed in such a big production unit, most of whom are generally semi-literate or illiterate, may fall in line with the literate staff and put the Library to good use.

At the conclusion of his speech Shri S. L. Visvanadhan pressed a button, when the screen on the stage parted and almirahs full of books came into view.

Shri K. Sadagopan, our Chief Administrative Officer, then addressed the gathering. He

stated that it was a great honour and a great privilege that, despite his multifarious engagements, Shri Visvanadhan was good enough to accede to our request to perform the inauguration ceremony that evening. He said that he hoped the Library would prove to be a source of entertainment and instruction and that the members would try to make the maximum use of the Library. He said that the Board might consider a formula in the matter of allotment of adequate funds. The per capita rate of funds from the S.B.F. would give to small production units like the I.C.F., only a very insignificant amount as compared with the Zonal Railways, where the per capita rate would work to a good amount. He suggested that the Board might consider the allotment of a minimum of twenty to thirty thousand rupees to a production unit like the I.C.F. Concluding his speech, he said that the members of the Institute were grateful to Shri Visvanadhan for having kindly consented to perform the opening ceremony of the Institute Library.

With a vote of thanks by Shri K. Swarup, President of the Institute and our Dy. Chief Mechanical Engineer, the function came to a close.

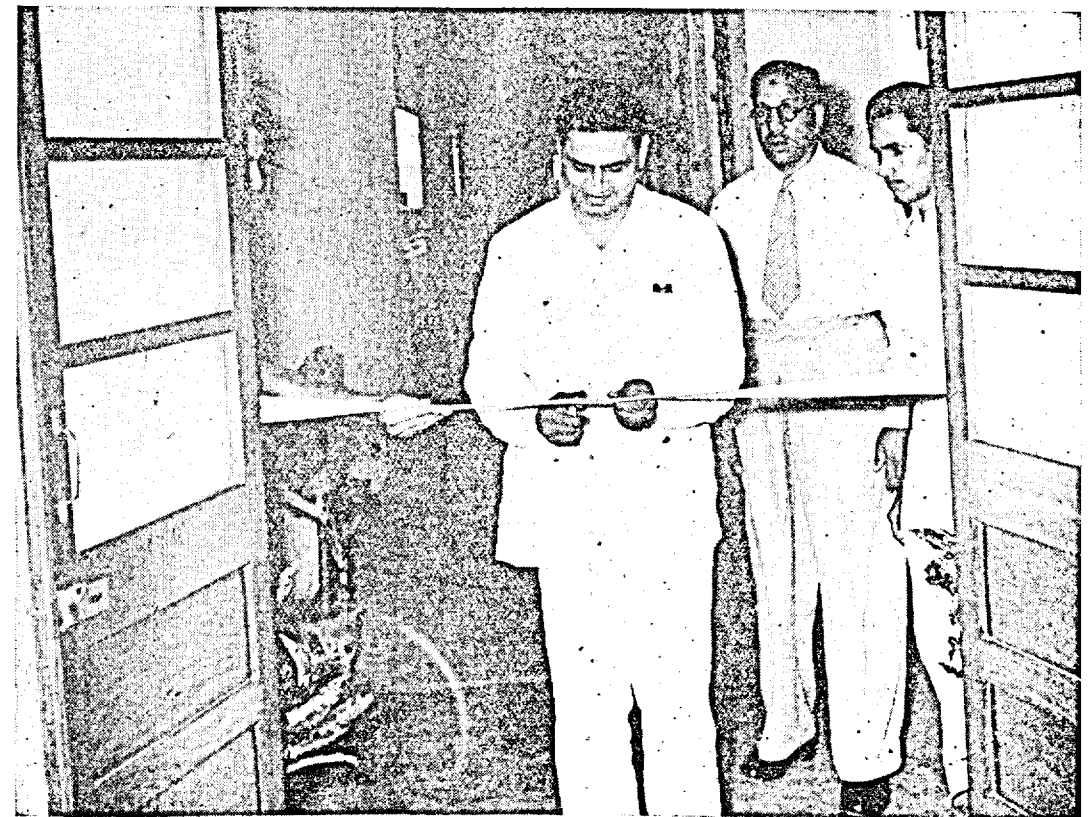
Vegetarian Mess inaugurated in the Apprentices' Hostel

The long felt need for messing arrangements in the Apprentices' Hostel was met when Shri K. Sadagopan, the Chief Administrative Officer, inaugurated the Vegetarian Mess on the 8th April, 1957. The function was held at 5-15 p.m. and the guests, who included Officers and staff of the I.C.F. and authorities of the Perambur Hospital, were seated on the tastefully decorated lawn in front of the Apprentices' Hostel.

The Chief Administrative Officer on arrival was received by Shri K. Santhanam, Principal, Technical School and the Hostel Superintendent, Members of the Mess Committee and the Mess Manager were introduced to him.

Shri K. Santhanam in a brief speech welcomed the guests and gave an account of the events leading up to the starting of the Mess. He mentioned that the management of the Mess will be by a Committee composed of apprentices, selected by the hostel residents, under the guidance of the Hostel Superintendent. He thanked the administration for making available adequate funds for the purchase of high class vessels in adequate number. He mentioned that the authorities of the Perambur Railway Hospital had shown extreme kindness in treating the sick apprentices, as on quite a few occasions they had taken apprentices as in-patients

Shri K. Sadagopan Cutting the Tape to declare open the Mess





Shri K. Sadagopan inspecting the utensils purchased for use in the Mess

even though beds were not available in the hospital. He referred to the co-operation extended and the assistance given by the Electrical, Engineering and Protective Force departments in making the function a success and concluded with requesting the Chief Administrative Officer to declare the Mess open and bless the venture.

The Chief Administrative Officer thanked the Principal and the Members of the Mess Committee for having invited him to declare the Mess open and mentioned that there had been some unavoidable delay in starting the Mess and that he was happy that the messing arrangements had at last been started. He paid a tribute to the ability of the Hostel Superintendent, Shri Abbas, and said that he expected to see good results, with him in charge of the Hostel. Turning to the apprentices he said :—

“I need hardly tell you, my young friends, what a glorious opportunity you have in living together as members of a common family under one and the same shelter, living minute after minute in the company of one another. This will give you a very great education in community living and I would appeal to each and everyone of you, my dear young friends, to make the best use of the opportunity you have. This is a great training for you in your social life, in community living, in developing the spirit of mutual help, the spirit of co-operation and *esprit de corps*. This will stand you in excellent stead in the life that is before you and I am glad to note that you are going to run the Mess by electing your own representatives. This is indeed a very good idea. It will give you practice in real democracy. You

must be able to elect worthy representatives, who will do credit to us all by honest, sincere, efficient and economical management.

“I offer my warmest good wishes and cordial greetings to you all on this occasion and I have no doubt that you will keep the banner flying and work this Mess in the usual I.C.F. standard.”

Shri K. Sadagopan then declared the messing arrangements open.

The Chief Administrative Officer and the guests inspected the vessels purchased and the messing arrangements made and later returned to the lawns for partaking in the light refreshments, the first set of items to be prepared in the Mess. The quality of the dishes served was good and it was a good beginning for the newly started Mess.

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Kumari Ganga in Delhi

Kumari Ganga, whose Bharata Natya Arangtral took place in Madras last November, was invited by the Ministry of Railways to participate in the Railway Week Celebrations held at the Northern Railway Stadium, New Delhi. She gave dance recitals on the 11th and 12th evenings before an audience more than 5,000 strong. The classical recitals were very well received by the cosmopolitan audience of New Delhi and were repeatedly cheered.

In appreciation of her performance, the Ministry of Railways presented her with a silver medal. Shrimathi M. K. Kaul, wife of the General Manager of the Northern Railway,

gave the artiste an attractive prize as a token of her appreciation.

Commenting upon the performance Shri M. K. Kaul, General Manager, in his letter to Shri K. Sadagopan, said :—

“Kumari Ganga gave an excellent performance and it came as a complete surprise to a vast number of spectators that amongst Railwaymen, we have such gifted artistes.”

Under the auspices of the South India Club, New Delhi, Kumari Ganga treated a packed South Indian audience to a recital of Bharata Natyam in the Club's auditorium at Reading

Kumari Ganga, talented daughter of Shri S. G. Iyer, Executive Engineer, I. C. F.



Visitors to the I.C.F.

A team of Japanese Engineers, who were in India in connection with exploring ways of co-operating with our country in her industrialisation programme, visited the I.C.F. on the 28th March 1957. They were shown round the Technical Training School and the workshops of the Factory. At the conclusion of their visit they expressed the view that this factory was one of the best coach plants in the world.

A Sudanese Trade Delegation consisting of seven members, drawn from business organisations and Government Departments in Sudan, visited the Integral Coach Factory on the 17th April 1957. They were taken round the Technical Training School, the Workers' Colony and the Workshops. They were greatly impressed by the work being done in the factory and, at the conclusion of their visit, remarked that the I.C.F. was a great Project of vital interest to progressive India.

(continued from page 48)

Road, New Delhi. The programme was marked by grace, tempo and eloquence throughout and was of the conventional type. The artiste was at her best.

Shri Sivashanmugam Pillai, Member, U.P.S.C who presided over the function eulogised the artiste for her good dance and for having grasped and brought out so well the intricacies of the art. He also presented a gold medal to Kumari Ganga on behalf of the members of the South India Club. The *Times of India*, Delhi, reported on the recital as follows :—

“To celebrate the Tamil New Year's Day, the South India Club, New Delhi,

put on boards a dance recital by Kumari Ganga on Saturday evening. This promising young dancer from Madras gave several Bharata Natyam items, of which “Azhagar Kuravanji” (a composition of Soolamangalam Sitarama Bhagavathar) was the best. Considering her tender age, the recital was good and showed sound training in the art. The musical accompaniment was really good.”

We offer our congratulations to the artiste, her tutor and to her proud parents and wish her a very bright future.

Railway Week Celebrations by the Staff and Officers of the I.C.F. Stores Depot

On 15-4-57 the staff and officers of the I.C.F. Depot celebrated the 'Railway Week.' The function was held at 5 p.m. in the spacious quadrangular to the south of 'G' Shop. The space was decorated with festoons, and instructive and informative posters spotlighted the steps to be taken to prevent accidents in the Depot and preserving of materials by the use of appropriate protectives. The function which was well attended by Stores Officers of Southern Railway and representatives from the trade and officers of other departments, was presided over by the Chief Administrative Officer.

Shri K. Ranga Rao, A.C.O.S., while welcoming the guests referred to the spirit of co-operation existing among the staff of the Depot and also the co-operation that was existing between the Stores and other departments, in particular the Mechanical Department, due to which it had been possible to produce more coaches than scheduled by the Government. He also paid a tribute to the assistance rendered by the Swiss Collaborators.

A variety entertainment was gone through beginning with a demonstration on muscle control by Shri R. S. Manirajan, of the Depot. The Fancy Dress Competition which followed was greatly appreciated. The first prize was won by Shri C. B. Padmanabhan and the second prize by Shri G. Jayaraman, both khalasis of the Stores Department. The last item of the entertainment was a humorous skit, entitled 'Interview with the Service Commission.'

The Depot Officer Mr. Jayaraman traced the origin of the Railway Week Celebrations in the Depot. He mentioned how a casual remark of the Deputy Controller of Stores was the cause for celebrating the 'Railway Week' for the first

time. He expressed the hope that the celebration of the 'Railway Week' would become a habit with the Depot and that they would be trying to do better and better every year, not only in providing entertainment and other items in lighter vein but also in turning out better work. Mr. Jayaraman mentioned that this year the Depot was able to add more items like sports and variety entertainment and also instituted a Rolling Shield for the Best Ward, to be awarded during the 'Railway Week' celebrations. He expressed his gratitude to the Chief Administrative Officer for the readiness with which the latter came forward to meet the cost of the Shield. He also expressed his thanks to Messrs. A. V. Sugavaneswaran, D. R. R. Sastri and Kukillaiya who acted as judges and then went round the Wards.

Mr. Jayaraman congratulated the staff and the Ward Keeper of 'B' Ward for having won the Shield. He also made a reference to the problem of stacking and handling the materials in a Depot. While the I.C.F. Depot had had the good fortune of having the benefit of Swiss Collaborators' experience and knowledge in this field, he said that it was his feeling that there was still room for improvement. He suggested that firms dealing in Handling Equipment should come forward to study the problems of the Stores Depots not only in the I.C.F. but also on the Railways so that they could give the fruits of their specialized knowledge to improve the stacking and handling methods in the Depots. In fact, he said, this mode of assisting the industries was nothing new and oil companies in India were actually making periodical studies of the requirements of the various Workshops from the point of view of lubrication and were putting up proposals,

A similar survey by handling experts would help the Stores Depots.

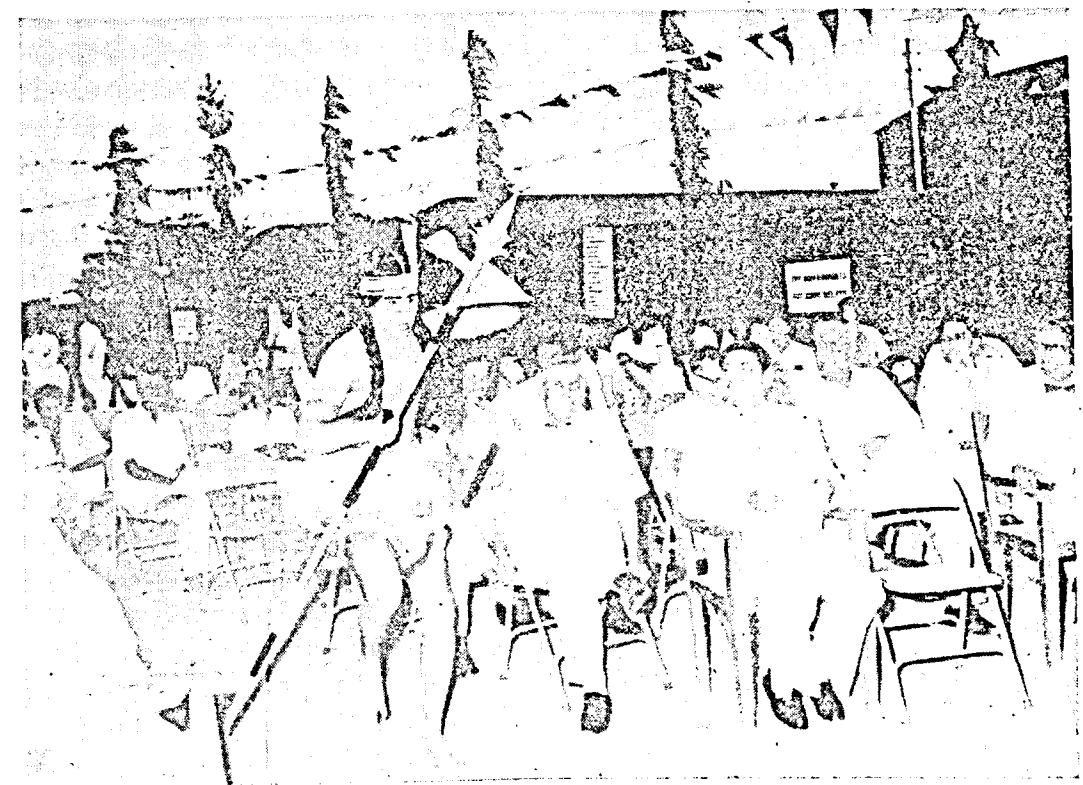
Lastly Mr. Jayaraman paid a tribute to the spirit of co-operation and enthusiasm shown by the Depot Staff in doing their work in the year that had passed. In appealing to the staff to rededicate themselves to do their best in their allotted spheres of work, he said "Let our individual best efforts combine to flow into a mighty river of national prosperity which will yield in turn a higher income, better industrialisation and more employment so that we can lay the foundation of a better and stronger Bharat."

After this the Chief Administrative Officer distributed the prizes to the winners in the sports and the Shield for the Best Ward to Shri K. P. Karunakaran in charge of the "B" Ward.

In his presidential speech Shri Sadagopan expressed appreciation of the work done by the Depot Staff and commended them on the manner in which they got up the Evening's Function. He said "I could see that you do not take your job as a burden and as something to earn a living but take it with enthusiasm and good cheer in a patriotic spirit. I have no doubt that in the years to come, as I have said in my message to the 'Depsto News', the monthly published by our popular and efficient Jayaraman, that this Depot will grow from strength to strength and turn out to be a model one in every respect. I have no doubt that this strong, well organised and well knit family of Depot Staff will make the I.C.F. proud."

The function came to a close with a vote of thanks by Shri K. K. B. Panicker, D. S. K., and the singing of the National Anthem by the staff.

The "Red Indian" portrayed by Shri C. B. Padmanabhan of the Stores Depot, won the First Prize in the Fancy Dress Competition.



Children's Excursion

(By our Correspondent)

It can be well said that an excursion is an exhilaration. In this busy world, one hardly gets time for real relaxation or recreation. To many, experience shows that the present-day life is enveloped in monotonous routine.

During the Railway Week Celebrations, as was done last year, an excursion was organised under the leadership of our Welfare Officer, Shri T. D. Jayaram, ably assisted by guides, to afford an opportunity for the children of I.C.F. employees to spend some time away from the humdrums of everyday life. True to the I.C.F. tradition, there were spontaneous response and wholehearted co-operation in this endeavour, from all quarters. Our humble thanks are due to our Chief Administrative Officer, whose enthusiasm and support for all social and welfare activities, we can never afford to forget.

One hundred and eleven boys and girls of ages ranging between 5 and 12 years assembled at the I.C.F. Institute at 8 a.m. on Sunday, the 14th April, 1957. They were formed into 9 groups, each group in charge of a Guide. To prevent children getting lost and to identify them readily, badges with the letters "I.C.F." on them were pinned on to the lapel of each child's clothes. The Guides included 4 Officers and 3 members of the lady staff of the I.C.F. and 2 Welfare Inspectors. The party boarded the Staff cars and the lorries which had been requisitioned for the occasion.

At 8-30 the party left the I.C.F. Institute and reached the Gandhi Mantap at Guindy at 9 a.m., where the children had their morning biscuits and coffee. It was a pleasant sight to witness children frisking about the lawns of 'Gandhi Mantap.' After about half-an-hour's stay there, the party drove

straight to the Aerodrome at Meenambakkam. The flight of the planes was a source of awe-inspiring interest and enthusiasm to the children. Their inquisitiveness was kindled to an immeasurable extent. The next item of the programme was a visit to the Theosophical Society, Adyar. The children took advantage of the occasion to devote a good part of their stay at the Kalakshetra and also enjoyed the inimitable shade under the notable Banyan Tree. The party also went round the shady groves of the society and left the society at about 12 noon.

The party immediately proceeded to the War Memorial Hall near Fort St. George to have their lunch. Delicious items prepared in the factory Canteen were kept ready for consumption at the War Memorial Hall. The children were pretty hungry and they enjoyed their lunch with great gusto. After relaxing for a while, the party proceeded to the 'Vauhini Studios' at Kodambakkam. Through the kind courtesy of the Studio authorities, the children were then taken round the shooting centres. During an hour's stay in the Studio, the children enjoyed themselves thoroughly. The evening tea consisted of a sweet cake and savoury. The party left the Studio and proceeded to the Triplicane beach. The children were taken to the sea-shore where their spirit of amusement reached its climax, as the day's programme was coming to a close. Even at this hour, the children did not show the least inclination to go home.

However at 5-45 p.m., with great reluctance the children agreed to return home. All the children kept up singing in various tunes, till they reached the I.C.F. Institute. As soon as the party arrived at the Institute, a band of parents was found awaiting the arrival of the

children with a degree of joy coupled with anxiety. The party concluded its venture with the singing of the National Anthem.

The credit for the success of the excursion goes to the Welfare Officer and the under-mentioned, who acted as guides:

Shri T. S. Jayaraman, D.C.O.S., Depot ; Shri T. S. Satchidanandam, A.P.O. ; Shri K. Ranga Rao, A.C.O.S., Depot ; Shri M. N. Menon, A.M.E./Millwright ; Shri M. Balakrishna Raju, Circle Inspector, Security Force ; Shri P. K. Jayavelu, Head Clerk, Personnel

Branch ; Shri P. Sekara Menon, Senior Clerk, Personnel Branch ; Shri M. Jayavelu, Asst. Welfare Inspector ; Shri A. Venugopala Menon, Asst. Welfare Inspector ; Shri T. S. Govindarajan, Head Clerk, Personnel Branch ; Shri T. S. Rangaswamy, Senior Clerk, Personnel Branch ; Shri R. Ramakrishnan, Clerk, Furnishing Office ; Shri N. Madhavan, Clerk, Personnel Branch ; Shri P. M. Rajagopal, Clerk, Personnel Branch ; Shri Md. Sheriff, Peon, X.E.N.'s Office ; Kumari I. Kamakshi, Steno to P.O. ; Kumari S. Radha Bai, Clerk, Personnel Branch ; Kumari S. K. Kuppmal, Clerk, C.A.O.R.'s Office.

The children of I.C.F. employees had a good time going round places of interest in Madras City. Here they are with the guides provided by the Administration.



OUR FAMILY



Shri B. Veeraswamy

BALASUNDARAM VEERASWAMI, the quiet going clerk attached to Shop No. 16, took everybody by surprise by carrying away the First Prize in the elocution competition held recently. The subject of his talk was "Growth of Railways in India" and it is now known that he is also good at writing short stories in Tamil.

Born in Janakipuram village in Chingleput district in 1930 he completed the B.A. degree course with Economics as his main subject in 1953. He joined the I.C.F. in May, 1955 as a Progressman and was absorbed as a clerk in Shop No. 16 in June, 1955. He still retains his interest in Tamil and he is an ardent reader of Tamil literature and books on Economics.



Shri S. Raman

Smart looking **SUBRAMANIA IYER RAMAN** won the First Prize in the Essay competition held in connection with the Railway Week Celebrations with his Essay entitled "If the Coach were to speak." He was a bright student in his school days having been First in Mathematics in the S.S.L.C. examination and First in the Tamil examination conducted by Manavar Manram, Madras.

He was born in Mayuram in 1935 as the son of a school teacher. After Matriculation he served as a Typist in a private firm and joined the I.C.F. as a clerk on 18-6-55. He was transferred to the Mechanical Department on 1-2-56.

Essay and Elocution Competitions (Special Correspondent)



Shri V. B. Purushothaman, who won the second prize in the Elocution Competition

As part of the 'Railway Week' celebrations, essay and elocution competitions were held for the staff of the I.C.F. at 6 p.m. on the 12th April 1957. The competitions were held in the I.C.F. Institute.

Shri K. Sadagopan, Chief Administrative Officer, Shri R. Rajagopalan, Dy. C.M.E. and Shri T. Ramdas, Chief Clerk, Mechanical, were the judges for the 'Elocution Competition' while Shri R. Rajagopalan, Dy. C.M.E. and Shri T. Ramdas, Chief Clerk, Mechanical, acted as the judges for the 'Essay Competition.'

Shri B. Veeraswamy, Clerk, Shop No. 16 and Shri V. B. Purushothaman, Clerk, Dy.



Kumari S. K. Kupammal, who won the second prize in the Essay Competition

C.M.E. (Works) Office, were adjudged the first and second prize winners respectively in the 'Elocution Competition.' Shri S. Raman, Dy. C.M.E. (Works) Office, and Kumari S.K. Kupammal, Clerk, C.A.O.R.'s Office were declared as the first and second prize winners respectively in the 'Essay Competition.' Cash prizes to the value of Rs. 30 for each first prize winner and Rs. 20 for each second prize winner were awarded. The prizes were given away at the conclusion of the Third Annual Day Celebrations of the Technical Training School by Dr. A. Lakshmanaswami Mudaliar, who presided.

Celebrations in the I.C.F. Colony Aided Elementary School

The children of the I.C.F. Colony Aided Elementary School put up a variety entertainment on 11-4-1957 at the I.C.F. Institute. The entertainment included dances, folk songs, a fancy dress parade and a drama. One hundred and sixty children of the school participated in the function and they held the interest of the audience throughout the function. The various items of the entertainment were gone through in quick succession and children of

varying age groups showed great talent in the performance.

The lawns of the Institute presented a festive look. A number of parents took an abiding interest in witnessing the entertainment. Shrimathi K. Sadagopan distributed the prizes to 12 pupils of the I.C.F. Colony School, who came out successful in different items. The function ended with the singing of the National Anthem.

Shrimati Pattammal Sadagopan distributed the prizes to the children of the Colony Elementary School during the Railway Week celebrations.



Institute Entertainments

The I.C.F. Institute arranged a variety entertainment on 12-4-1957 in the immediate presence of Shri S. Chakravarti, Chief Mechanical Engineer, Southern Railway.

C.A.O. (R.) Dy. C.M.E., and other officers and staff, with their families, numbering in all about 1,500 attended the function. The members of the Institute provided an interesting

fare consisting of songs, dialogues, dance and a skit. The function concluded with a Tamil drama entitled "The Lady Typist" put up by the Railwaymen's Amateurs Dramatic Club. The gathering evinced great interest from beginning to end and was immensely pleased with the varied items which were put up at such a short notice.

A characteristic pose of the heroine in the Tamil Drama "Lady Typist" which was a great success



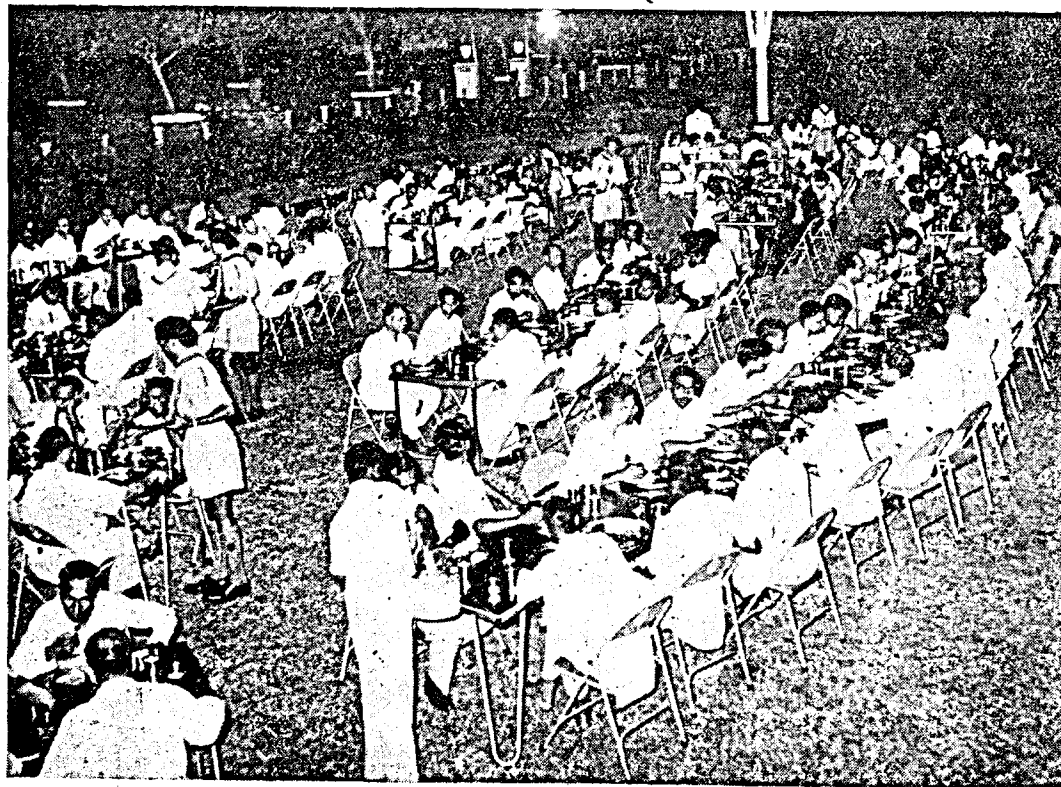
Community Dinner

The most noteworthy function during the Railway Week was the Community Dinner held at 7-30 p.m. on the 15th April. Tables had been laid in the colourfully decorated and pleasantly lighted lawn in front of the Apprentices' Hostel. The hostel building also was decorated with coloured lights. Officers, Swiss Technicians and staff of the I.C.F. attended the

dinner with their families and about 200 partook in the dinner. Rich and wholesome food, prepared in the Staff Canteen, was served by the I.C.F. Scouts.

The function was a great success, as, for a very nominal sum, good food was served and the staff of all categories and officers mixed freely with one another.

The Community Dinner on the lawns of the Apprentices' Hostel was a highlight of the Railway Week celebrations in the I.C.F.



Railwaymen Honoured

The Union Railway Minister, Shri Jagjivan Ram, presented certificates for outstanding merit to 15 railwaymen at a ceremony held in New Delhi on 16-4-57 as part of the country-wide Railway Week Celebrations.

Three of the certificates were given posthumously, the workers having lost their lives while performing their duties, while one recipient was in hospital.

The ceremony, held on the last day of the "Railway Week" observed all over the country, coincided with the 104th anniversary of the inception of railways in India and in Asia.

Before giving the certificates, Shri Jagjivan Ram emphasised the need for co-operation and co-ordination among all the categories of railway employees for the efficient running of the railways. Slackness on the part of even one individual sometimes might end in a big disaster, he said.

The responsibility of running the railways, the Minister said, was more on the so-called lower grade employees.

Referring to the help given to the dependants of those employees who had lost their lives while discharging their duty, the Minister said that he was not satisfied with this. He wanted to do something more, to assure the Railway employees that their dependants would not be neglected and would be looked after by the Government.

Earlier Shri P. C. Mukerjee, Chairman of the Railway Board, said that despite serious handicaps, the army of Railwaymen would not be deterred from the path of duty. "We all know the exacting requirements of the Second Five-Year Plan and we also know what it means to the nation."

The citations read out on the occasion narrated the grave moments when the recipients displayed exemplary courage and presence of mind, risking their lives and limbs to avert ghastly tragedies. The following are their names:

Messrs. Hamjad Hussain, Baidya Nath Mukherji, Amti Singh (Central Railway), Suresh Chandra Mazumdar, Pulin Chandra Das, Gobarchan (North Eastern Railway), Vige, Krishnaswamy (Athletic coach, Southern Railway), Foster, Pannalal Pathak (Western Railway) and late Messrs. Balley, Gulab Singh (Northern Railway), and Johannes (South Eastern Railway).

Shri Tara Singh of the Chittaranjan Locomotive Works and Shri Viswanathan of the Integral Coach Factory, Perambur, were awarded certificates for their technical and organising skill respectively.

The Citation on Shri R. Viswanathan of our factory runs as follows:—

"Shri Viswanathan has played an outstanding part in organising the Main Assembly shop—the chief hub of the Integral Coach Factory. His outstanding ability, devotion to duty and steadfastness have been acknowledged not only by the Integral Coach Factory Administration but by all engineers working in the Factory.

"Shri Viswanathan started his railway career in November 1933, as an apprentice with the ex-Madras and Southern Mahratta Railway. In April 1954 he was transferred to the Integral Coach Factory as a workshop instructor. He was sent to Switzerland for training from June 1954 to April 1955, and since his return, he has been working as a Foreman."



1. A young couple who had just married were lucky indeed in receiving many presents after establishing their new home. One day they received two cinema tickets with which a note was attached and which read, "Guess who has sent these?"

On the appointed evening they went to the cinema hall and returning evidently very late, to their great surprise, they found that all valuables from the house had been carried away and on the table in the drawing room they found a note which read, "Now you know!"

2. In the course of a dinner party the dance followed up. A sympathetic looking husband was asked by one of his friends whether he had before ever attended a dinner-dance. The meek little husband replied non-chalantly, "Oh my boy, do not remind of that whole night, I danced after eating my wife's first cooking."

3. An old woman feeling always that she looks too charming for her age once said to a friend of hers proudly, "Well Mr. Kapur, do you know that I am often mistaken for my daughter."

"Is that so, Mrs. Kumar," replied the friend and continued in a cool tone, "Fancy you having a daughter looking as old as you are!"

4. The doctor enquired earnestly, "Did my medicine do any good Mrs. Ramdas?"

"A wonderful remedy, doctor," came the reply. "I took a spoonful in milk and my stomach-ache vanished, rubbed two spoonful over my neck and the cough and cold disappeared and the rest I used for cleaning the stainless utensils."

5. "Now that you are married" said the insurance inspector, "I suppose you will take out an insurance policy?"

"Oh no", replied the new husband, "I do not think my wife is going to be so dangerous."

6. Bijoy was one morning asked by his father to take the old watch-dog to the nearby forest and lose it. He tied the eyes of the beastly thing and tramped through the forest hither and thither in an effort to lose it. Late in the evening Bijoy's father was shocked to see his son weary and tired and following the dog back home. "Well," he asked his son, "Could you not lose it?"

"Lose it!" gasped Bijoy, "If I had not followed it I'd never have found my way back home!"

7. "Well dear" enquired the wife, "What was the real reason you stopped drinking alcoholic drinks?"

"It was like this you see," replied the husband, "Last time I came home tight your mother was here and I saw two of her,"



1. An interested spectator was watching a ladder suspended from the deck of a ship in a harbour. He observed that the bottom five rungs of the ladder were submerged in water. If the two inch thick rungs were eleven inches apart and the tide was rising at the rate of 18 inches per hour, how many rungs will be submerged at the end of two hours?

2. A regiment had to fight three engagements. In the first they lost half a soldier more than their half number; in the second they lost a third of a soldier more than a third of their remaining number. In the third, a quarter of a soldier more than a quarter of the number that remained. They won the battle with twenty men in the end. How strong were they originally?

3. After a party of men had finished their lunch in a hotel, two of them discovered that they had no money in their purses. So the others had to settle the bill and, in doing so, they found that each of them had to pay 12 naye paise more than his rightful share. If the bill in total worked out to Rs. 11.70 nP., how many were there in the party?

4. A man on his way to the station observed that he passed the clock tower when it showed 8.25 hours after having gone a quarter of the distance. At a third of the distance he passed the post office clock which showed 8.40 hours. If the clock tower timing was five minutes slow and the post office clock was five minutes fast, when did he get to the station?

5. A is the father of B & C and D & E are the sons of B & C respective. Once D said

to E, "It is funny that even though we both are grand-children of A and sons of B & C, but still X, who is the brother of A has no nephews." How is this?

6. A shoe-maker once sold a pair of boots to a customer for Rs. 20. The customer for payment of bill took out a hundred rupee note and asked for the change. The shoe-maker finding no change with himself went to the next shop and brought the change and paid the customer the balance. After a while the neighbouring shopkeeper came complaining to the shoe-maker and told him that the note was a counterfeit one. If the shoe-maker had to change the note for a genuine one how much in total the shoe-maker had lost?

Solution to last month's brain teasers

- 34 coins in the order of 2, 14, 17 and 1 (or) 26 coins in the order of 9, 3, 6 and 8.
- Krishnan's age is 23.
- The proportion shall be equal.
- 142857.
- Running rate of Perumal is 10 miles per hour.
- While selling the 60 oranges at 20 nP. for five, he sold the small oranges at a profit of 20 nP. whereas he lost 30 nP. while selling the bigger ones. Hence the difference of 10 nP.
- The length of Biller's frontage is 608 feet.

(NOTE.—The first all correct solution was received from Shri G. Sanker, S/o. Shri S. G. Iyer, XEN/I.C.F.)

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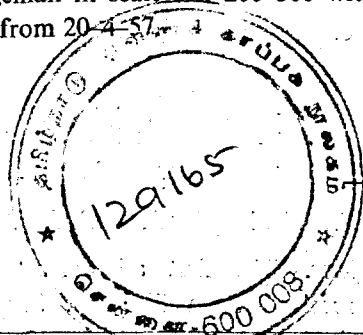
Personnel Notes

Our felicitations to—

1. Shri R. L. Kukillaya, AEN/F promoted XEN (SS)/Furnishing with effect from 26-3-57.
2. Shri M. Narayana Menon, Foreman, Tool & Die Shop, promoted AME/MW with effect from 27-4-57.
3. Shri V. S. Krishnan, Head Draftsman in scale Rs. 300-400, Mechanical Drawing Office, promoted Chief Draftsman in scale Rs. 360-500 with effect from 21-3-57.
4. Shri B. K. Mukherjee, Head Draftsman in scale Rs. 300-400, Mechanical Drawing Office, promoted Chief Draftsman in scale Rs. 360-500 with effect from 21-3-57.
5. Shri K. C. Mathur, Head Draftsman in scale Rs. 300-400, Mechanical Drawing Office, promoted Chief Draftsman in scale Rs. 360-500 with effect from 21-3-57.
6. Shri T. B. Tolani, Chargeman in scale Rs. 150-225 promoted Chargeman in scale Rs. 200-300 with effect from 26-3-57.
7. Shri L. V. Sankaran, Planner and Estimator in scale Rs. 150-225 promoted Chargeman in scale Rs. 200-300 with effect from 20-4-57.
8. Shri P. K. Kunhikannan, Progress Chaser in scale Rs. 150-225 promoted Chargeman in scale Rs. 200-300 with effect from 20-4-57.
9. Shri K. N. Gopalan Nambiar, Progress Chaser, in scale Rs. 150-225 promoted Chargeman in scale Rs. 200-300 with effect from 20-4-57.
10. Shri T. E. Cherry, Progress Chaser in scale Rs. 150-225 promoted Chargeman in scale Rs. 200-300 with effect from 20-4-57.

Our welcome to

1. Shri M. Balaraman, AEN, transferred from Central Railway and posted AEN/F with effect from 27-3-57.
2. Shri S. N. Venkata Rao, Asst. Engineer, Southern Railway, posted for training in the Furnishing Unit from 2-4-57.
3. Shri K. Thangavelu, Asst. Engineer posted for training in the Furnishing Unit from 11-4-57.
4. The undermentioned five Graduate Apprentices of the Metre Gauge Coach Factory posted for training in the Technical School :
 1. Shri M. Somashekar Rao.
 2. Shri Amrit Lal Jain
 3. Shri K. S. Gundu Rao
 4. Shri Suresh Chandra Mital
 5. Shri C. K. Rajagopalan



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The Sudanese Delegation which visited the I.C.F. on the 17th April 1957

The children of I.C.F. employees having a gay time on the Beach.





A group of women led by Shrimati Pattammal Sadagopan, wife of our Chief Administrative Officer, visited our Factory in April 1957.

Children of the Colony Elementary School singing folk songs as part of the entertainment provided by them during Railway Week.

