

Rail Coach

Vol: V

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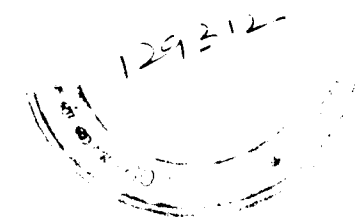
RAILCOACH

VOL. V, No. 7

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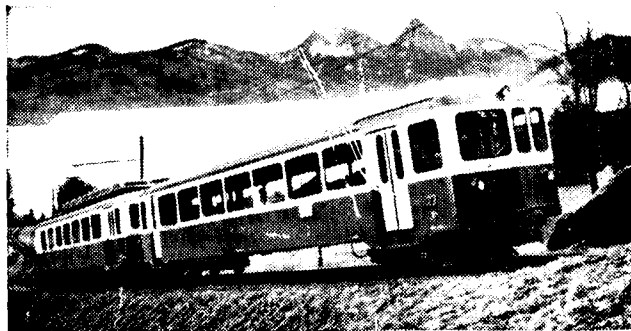


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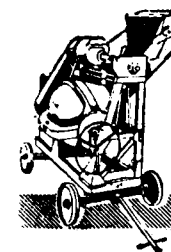
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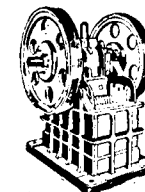
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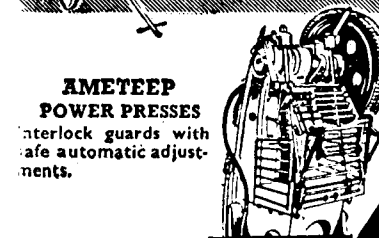
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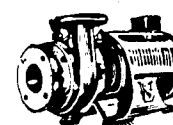


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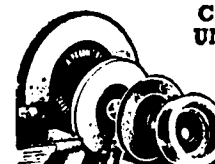
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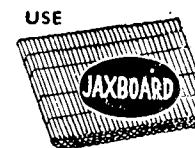
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Contributions should be addressed to the Editor, not by name, and reach him not later than the 25th of every month for consideration for publication in the next month's issue.

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editorial

SIX YEARS OF COACH PRODUCTION

The I.C.F. has completed yet another year of its production life. It was in October 1955 that the Factory went into production and so to mark this occasion this edition of the RAILCOACH is brought out with special and interesting articles. Contributors to this edition include some of the top executives of the factory and the contents should therefore be of much interest to the readers in general and to the employees of the factory in particular.

The achievements of the factory in the production of passenger coaches have been most noteworthy, in that it has not only increased production rapidly to meet the evergrowing demand of coaches but has also diversified the production to cater to the Railways requirements of the various types of coaches.

The readers will be glad to note that as against the full production target of 350 shells per annum, the factory during its 6th year of production from October 1960 to September 1961 has actually produced 609 shells. The progress year by year has been as under :

Production Year	Original target	Actual output
1	20	43
2	100	150
3	200	308
4	300	424
5	350	502
6	350	609

The Factory has also been expanding rapidly in all directions and has been gearing itself to build any type of coach for any gauge.

All these achievements of the factory are a testimony of the uniformly excellent work put in throughout by the workers to whom the RAILCOACH offers congratulations and good wishes for still better results in the future.

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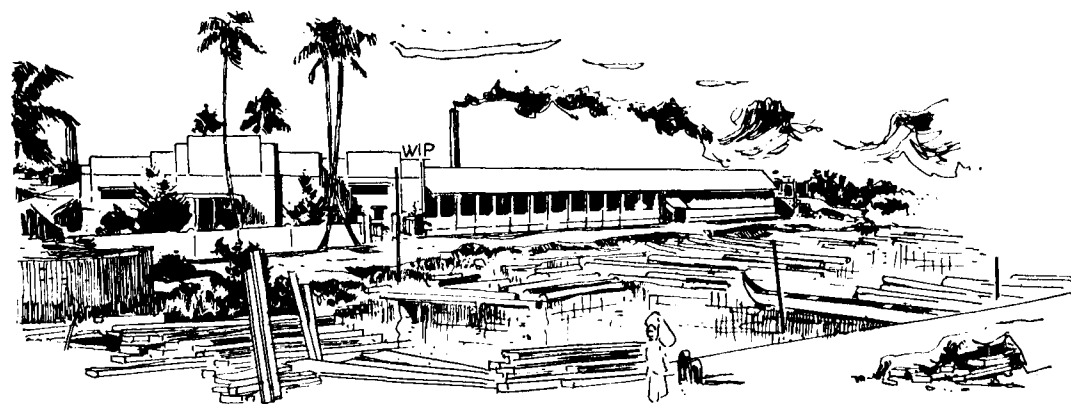
The use of plywood in all walks of life has been growing at an astonishing rate. Whether it is in industry or home, in construction or decoration, in consumer articles or big plants, plywood has come to play a big part and a live part too! Its adaptability, its remarkable economy and its availability in a variety of sizes provide the answer to many of the needs of the modern times.

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VOL. V, No. 7

THE RAILCOACH

OCTOBER 1961

SOME FUNCTIONS OF ADMINISTRATION

(R. D. NADIRSHAW, *Factory Superintendent, I.C.F.*)

The successful administering of industrial organisations large and small has emerged in the past decade or two as a highly specialised technical skill. It does not depend upon hit and misprinciples or upon an element of luck, but upon a professional knowledge and technique, without which those who attempt to administer groups of industrial workers are likely to blunder. Although as yet what one may call the art of administration has not evolved as an exact science, nevertheless there is a great deal of knowledge and experience gained in the highly industrialised West on which we in India must draw if we are to avoid the pitfalls and errors to which the former were subject, and which they have in many instances overcome. What is required is the imagination to apply this accumulated knowledge to current problems and to prevent its misuse for personal or selfseeking ends.

The Main Aim

The aim that must be pursued by an enlightened administration is to enlist the interest of a particular group as a whole, so that it is aware of the basic social underlying principles which are necessary to secure co-operative living and working, based on moral, spiritual

values, diversified from personal opportunism or corruption. Concurrently to obtain maximum effectiveness from what may be called the "industrial machine" it is necessary to evolve and accept norms of conduct and action within the social group, which would consider anti-social any violation of these principles.

One of the main problems of administration is to bridge the gulf between scientific machine technology and perhaps not so the scientific knowledge of the humanities—in other words to co-ordinate and integrate successfully the technical management of the machine with the social and humanitarian administration of the staff complex that mans it. Where this is not achieved a gradual sense of frustration, of waste, of muddle, and misunderstanding are likely to develop which will undermine efficiency, and the success of the undertaking.

It has been accepted, as enunciated by Henri Fayol that the sub-divisions of any industrial organisations are technical, commercial, financial, accounting, security and administration, i.e., administration is only one of a group of inter-related functions. Thus it is necessary for any head of an industrial organisation to give sometime to each of these. Unfortunately

RAILCOACH

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there is a tendency generally for the other functions to be neglected and for the head of the organisation to attend to administration alone. The success of the I.C.F. when compared to other undertakings, is, I find, in no small measure due to the fact that a balance has been struck, so that each function receives due attention.

The main functions of administration are to plan, to organise, to command, to co-ordinate and to control. But planning also involves forecasting without which it cannot exist, for it is only through intelligent forecasting that proper planning can be done.

Forecasting

Thus, in an industrial organisation, accurate forecasting is the prime requisite at every stage and must be given sufficient importance. Forecasting is equally important for the administrator, the executive, and the supervisor, each in his respective sphere, and it is the duty of an efficient administrator to inculcate this as an essential part of the day-to-day work of all staff. It is only after adequate preliminary research and investigation that reasonable forecasts can be made, which will allow of fairly accurate planning. For instance it is necessary to forecast future requirements of the end product (Railway coaches in so far as the I.C.F. is concerned for which the forecasting is done by the Planning Commission and the Railway Board) and subsequently of facilities, staff and materials. Such forecasts have already been made both by the Board and by the I.C.F. in so far as the requirement of coaches for the first 3 years of the Third Five-Year Plan is concerned. Unfortunately in the context of the somewhat fluid demands for different types of railway carriages, the Board has been able to forecast and plan only for the first 3 years of the Third Plan, and firm commitments for the last 2 years are yet to come.

It is obvious that the longer the period that can be covered by forecasts, the better will be the planning and execution, and, for this, the preliminary research, investigation must be of

wide comprehensive and exact nature. As example, the American International General Electric Company have forecasts of fairly reasonable accuracy upto 30 years, of extreme accuracy upto 20 years, and are thus able to plan with certainty and exactness for 10 years. However, this can only be possible when the industrial potential of a country is large and is confined within a balanced economy which has had long periods in which to develop and stabilise. Such a position has not yet been reached in this country.

Forecasting then demands an examination whether the human and material organisation are suitable for the objects, resources and needs of the undertaking. It commences with the provision of a suitable organisation, takes effect when there is a co-ordination of effort, and culminates at the stage where planning takes over.

Planning

The purpose of planning in the broad sense may then be said to be to secure systematic action in accordance with the general objective and broad policy of the undertaking, and to see that (i) material and human order are introduced (ii) a management is established which is competent and has unity of purpose and (iii) everything is subjected to strict control.

Planning may be defined as a predisposition to do things in an orderly way, to think before acting and for subsequent action to be based on facts, not suppositions.

Organisation and Co-ordination

Organisation may be defined very simply as determining what activities are necessary for any purpose and arranging them in groups which are placed in charge of certain individuals. When done intelligently and with *savoir faire*, it leads to success. In the present-day context of rapid development and change in this country, some organisers have got quick results by being energetic, forceful and ruthless. This however is a short

sighted policy which when applied to delicate human situations results in chaos of the various inter-relationships that govern the undertaking. Such men in fact cause serious eventual disorganisation, and seldom remain long enough to have the resultant confusion catch up with them. When such mistakes are made, there is a general tendency to think there is something wrong with the organisation.

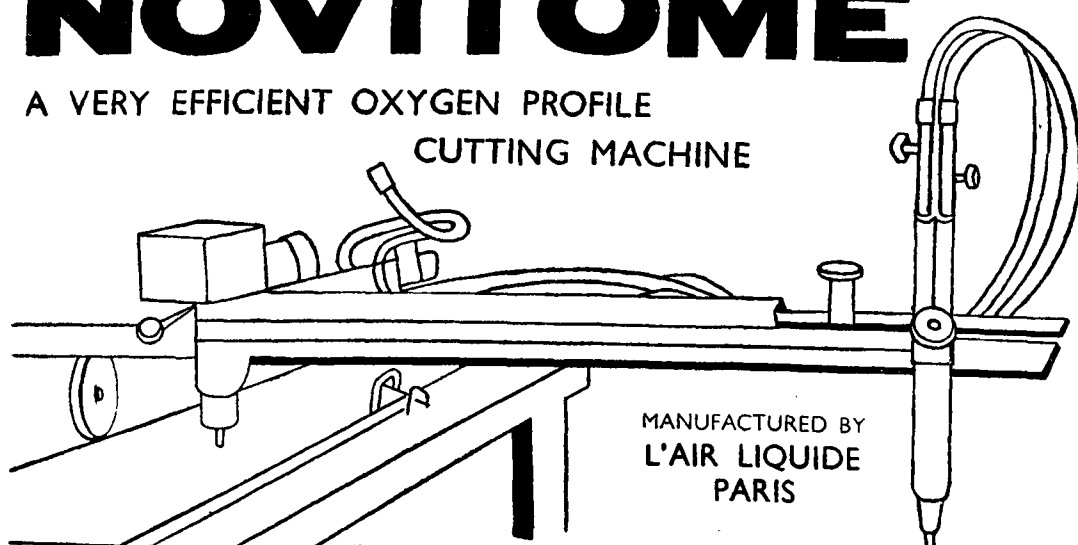
The most important fact about any organisations is that it consists of human beings, each individual having complex personal life with thoughts, ideals, sentiments and idiosyncrasies which must receive consideration. Therefore when co-ordinating an organisation, it is necessary to take what Urwick calls the "engineering approach". The "engineering approach" is the practical approach. Anything that gets the organisation to work more smoothly and efficiently is the engineering approach. We may consider a somewhat amusing but apt example cited by

him to illustrate the lack of engineering approach when dealing with organisational situations. "If a man's car stalls", he says "he may abuse it and its maker in a first moment of pardonable irritation. But he does not imagine seriously that kissing its radiator or kicking its differential, still less putting it concentration camp will be of great assistance. "The only way to make it go is to understand how it works." Yet when things go wrong in an organisation how often do people react in the same way as the man who kicks the differential! What is necessary instead is to examine in a cold-blooded, detached spirit, whether there is an optimum distribution of duties, responsibilities and relationships, whether there has been a conscious adjustment deliberately undertaken to utilise the special qualities of each individual to the best advantage and in order to deal with personal idiosyncrasy.

In large organisations particularly those in

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the Public Sector however there is little time or inclination or sometimes the knowledge, or ability, for the leader to attempt to fit the motley jigsaw of the human element into their correct position so as to make a co-ordinated whole. More often it is left to chance, to drift, and when not unnaturally things go wrong, to blame the individual or the organisation and kick each in its particular differential! It is therefore logical and sound procedure to select the right man for the right job and then to give him a well defined idea of his duties, responsibilities, delegation of power, and authority. The personal touch is important. Kindness, tact, and generosity of spirit as between colleagues, are invaluable lubricants in any undertaking. From superior to subordinate at all levels they are an obvious duty. Quenching all this is the need for decisions clearly enunciated and followed through to completion, as also a pervading sense of discipline, maintained with firmness, understanding and justice.

A great deal could be written on the subject as not all the functions and attributes of sound administration have been covered in this brief monologue. This may be the subject of a further article in a subsequent issue of the Railcoach.

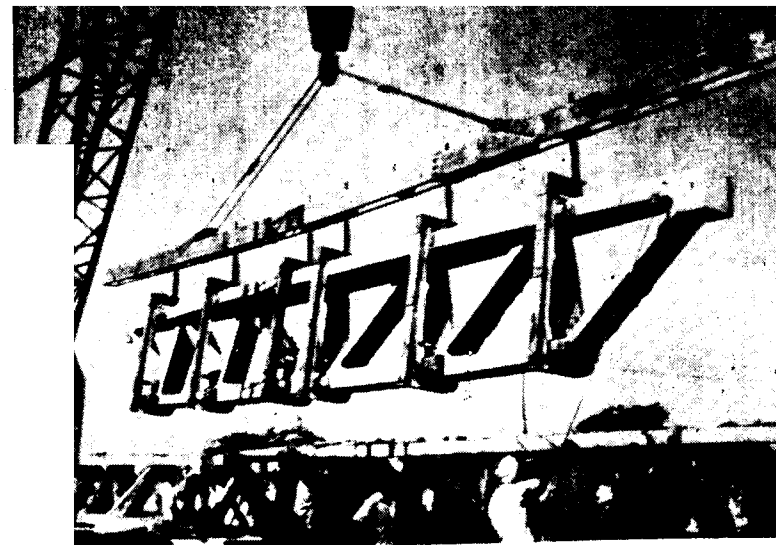
During the short period the writer has been at the I.C.F. he has been happy to observe that many of the principles briefly enunciated above, do to some extent exist; that an endeavour has been made to fit the right man into the right job; that there does exist a pervading spirit of the thoughtful and kindly approach as between colleagues, superiors and subordinates; and that there is a more or less clear delineation of duties. Though it can scarcely be expected that conditions are Utopian, nevertheless they are as near this ideal as anything witnessed elsewhere in the country. Every endeavour must be made to see that these principles and ideals continue to be put into practice, so that the I.C.F. family may grow from strength to strength.

TROUBLING TWO

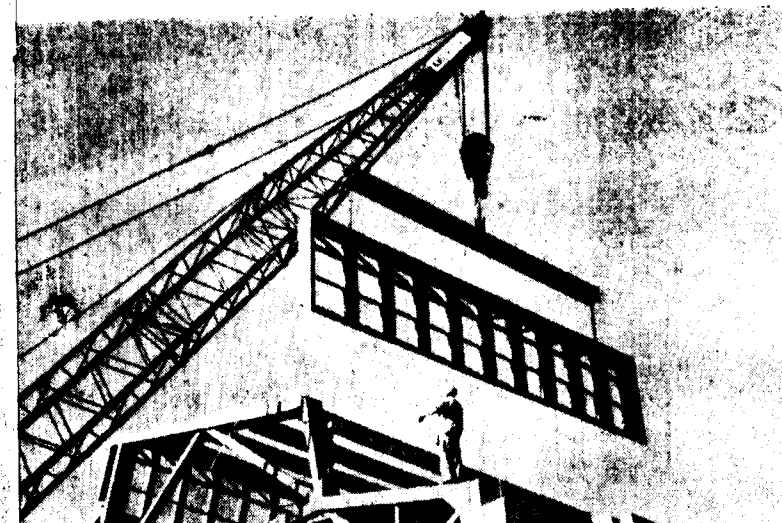
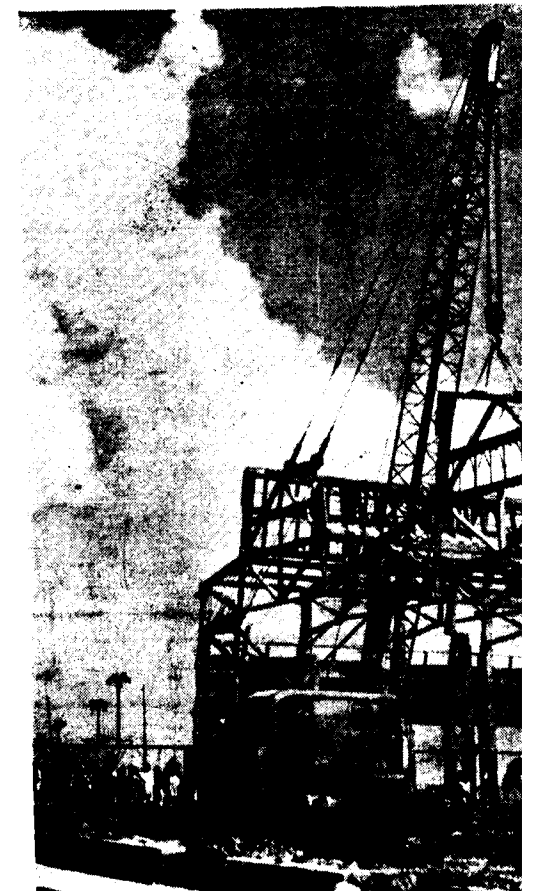
I go to the office by ten twenty two
And stick to the job till tiffin at two ;
My tiffin is light with items two
So cheap it is, it's annas two ;
To boss me I have more than two
So how can I chat for a minute or two ;
For me the Sundays are only two
As I am booked in the other two ;
Though I have passed the Appendix two
They say that I wait for an year or two ;
Because I am a C. G. two
My basic is one twenty two.

M. SHAFI
Accounts Department, Garden Reach

OCTOBER 1961



Photos show some stages of construction of prefabricated reinforced concrete workshops for the Permanent Furnishing Factory.



ROLE OF FINANCE AND ACCOUNTS IN GOVERNMENT ORGANISATIONS

(By V. R. GANESHAN, Dy. F.A. & C.A.O., I.C.F.)

The role of Finance and Accounts Departments in the public sector has come in for severe criticism recently in some of the special articles published in the Press on the functioning of the Public Sector companies and corporations. In one article it was even mentioned that the Financial Controllers and the Accounting Managers are the worst obstacles in the progress of these concerns. Such a criticism can scarcely come from a responsible and knowledgeable critic.

Ordinarily no critic is liked by those who are the subject of his criticism. The function of the Financial and Accounting Controller is almost that of a critic and therefore his job none too enviable one. It often happens that even a constructive criticism is not taken in the proper spirit by the Executive and is regarded more as an interference. Half the annoyance and dislike of Finance and Accounts will be gone the moment an executive realises that the Department of Finance and Accounts is one of the limbs of the same organisation and intended to discharge its functions for the achievement of the common aims of the organisation. It is then merely a question of approach and a proper reorientation of outlook.

There is a considerable difference in the approach and outlook even between executives who are merely departmental executives and those who are part of the higher levels of management. The young departmental executive starting his career regards his job as "getting things done" irrespective of other considerations and considers that his merit and performance will be judged solely by his ability to "get things done anyhow". It is here that a corrective approach is necessary;

for merely getting things done irrespective of consideration of cost does not require much skill nor does it bring out the man's ability and merit. A man who is in a position to throw money left and right is always able to have his own way in the modern world. When someone points out that haste and waste should be avoided, he regards the adviser as an intruder and as one who has no place in the organisation which requires him to get things done.

As he picks up experience, matures in wisdom and know-how and by his frequent contacts and discussions with his senior colleagues, he learns that the question of economy also has a bearing on the standards by which his results are judged and therefore besides quality and quantity, economy in production and execution of works is also a necessary factor to be reckoned with.

In fact, it is common experience that in private concerns, the senior executives have the greatest regard and understanding of the role of their 'Accounts' Department. This is because the main factor by which the performance of the company is judged, is the financial results of working during the year. A company which is able to show a good percentage of profit and the best capital-turnover ratio is regarded as the most successful.

The role of the Financial Controller and the Accountant in the successful working of an organisation can hardly be exaggerated. As a Financial Controller he takes part in the planning of further investment or expansion programmes of the Company and helps in arriving at decisions in these matters by

collection of the necessary information and statistical data, scrutiny of estimates and standards of costs, besides concurrent advice in the day-to-day functioning of the organisation. As an Accountant, he prepares the statements of actual expenditure from month to month, besides assisting in the day-to-day disbursements of wages, payments to creditors, etc. He is also the internal auditor of the company, as every bill/voucher is pre-checked with reference to the propriety and correctness of the claim before payment. He is also responsible for the compilation of the annual accounts and scrutiny of the actuals of expenditure with reference to budgetary forecasts.

Just as the Financial and Accounting Controllers are expected to assist the Executive in the discharge of their functions, it is also necessary to appreciate the fact that the accuracy of compilation of Accounts by the Accountant is mainly dependent on the promptitude and correctness with which the initial documents are prepared by the Executive Departments. There is no information which appears in the final accounts or financial statements of the organisation, which does not have a bearing on the initial documents prepared by the Executive Departments. Very often, the Accounts are found fault with for the compilation of certain absurd statistical data but on further investigation it was found that the initial documents have been wrongly posted.

There is also another aspect of the criticism of the Finance, that is, all delays in execution are due to the delays in Finance in tendering financial advice or accepting certain proposals. Obviously this is not an argument which can be sustained for any length of time at all. Generally, there is a tendency on the part of the Executive Departments to "just send a proposal through Finance as a 'poser' with the idea that if it goes through, it is well and good". In the case of such 'posers', the problems are not completely examined nor well thought out and are merely prepared on a

'hit or miss' theory. The problem is not clearly stated, the implications are not clearly brought out, the necessity for the additional expenditure is not explained properly, and finally all data are not furnished even in the first instance. Naturally there are questions and counter questions and delay becomes inevitable. Should Finance be held responsible for such delays?

In the foregoing paragraphs, the role of Finance and Accounts has been discussed mainly with reference to the pattern or the organisations obtaining on the Railways, where Finance Organisation is an Associated Finance organisation, i.e., closely associated with the day-to-day functioning of the Executive Departments and sharing the responsibility for the decisions of the Management equally with the Executive. The deficiencies and day-to-day misunderstandings pointed out are almost in the nature of 'family quarrels' which are settled as soon as they break out. Otherwise the activities and responsibilities of the railways cannot be carried on.

Despite all the deficiencies pointed out, organisationally, the pattern obtaining on the railways has stood out to be the best in comparison with the organisation obtaining in other Government departments. By his close association with the executive even in technical discussions, there is a more realistic approach and a proper appreciation of the problems arising from day-to-day on the part of the Financial Adviser; besides, the feeling of being part of the organisation which has certain responsibilities to the public, enables the Financial Adviser to temper his criticism with moderation and tender his advice with the expedition so that the main objective of the organisation is not lost sight of. Indeed, the scheme of association of Finance closely with the activities of the Executive departments has commended itself so much to our national planners that the system of associated Finance is proposed to be extended to other Ministries of the Government of India as well.



Artist Donald Friend, who visited Ceylon in 1956 and has lived there ever since, works on one of his aluminium sculptures.

Artists In Aluminium

That art is arduous—and life correspondingly short—is a truth recognized by most people who stop to think about it, including the artists themselves. While such concepts as “increased productivity” and “easy materials handling” seem rather crude and out of place in the creative life of an artist, yet some help in this respect is not, presumably, without value for the artist. The aluminium industry is modestly pleased about its growing contribution to the arts—which it recognizes as being useful rather than inspiring, but which allies it to a valuable form of human endeavour.

In the applied—or decorative—arts, aluminium is proving itself more than useful. Its intrinsic qualities frequently become the point of departure for a design. Probably the qualities which exert most influence in these cases are its lightness, formability and natural sheen or, alternatively, its capacity for anodizing in colour.

These two pages show some examples, from various parts of the world, of aluminium in its role as an artists’ medium. At one end of the scale one sees the religious font and mural for a church in London, and the sculptures of Donald Friend. In the latter case, perhaps, aluminium can claim to have been more than an ally to the artist, and to have been a liberator. It is said that Friend has found in aluminium “the one possible medium that can free his concepts from the heaviness and intractability of bronze and granite”. The resulting works—one can hardly call them sculptures—have a volatility that seems to defy gravity.

The two giant statues, representing Power and Speed, which stand over the entrance to the new English Electric Company head office in London, are as large and heavy as Friend’s sculptures are small and light. In this case, aluminium has been used as a covering (the statues are cast in bronze). These statues exemplify the benefit of aluminium’s corrosion resistance for outdoor

decorations, and the appeal of this metal when combined with stonework. The surface either can be allowed to weather to shades of stone grey that harmonize with the masonry, or it can be given a brilliant or matte finish which maintains its original colour.



Giuseppe Baggi, Italian-born New Yorker, entertains with aluminium foil figures he makes to accompany fables as he tells them. This particular one concerns a deer which, when captured, tries to believe it prefers captivity to freedom.

Aluminium decorations on a new post office in Oslo. Besides ease of fabrication, corrosion resistance of aluminium’s natural or finished surface is an advantage for outdoor decoration.



RAILCOACH
R 3

The decorated building facades at the left come from Oslo, a city which seems to have made the decorated wall face one of its favourite art forms. The colour-anodized decoration for the Hotel Bristol measures 330 sq. ft. and was designed by the artist Fritz Roed. The front for the new post office, meanwhile, has Oslo’s citizens guessing—people cannot agree on what the aluminium symbols mean.

Finally, Giuseppe Baggi, an Italian-born artist living in New York, takes that mundane but useful material, aluminium foil, and uses it for the art of story-telling. At children’s parties, in night-clubs or on television, Baggi uses his nimble fingers, a pair of scissors and the foil to make successions of figures that illustrate his fables as he tells them. Mr. Baggi looks too lively and busy a person to pause to analyze his reason for using aluminium foil, but we are glad to suggest some of them; attractive appearance; it can be cut with scissors; it can be torn, folded and twisted; and it holds whatever shape he may give it.

MIND OF A TRUE RESEARCHER

BY

G. MUKERJEE, C.M.T., I.C.F.

An Engineer friend of mine said to me the other day half in jest: "The theoretical researcher can do a lot of things, but never what you happen to want him to do just at the moment." I often wonder what is the reason for this peculiar lack of adaptability!

In the temple of science there are many mansions and various indeed are these that dwell therein and the motives that have led them there. Many take to science out of joyful sense of superior intellectual power; science is their own special sport to which they look for vivid experience and the satisfaction of ambition; many others are to be found in the temple who have offered their brains at the altar for utilitarian purposes. Where an angel of the Lord to come and drive all the people belonging to these categories out of the temple, the assemblage would be seriously depleted, but there will still be some men of both present and past times left inside.

I am quite aware that we have just now light-heartedly expelled in imagination of many excellent men who are largely, perhaps chiefly responsible for the building of the temple of science and in many cases our angel would find a pretty ticklish job to decide. But one thing, I feel sure; if the types we have just expelled were the only types there were, temple would never have come to be, any more than a forest can grow which consists of nothing but creepers. For these people any sphere of human activity will do, if it comes to a point; whether they become engineers, administrators, tradesmen or scientists depends on circumstances. Now let us have another look at those who have found favour with the angel. Most of them are somewhat odd, uncommunicative, solitary fellows, really less

like each other, in spite of these common characteristics, than the hosts of the rejected. What has brought them to the temple? I agree with the Philosopher Schopenhauer that one of the strongest motives that leads men to art and science is escape from everyday life with its painful crudity and hopeless dreariness, from the fetters of one's own ever-shifting desires. A finely tempered nature longs to establish from personal life into the world of objective perception and thought; this desire may be compared with the townsman's irresistible longing to escape from his noisy, cramped surroundings into the silence of high mountains, where the eye ranges freely through the still pure air and fondly traces out the restful contours apparently built for eternity.

With this negative motive there goes a positive one. Man tries to make for himself in the fashion that suits him best, a simplified and intelligible picture of the world; he then tries to some extent to substitute this cosmos of his for the world of experience and thus to overcome it. This is what the painter, the poet, the speculative philosopher, and the natural scientists do, each in his own fashion. Each makes this cosmos and its construction the pivot of his emotional life, in order to find in this way the peace and security which he cannot find in the narrow whirlpool of personal experience.

Thus with very special idea of the world, the theorist works in such a fashion that his method involves his using as his foundation, general postulates or principles from which he can deduce conclusion. His work thus falls into two parts. He must first discover his principles and then draw the conclusions which follow from them. For the second of

these tasks he receives an admirable equipment at school. If, therefore, the first of his problems has already been solved for some field or for a complex of related phenomena, he is certain of success, provided his industry and intelligence are adequate. The first of these tasks, namely, that of establishing the principles which are to serve as the starting point of his deduction, is an entirely different nature. Here there is no method capable of being learned and systematically applied so that it leads to the goal. The scientist has to work these general principles out of nature by perceiving in comprehensive complexes of empirical facts, certain general features which permit of precise formulation.

Once this formulation is successfully accomplished, inference follows on inference, often

revealing unforeseen relations which extend far beyond the province of reality from which the principles were drawn. But as long as no principles are found on which to base the deduction, the individual empirical facts which may be very important for engineers is of no use to the fundamental researcher; indeed he cannot even do anything with isolated general laws abstracted from experiences. He will remain helpless in the face of separate results of empirical research, until principles which he can make the basis of deductive reasoning have revealed themselves to him. That is why it is sometime said that fundamental or theoretical research brings revolution whereas engineering or experimental research brings evolution.

*Where the mind is without fear
and the head is held high,
Where knowledge is free;
Where the world has not been broken
up into fragments by narrow domestic walls;
Where words come out from the depth of truth;
Where tireless striving stretches its arms towards perfection;
Where the clear stream of reason
has not lost its way into the
dreary desert sand of dead habit;
Where the mind is led forward
by Thee into ever-widening thought and action—
Into that heaven of freedom, my Father,
let my country awake.*

—Rabindranath Tagore.

EDUCATIONAL FACILITIES IN THE I.C.F. COLONY

BY

S. G. IYER, X. E. N., I.C.F.

When the I. C. F. Colony with about 400 houses was available for occupation during 1953, the need for educational assistance to the young children of the Colony residents was keenly felt and the Ministry of Railways was pleased to sanction the opening of an Elementary School from 1954, which was also duly recognized by the State Education Department. To begin with, the Elementary School was housed in a residential block, suitably modified to meet the requirements of the school. Since then, the School has been gradually increasing in pupil strength as well as teacher strength. The School has also been in receipt of full grant as admissible from the State Education Department and the deficit to meet the expenditure of the School was met with substantially by grants from the I.C.F. Administration.

Meanwhile, with the construction of the Furnishing Factory and the introduction of Second Shift in the Integral Coach Factory, 200 more quarters are under occupation and another 200 are under construction. This has naturally resulted in a greater number of pupils looking up to the School and the I. C. F. Administration was kind enough to provide a separate building to house the Elementary School in the midst of the Colony.

The Ministry of Railways was also pleased to sanction the upgrading of this School into a Middle School from the year 1960. The

Middle School has also been recognized by the Government of Madras and functioned satisfactorily during the first year of its existence.

With a view to give the pupils a synthetic correlated course of studies and also to avoid the hardship of the children of the Colony having to go over long distances for their schooling, both the Ministry of Railways and the State Government were approached to sanction the opening of a Higher Secondary School from this year. This has also been sanctioned with Standard VIII only according to the integrated syllabus for this year, further standards to be opened in succeeding years.

The New High School was opened on 11-6-'61 by the Hon'ble Shri S. V. Ramaswamy, Deputy Minister for Railways in the renovated temporary office building of the Project at a pleasant function which was marked by goodwill, informality and candour. In addressing the 500 children that were assembled on the lawns of the school, the Deputy Minister explained to them the ample facilities for education which they are now getting in Free India which was denied to the elder members of the audience in their school days. He exhorted them to develop those qualities of team spirit, discipline, enthusiasm and intellectual attainment as would go to make them worthy citizens of our motherland.

INCENTIVE SYSTEM IN I.C.F.

BY

N. R. SIVASUBRAMANIAN

Production in the Integral Coach Factory was launched on 2nd October 1955, which was inaugurated by Prime Minister Nehru. A factory foremost in the Coach Building Technique in Asia was started with the Swiss Collaboration on most modern lines. Thus it could be recorded that the "Technical know-how" to the Indian Technicians was imparted through the experienced guidance of the Swiss personnel. By 1957, I.C.F. was matured enough for the introduction of incentive and by then 193 coaches had successfully rolled out.

The question of the introduction of incentives in Railways was first initiated by the Board in 1949 and in response thereof system of payment by results was proposed to be introduced first in Chittaranjan. The task was taken up under the guidance of the British Technicians under the Colombo Plan. Thus I.C.F. had been the next to take up the task.

Time Study in I.C.F. was started in 1957 with a nucleus staff of five which was later augmented. The team was headed by Shri L. D. E. Scott, Asst. Production Engineer. It was possible to gather the "Technical know-how" and the Time Study principles in a period of 6 months which covered training on the use of Stop Watch, Time Study with a stop watch, Rating Concept, Random Observation Studies, principles of chartings and basic knowledge of standard build up.

Adequate facilities were afforded to the staff to study the principles in detail by purchase of apt books as also arranging visits to other Factories. Frequent meetings were also arranged to enable exchange of views.

The method of Time Study reckoned in I.C.F. is the continuous method and the 75-100 scale of rating is adopted to gauge the

performance of the operator. The base time finally arrived at will represent the phase of working of a normal worker under incentive conditions which would enable him to work 1/3 faster (than under non-incentive conditions) and earn 33% bonus. To this Base Time the following allowances are cumulatively added to arrive at the Time Allowed which will be indicated on the job card:

33½%	— Bonus
12½ to 25%	— Fatigue according to the nature of the job
12½%	— Contingencies
5%	— Gauging & Measuring for machining operation wherever necessary.

The standard timings thus set up will be workable for an average man with an average skill and effort. If a man works at 100 rating, and utilises the allowances provided for general handling, contingencies and fatigue, he can complete the job in ¾ the allowed time earning a bonus of 33½%.

The men who put in more skill and effort are provided with an opportunity for earning bonus upto a maximum of 50%. For example if the allowed time for a job is 60 hrs. and if a worker completes the task in 40 hrs. the time saved is 20 hrs. and hence the percentage of bonus $\left(\frac{\text{Time saved}}{\text{Time taken}} \times 100 \right)$ earned is $\frac{20}{40} \times 100 = 50$

The ceiling limit of 50% is laid down in order to safeguard the health of the workers from overstraining themselves.

Method Study

One may wonder as to how the Time Study was done and incentives introduced without initiating method study which is a pre-requisite

to Time Study. It may not be out of place, I am sure, to mention here that the Swiss Collaboration aided a very systematic start with latest equipments and techniques based on the past experience and as such the question of mass method study was not needed. Prior to taking Time Studies however the processes, equipment and method of manufacture of individual parts were questioned day to day and wherever it required changes the improvised methods were implemented.

'Best Method' of the current day should fade off and give way for betterment and such auditing is constantly being carried out everyday.

Method Study in the Temporary Furnishing Annex, however, is being done extensively with a view to standardising the methods and working conditions which would form the basis for sound foundation in the permanent Furnishing.

The major bottle-neck in any workshop

seems to be in the material handling and transport. The problems have carefully been studied and the centralised Transport is now being organised to eliminate empty runs of the power trucks and delay.

Introduction of Incentive and Cost Control

With the introduction of incentive it has been possible to step up the production by about 25% as the men were able to do the job in 75% of the time allowed. There has been considerable reduction in the overheads.

The entire production shops of the Shell side have now been covered under the incentive and steps have been taken to extend the scheme to the Furnishing, Electrical and the Service Departments.

I.C.F. has always been in the forefront and it would not be exaggerating when I comment that the progress so far made in the introduction of incentives is remarkable.

—God speed

BY A. SEN

Alone In The Air

D. David to Red Leader : Are you receiving me?

Red Leader receiving. Over.

Twelve plus bandits at ten o'clock about 30,000 ft. Do you see them? Over.

Thanks, I see them all right. Follow routine. Over.

Roger. Over and Out.

The conversation is brief, even cryptic, over the radio transmitter ; but it is sufficient to trigger off the drama that is played out against a cold, impersonal sky. Engines bellowing, the two Spitfires lance into a ' box ' of Heinkels and Dorniers—twisting, turning, rolling, killing all the time. They are good, these R.A.F. lads when it comes to putting up a wizard show against impossible odds. But will the two survive against an overwhelming twelve? That is the question uppermost in the mind of a fourteen-year-old schoolboy who is sweating with excitement, holding on hard to his ten-anna seat in a cinema.

The drama is played out to its logical conclusion. The R.A.F. planes accomplish their task, roar back to their airfields and land on the proverbial " wing and a prayer ".

Walking back home that summer-scented night the schoolboy resolved to become a fighter pilot. Somehow, he overlooked the heavy owlsh spectacles perched upon his nose.

" Mother ", he said, " I am going to be a fighter pilot ".

" Of course, dear, of course ", she replied with an abstracted air. " There is jam pudding for dinner. Go and wash. You are grubby."

The jam pudding was very good indeed that night.

The schoolboy didn't know then that sixteen years and many dreams later, a scruffy middle-aged commercial assistant of thirty would re-live those terror-filled moments of a cinema hall while waiting for his ' air experience ' at the Barrackpore Flying Club.

It is a gentle, cool November morning with a heavy low mist that swirls, curls, then gently

An Opportunity for Railwaymen

BHARATIYA RAIL

(Illustrated Hindi Monthly Journal published by the Railway Board)

Railway Employees who are drawing a consolidated salary of Rs. 100 or below may get themselves enrolled as regular subscribers of " Bharatiya Rail " at a concessional rate of Rs. 2 per annum.

They will be required to produce necessary Certificate from their superiors to that effect.

falls asleep on the ground when the wind will let it. I am sitting by the tarmac, waiting my turn to go up for 'air experience' in a Tiger Moth.

Slowly the white mist wall creeps up, pauses a moment and then shrouds me in opaque folds; now I am utterly isolated, utterly alone, all communion severed with the warm world of men. Perhaps some day (I think) I shall experience this feeling again in the cold impersonal heights and then it will be the truth. But, here, on the ground, it is the beginning of fear, so I shy away from it.

The freshening breeze drives a rift through this drifting world and unexpectedly I catch a glimpse of a lovely frail aircraft, silver wings glinting in the sudden sun. She is the Tiger Moth. I love her at first sight, all of her—slender silver fuselage, frail tail-plane and the high blue nose straining towards the sky. Yes, the Tiger deserves all these adjectives plus one more—she looks ridiculous, ever so slightly, faintly ridiculous so that one is never really afraid of her.

A few months later this opinion was revised when the Tiger Moth clearly demonstrated that being the great lady she is, she could kill when insulted. But for the present I thought her slightly ridiculous.

"Mr. Sen," a bellowing voice interrupts my reverie. "Mr. Sen, the Met has cleared us. Go and get briefed for 'air experience.' Find out 'sector and height'. That is my C.P.I. (Chief Pilot Instructor), a dark tubby man, trundling towards me on short fat legs. Not much that is romantic here, decidedly not the sort to seek high adventure amidst higher clouds.

"Roger", I reply attempting humour, but humour and my C.P.I. are evidently not espoused. He passes on with a dirty look. I stamp up to the control tower imitating the walk of one of the hot jet pilot instructors. A Flight Sergeant politely says—"Yes, Sir?" as I storm into the control room.

"Aircraft No. XXX. My name is Sen.

Instructor is Mr. R. I want operational height and sector." I rattle this out very curtly, cryptic in the best Air Force tradition.

"What exercise, Sir?" the Flight Sergeant asks, all innocence.

"Air experience", I mumble and crawl down the stairs without a backward look.

In the changing room, I slip on the leather helmet and goggles, then peer into the mirror. It's an outrageously funny sight—a tired, emaciated, middle-aged face cloaked in the brave regalia of a barn-storming pilot of the 'twenties. Somehow, the two don't belong together and yet the will is fusing them into one.

On the tarmac my C.P.I. gives me final instructions.

"Now, Mr. Sen, this is a joy ride so enjoy yourself." Wonderfully logical man is our C.P.I.

"You are not to touch anything," he continues. "I repeat NOT TO TOUCH ANYTHING. And above all, if you begin to feel queasy just yell into the speaking tube."

This is getting to be intolerable, so I inform him coldly that I, A. Sen, have flown thousands of miles in Viscounts, Vikings, Dakotas and what have you.

"That's all very well," replies the C.P.I. lumbering into the front cockpit, "but this time it happens to be a Tiger Moth."

I follow him into the aircraft, pupil's cockpit and am promptly trussed up like a hen by helping hands.

"All set, Mr. Sen," a voice murmurs in my hearing tube, the umbilical cord that attaches me to the Instructor up front.

"Yes."

"Well, here we go."

Gently the aircraft taxis down the grass patch, pauses a moment before mounting the runway, swings hard left and straightens out facing the wind.

Then the plane becomes a live thing, shuddering, jarring, as she races down with

throttle wide open. I feel the tail-plane moving up, the nose sinking and suddenly we are on cream, held aloft by wings and the air.

The winter sun is a blessing on my back ... and now I hear the strut wires singing. I begin to sense, to understand something of the strange lure of sky..... freedom, movement and total isolation. These are the absolute truths of flying and sufficient vindication of the dark wreckage on the ground (that is, if a vindication is sought).

* * *

Four months and twelve flying hours later, I am still waiting for my first solo, and, as far as I can make out, I am no whit nearer to it than on the first day.

It is a sultry summer day at the airfield. Nerves are taut, tempers edged. I am *blase*, bored with flying and mad at the C.P.I., the lily-livered chicken who is standing between me and death. Yes, I am dramatising it.

"Mr. Sen, go and get briefed for Circuit and Landing."

"You mean Circuit and Bumps." I snarl at him, but softly, for the fat man is still the C.P.I.

I taxi down the runway with the C.P.I. monolithic in the instructor's cockpit. Will nothing remove this fixture?

The first take-off/landing is good. I throw the aircraft about a bit in the air but that is just to show off. My second landing is copy-book. The Tiger Moth literally wafts down and settles on the runway; then the taxiing run back, and I am about to switch off the engine when a voice and a sentence arrest me.

"Don't. She is all yours. Take her up. And remember, if you are at all doubtful when coming in, open up and go round. There's no shame in it."

I hear the words but they are bereft of meaning. Many seconds later the full implication soaks through a resisting consciousness. I am to take the plane up alone. This is it. This is the point towards which all my past action had been directed, the

fruition of a labour willingly undertaken. Yet now, do I want the fruit? Some mysterious instinct of self-preservation is already lending a bitter flavour to it.

But, in the meanwhile I am automatically carrying out the cockpit check. Instruments comprising altimeter, air speed indicator, R.P.M. gauge, oil pressure and fuel gauge, all O.K. Control column, rudder bar, the throttle lever and tail trimmer, all moving free and easy. These are almost reflex actions which are performed without any conscious thought.

Deliberately, I shut out all thought. This is not fear. I know where fear will clutch me, on the downward leg of the circuit at 800 ft. when time stretches interminably and there is no action to consume it; only thought, thought in Time.

Gently, as I push forward the throttle lever, the aircraft starts on the run. I have done the irrevocable. My mind recognises the act and accepts the consequences.

Green from the control tower. Still hesitating.

Someone in the control tower is waving at me, wanting me off the runway, quickly. Why does he urge me on? He has nothing to do with me really; he is separate, remote, in a different world altogether, that world of normality where the ground is hard under one's feet and nightmares are locked away in dreams.

I look down at my left hand—it is setting the tail trimmer at the centre of the ark, exactly as it had been taught. The nose of the aircraft is straight, in line with the middle path of the runway—it's the classic take-off position. What am I waiting for?

Away in the control tower, a small figure begins to dance a jig. Slowly, inexorably, my left hand moves up to the throttle lever, and rams it open hard with a jerk. Oh you fool what have you done? The aircraft shoulders forward with a roar, gathering speed, eating up the long ribbon of the runway. Steady now, she is swinging to the left, left; a touch of the right rudder and she is straight again. I can

feel her tail-plane lifting, then she struggles to take the air. Gently haul back on the stick so that the nose lifts slightly, then hold her down, down, to gather speed. Lord, not, not a stall now because.....because I want to live.

I rise away to the left in a slow lazy curve, using only a little rudder for the climbing turn but no bank, exactly as the instructor wants it. But the climbing speed is too high at 75 m.p.h. My attitude to the horizon is correct. Check, double check. No need to panic, look at all the instruments. Good God, I have forgotten to throttle back to 2000 R.P.M. A touch on the lever, and the aircraft flies sweetly at 65 m.p.h.

At 800 feet I level off, apply left bank and rudder, holding the aircraft steady at rate 1.5 turn and come out parallel to the runway, a long black streak below me.

Now I am approaching the crisis point of my solo, the long downwind stretch where fear begins. My hearing tube is still attached to the instructor's cockpit, but it is now a useless trailing umbilical cord connecting me to NOTHING. So this is what it feels like to be utterly alone in danger, and quite beyond the reach of help, in thought or action. Fear, mute so far, but always at my shoulder, a silent witness to action, begins to crowd and jostle the mind. It begins to mount in waves of nausea, lapping, corroding, eating into the wall of the will. This is not fear of death;

that I could control, for death is so absolute it is stupid to be afraid of it. But fear, just cold, clammy, dark fear of nothing is impossible to comprehend and therefore terrifying beyond measure. I am terribly afraid of the dark.

A mist is forming before my eyes. Act now, act quickly. Look at that far crooked bend of the river which should have been to the left but is now aligned to the right wing tip. Look at altimeter needle, which ought to be at 800 ft. flickering at 1000 ft. Faults come crowding upon the mind. This is good. With action I am breaking the hold of fear and it's no longer the only truth.

I am flying over a tall black chimney; it is my landmark for a left bank and turn. Easily I hold the aircraft to rate 1.5 coming out at right angles to the runway. Cut throttle at this point and begin your gliding turn. She is sweetly lined up with the runway, nose pointed to the far end. Brown ground rushes up in a welcome. Fifteen feet from the runway, I check the swoop of the aircraft with a gentle stick. Watch out for that small sinking feeling, that's no more than a suggestion. Now, now, check and check again, hauling the stick hard back into the stomach. She is down with a bump and bump again, then smooth, rolling on cream. I am conscious of figures running up to meet me and someone says, "How was it?" "A piece of cake", I reply, climbing out of the aircraft. What else could it be? I look at the grass and somehow the grass looks greener with another intensity.

A healthy man once went to a doctor. The latter asked him the secret of his good health.

The man replied, "Doctor, when I married I entered into a pact with my wife that when I became angry she was to laugh and when she became angry, I had to leave the house. So doctor, I am always on the road and this is the reason of my good health."

RESEARCH ON RAILWAYS

R. D. S. O.'s Contribution to Self-sufficiency

BY

QURBAN SINGH
*Former Director General,
Research, Designs and Standards Organisation*

The rapid strides made by the Indian railways in research, design and development has aroused considerable interest even in most advanced countries.

The recent visit of foreign railway experts organised by the Economic Commission for Asia and Far-East to study the Brahmaputra bridge construction involving several unique features, is an indication of the recognition of Indian railways' advance in technical fields.

Repository of 'know-how'

The Research, Designs and Standards Organisation is the repository of the 'know-how' of the technical departments of Indian railways.

The organisation has helped the Indian railways in the production of railway materials and equipment, in accordance with standard designs, specifications and codes of practice. It has found solutions to numerous specific problems referred to it.

Organisational set up

The Research, Designs and Standards Organisation, in its present form, with its three permanent wings, the Mechanical, the Civil and the Research, each under a Director, came into being in March 1957.

Its evolution as the Central Standards office dates back, however, to 1930. There were also the still earlier phases of the various standards committees under the Indian Railway Conference Association. These mostly concentrated on evolving standards of moving dimensions and clearances of fixed structures, strength of bridges and track, and types of locomotives, rolling stock and equipment,

acceptable to railways, a large number of them were Company managed. The Central Standards Office was called upon to prepare tender documents, specifications, schedules and drawings, when, in 1931, the tenders for rolling stock and equipment started being invited simultaneously in England and India.

First research work

The first research work undertaken was in 1935, which brought out the "Track Stress Research Report". Later, after the Pacific Locomotive Enquiry Committee had recommended extension of research work and dynamometer car and oscillograph equipment and cars had been acquired by the Central Standards Office, the research and experimenting activities were extended, an initial Research Centre was set up, followed by a comprehensive Research Centre at Lucknow, under a separate Director of Research in 1952.

The Khosla Committee

The Committee of Engineers, presided over by Dr. A. N. Khosla, recommended the collection and analysis of a large volume of hydrological, meteorological and topographical data from railways and other institutions in the country as well as the information regarding the practices obtaining in other countries. A fourth wing has, therefore, been added, temporarily, to the R. D. S. O., since March 1960 for these studies by putting under observation a number of railway bridges.

Central Board of Research

The Ministry of Railways constituted last year a Central Board of Railway Research consisting of eminent scientists, engineers and

industrialists of the country to advise on the programme of the railway research and development and to ensure co-ordination and co-operation with other sister institutions and manufacturers.

The achievements of the National Research stations and other research organisations are freely used for application on railways and any subject of original research, which railways will like to be studied, are formed out to these research organisations. This will complete the set-up for ensuring full co-ordination in research and in advancement of technical knowledge, both for making India self-sufficient, to the maximum extent, in production of railway equipment and for achieving high efficiency and economy in the equipment produced.

In addition, a close contact is maintained with research institutions, railway systems and leading manufacturers of railway equipment in all progressive countries of the world. Opportunity is also taken to send railway officers abroad to have first hand knowledge of work being done in other countries.

Officers of R.D.S.O. represent the railways as members of a number of committees set up by the Indian Standards Institution, National Buildings Organisation, other Government bodies and Ministries, on matters in which railways may be interested. They thus get first hand knowledge of the view of experts from other branches, organisations and industrial undertakings on the subjects discussed.

Rail Sub-committee of ECAFE

The Railway Sub-committee of the Inland Transport Committee of the ECAFE, set up by the U.N.O. has so far made studies on important aspects of railway operation. These cover improved turn round of rolling stock, working of diesel locomotives, incidence and prevention of railway accidents, improved system of signalling in relation to speed, safety and increase in line capacity construction and maintenance of welded track.

These studies include collection and synthesis of data received from the member countries and the discussions at the Railway Sub-committee by experts representing the various countries and also for their final recommendations for adoption or trial in the constituent countries.

Collaboration with other Countries

Indian Railways have the largest network in Asia, with a well developed research and design organisation which has been working in close association and co-ordinating the work of the Indian railways on the ECAFE.

Indian Railways have offered facilities in its various institutions for training and also for undertaking research on problems of railway systems in South East Asia.

New designs issued

The mechanical wing of the R.D.S.O. is preparing completely new designs of rolling stock, a large number of which have already been issued to the indigenous builders. Locomotives, carriages and wagons of these designs are already under manufacture and in service.

The R.D.S.O. has started functioning as consultants to various public bodies in the country, such as Port Trust, large industrial corporations, shipyards, etc. Advice is being regularly given to them regarding the design, selection and purchase of rolling stock.

R.D.S.O. has also sent out teams of engineers to foreign countries offering them the technical 'know-how' pertaining to the design and manufacture of the rolling stock. The new standard locomotives have been designed to burn lower grade coal, so as to make the higher grade coal available for metallurgical use. Designs are also in progress for fitment of mechanical stockers and burning of oil fuel in our standard locomotives.

Dieselisation Wing

New diesel and electrical wings have been created in the R.D.S.O. The officers in these new wings are engaged in studying the developments abroad and building up basic data with

regard to diesel and electric traction as also the salient features of different designs of diesel and electric locomotives.

These studies have proved to be of great value in framing our purchase specifications for diesel and electric locomotives so as to obtain the most efficient and yet economical locomotives, with due regard to their future standardisation.

Suri Transmission

Original work has also been done in respect of the hydraulic transmission used in diesel locomotives.

Seven prototype diesel locomotives incorporating our patented "Suri Transmission" are under manufacture in West Germany and the first locomotive has already been received.

The R. D. S. O. have already furnished a design for D.C. electric locomotives of 3,600 h.p. which is under manufacture in Chittaranjan Locomotive Works. The design and manufacture of A. C. electric locomotives are also in hand.

Designing Rail Coaches

For over a century, the design of passenger coaches on the Indian Railways was on conventional lines : a wooden body on a separate steel underframe.

In line with the contemporary technological advance, the R.D.S.O. have developed integral designs of steel-bodied coaches, which are now being produced in large numbers by mass production units like Integral Coach Factory, Hindustan Aircraft and Jessops. The integral steel coaches are much lighter in weight, afford a far greater measure of safety to passengers during accidents, cost less in operation, repairs and maintenance and with the increase in the carrying capacity would mitigate overcrowding in passenger trains.

Third-Class Sleepers

Considerable progress has also been made in the design of Electric Multiple Unit stock and diesel railcars, refrigerator fish vans and the III

Class sleeper coaches. Similarly, the amenity of air-conditioning has also been extended to the III Class travelling public. Studies are in progress to provide even better travelling comforts and amenities to the travelling public at optimum train speeds.

Box Type Wagons

The rapid industrial development of the country can only proceed if the movement of bulk materials and finished industrial products continues steadily at the required pace.

The tonnage to be moved during 1960-61 has increased by about one and a half times as compared to the position at the end of the First Plan. The increase in the volume of goods traffic to be moved during the Third Five-Year Plan would be even greater.

It is not practicable to increase the line capacity at this rate and the only practical alternative is to increase the throughput from the available line capacity. This calls for heavier goods trains to be accommodated within the existing lengths of loops and higher speed for the goods vehicles.

Accordingly, the design of BOX type of wagons for the movement of bulk materials was developed, which permitted about one-third extra train load over the existing length of loops.

Prototype of a gondola version of the BOX wagon is also being manufactured, which would permit the optimum intensity of track loading being achieved.

These gondolas would be employed exclusively for the transport of ore, particularly on the Kiriburu-Vizag and Bailadilla-Vizag section for the export of iron ore to Japan, which is estimated to reach the target figure of 6 million tons per annum.

Tank Wagons

The same principle of higher intensity of track loading has also been applied in the transport of oil and the type of Bogie Petrol Tank has been designed for transport of oil

from Gauhati to Barauni over the metre gauge section, to ensure the maximum throughput from the available line capacity.

Other Items in hand

In view of its significance in saving idle time of rolling stock, reducing loading and unloading costs and minimising damage to goods under transport, it is proposed to undertake the design of mechanical handling equipment in the R.D.S.O. and extend applications thereof for the particular requirements of the industry and at transshipment points.

It is also proposed to take up the formulation of standard specifications for machinery and plant, particularly, machine tools, in order to ensure that the capital investment for a given production, operation or repair and maintenance task, is the minimum possible.

Design for Cast Iron Sleeper

India being very short of the conventional material, timber, for making railway sleepers, a sustained effort has been made, during the past few decades, to develop design of an efficient and economical cast iron sleeper. At present, about half the track mileage in India is laid with cast iron sleepers.

To meet the requirements of sleepers for the Third Plan, substantial quantities of steel sleepers will also be available from the new plant at Durgapur. Trials are also being made with several alternative designs of reinforced concrete sleepers, both plain concrete and prestressed.

I. R. S. Rails

This organisation evolved the 90 lb. I. R. S. section, giving greater strength vertically as well as laterally and some 82 track miles rails rolled to this section, in India, have been under trial for the last six years.

To handle the much heavier traffic densities generated on trunk routes by rapid industrialisation of the country under the Five-Year Plans, and also to meet the persistent pressure for speeds higher than the present maximum

of 6 m.p.h., a new design of 105 lb. I. R. S. rail has been evolved.

Another modern development introduced is the extensive use of welded rails, of which nearly 2,000 track miles, with upto 210 ft. long rail panels, have already been laid.

Trials are also being conducted with halfmile long welded rail panels, with special expansion joints at ends.

To enable non-stopping trains to negotiate station loops at 25 to 30 m.p.h. speeds, cast-manganese steel crossings of 1 in 16 and 1 in 20 have been designed and arrangements are in hand for the progressive manufacture of these crossings indigenously.

Pre-stressed Concrete for Rail Bridges

The newly developed techniques of making prestressed reinforced concrete for girders for use on railway bridges, have been successfully adopted on Indian Railways in the Second Plan period particularly when steel was in short supply. To date, prestressed reinforced concrete girder spans, totalling nearly 30,000 linear feet, have been used on Indian Railways (B.G. and M.G.) or are in the process of being made.

The Bridges and Structures section actively collaborated with the engineers in-charge to finalise the design for the Rajendra Pul over the Ganga at Mokameh, which was opened in 1959.

Similar collaboration in design and in checking the data has been given for the Brahmaputra Bridge construction involving several unique features.

Designs for Station Buildings

The architectural section designed a number of imposing station buildings built on Indian Railways during the two Plan periods. The New Delhi Station, with its red-stand stone facade, internal garden-courts and pools, spacious circling areas and modern amenities presents a pleasing blend of Mughal architecture and current construction practices.

The 8-storeyed Churchgate Station of the Western Railway, the new station buildings at Ahmedabad and Jaipur are other examples of good aesthetic appearance, combined with functional efficiency and reasonable costs.

At present, a 14-storeyed office building for Eastern and South-Eastern Railway offices at Calcutta is being designed.

Signalling Equipment

The reorganised Signal and Telecommunication Section of R.D.S.O. has been engaged, since 1955, in the evolution of standard signalling equipments for Indian Railways.

Under the Second Plan, a special drive for maximum self-sufficiency in railway signalling equipment became necessary and so far as mechanical signalling equipment is concerned a large measure of success in achieving self-sufficiency has already been attained.

Electrical Signalling

Considerable progress has also been made in respect of electrical signalling equipment and investigation of numerous designs and prototypes and some pilot installations have been made to permit detailed studies. Tokenless block instruments double-line block instruments using coded impulses, high-frequency track circuits, power signalling and relay interlocking are some of the items under test.

For developing the capacity needed for the Third Plan at relatively less cost, about 250 track miles are to be equipped in the first instance with the Imported Centralised Traffic Control, based on one of the most advanced systems of signalling so far evolved anywhere.

Performance Trials

The Research Directorate also carried out extensive trials, both in laboratories and in the field, to determine the performance of loco-

tives, rolling stock, track, bridges, etc., and their components, and also of different fuels, lubricants and preservatives.

Progressive replacement of imported items of railway stores by indigenous products has also been the subject of research. An important example is the formulation of a cheap bitumen emulsion paint which has been found to be an effective preservative of steel against corrosion even in trying climatic conditions.

Waste products like coal ash, saw dust and lubricants are released by railways in abundant quantities and their utilisation or reclamation is an important item of research.

Other Items

The utilisation of coal ash in place of sand, where good sand is not available or is costly, is being progressively adopted for the preparation of lime mortar. Efforts are also continuing for manufacture of hard boards from saw dust in collaboration with the Forest Research Institute.

Reclamation of axle oil, which is released in large quantities, has also been taken up for study and a pilot plant is expected to be shortly erected at Chittaranjan for this purpose. The study of reclamation of lubricating oil from diesel engines has been started, in collaboration with the Defence Research Laboratory.

Soil Mechanics

Railway research has made satisfactory progress in the study of soil mechanics, which involves the determination of conditions for stability of banks, cuttings, and foundations of structures in the vast area served by the Indian Railways with widely varying types of soil.

A well-equipped laboratory has been established in Lucknow for studying soil characteristics and their safe bearing load.



VISITORS DURING THE

YEAR 1961

C.A.O.R. explaining the salient features of an integral coach to Her Majesty Queen Elizabeth, who visited I.C.F. on 20th February 1961.

Members of the World Bank Mission led by Mr. Stanley F. Dingle who visited I.C.F. on 1st April 1961 seen inside a fully furnished coach built by I.C.F.



Sri Rangarajan, a young worker of I.C.F. presenting a bouquet to Her Majesty on behalf of the workers.



C.A.O.R. explaining the salient details of the Factory with the help of the model to H. E. Mr. Kosygin, First Deputy Chairman of the Council of Ministers of U.S.S.R. and party who visited I.C.F. on 27th February 1961.



Her Majesty signing the Visitors' Book.

H.E. Dr. Ricardo Mosquera Eastman, the Argentine Ambassador in India being presented with a coach model by C.A.O.R., when he visited I.C.F. on 17th May 1961.



ART IN INDIAN PAINTING

BY

J. K. NAG

The art of painting was being practised in India from the pre-historic times. The cave paintings in the Central India, at Singanpur near Raigarh, at Sarguja near Jogimara and in the Vindhya hills region in the districts of Mirzapur and Hoshangabad are relics of the past. The drawings in Singanpur are simply wonderful; they include representations of horse and deer similar to the famous Old Stone Age (Palaeolithic Age) cave paintings of Cogul and Altamira in Spain. There have been found, of the later pre-historic period at Mohenjodaro (3/4000 B. C.) painting in forms of decoration in reckless exuberance on pottery. At Mohenjodaro and Harappa of the famous Indus Valley civilisation among the discovered relics are also painted statuettes bearing testimony to the existence of the art of painting in the country from a very long time. There is no hiatus however between the rock paintings of the primitive people and the evolution of the art in the Indus Valley culture as signs of it on perishable materials either disappeared or buried under the earth as minor fragment.

Ajanta and Ellora

But the renowned Ajanta cave paintings have kept a landmark of the art in those old days from 700 B. C. The frescoes there, on the walls and ceilings of the excavated Buddhist temples and Chaityas (chambers), are the earliest examples of the much progressed painting art of India that time has left to us in a good state of preservation. Painting similar to those at Ajanta were discovered in the excavated halls at the Bagh cave of Gwalior. There are also a few specimens of the early art on similar lines, amongst the famous sculptures of the caves at Ellora. These are regarded as contemporaneous with the later Ajanta frescoes. Belonging to the early Seventh

century, the murals discovered in a small temple at Sittanavasal near Pudukottah in South India are also of Ajanta manner. The frescoes of Badami and Bijapur too are beautiful examples of early Indian art of painting.

These various centres of wall painting as well as the subsequent Hindu paintings indicate the immense area over which the influence of Ajanta was directly felt. The frescoes at Sittanavasal were probably inspired by the Pallava King Mahendra Varman 600-625 A.D., who gave to Indian art the incomparable sculptures of the famous Mamallapuram. The magnificent paintings of Ajanta and Bagh, all on the walls of the excavated Buddhist temples and monasteries, and the so-called caves belonged for the most part to the patronage of the Gupta kings. The frescoes of caves 9 and 10 date from the beginning of the Christian Era or even earlier, those of caves 16 and 17 date to about 500 A. D. those of the 19th cave about the middle of the Sixth Century and of caves 1 and 2 date from the Seventh Century.

The subjects are all Buddhist representing Jatakas and scenes from the life of Buddha with the popular mythology of Yakshas and Nagas as incorporated in Buddhism. The frescoes are rather wonderful showing a perfection in style and drawing that set a standard of the Indian art as influenced the contemporary artists. One of the best examples is in the picture of Bodhisatta Padmapani that has been acclaimed by critics as one of the world's most beautiful murals in which colour is brilliant varying from full red in the architectural background to golden flesh tones, olive greens and occasional flashes of a vivid blue which has lost nothing of its strength and freshness through centuries. The notable others are the Renunciation, Dying Princes

and the Royal Processions, etc. About all the frescoes in general an European critic said that they recalled the vigorous and overcrowded canvasses of the Venetian masters of the Renaissance.

The influence of Ajanta is also manifest in the frescoes though few in number, painted inside the famous caves of architectural grandeur at Ellora not far from the hills of Ajanta. These murals together with the beauty of high class sculptures here bear signs of the last glory of the Indian art during the Hindu period. The cave temples of Ellora were built probably during the reigns of the Chalukyas (550-750) and Rastrakutas (750-975 A. D.). History says that Krishna I of Rastrakuta kings was one of the chief patrons of the artists and sculptors of Ellora.

Medieval Schools of Painting

The next thousand years, the period from the Seventh Century to the Sixteenth Century, was not glorious for the art and culture of the country. The northern part was in a constant state of turmoil due to the invasions of the Afghans and Tartars from Western and Central Asia. The Buddhist people were absorbed back into Hinduism and sculpture largely displaced painting in the service of religion. The art of drawing and painting remained as a legacy but only in miniature in manuscripts and as folk art on dried thick plant leaves or mache's. The technique of the Hindu art on paper was identical with that of the Ajanta murals though deteriorated in form. The best example of the contemporary art is the Gujarati School of manuscript illustration which flourished from the 13th to 17th century A. D. depicting Jaina scriptures.

Moghul Art

During the Sixteenth Century the Muslim power had established in India and the artistic influence from Central Asia and Iran came with the courts. It stimulated the Indian art but absorbed something of the indigenous patterns resulting in the growth of the so called

Moghul Art, and subsequently what is known as the Rajput Art. It also later influenced the rise of the Pahari and the Kangra Schools of painting in the Punjab and the lower Himalayan region. The Moghul emperors were enthusiastic patrons of painting. Humayun introduced the Persian masters like Abdul Samad and Mir Sayad Ali, etc. While he sought asylum at the court of Tabriz in 1544 A. D. being ousted by the Sher Shah, he became a lover of the Persian art and following his regain of the throne of Delhi he invited the above masters with several others.

Besides the manuscript illustration like the Babarnama, Akbarnama, etc. the Moghul School being principally a court function treated nature for edification of princes and created a large number of human pictures of exquisite colour and finish. The Moghul painters excelled also in animal subjects in the illustration of fables. There developed a brilliant portrait art in the Moghul School depicting court scenes reaching climax under the patronage of Akbar and Jehangir and it was in full bloom during the latter's reign as a result of the impetus his father gave to the artists. His son Shahjahan was however a greater enthusiast of architectural development. The Moghul art at its most typical is eclectic but it always retained many elements neither Persian nor Western though with a bit of Chinese character, but Indian features reasserted themselves more and more.

The Rajput Art

The Rajput School of painting later flourished side by side with the Moghul School. The early form of Rajasthani art though following many traits of the Moghul school had certain outstanding features that distinguished it from purely Muslim art. It depicted the home life and religious ideas of the Hindus dealing mainly with Vaishnav subjects. There were of course many Hindu painters in the Moghul School like Dasa-nath, Basaon, etc. The Rajput art was a simple, sincere, theodemocratic art full of

charm and beauty to those capable of accepting the conventions of the time. Jaipur was the chief centre of development of the Rajasthani art. In most of the capitals of the princely states, Bikanir, Mewar, Jodhpur, etc., the painters of this school have left beautiful pictures still on the walls of palaces and temples. The work of these painters was largely miniature and depicted religious and domestic scenes with a delicacy of detail and attractiveness of colour that delight the lovers of paintings.

During the seventeenth century the art became confined to Udaipur and Marwar but later it revived largely as a passion of the rulers as a result of which Bundi, Kotah, Kishangad also, with the said states became centres of the culture. One of the outputs that dazzle the eyes of the critics are the frescoes paintings of the Rangmahal palace of Bundi. But still these murals belong to a period when Rajput art was declining.

Pahari Schools

From the reign of Aurangzeb the Moghul school of painting fell into decay and the Rajasthani art also suffered from the confusion of times. During the eighteenth century the withdrawal of imperial support caused the painters disintegrate and disperse to the small states away, where the rulers offered patronage. The painters came to earn livelihood as far as to Lucknow, Patna, Deccan, Tanjore, Mysore but more to the states in the Punjab and Himalayas. In the hill retreats of Nurpur, Basholi, Chamba, Jammu and Kangra they stuck root and evolved a distinctive style of painting collectively known as the 'Pahari' (mountainous) School. The pictures of this school excelled in the spontaneity of drawing and in richness of colour sequences. When the 'pahari' states passed under Ranjit Singh (1809-39) of the Punjab, the Kangra School became an ornament of the Sikh court at Lahore.

The writer had opportunity of seeing a few famous pictures of the abovesaid schools

in some of the art-galleries of Northern India. Mysore and South India including the Shree Chitrasala of Trivandrum. The impression of twelve months of a year and representations of musical modes as painted by the Rajasthani painters was simply fascinating when he looked with interest at the pictures of the Jagamohan Palace at Mysore city.

II

The art of painting in India declined during the Nineteenth Century. The wave of creative activity amongst the contemporary artists receded and the impact of the European culture of the Dutch, Portugese, French and mainly British failed to do more than produce a mediocre amalgam of Indian subject-matter and western methods. One of such painters influenced by the European art was Ravi Varma (1848-1906) of the South whose numerous picturisations of Hindu mythology evoked great interest at Vienna and Chicago in 1892. Ravi Varma was practically the vanguard of the painters in oil colour in the country on the line of the European art though in his later years he used water colour and acquired mastery. He was mainly a portrait painter and was foremost in the contemporary art and his achievements in the art were true to life and of brilliant execution.

The Renaissance

Renaissance of the Indian art originated in Calcutta during the early part of this century with the rise of a few great painters who did not follow the path Ravi Varma traversed. Mr. Havell, an English master, became the Principal of the Government School of Art, Calcutta. He restored the Indian method and point of view. Among his associates were Abanindranath Tagore and Coomarswami. Tagore, coming of the renowned house of the city that gave us the famous poet Rabindranath, took up the work of reviving the Indian art and was later joined by his elder brother Gaganendranath who till then belonged to the European school of modern art.

The Tagore family mansion at Jorasanko became the centre of a new movement in the painting art of India. Among the pupils that gathered round these two geni were Nanda'at Bose, Asit Kumar Haldar, Samarendra Nath Gupta, Surendranath Kar, Venkatappa and Promode Kumar Chatterjee. The later disciples of Shri Abanindranath Tagore were Jamini Roy, Atul Bose, Sunayani Devi, Mukul Dey, Debi Prosad Roy Choudhury, Sarada Ukil and Sudhir Khastagir, etc. By and by Rabindranath, with the able guidance of his nephew Abanindranath, opened in his Ashrama at Santiniketan, Bolpur, a school of Indian painting, the 'Kalabhavan', and entrusted Dr. Nandalal Bose with its organisation. Later a group of artists rose here in eminence forming what is known as the Santiniketan School of painting.

New Schools of Art

The appreciation of the works of some of the above renowned artists resulted in the appointment of Indians as Principals of the Government Schools of Art, Asit Haldar at Lucknow, Samar Gupta at Lahore, Devi Prasad at Madras. There were also founded few private institutions in other important cities that produced a number of fine artists. One was the Indian Society of Oriental Art started by Abanindranath himself at Calcutta when the new Principal of the Government School of Art, after Havell retired, was not enthusiastic about the teaching of the Indian style of painting.

The Tagore Brothers

The paintings of Gaganendranath Tagore (1867-1938) were exhibited at Hamburg and Berlin and were appreciated by art critics for their expressionism and the exposition of some of them at Paris in 1914 achieved great success. They were also shown in U. S. A. in 1927 and at London in 1934. A fuller exhibition of his works was held a few years back at Jorasanko, the Calcutta Centre of West Bengal Sangeet Kala Akademi in the very premises of which, in the now demolished ancestral house of the

family, decades ago we had opportunity of seeing the great artist brothers.

The genius of the famous painter and literature, Abanindranath Tagore, was well perceived in the contemporary culture of Bengal and the school he established diffused the glory of art to the entire country. His greatest disciple, Nandalal Bose, started the Oriental School of Santiniketan which earned wide reputation. His other pupils like Promode Kumar Chatterji and K. Venkatappa came to teach in art academies of Central and Southern India and bore his torch. Venkatappa is regarded as one of the master painters of South India. Of Tagore's other disciples, Jamini Roy (1887) having his early education at the Government School of Art, Calcutta, attained success as a conventional portrait painter but from 1921 he devoted to the study of folk art in a style of his own that echoes of the Post-impressionist School of modern European art and Mukul Dey (1895) also studying in the Royal College of Art, London, under the reputed artist William Rothenstein, became later a Principal of the Government School of Art, Calcutta.

The Ukil Brothers

The Ukil brothers of Delhi, Sharada, Barada and Ranada, rising out of the revival in Bengal established a school at Delhi and produced works of fine composition and colour with a remarkable style of their own. Promode Chatterji, an early pupil of Tagore, began as a western style painter but after a pilgrimage to the Himalayas became an Indian style painter. He had an able disciple in Ananda Mohan Sastri at Masulipatam that reared the Andhra School of Painting. There are notable schools in South India, one established by the reputed artist Sri Panikker (1911) of the Madras School of Arts, one by Madhav Menon, Cochin (1911), the officer-in-charge of the Shree Chitrashala, Trivandrum, and the other by Sushil Mukherji, the art master of Lawrence School, Ootacamund.

Influence of Bengal School

The Bengal movement also sprouted at Jaipur a school of derivative endeavour trained by Sailendra Nath Dey. His pupil, Ramgopal Vijaya Vargiya, has produced some of the most beautiful picturers of Indian style. The example of the Bengal movement inspired Ravi Shankar Raval to send his student Kanu Desai for schooling at Santiniketan. Desai very ably followed the tradition of his master Nandalal Bose. Besides the Lucknow and Delhi schools, at Lahore where Samar Gupta carried the torch of the Bengal movement there were two great painters in the late Amrita Sher Gil and Abdur Rahaman Chagtai (1897).

The latter belongs to an ancient Persian family of artists. He painted Hindu subjects like Radha, Krishna, etc., as good as his famous Anarkali. He is an artist of distinctive personal style with the love of his ancestors for line and colour. The late Shrimati Sher Gil's works of the modern school of art have been acquired by Government of India for the art gallery of National Museum. Her subjects were Indian but the paintings show immense trend of Post-impressionism. Born in 1912 of a Sikh father and Hungarian mother she had her education in art at Ecole des Beaux Arts, Paris. She held a unique position in the modern school of Indian painting but she died young at the age of 29 only.

Nicholas Roerich

There was the great European artist Nicholas Roerich contributing much to the Indian art. A Scandinavian in blood and son of a Moscow barrister this Russian painter brought western blend to the country's modern art. He won world-wide reputation specially in the U. S. A. where he settled before the October Revolution in his native land. He came to India in 1924 and founded the Urusvati Himalayan Research Institute in upper Punjab. Nicholas Roerich was a great artist and his worthy son Svetoslov, a painter of great merit, is following his line equally, producing some of the most beautiful pictures in the country on Indian subjects in the Roerich studio at the foot of the Himalayas. Svetoslov Roerich's portraits are also singularly unique.

The modern art of India has the Calcutta group of artists in Messrs Gopal Ghose, Sudhir Khastagir, Rathin Maitra, etc., the Madras Group led by Shri Panikkar and the Bombay Group headed by Shri Satwalekar. The Bombay J. J. School of Art has also put much enthusiasm to the younger generation of painters. The disciples of the renowned artist Professor Palsikar have liked mostly to evolve modernism in their art influenced by the revolutionary modern painters of Europe of expressionism, fauvism, cubism, futurism and formalism etc.

(Courtesy South Eastern Railway Magazine)

"I shall work for an India in which the poorest shall feel that it is their country in whose making they have an effective voice, an India in which there shall be no high class and low class of people, an India in which all communities shall live in perfect harmony. Women will enjoy the same right as men. This is the India of my dreams".

—M. K. GANDHI

BY (MRS.) MYTHILY

"THE CUCKOO"

(Dedicated to Swami Vasanthananda, who delivered a series of lectures on Karma Yoga under the auspices of the Divine Life Society, Aynavaram Branch).

It was a lovely garden, bedecked with flowers
Varied in colour and odour ;
My heart leapt in joy at their pomp,
And I knew not which to pick—
How long this dilemma lasted. I was unaware,
But hark ! the sweet voice of a Cuckoo, awakened my mind.

It called itself as the "Spring Happiness"—
A well chosen and fitting name indeed !
For it thoroughly knew the garden,
And could guide others to make their choice
From the grand garden of Bhagavad Gita
With its glorious slokas and its blossoms.

Though every flower was worth the pick,
It was only a few that I could don ;
At a loss, which would fit me best
I lingered, when the Cuckoo came to my rescue :
She is my Guru
The torch of Knowledge that lit my wake.

The rapid, lucid oration of hers
Thrilled the heart and captured the intellect ;
Drew the indriyas and the senses to integrate,
To dive deep into each action and split the oysters,
To search for the pearl of selflessness
And to evolve myself into Divine Bliss.

Oft had I entered this Heavenly park,
Always driven, alas ! by mere curiosity ;
Hardly had I stopped a moment, to inhale the fragrance
Albeit its strong attraction,
Resulting in my remaining as poor as before ;
But this time I emerged with a collection that enriched my heart and soul

The Cuckoo sang the "Song Divine" in excellent melody
Which will remain ringing in every ear that was blessed to hear it.
Attracting every stray mind to the essence of the song,
She elevated each soul, striking home the Lord's words ;
Her eloquence, yet very like the spoon feeding,
Kindled the desire to live the life Divine.

Her voice is echoing in my heart—
Setting the waves of vibrating thoughts in motion,
Circling round the pebble of action
Dropped in the tank of life.
Slowly and gradually do I realise that the pebble has sunk
And that the Creator and the Created are one and the same.



Turn Blue, Boss

Suggestion boxes in Illinois Central shops, terminals and offices—despite what cartoonists are forever drawing and the gags that comedians are forever making—yield surprisingly few “drop dead, boss” suggestions.

But there have been a large number of humorous suggestions that have come in over the years. Employees Suggestion System Manager Harold V. Bostock, who takes all suggestions very seriously, regrets not having started collecting instances of off-beat suggestions years ago. “We get almost none of the poisonous suggestions the cartoonists are always drawing,” he says. “But, railroaders being what they are, we get our share of the serious-toned, straight-faced propositions via the suggestion system—the kind where it takes a few minutes before you feel the tug—and know your leg is being pulled.”

Some few years ago, for instance, the Illinois Central's suggestion system posted signs proclaiming “FABWODI” all over the railroad. The preliminary promotion encouraged employees to watch for the announcement of the campaign's slogan—represented by the word “fabwodi”. Pretty soon there came a solution from the then-Springfield Division involving

Fred A. Brink who was then trainmaster at Clinton. The definition? “F. A. Brink Wants Overtime Discontinued Immediately!” It was almost an anticlimax when the announcement disclosed that fabwodi represented “Find a Better Way of Doing it.”

“I know of one case” says Mr. Bostock, “where an employee suggested a hand rail at the bottom of a stairway to prevent employees from walking out into considerable hand truck traffic. It was an excellent idea and the employee was given a cash award when the guard rail was installed. Two months later a suggestion came in suggesting removal of the hand rail as it extended through a doorway which would keep a fire door from closing. It was an excellent idea, the hand rail was shortened and an award was paid—to the same employee!”

Another suggestion, which, while funny sparkles with common sense, was this one, “I notice where I work that there has been rat poison placed around in many places. When rats eat this poison they are not going to come out in the middle of the floor and die. They are going to hide behind something or go into the wall. We'll have to have a couple of men moving cabinets and crates around or

cutting into walls—spending several hours away from their regular jobs. You can see how much it will cost to get one rat. I suggest we use traps. That way we will have no trouble finding them. If my foreman will furnish me with traps and a piece of cheese, I promise I won't eat the cheese. I will bait the trap with it.”

A recent news item told about a suggestion made by an employee of the John Hancock Insurance Company in Boston. The employee suggested a bell be installed between a cashier's window and a police office. As the suggestion was being processed, the cashier was held up. Needless to say, the suggestion was adopted.

Another suggestor, at a Louisiana lumber mill, submitted an idea that wages be paid in cash instead of by cheque. It was a sound idea inasmuch as banks and currency exchanges were closed on payday. When the suggestion was put into effect the following payday, a lone bandit staged a hold-up and made off with the cash. When police arrested the bandit a few hours later, they discovered it was the employee who had made the suggestion that the mill pay in cash.

A West Coast canning factory got a suggestion written in a dainty, feminine hand demanding that all new male employees be under 30, single and good-looking.

In Detroit not long ago a suggestion box yielded this jewel: “If someone doesn't make my foreman stop eating garlic, there's going to be a murder around here.”

A Canadian suggestor came up with this one: “Let us hire Miss Canada, dress her in a bathing suit and have her sit on the back of a convertible and drive all over Canada to advertise our products. I volunteer to be the driver.”

Are the funny suggestions considered? you bet! “Humorous suggestions do liven things up,” observes Mr. Bostock, “but even the humorous suggestions are given serious consideration. It is remarkable how often even the funniest of suggestions has a real good point to it. It is not at all unusual to have such suggestions earn awards for the point they make—even though the point is made humorously.”

* Courtesy—Illinois Central Magazine—U.S.A.

*If we are not to lapse into individualistic nationalism and ultimate negation,
if we are not to be lead astray by our wandering whims, if our personal intuitions
are to be guided by the accumulated wisdom of the race, only tradition can help us.*

S. RADHAKRISHNAN

SPORTS

Athletics

PERFORMANCE OF I.C.F. ATHLETES IN THE FIRST OPEN MEET

In the first Open Sports Meet held on the 7th and 8th October 1961 under the auspices of Madras State Amateur Athletic Association, I.C.F. came third in the Team Championship with 28 points.

Rudy Peterson came first in 800 metres and second in 1500 metres. It is gratifying to note that this young athlete is showing very fine progress.

C. Sankaran secured the first place in long jump.

The I.C.F. Relay Team came second both in 4×100 and 4×400 .

Asir Jagadisan, Satoor and K. Subramaniam came third in Hop Step and Jump, 400 metres and High Jump respectively.

Hockey

I.C.F. RETAINS PALAYAMCOTTAH CUP FOR THE FOURTH YEAR IN SUCCESSION

Two Hat tricks by Jabbar Badsha

The I.C.F. Hockey Team established their supremacy by annexing the Paul Thangiah Edward Memorial Hockey Tournament, Palayamcottah, for the fourth year in succession, held during August 1961.

On 16-8-'61 in the quarter finals, they defeated St. John's College by 5 : 0. The noteworthy feature of the match was hat trick by Jabbar (3); Basker and Murugesh added one each.

The Southern Railway annexed the Team Championship by securing 88 points, the S.A.P. Avadi came second with 29 points and I.C.F. third with one point less. I.C.F. could have secured more points, had Louis Jayasekaran (who was not keeping fit) taken part in his favourite events.

There is every chance of I.C.F.'s winning the Championship in athletics too in the near future provided the team strength is increased considerably and good training is imparted to them.

Mr. C. G. Devaya, Deputy Chief Mechanical Engineer, who presided over the function, said that the success of an athlete depends much on his or her own individual effort and practice. Mrs. Devaya distributed the certificates to the winners and runners-up.

On 17-8-'61, in the semi-finals, the I.C.F. Team had to meet the Southern Railway Institute, Golden Rock and defeated them by 4 : 0. Here again, Jabbar performed a hat trick.

On 18-8-'61, in the finals, I.C.F. met the Southern Railway Athletic Association, Madras, and the I.C.F. Team beat the Railway Team by a solitary goal scored through Stephen and emerged as the proud winners for the fourth year in succession.

— A. R. Venkat

NEWS FROM SWITZERLAND

A non-returnable pack for liquids

Plastics have revolutionized packaging techniques. A striking example of this is the non-returnable pack for liquids and pastes produced on the Formseal machine. The whole idea has been very well thought out and is at the same time extremely simple. The package is a shaped container tapering slightly towards the bottom and formed from a reel of thin but rigid thermo-plastic film. The container and its flat preprinted lid are sealed together so as to form a double flap which forms a spout when cut. In order to use, one has only to cut open the flap with a pair of scissors and squeeze the container lightly while pouring. As soon as the pressure is released the flow of liquid stops and the flap closes, preventing any dust from entering and contaminating the rest of the contents, which need not be poured out all at the same time. The operations by which the pack is produced, that is to say the making of the container from a reel of thermo-plastic film, the filling of the required amount of liquid, and the sealing with a lid, are synchronised, so that production is rapid, economic and hygienic. It is possible to produce three or six packs at the same time or even more depending on their diameter. This new pack is ideal for packaging cream, fruit juices, concentrates, sauces, detergents, etc., in quantities up to a maximum of 1/2 pint.

A sensational new invention : photography in relief

Photography giving a relief effect by direct viewing without any optical aids such as polarized glasses, binocular viewers, etc., has just been launched by a Swiss firm. Mr. Jean Bourguignon, inventor of the "Vidireal" process, explains that it has been possible to achieve a stereoscopic effect from the direct viewing of a single plane surface—hitherto

considered to be completely impossible—by means of an optical imitation of the physiological process which enables us to see in relief an image that the retina of our eyes sees only in two dimensions. Such a result is now perfectly feasible in all fields of photography, whether films, slides or typographic reproductions (book illustrations, postcards, posters, advertising leaflets, etc.). In addition, this process opens up a new mode of artistic expression—that of three-dimensional painting. With the stereoscopic effect, the "Vidireal" process combines two others; overall sharpness at all depths and a very wide field of view. Any camera can be used to obtain these results, provided it is fitted with a special patented lens, which can be screwed on in the same way as a telephoto lens, for example. A photograph taken in this way can be printed or projected by ordinary apparatuses. The "Vidireal" process has already been put to commercial use, both in Switzerland and abroad, in particular for touristic and advertising slides.

A Geneva firm designs an automatic slot machine for railway tickets

For several weeks now, an automatic railway ticket slot machine designed by a Geneva firm has been tried out in a Swiss railway station. In spite of its small size—it measures just over 3 ft. 3 in. wide by 3 ft. 7 in. high—this new machine is able to print and issue tickets for 32 different destinations, for first and second class, single, double and half fares. It is designed to take coins of 1, 2 and 5 francs and 10, 20 and 50 centimes; it gives the right change, indicates the price to be paid when the passenger presses on the appropriate button, prints and dates the tickets, records and totals the receipts and the number of each sort of ticket sold. This machine, the first of its kind in Switzerland, contains 250 different apparatuses in all and nearly a mile of wiring.

CHITTARANJAN MAKES HISTORY

BY

G. P. SHAHANI

Formerly, General Manager, C.L.W.

(The author, until recently, the top executive of the Chittaranjan Locomotive Works describes the First Electric Locomotive built in India, which was launched on the track by the Prime Minister at Chittaranjan. Turning out 164 locomotives a year, the C.L.W. has already made Indian Railways completely self-sufficient in B.G. Steam locos.)

Although the Indian Railways are about 108 years old, the Railways activities till Independence were mainly confined to "Operation" and "Maintenance". They relied mostly on imports to meet their requirements of stores and equipment.

It was only after 1947, when the country won her freedom, that the Railways took up seriously the question of self-sufficiency in the procurement of their rolling-stock, stores and equipment. Since then, and particularly during the two Plan periods, they have developed indigenous capacity in many directions and have been able to considerably cut down imports.

Chittaranjan shows the way

In 1948, the Indian Railways started work on a production unit of their own for the manufacture of steam locomotives at Chittaranjan in West Bengal. The first steam locomotive rolled out of the Works in November, 1950. Confining itself only to the manufacture of B.G. locomotives, mostly WG type (the Indian Railways standard for the freight locomotive), it has turned out, up to the end of August, 1961 about 1,249 BG locomotives. Out of this 1,239 are WGs and the remaining 10 WTs.

The W.T. locomotives are designed for branch lines where they can haul both passenger and freight traffic. The W.G. locomotives are hauling heavy freight trains on the B.G. trunk

routes all over India meeting the ever increasing demands from the new and expanded industries.

Electric locos gain ground

Although the steam traction has held its ground and served us well over more than a century, it is evident that Indian Railways can no longer cope with the increasing traffic arising out of the rapid industrialisation of the country, by relying exclusively on steam locomotives. In fact the phenomenal spurt in the density of the traffic as well as the exacting requirements of present-day railway operation have already necessitated the introduction of diesel and electric traction on some of the busy routes. Electric traction is indeed destined, even in India, to progressively replace steam traction.

Progress of electrification

Up to the end of the First Plan, only about 250 route miles near Bombay and Madras had 1,500 volts D.C. electric traction. Early during the Second Plan electric traction was brought for the first time to the Calcutta area—on the Howrah-Burdwan and Sheoraphulli-Tarakeswar sections—on 3,000 volts D.C. system.

Later it was decided to adopt 25 KV, 50 Cycles, A.C. system for electric traction on Indian Railways because of greater economy and superior performance of the new system. During the Second Plan, considerable progress

has been made on the A.C. electric traction on the Eastern and South-Eastern Railways in the coal-steel areas. About 600 route miles have already been brought under electric traction.

It is proposed to introduce electric traction on another about 1,100 route miles during the Third Plan. With the rapid expansion of electric traction, the demand for electric locomotives also increased considerably. Thus the need for manufacturing electric locomotives became apparent.

The Railway Board, therefore, intended to make a start in this direction by manufacturing a few D.C. locomotives at Chittaranjan. It was decided to develop capacity at the Chittaranjan Locomotive Works for manufacturing six electric locomotives a month in addition to maintaining the present monthly rate of production of 14 BG WG steam locomotives.

While mechanical parts of the electric locos will be all fabricated at Chittaranjan, the electric equipment will, in the initial stages, be imported from abroad. Later, when the Heavy Electricals at Bhopal, develop capacity for the manufacture of electric equipment, the need for import from abroad will disappear.

India-made Electric Loco

The first electric locomotive, now ready to leave the Works is a 3,600 H.P., 1,500 Volts D.C. The locomotive, has most of its mechanical parts completely manufactured at Chittaranjan. The electric equipment has been imported from U.K. It has got about 34,000 components of 3,900 different types.

Although this is the first venture of the works at Chittaranjan on the manufacture of electric locomotives, it speaks highly of their skill that very little of the work had to be rejected and redone. Some of the foreign experts maintained that it would take at least 14 months to turn out the first electric locomotive. In spite of the delays and setbacks in receiving the electrical equipment from abroad, this first electric locomotive has been built by Indian

workers at Chittaranjan well within a period of 12 months only.

Technical features

The locomotive, which earns the proud privilege of being launched on track by the Prime Minister, will be assigned to the Central Railway. It can be utilised to haul both passenger as well as freight traffic on the difficult Western Ghat Sections of that Railway. Having tractive efforts of 69,000 lbs. it can haul on the level an express train of 560 tons at a maximum speed of 65 m.p.h. or a goods train of 2,000 tons at a maximum speed of 45 m.p.h. It weighs 123 tons and has an axle load of 20.5 tons. It is mounted on the bogies, each with three axles. Each axle has been fitted with an independent traction motor to drive it.

These locomotives are equipped with the regenerative braking to keep the heavy trailing load under control on steep descending grades and thus reduce the heavy wear and tear on the tyres as well as the brake gear. The newly built locomotive incorporates many safety devices to ensure its safe operation, such as overhead relay, no-current relay, current balance protection, low pressure governor, vacuum control governor, earth fault relay and lightning arrestor and surge absorber.

Impressive performance

While the manufacture of electric locomotive adds another feather to its cap, the C.L.W. continues to march ahead in the matter of steam locomotives progressively improving its already impressive record of performance.

The prime cost of a steam locomotive which in the first year of production was over Rs. 7 lakhs, has now been brought down to Rs. 4.06 lakhs only. The number of man-hours per locomotive have also been reduced from 4,51,000 in the first year of production to only 54,000 now.

An incentive bonus scheme was started in the year 1954-55 and it now extends to all the production shops and a few of the service shops. By virtue of the scheme, not only has

the production gone up, but also the workmen have increased the contents of their pay packets.

Steel Foundry

Besides developing the facilities for the manufacture of electric locomotives, Chittaranjan is planning to instal during the Third Plan a Steel Foundry at an estimated cost of Rs. 3.7 crores. It will have an initial capacity of 7,000 tons per annum, capable of expansion to 10,000 tons per annum. The foundry is scheduled to go into production in 1963.

Although galvanizing has nothing to do with production of steam locomotives, a Galvanizing Plant was erected at Chittaranjan in 1959 to assist the sister organization the Railway Electrification Project. A total of about 10,000 tons of steel structures have been galvanized which has already resulted in a saving of about Rs. 40 lakhs in foreign exchange, and of about Rs. 30 lakhs in the capital estimate.

Workers' Welfare

The workers at Chittaranjan are associated with the running of the shops and township through the Staff Council, Works Committee and Area Committees. They are encouraged to suggest ways and means to improve productivity and conditions of work. The staff concerned have been awarded with monetary rewards for suggestions accepted.

The total strength of employees is approximately 8,400. About 6,200 houses have been built for the employees of Chittaranjan Locomotive Works in a township covering nearly 7 sq. miles. Some of the staff are drawn from the neighbouring villages. There are two High Schools—one for boys and the other for girls—and 26 other primary schools, a 70-bed main hospital and four dispensaries in the township.

Congratulations

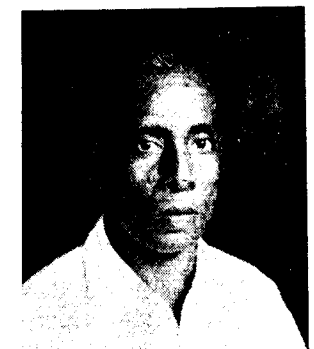
. . . . to these men of the factory

Recent Award Winners in the Suggestions and Inventions Scheme



Sri A. R. Nityananda Lal,
Chargeman, Shop 41.

Sri C. P. Gajendran,
Clerk, Gr. I, CAOR's Office



Sri C. A. Narayanaswami,
Mistry, Shop 16

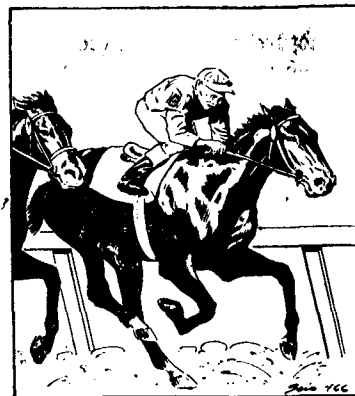


Sri T. R. Venkateswaran,
F. O. Shop 16

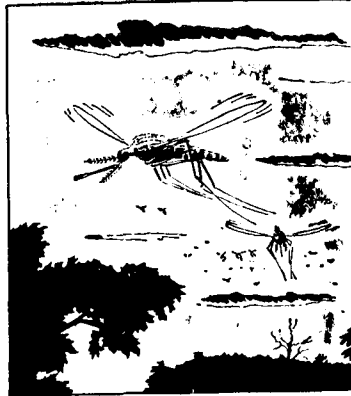


DID YOU KNOW . . .

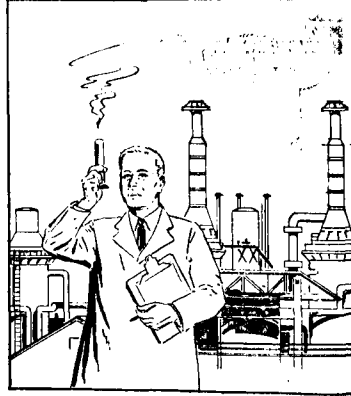
By SCIO



It is extremely rare at most race tracks in the world to see a race horse more than ten years old, but in Japan a 14-year-old gelding won a race, ridden by a jockey who was 72.



The average number of wing vibrations a second for mosquitoes is between 160 and 190. Wing muscles comprise nearly 20% of the total weight of a mosquito.



The American Chemical Society is the world's largest professional association of scientists. It includes 88,000 chemists and engineers.

Dr. WILLIAM SHOCKLEY, FATHER OF THE TRANSISTOR

Dr. William Shockley, the "father of the transistor", is that rare type of scientist—a theoretical physicist who at the same time has always been intensely interested in the practical applications of his research work.

"We simply wouldn't start the research," he said when he was with the Bell Telephone Laboratories, "if no practical applications for it were seen."

Joining the Bell Telephone Laboratories, the research and development branch of the American Telephone and Telegraph Company, immediately after he graduated from the Massachusetts Institute of Technology in 1936, he was the leader of the research group that developed the transistor, the tiny device that has replaced the vacuum tube, or valve, in many electronic devices. The invention of the transistor, hailed as the "great breakthrough" in electronics, was announced in 1948.

About the size of a pea, requiring only a small fraction of the power of a vacuum tube, and able to magnify signals 100,000 times, the transistor opened the way for innumerable scientific advances in instruments, transmission, switching, hearing aids, radios, television, computers, and other electronic devices.

Dr. Shockley did not actually invent the transistor single-handed; but he "fathered" it by advancing the hypotheses or principles upon which its construction is based and by leading the way to its creation. The practical development of the first transistors was carried out under his supervision by Dr. John Bardeen and Dr. Walter H. Brattain, two brilliant members of his research group. The three scientists shared the 1956 Nobel Prize in physics for their achievements.

The most important parts of transistors are tiny pieces of germanium, a metal found in zinc ore, or silicon. It is within these particles

that electrons are harnessed by the methods devised by Shockley and his associates to do the same type of work as performed by a vacuum tube. They amplify electronic signals as the vacuum tubes do in radio and television sets but require less power and create less heat, the plague of the vacuum tube.

Because of their diminutive size, they have made it possible to miniaturise electronic products of all kinds. Two of the most common examples are small transistor radios and miniaturised hearing aids.

William Shockley was born in London, England, in 1910, of American parents. He grew up in California, where he graduated from the California Institute of Technology in 1932 with a Bachelor of Science degree. He was then appointed to a teaching fellowship at the Massachusetts Institute of Technology, where he worked at the same time for his Doctor of Philosophy degree in Physics. After obtaining this degree in 1936, he joined the Bell Telephone Laboratories as a member of its technical staff.

He already knew at that time, as did many others, that the vacuum tube could be much improved upon, since it had several inherent weaknesses. These included a short life, high power consumption, bulkiness, fragility, and the inability to rectify extremely high-frequency signals such as those used in radar. Rectifying is the transforming of alternating current into direct current.

He also knew that an alternating current could be rectified by the use of materials known as semi-conductors. These have electrical properties that are intermediate or half-way between those of metals that conduct electric currents and the properties of insulators. Vacuum tubes both rectify and amplify, while semi-conductors merely rectify. Shockley decided to see if he could develop a semi-conductor

device that would duplicate the vacuum tube, that is, amplify as well as rectify.

This work commenced in 1939. It was continued after being interrupted by Dr. Shockley's World War II service, when he worked on radar, and finally led to the successful development of the first transistors. The many experiments that were needed during the long research for success were conducted, as already noted, by John Bardeen, a theoretical physicist, and Walter Brattain, a gifted experimental physicist.

Shockley's transistors have already revolutionised the entire electronics industry. Together with other new types of semi-conductor devices such as power diodes and capacitors, some as small as a grain of wheat, the transistor opened up the vast new field of making miniature components for electronic instruments and devices of all kinds, and at the same time improving the performance of these devices.

Computers that previously filled an entire room when equipped with vacuum tubes, are now made the size of a filing cabinet by using transistors. And transistors have wholly or partially replaced vacuum tubes in many television and radio sets, radar systems, automatic pilot instruments for aeroplanes, and innumerable other kinds of electronic equipment. They have made it possible to build the miniaturised radio transmitters that enable satellites to send scientific information back to earth. They have been one of the most revolutionary developments of this entire age of scientific marvels.

Why did the foreman sack you yesterday?

"Well, you see the foreman stands around and supervises."

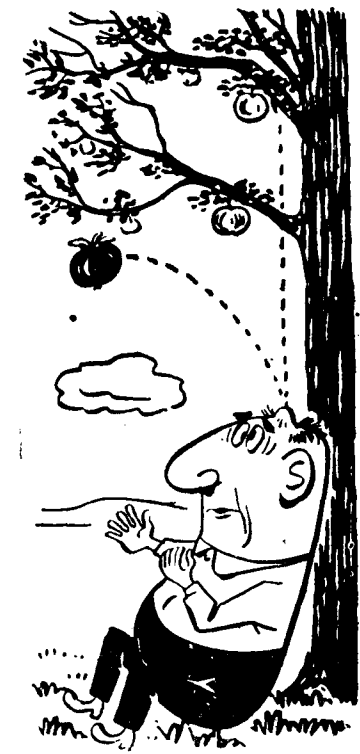
'But what's that got to do with you getting the sack?'

'I think he got jealous. People used to think I was the foreman.'

* * *

RAILCOACH

"Lumps" said a cynic
"are the fruits of experience."



Legend has it that Newton turned a lump from a falling apple into the law of gravity. A modern wit pointed out that while not all of us would have been able to come up with the natural law defining gravity that Newton came up with, many of us might have invented the derby. So, today, "lumps" in a job or operation are recognized as opportunity for thinking of a better way to do things. Whether your idea is of the magnitude of a natural law or only a "derby" idea, turn it in. You'll be surprised how good it feels to have an idea click.

MARCH OF SCIENCE

Use of Aluminium in Motor Cars

There have been many estimates of the amount of aluminium used in the motor car of today and expected in the car of the future. The figures do not always agree, but most have one thing in common—they indicate that the amount of aluminium used in automobiles is increasing rapidly. One thing is certain: if the applications of aluminium in the various cars were duplicated in all other cars in America, the volume of aluminium required would be increased by about 400%.

Present estimates are that the 1961 models use an average of about 62.8 lb. of aluminium. If all the aluminium components in the different cars were used in all cars, this figure would become about 250 lb. per car. On the basis of a production of six million automobile units per year, this would represent about 750,000 tons of light metal.

And how—Honey combs made of aluminium

For a long time honey bees have been represented as paragons of industry. How they have managed to be such efficient and reliable performers without the services of aluminium has been something of a mystery. There should be no mystery about it in the future, however, now that the A. I. Root Co. of Medina, Ohio, has put aluminium at their disposal.

This company is marketing a three-ply foundation for honey combs, made of formed aluminium sheet laminated on both sides with bees wax. A report says they receive acceptance by the bees that no other foundation can offer. The strength of the aluminium base eliminates cell distortion and allows less breakage in the

honey extractor while their design provides a maximum number of cells to the comb.

With this new incentive, the honey bee should work harder than ever. It is even possible that the better working conditions will make the bee sweeter-natured and less prone to use its weapons on careless humans.

Insecticidal Paint

Nearly 1,000 gallons of a type of insecticide paint have been ordered by overseas countries so far this year from J. Manger and Son Kingsland, London E. 8.

The paint, known as Lakil, is a gloss enamel type which contains two powerful residual insecticides, either of which is sufficient to kill almost any variety of insect. Supplied in a range of eight colours, plus black, white and clear, it can be applied in exactly the same manner as ordinary paint. Two of its greatest advantages are its freedom from offensive odours and the ability to retain its lethal properties for the whole life of the paint. Washing down increases its potentialities.

Four-purpose Wood Polish

A high-grade silicone wax for furniture and floors, that incorporates insecticides, germicides and fungicides in significant proportion has been developed by Cuprinol Ltd., 9, Upper Belgrave Street, London, S.W. 1. In fact, these additives are said to be so powerful that the polish will kill flies, cockroaches, wood-boring beetles and other pests after only a short period of contact with the polished surfaces. The harbouring of harmful germs is prevented, and the fungicides stop mildew and other mould growths.

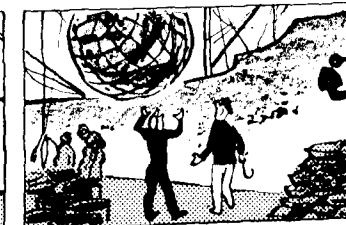
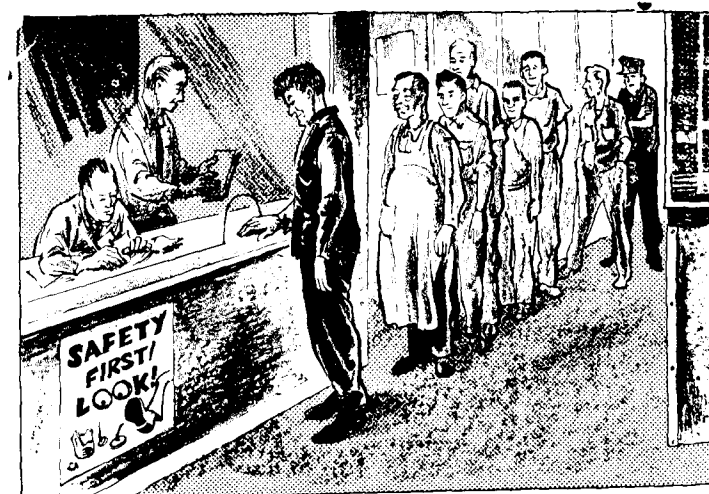
IT'S A FACT

By Bill Wilson

This is one of the questions most asked about the United States.

Question: What is the average income-tax paid by Americans?

Answer: The average American pays an annual federal income-tax of \$ 734. This is usually deducted from his wages and paid directly to the Government.



A large portion of the U.S. taxpayer's dollar goes to run the Federal Government and to support its many health, educational and research programs.

The U.S. taxpayer realizes that much of his taxes goes into foreign aid and to help protect the free world from aggression and to help underdeveloped countries.

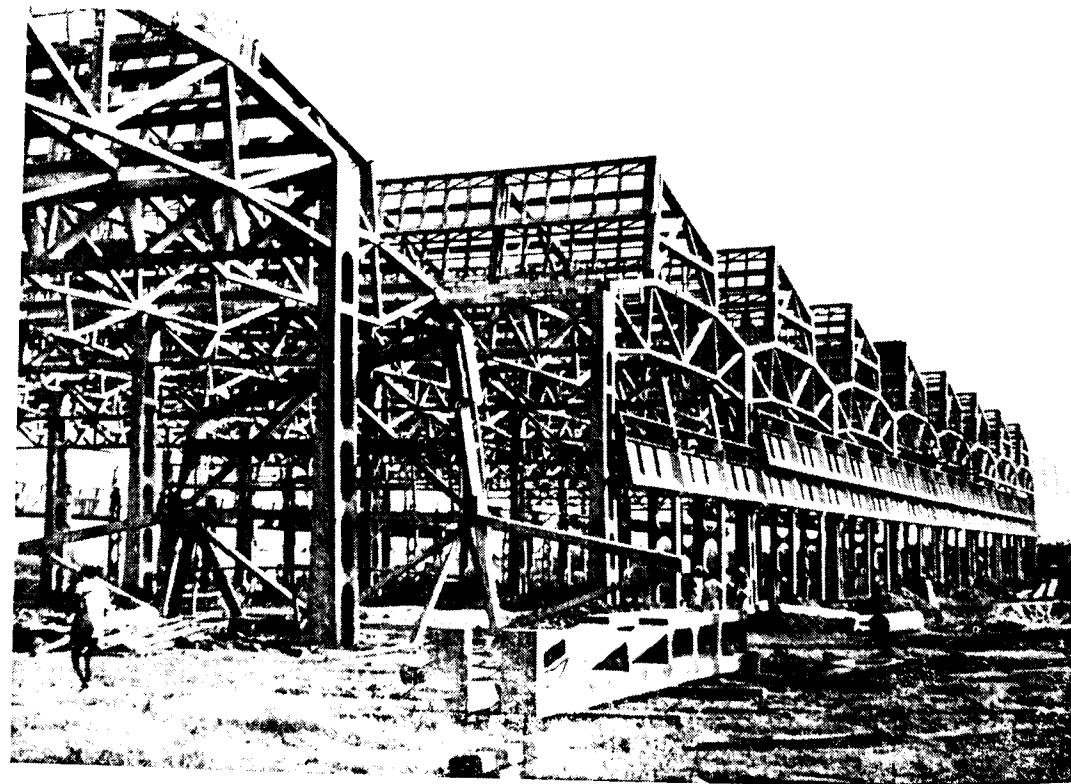
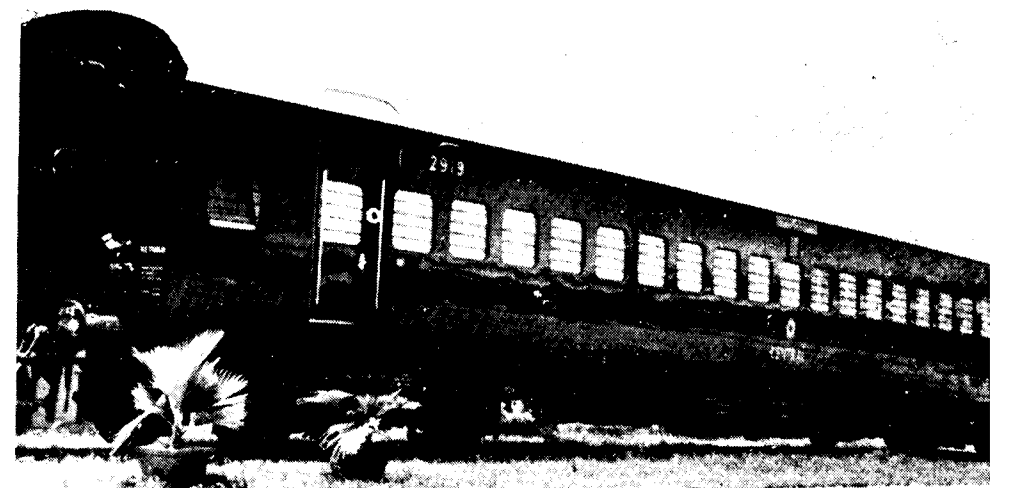


Photo shows the precast structure completely erected for one of the sheds of the Permanent Furnishing Factory.



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The "Railcoach" circulates among officers and staff of the Integral Coach Factory, General Managers and other important Officers of all Railways in the country, the Union Minister for Railways, the Union Deputy Ministers for Railways, the Chairman and Members of the Railway Board, etc.

TERMS

1. Blocks or lay-outs are to be supplied by the Advertiser or will be charged for extra.
2. Advertisement materials to reach the Editor before the 1st of every month for the month's issue.
3. Cheques should be drawn in favour of the Editor, "Railcoach", Integral Coach Factory, Perambur, Madras 23.
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The Editor

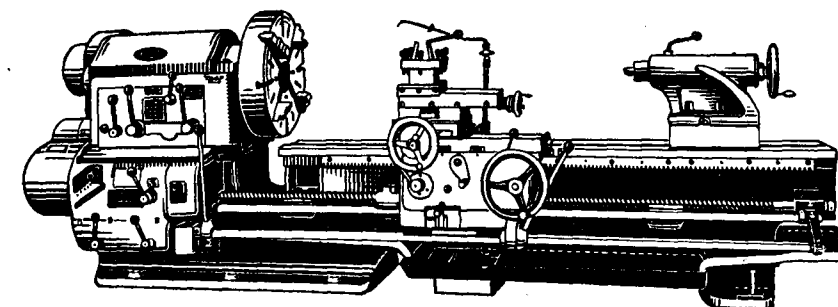
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Integral Coach Factory, Perambur, Madras 23



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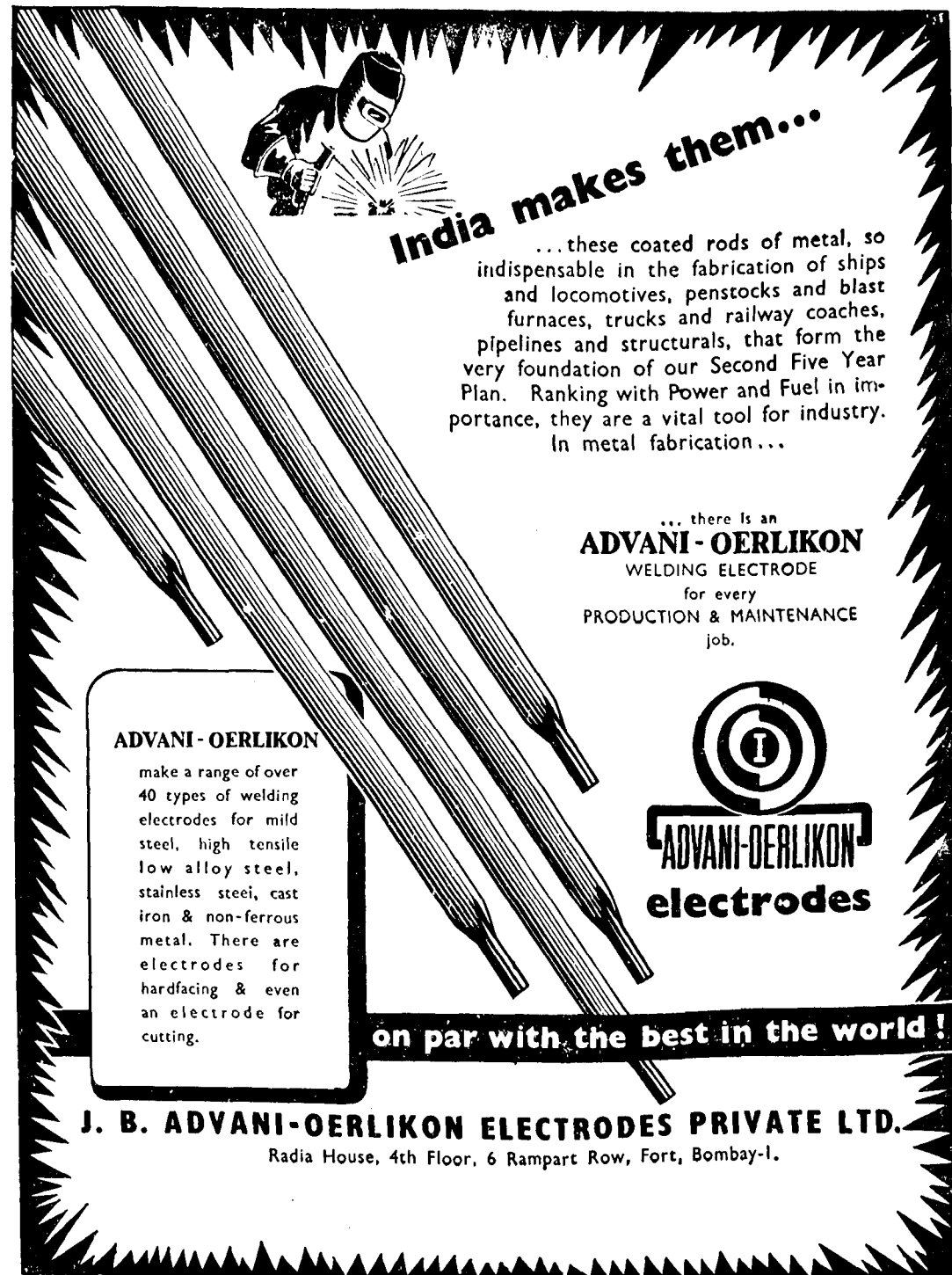
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RAILCOACH

(INTEGRAL COACH FACTORY MAGAZINE)

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

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

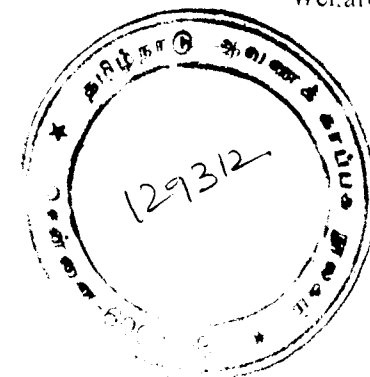
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Telegrams : Dieselage Madras

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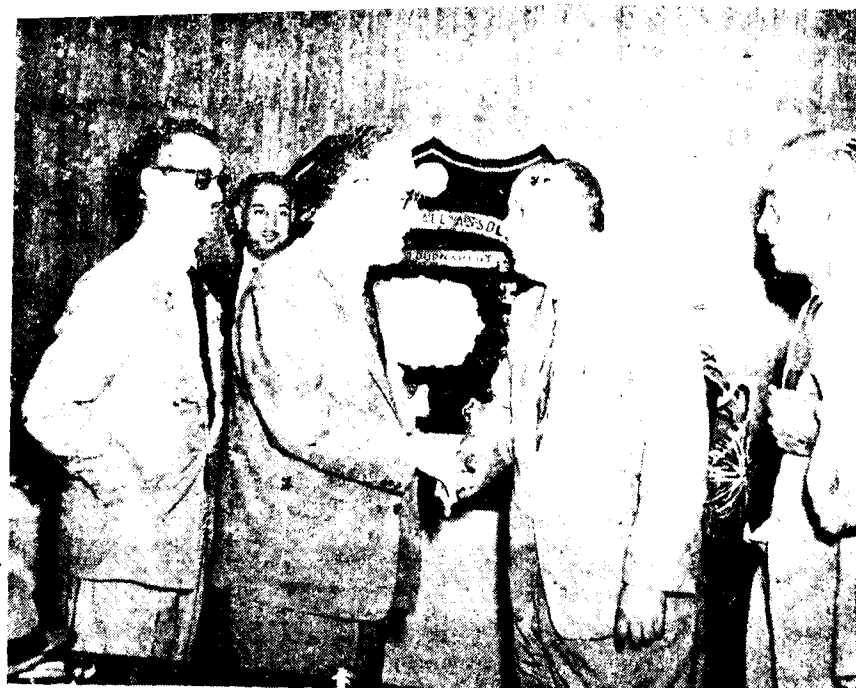
editorial

The Indian Industries Fair opened in New Delhi in November 1961, has proved that the importance of Trade Fairs and Exhibitions for economic activity in general is being increasingly recognised in the Indian industrial circles. 16 foreign countries, 7 Indian States, various Ministries of the Government of India, such as the Railways, P. & T., Defence, Steel Mines and Fuel, Irrigation and Power, C.S.I.R., All-India Handloom Board, Silk Board, Coir Board, Khadi Board, etc., besides a number of large and small groups of industrial establishments have taken part in the Fair. The most modern methods of a variety of exhibits displayed by the foreign participants, pictorial representation with an impressive array of mechanical appliances of methods and techniques of development, etc., demonstrates that industrialisation and economic development could be accelerated through the application of modern science and technology to the tasks of economic development. The Fair provides an opportunity to improve the existing contacts between the industrial circles of India with other advanced countries and also establishes that better trade relations would prevail if Indian businessmen came into direct contact with foreign businessmen not only for economic development but for human relations as well.

The export promotion pavilion shows to foreign visitors that India has started offering in international markets an ever increasing range of finished and semifinished products. The Fair also provides an opportunity for increasing the imports of Indian goods by foreign countries which would help her to improve the balance of trade. The exhibits of big steel plants set up with foreign technical collaboration establishes that co'laboration with advanced countries is necessary for properly developing heavy industries in the underdeveloped countries.

The Fair further helps much to show our country's determined effort to develop a modern economy through successive Five-Year Plans and to show how the foreign aid is effectively used in many ways in India.

The Federation of Indian Chambers of Commerce and Industry which has so successfully organised this Industries Fair deserves to be congratulated.



Some of the delegates of the Asian Railway Conference, who visited the Factory on 23rd November 1961 seen with the CAOR



Pakistan delegates seen with Sri R. D. Nadirshaw, Factory Superintendent of the ICF.

VOL. V, No. 8

THE RAILCOACH

NOVEMBER 1961

THIRD ASIAN RAILWAYS CONFERENCE

INAUGURAL ADDRESS BY VICE-PRESIDENT

I am happy to be here and inaugurate the Third Asian Railways Conference. The two earlier Conferences were held in Japan in 1958 and 1960, and now the third is being held in this country.

This is a more representative gathering. Ministers, executive heads, senior railway officials from Iraq, Iran, Japan, Malaya, the Philippines, Thailand, Turkey, Burma, Ceylon, Indonesia, Saudi Arabia, Pakistan, United Arab Republic as well as the Head of the Transport and Communications Division of the ECAFE and observers from France and U. K. are attending this Conference.

The world is becoming increasingly interdependent and this interdependence can be sustained by regional co-operation leading to international co-operation on a larger scale. Railwaymen the world over form a fellowship and extend to one another courtesies and privileges. This fraternity cuts across national and racial frontiers and makes for international co-operation. Remember the great phrase used by Karl Marx "workers of the world unite". Railway workers of the world are united, I hope for the purpose of co-operation and not for conflict.

India has had relations for many centuries with many of the countries in this region. We have had a great deal of give and take, cross fertilisation of ideas. With the new methods of transport this process has been speeded up. The railways have contributed not only to inter-connection between different countries but to

national development. In 1944 when I visited China the railway system there was confined to the coast line. Now, of course, there has been a great development. The railway development is essential for national progress.

The countries of this region have more or less similar geographical, social, cultural and historical conditions and the problems there are quite different from those of highly industrialised countries. In these areas we find colossal poverty, the meaninglessness of millions of lives spent without purpose or interest and extinguished without notice. All these countries in Asia and Africa which were under colonial domination till recently suffer from the nightmares of the past and have dreams of the future and they are anxious to accept the challenge of the times and build up their railway system. So a Conference like this will help us to understand our special problems and establish closer relationship between the different countries which will be to great mutual advantage. Exchange of views on problems of railway construction, operation and development among the top executives and technical experts of Asia and Africa will be a great stimulus to standardisation and further expansion of railways.

We cannot say that all the countries here are underdeveloped. Japan, for example, is well developed. We are also developing and are making a great deal in railway equipment in our own country. We have now nearly 35,000 miles of railway routes. Steam engines,

coaches, wagons, signalling and most of other accessories and stores are now manufactured in the country. The first electric locomotive has come out of the Locomotive works at Chittaranjan and the production of diesel engines has also started. It is a novel feature that the Indian Railways have a research and design wing which carries on scientific investigations into the various technical aspects of railway operation. We have also over fifty technical training centres for railway staff, from officers to tradesmen which are open to railway systems of other countries.

We have to develop the railway system further on account of rapidly increasing volume of traffic resulting from the successive Five-Year Plans.

While we are advancing in scientific knowledge and technical skill, we are falling behind in the understanding and appreciation of human values. We can handle machines and physical nature beyond the dreams of previous generations, but in dealing with human beings or in handling ourselves we do not seem to have made much progress.

We had in recent weeks three major railway accidents which are causing us grave concern. It is easy to build machines and equipment but it is difficult to build men, though it is absolutely essential. Many of our people suffer from a lack of purpose and dedication. They must be made to realise that they are contributing to the development of the country by their hard, honest and efficient work. This spirit should be developed at all levels from top to bottom. A new climate has to be produced of disciplined, dedicated work.

I hope your deliberations will prove of value to the different countries participating in the Conference.

RAILWAY MINISTER'S SPEECH AT THIRD ASIAN RAILWAYS CONFERENCE

It is my proud privilege, on behalf of the Government of India, to welcome you to this Third Asian Railways Conference.

It was in 1958 that the First Asian Railways Conference was convened by the Japanese National Railways with the aim of promoting closer relationship between Railway systems of Asian countries. The Conference afforded an opportunity for the delegates to exchange ideas generally on problems of mutual interest, and to see Japan's industrial advancement after the war and its potential in the railway field to meet the developmental needs of countries in Asia, whose requirements had hitherto been met by imports from European countries.

In 1960 the Second Asian Railways Conference was again held in Japan. In response to an invitation extended by the Chairman, Railway Board, on behalf of the Government of India, all participating countries agreed to hold the Third Asian Railways Conference in New Delhi and thus we are assembled here today.

Delegates representing the Railway systems of 15 Asian and African countries have come to participate in this Conference. In addition, observers from the United Kingdom, and France and the Chief of the Transport and Communications Division of E.C.A.F.E. are attending the Conference. The participating countries are : Burma, Ceylon, India, Indonesia, Iran, Iraq, Japan, Malaya, Pakistan, Philippines, Saudi Arabia, Syria, Thailand, Turkey and the United Arab Republic.

It is particularly gratifying to have amongst us President Sogo of the Japanese National Railways whose initiative resulted in the previous two Conferences held in Japan in 1958 and 1960. We are also honoured by the presence of His Excellency Jamal Ganji, the Iranian Minister for Roads, who is leading the delegation from Iran.

These Conferences, apart from helping to lay the foundation for close and friendly relationship between the participating countries, constitute an important forum for the exchange of views on problems of railway operation and development, amongst top executives and technical experts of Railway systems in Asia and Africa.

Railways provide an essential service. The task of Railways is a complex and difficult one and their problems are varied and complicated.

In India we have undertaken a stupendous task of all round development of the country on a planned basis. Railways in India are also engaged on a large-scale expansion and development to meet the rapidly increasing volume of traffic generated by the successive Five-Year Plans. From twenty-seven thousand million ton-miles of freight traffic carried in 1950-51, the freight movement has risen to fifty-four thousand million ton-miles in 1960-61, recording an increase of 100% during this period. The Indian Railways carry nearly 4½ million passengers and half a million tons freight every day. Over 7,000 trains run daily serving over 7,500 stations. In the countries of our region, Railways are naturally called upon to play an essential role to meet new changes and increasing demands.

The development of Railways in an expanding economy is one of the main subjects for discussion at the present session. Standardization of rolling stock, equipment and their local manufacture is another important item. Other subjects for discussion include financial problems of railways and presentation of railway accounts and transport policy and co-ordination. Organisational matters pertaining to the future conferences will also be discussed by the delegates.

India has a very large railway network spreading over a sub-continent where every conceivable kind of terrain and climate can be found. The problems facing Railways of some of the countries of our region are the same as those that confronted the Indian Railways long ago. The delegates from these countries would perhaps be able to see how these were met by the Indian Railways under similar geographical, climatic, social and developmental conditions.

It would appear from the wide interest that this conference has aroused that its usefulness has been realised. I hope therefore that these

conferences will continue to provide a regular forum where representatives of railways from all countries of our region could exchange views on common transport problems. This would surely help in developing our railways along sound and economic lines.

Like many countries in our region, the Indian Railways were dependent until recently upon imports for all major portion of their equipment, machinery and plant. With the developments during the post-independence period, our country has acquired self-sufficiency in regard to almost all railway requirements—steam engines, coaches, wagons, mechanical signalling and a large number of other accessories and stores, now manufactured in the country. The first electric locomotive has also rolled out of the Indian Railways Locomotive Works at Chittaranjan and the manufacture of diesel locomotives is undertaken. The Indian Railways have also established an elaborate Research, Designs and Standards Organisation to cover various technical aspects of railway operation and serve as Technical Consultants for all projects and railway undertakings.

In addition, there are over fifty technical training centres for all categories of Railway staff from officers to workers in different trades.

After the three-day session in Delhi a tour has been arranged for the delegates to visit some development projects like the Bhakra Nangal Dam and important railway installations like Chittaranjan Locomotive Works and the Integral Coach Factory. In Calcutta, Asansol, Bombay and Madras, they will also witness other developments in the country and particularly various items of railway equipment and rolling stock, manufactured in the private sector.

In the end, I wish to state that all resources available with the Indian Railways with regard to railway equipment, rolling stock, etc., training facilities for staff and technical consultation and design services are at the disposal of all countries and they are welcome to take advantage of them.

CHITTARANJAN BUILDS FIRST ELECTRIC LOCOMOTIVE

INAUGURATION BY PRIME MINISTER SRI JAWAHARLAL NEHRU

October 14, 1961, is a historic day for Chittaranjan. The workers of Chittaranjan Locomotive Works have once again proved unmistakably that they have a great role to play in the industrialisation of the country—a dynamic role so to say, and have acquitted themselves creditably on the new assignment of manufacture of Electric Locomotives.

Our beloved Prime Minister Sri Jawaharlal Nehru, who honoured us with a second visit and graced the occasion, switched on the power and drove the first Chittaranjan built electric locomotive amidst thunderous applause and shouts of Jai Hind from the tumultuous staff, their families and public gathered on the occasion. The spacious area in the vicinity of the Assembly shop was the venue of the impressive and delightful ceremony, where a well-decorated rostrum and a spacious pandal with well planned seating arrangement was set up.

The Prime Minister accompanied by Smt. Vijaya Laxmi Pandit, Bharat Ratna Dr. B. C. Roy, Chief Minister of the State, Sri Jagjivan Ram, the Hon'ble Railway Minister, Sri Karnail Singh, Chairman, Railway Board and Sri E. W. Isaacs, Member, Mechanical Engineering arrived at the site of ceremony punctually and took their seats on the rostrum.

Besides the C. L. W. workers and members of their families, a distinguished gathering of guests from adjacent places were present. The children, neatly dressed in the finery of things and more so when 'Chacha Nehru' was Present, occupied conspicuous position in front of the rostrum.

The first electric locomotive to roll out of the assembly lines works on D.C. 1500 Volt, pressure and has a rated H.P. of 3,600 and has

been designed by the R.D.S.O. of the Indian Railways for use on Central Railway. Painted in a most agreeable two tone blue and cream colour, it stood majestically on the track through the inaugural function awaiting the energising ceremony by the Prime Minister.

Sri Gopal, Mistry T/No. 09/054, who is in the fortieth year of his faithful service, earned the proud privilege to name the first Swadeshi Electric Locomotive, manufactured in Chittaranjan, as "Lokamanya" after the hallowed memory of Bal Gangadhar Tilak, the great national leader, an indefatigable worker and fighter in the struggle for freedom of India. A miniature model of the electric locomotive was also presented to the Prime Minister, by Sri Gopal, Mistry as a token of love and affection, on behalf of the workers of Chittaranjan.

At the outset Sri R. Krishnaswamy, General Manager, C.L.W. extended a hearty welcome and read out his address outlining the birth of the loco building project at Chittaranjan, which was primarily sponsored to achieve self-sufficiency in Steam locomotives. The rapid progress made by C.L.W. was indeed a heartening record of achievements, the targets set having been achieved ahead of the time schedule with gradual planned decrease in the average cost of the W.G. locomotive.

With the establishment of G Ivanising Plant, the speaker continued, the Chittaranjan Locomotive Works entered a new phase of activity in connection with the Electrification Project. Since March 1, 1952, the last occasion when the Prime Minister visited the "Loco" town, C.L.W. was able to surpass her own record and set up new milestones within the span of a decade only, the latest being the

manufacture of the first electric locomotive. After the completion of the present order for D.C. locomotive, the General Manager revealed that scheme for manufacture of A.C. electric locomotives, was also under contemplation.

The General Manager also narrated how the township kept pace with the progress achieved in the production front and social development of the township. In conclusion he paid tribute to the workers of Chittaranjan for their hard work and unflinching devotion to duty, which was reflected in the results achieved.

Sardar Karnail Singh, Chairman, Railway Board, reviewed the performance of C.L.W. and felt proud that Chittaranjan-made locomotives were not inferior in quality compared to the imported engines from other countries, but proved to be superior in some respects for their efficiency and cheaper cost of production.

Continuing he said that the Incentive scheme, introduced at C.L.W., while raising the emoluments of the workers from 28% to 30% on their basic pay, helped largely in the general production. He praised the skilful performance of the C.L.W. workers and invited the distinguished guests to have a look round the workshop and see for themselves how C.L.W. was equally good for heavy as well as precision work, which in some cases needed accuracy even to ten thousandth part of an inch.

He congratulated the workers of Chittaranjan Locomotive Works for their confidence and firm determination to rise up to the occasion and hoped that under the able guidance of the National leaders, Chittaranjan, or for that matter the entire Railway family, would forge ahead successfully with full faith in God.

Dr. Bidhan Chandra Roy, Chief Minister of Bengal, in a short be-fitting address paid glowing tributes to Deshabandhu Chittaranjan

Das to whose memory the place was dedicated and urged the gathering to follow him in his footsteps.

Referring to the tremendous progress that C.L.W. made in switching over to the production of electric locomotive he drew a fine analogy and said that Sri Jawaharlal Nehru, our beloved Prime Minister, was associated closely with all that was progressive in the country and his august presence was a proof of his desire to bless all that would lead to progress.

Dr. Roy held that for the development of the country, multi-directional progress was needed which was dependent on the total efforts and hard solid work put in by the people.

Addressing the gathering on the occasion Sri Jagjivan Ram, the Hon'ble Railway Minister, observed that the ceremony was a historical event, which would be written in gold in the history of Indian Railways. The expansion in the transport capacity should keep pace with the industrial and agricultural development of the country and accordingly, the Indian Railways were expected to carry 59% more load by the end of the third Five-Year Plan than what they carried today. The passenger traffic would also increase. Naturally the Railway had to launch upon the programme to build electric locomotives locally. The work for electric engines had already started at Chittaranjan and that for diesel engines a plant was being set up at Varanasi. C.L.W. would manufacture the mechanical components, and the Heavy Electrical Works at Bhopal will supply all the electrical components to Chittaranjan for Building of Electric Locos.

The Railway Minister took this opportunity to acquaint the gathering with the history of advancement that the Indian Railways were making in all directions and appreciated the commendable contribution made by Chittaranjan.

We have made Chittaranjan an ideal Railway unit where the workers enjoy all sorts of amenities, viz. education, sanitation, medical facilities and so on. It has all along been our endeavour to introduce such facilities on all Railways in a larger measure, so that the employees do not have to incur any expenditure on these accounts — declared the Railway Minister, and called upon the C.L.W. workers to form Co-operative Societies of various kinds to cater to their own needs and keep off the profiteers and middle men as far as possible, for which purpose an amount of Rs. 50,000 would be advanced.

In a nationalised undertaking like this, the speaker went on to say, there was no question of employer and employee, but everybody from the top to the bottom was engaged in the common service to the nation. The cordial relation that existed between the officers and men at Chittaranjan was highly appreciated.

The Railway Minister characterised the exemplary work carried on at Chittaranjan and felt that not only the Railway as a whole but the entire country felt pride in C.L.W.'s achievement. In conclusion, he thanked heartily the Prime Minister and Dr. Roy, the Chief Minister of the Province, for their august presence and blessings.

Prime Minister's Address

In his inaugural address, the Prime Minister recalled his first visit to Chittaranjan nine and half years ago and said that since then she had made considerable progress and earned reputation not only in India but abroad also.

Referring to the manufacture of electric locomotive the Prime Minister preferred to term it as a epoch-making event and a bold step forward ushering a new era — an Electric era in the country.

The lofty ideals of Deshabandhu Chittaranjan Das, his great patriotism and sacrifices and the towering personality that he possessed were focussed upon and he hoped that those who were fortunate to work here, would draw

strength and inspiration from his spirit. The economic salvation of the country, he added, rested with the countrymen in general and the responsibility devolved on the forty crores of people in India.

The Prime Minister referred with regret to an open letter received by him calling the township as a "prison house" and wondered at the fantastic allegations. He dismissed the issue as highly objectionable, irresponsible and useless and asserted that to protect the historic achievement at Chittaranjan, subversive activities would under no circumstances be tolerated.

Continuing the speaker added that India had launched the development plans the success of which depended on the active co-operation and hard labour of the people. A large number of engineers and technicians were needed for the Third Five-Year Plan.

The wealth of a country did not always mean the actual silver or gold held by it, but it constituted in the hard labour of the workers, both in the field and industry, he added.

Stressing on the need for proper education, both for boys and girls, the Prime Minister urged upon his listeners to get rid of superstition and be prepared to accept things on scientific analysis. Superstition was not religion he opined.

The Prime Minister congratulated the workers of C.L.W. for the good work they were doing for the country and made a fervent appeal to all to give up sectarian ideas and parochial outlook for the country's progress.

Presentation of Awards

As many as 12 C.L.W. employees who rendered valuable service were the lucky winners of prizes from the Prime Minister. Each of them was awarded a India-made Wrist Watch. The Winners included one Sri Amiya Ranjan Gosh, Electric Fitter, who received his prize from the Prime Minister in his sick bed at K.G. Hospital.

Press Conference

On the inaugural occasion of the Electric Locomotive a Press Conference was held in the Meeting Room of the Administrative Office on the day preceding, when reputed journalists from all over India came to Chittaranjan. Sri R. Krishnaswamy, General Manager, explained in details the background of the manufacture of electric locomotive and replied to the Press queries regarding the role played by Chittaranjan Locomotive Works in the context of the developing economy.

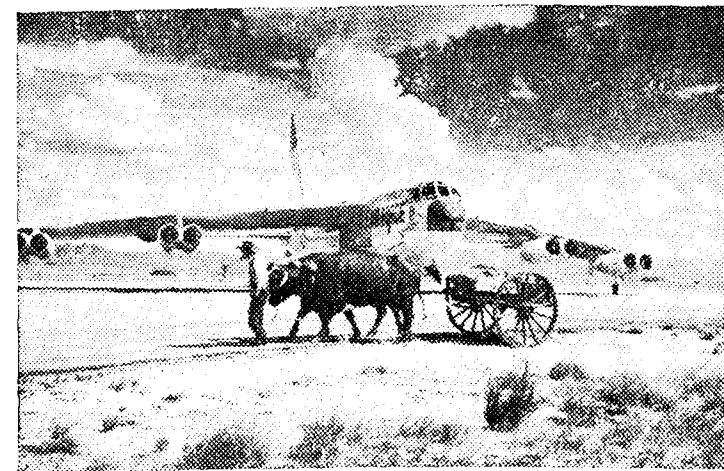
The members of the Press Party also visited

the Model Room and the Workshop to acquaint themselves with the activities of Chittaranjan.

During their stay at Chittaranjan, visits to the Hindustan Cables, Rupnarainpur, and to the Maithon dam were also arranged.

Distribution of Sweets

On the gay celebration of inauguration of the first electric locomotive, sweets were distributed to the employees and the children. Our beloved Prime Minister, who is so fond of the children started the distribution himself.



TRANSPORTATION, OLD AND NEW—About to start down the runway at Kirkland Air Force Base near Albuquerque, New Mexico, a big B-52 bomber finds the way barred by an old-fashioned means of transportation—an ox-drawn cart hauling a cargo of wine. The Strategic Air Command Stratofortress, powered by eight jet engines which develop over 10,000 pounds of thrust, flies at speeds above 650 miles an hour and has a range of 6,000 miles without refueling. (60—1499)

VISITORS TO THE FACTORY



Delegates of the Asian Railways Conference being conducted round the workshops by CAOR.

Mr. Ronald Hurman, Editor of the "Daily Mirror", London, whose visit to India was sponsored by the British Information Services, visited the Integral Coach Factory on the 2nd November 1961. After going round the factory he recorded his impressions in the Visitors' Book of the factory as follows: "Most impressive."

About 80 delegates who attended the ECAFE Seminar on Industrial Estates conducted in Madras in November 1961 visited the Integral Coach Factory on the 8th November 1961. They were conducted round the Factory in convenient batches. They were greatly impressed with what they saw in the State-owned production unit. At the conclusion of their visit they held discussions with the principal officers of the factory at the T.T. School Auditorium.

A team of leading American Industrialists and prominent Trade Union Leaders who belong to the Technical Cooperation Mission at present functioning in our country and who attended the Seminar on Industrial relations and Personnel Management at Madras as delegates, visited the Integral Coach Factory on the 14th November 1961. On arrival at the factory the distinguished visitors were received by Shri R. D. Nadirshaw, Factory Superintendent. After explanation of the salient details about the factory, the visitors

were taken round the Shell Factory and the Permanent Furnishing Project under construction. At the conclusion of the visit they held discussions with the principal officers of the factory. Greatly impressed with what they saw in the factory they recorded in the Visitors' Book as follows:—

Mr. Saul M. Silverstein,
President, Rogers Corporation.

"Keep up the good work".

Mr. Walter J. Buke,
District Director,
United Steel Workers of America.

"A modern operation on to technology".

Mr. John D. Foster,
Director of Personnel,
Port of New York Authority.

"Excellent operation".

Mr. Richard W. Humphrey,
Education and Research Director,
Allied Industrial Workers Union.

"A sign that India will succeed in her very objective".

An Indonesian Trade Delegation led by Mr. Haroon Al Rashid Saleh, Director of the Division of Economic Affairs of Indonesia, visited the factory on the 17th November 1961. The visitors were received by Shri K. Santhanam, Deputy Chief Mechanical Engineer who took them round the Shell Factory and the permanent Furnishing Project under construction. The delegates were greatly interested to know of the progress made in this State-owned factory in the field of coach building and were greatly impressed. At the conclusion of the visit the members of the delegation met Shri K. Swarup, Chief Administrative Officer and held discussions with him and other principal officers of the factory. Shri Swarup presented a model coach to the leader of the delegation.

Delegates to the Third Asian Railways Conference held at New Delhi during November 1961 visited the factory on the 23rd November 1961. On arrival the delegates were received



Some of the delegates of the Asian Railways Conference seen inside a fully furnished First Class coach built by ICF

by Shri K. Swarup, Chief Administrative Officer who explained the salient details about the factory with the help of charts kept in the lobby. Later the delegates were taken round the Shell Factory, where they inspected a fully furnished coach. The visitors were then conducted round the Furnishing Project under construction and the staff colony. The delegates were greatly impressed with the progress made in the factory. At the conclusion of the visit the delegates held discussions in the Meeting Room where jewel boxes were presented to them as mementos of their visit.

Professor Ritchie Calder the famous Science Writer, and his son Mr. Nigel Calder, the Science Editor of "New Scientist", visited the factory on the 24th and 27th November respectively. At the conclusion of the visit Mr. Ritchie Calder observed that the factory was "a remarkable achievement" and Mr. Nigel Calder wrote in the Visitors' Book that the factory was "a most stimulating place to visit" and "a great promise for modern India".



Delegates to the Seminar on Industrial Relations and Personnel Management looking at the buffer of an ICF coach

The following other distinguished visitors saw the factory during the month :—

Visitor	Date of visit	Remarks
1. Shri A. D. Mani, Member of Parliament.	1—11—1961.	“ICF is an example of what Indian talent at its best can achieve with minimum capital it has turned out to be one of the best enterprises from the time of the First Plan. I hope ICF will be able to export its products and earn for the country necessary foreign exchange”.
2. Mr. K. L. Kelly, Secretary-General of the Automobile Association of Great Britain and Mrs. Kelly.	21—11—1961.	“A wonderful achievement”.
3. Sir Arthur Elton, Publicity Chief of Associated Electrical Industries, England.	25—11—1961.	“Staggering scale of achievement”.
4. Mr. Kiffin Paterson, of Prynne Abbot and Davis, Madras, Mrs. Paterson (Australians) and Mr. H E.R. Baker of Oldham and Sons (Indi.) with Mrs. Baker (Englishmen).	25—11—1961.	—do—



Delegates to the Seminar on Industrial Relations and Personnel Management at Madras, who visited the Factory on 14th November 1961 seen with the Factory Superintendent.

NEYVELI

LIGNITE

PROJECT

India's earth is rich in minerals although not all her mineral-bearing areas have been surveyed or located. The great increase in the requirements of power for India's new industries has made it urgent that our underground reserves of coal, oil and similar minerals be quickly exploited.

It has been known for over eighty years that in South Arcot, sixty miles west of Madras, there is an extensive reserve of lignite under the ground. Lignite is a most useful all-purpose coal. But it was only as late as 1943 that detailed investigations were carried out by the Geological Survey of India at the instance of the Government of Madras. These proved the existence of a vast area of nearly 100 sq. miles containing about 2,000 million tons of lignite reserves. Exhaustive tests demonstrated their high quality and the Government of India decided to inaugurate an integrated project to exploit these lignite reserves. The exact spot where they occur is called Neyveli from which the project derives its name.

Neyveli lignite seams vary in thickness from just a few feet to as much as 80 ft. These are, however, covered with a crust of what is known as Cuddalore sandstone ranging in thickness from 150 ft. to 200 ft.

At the place of the present mining operations the overburden is 180 feet thick and the lignite seam 60 feet. The excavation in the initial Mine Cut involves the removal of 27 million cubic yards *in situ* or about 40 million cubic yards loose.

Modern excavating and conveying equipment is used in the open cast mining at Neyveli. For the first time in India giant bucket wheel excavators which can dig up earth upto 2,000 cubic yards per hour are being used for excavation. The excavated earth is taken to the spoil heap by a system of belt conveyors, one of the largest in India, and spread out by "Spreaders". The spoil heap has now become a hill rising to a height of 150 feet over a square mile in area. Conventional machinery consisting of loaders and bottom

dumpers were used during the early stages of mining and they are still being used to supplement the work of the specialised mining machinery.

The mining problem at Neyveli is made more difficult by the presence of an artesian aquifer underneath the lignite seam. The artesian aquifer exerts a pressure of 5 to 8 tons per sq. ft. To control this pressure, it would be necessary to pump upto 45,000 gallons or about 120 cusecs of water per minute, and for pumping this water deep well pumps of 1,000 gallons per minute capacity will be used in bore holes measuring 48" in diameter. Drilling such widebore wells in a single stage by using reverse circulation rotary drills is being done for the first time in India.

The lignite seam in the mine can be touched any day now. Mining operations at present are for winning 3.5 million tons of lignite per annum although the annual rate of production can be stepped up.

Thermal Station

About 1.5 million tons of lignite per annum will be used in the 250 M.W. Thermal Station now under construction. The boilers will be fired by pulverised raw lignite. The station will have five boilers each capable of producing 220 tons of steam per hour at a pressure of 100 atmospheres and at a temperature of 550 C. Boilers operating at such high pressures and temperatures are also new to India. Five turbo-alternators, each having a capacity of 50 M.W., will generate electricity. Considerable progress has been made in the erection of the Thermal Station; the first 50 M.W. unit is expected to be put into operation by October 1961 and the remaining units at intervals thereafter. There are plans to expand this Thermal Station which will be one of the largest of its kind in India. The power from this station will be fed into the Madras Grid and so made available for meeting the industrial and other demands in the State.

Fertilizer Plant

Lignite will also be used for the manufacture of urea in the Fertilizer Plant which is now under construction at Neyveli. This plant will be the biggest of its kind in the world. Lignite is proposed to be gasified in Winkler type gasifiers and ammonia synthesised by the Fauser-Montecatini process. Urea will be manufactured by the process developed by Montecatini of Italy. The plant is expected to go into production in 1963 and the fertilizer produced here will help increase the production of foodgrains as well as stop the expenditure of foreign exchange now incurred on the import of fertilizers.

Briquetting and Carbonisation Plant

The Briquetting and Carbonisation Plant, now under erection at Neyveli, will produce about 380,000 tons of carbonised briquettes per annum, using about 1.5 million tons of lignite. Carbonised briquettes will form an excellent substitute for charcoal. The Briquetting and Carbonisation Plant to be set up at Neyveli will also be one of the largest plants of its type in the world and will produce beside briquettes, lignite tar and various coal tar products for the chemical and plastics industries.

Clay Washing Plant

Good quality China clay is available in the overburden on the top of the lignite seam at Neyveli. A Clay Washing Plant with a capacity of 6,000 tons per annum is now being set up. The washed white clay will be supplied to ceramic, textile, paper and chemical industries which do not have, at present, an assured and regular supply of good quality clay. This plant will go into operation by October 1961.

Fireclay of good quality is available in the overburden and this could serve as a basis for refractory industries.

Integration of the Units

The Neyveli Lignite Project consists of several inter-dependent units. The lignite produced in the mine will be consumed by industrial units planned, and will make mining

economical. The Fertilizer Plant may use the products of the Carbonisation Plant as part of the raw materials and all the plants will use the power generated by the Thermal Station. Thus, the various schemes are inter-linked and the Project becomes an integrated one.

New Township

Besides a large number of workers employed by contractors there are over 20,000 employees at present engaged on construction work at Neyveli. After the commencement of production, it is expected that there will be about 8,000 permanent employees in the Project. To house these employees and their families, a modern township has been planned and about 3,200 houses have already been completed and occupied. The township is laid out in accordance with the latest principles of town planning. Broad boulevards and playing fields have been provided. There are hostels for visitors, clubs and reading rooms for staff,

elementary schools and a high school, for the children of the employees. A multipurpose co-operative society catering for the needs of the employees, including restaurant facilities, is functioning and branches are being opened wherever necessary.

Industrial Development of the Country

When the Lignite Project goes into production, it will stimulate development of various industries in the area and its neighbourhood. The development of iron ore at Salem depends upon the possibility of using the Neyveli lignite for iron ore reduction. Power from the Thermal Station will assist in the electrification of railways besides meeting industrial demands. Inaugurating the Neyveli Project on the 20th May, 1957, Shri Jawaharlal Nehru said, "This Project is not only good in itself but a symbol and witness to a development to follow. It is a kind of catalyst which may lead to a very considerable development."

Two men were a drift in an open boat. They'd been lost for five days without food or water, it was beginning to look like the end soon. Finally one of them began to pray.

"Oh Lord," he said in a dramatic voice, "I've broken most of your commandments. I have been a hard drinker. I've run around with a lot of women. But if my life is spared now I promise you..."

"Wait a minute," his friend interrupted, "Don't go too far, I think I see a ship."

NEWS FROM SWITZERLAND

A Miniature Swiss Radio and Clock Combined

The combination of a radio set and a clock is an idea that has been in the air for some time now, but what is absolutely new, in the "Swisselectric" model, is the combination of a high quality electric clock with a transistor radio set of extremely small size. In fact, measuring only $4\frac{3}{4}$ in. long, $2\frac{3}{4}$ in. wide and $1\frac{1}{2}$ in. thick, the "Swisselectric" is the smallest radio-clock in the world. The clock has a 7-jewel electric movement running on a 1.5-volt battery with a life of one year. The radio set is equipped with 6 transistors, runs on a 9-volt battery and is designed for a single wave band (medium wave). The "Swisselectric" can operate as a clock alone, as an alarm clock or as a clock and radio combined, with volume control and individual audition by means of an earphone automatically cutting out the loudspeaker. In order to use the set as an alarm clock, the radio is switched to the required wave-length and volume, and the time at which one wishes to be woken is set simply by turning the appropriate knob. At the required time, the radio set starts up at the pre-set volume and automatically runs for an hour which should be ample time to wake even the heaviest sleeper; the radio set then automatically switches off. This truly pocket-size radio alarm, scarcely bigger than a packet of cigarettes, makes an ideal gift giving pleasure to both the giver and the receiver.

Swiss Industry in India

The first contracts, concluded in agreement with the Government of India under the Indo-Swiss credit agreement, within the third Indian Five-Year Plan, have just been signed for the supply of equipment for various chemical products factories. These new installations will be planned, supplied and put into operation by an engineering office in Zurich. Three factories producing caustic soda, chlorine and related products are to be equipped; several

Swiss machinery and electro-technical firms will be entrusted with the manufacture of the necessary machinery and plant.

Also in India, a Swiss alarm-clock factory, in collaboration with a French firm of the same branch, has just founded a company with Indian capital for the manufacture of alarm-clocks.

Zurich — Ancient Oriental Art

Archaeologists and philologists from many countries have done fine work over the past hundred years in rediscovering a vanished people—in the Hittites, whose kingdom was a leading power in Asia Minor in the second millennium B.C. But whereas a large number of finds from other centers of ancient culture have found their way into European collections and museums, the Hittite discoveries stayed in their country of origin, present-day Turkey. The cultural heritage of one of the most important and interesting peoples of the ancient orient are on public view for the first time at an exhibition in Zurich's Kunsthaus Art Gallery from the middle of November this year. Thanks to the readiness of the Turkish museum authorities to part temporarily with their unique treasures, it will now be possible to see original statues which were previously known to a few experts and which, in many cases, have never been illustrated.

The Fame of the Great St. Bernards

Since the first St. Bernard dogs were kept as watchdogs at the monastery and hospice on the Great St. Bernard Pass about three centuries ago, many specimens of this sturdy, loyal breed have become world-famous for their rescue work in avalanches. Barry, one of the most celebrated examples of man's best friend that ever lived, is said to have saved the lives of 40 people. Although the monks still keep a number of St. Bernard dogs as faithful companions, the job of life-saving

after avalanches has been taken over by the less stolid Alsatians, while the St. Bernards are mostly used as watchdogs. Edi Rodel, owner of the largest existing St. Bernard kennels, who raises between 40 and 70 dogs at any one time on his estate at Ottenbach, near Zurich, last year went in for an avalanche course with two of his sturdiest animals. His experience confirmed his belief that the St. Bernards have lost nothing of their most important gifts, which lie in their tremendous strength, their sure sense of direction and their absolute obedience. Rodel, a farmer who bought a St. Bernard 15 years ago as a watchdog, soon turned over completely to raising this breed. How successful he has been is shown by the large number of first prizes gained at international dog shows and the fact that dogs bred by him can be found in over 100 cities all over the world, from Honolulu to Goteborg.

Art at the Festive Season

Christmas is always a hopeful time for Swiss artists. True, they are inspired by idealism, not commercialism, but since the season is one of giving, there is always the chance of their work being bought as presents! **Basle's** Christmas art exhibition goes on until February 7, and provides a good opportunity of buying an acceptable gift, thus making a local artist happy as well as the recipient. Kreuzlingen's seasonal art show is limited to

December 6-11. Eastern Swiss artists' work will be on view in **St. Gall** until January 7 and that of Thun and Bernese Oberland artists until January 14 in **Thun**. The extensive exhibition staged by **Zurich** artists in the local Helmhaus and Stadthaus closes at the end of December. The graphic art stand in the Helmhaus, particularly, is always an unfailing success. Other artistic occasions from among a wide variety are the "19th Century Popular Art" exhibition at the Swiss Folklore Museum, **Basle**, the documentary exhibition "Protection and Preservation of Historic Building" at **St. Gall**, "Modern Dutch Graphic Art" in the Graphic Art Collection Department of the Swiss Federal Institute of Technology, **Zurich** (until December 10), and "Graphic Art and Books by George Roualt" at **Soleure** (open until mid-December).

Notable events in Western Switzerland's artistic life in December are: **Geneva**, one-man exhibitions by Roland Weber (until December 7) and Favre de Thierrens (December 9 to 30); **Le Locle**, Robert Hainard's wonderful collection of coloured woodcuts (animal life in Switzerland and other lands, on view from December 2 to 17). In **Berne** the Cantonal Crafts Museum presents an exhibition of Bernese minor crafts until December 24, while the Gutenberg Museum exhibits the "Most Attractive Swiss Books of 1960" in the same building, until December 28.

The salesgirl approached the idle customer. "Pardon me, sir," she said, "Could I interest you in a bathing suit?"

"You sure could, dear," the customer said, "but that's my wife over there at the perfume counter."

RAILCOACH

COMPETITIVE EXAMINATIONS

BY K. SARVOTHAMA RAO

Competitive examinations are used for two purposes. At Schools and Colleges they give a stimulus to study by rewarding with reputation, prizes and scholarships, those who show that they have learned most. They are also used in the selection of Officers and Staff for the military and Civil services. Looking at them from an educational point of view, everyone must allow that they have a wonderful effect in encouraging hard work. Many boys who, without the stimulus of competition, would refuse to take any interest in their lessons, pursue their studies with the greatest industry in the hope of surpassing their rivals. In this way they are induced to expend upon their work the energy which otherwise they would display only in their games. Some love knowledge for knowledge sake but the majority seek knowledge as a means of success in life or as a possession which will give them the pleasure of triumphing over their associates. Success in life is too distant an object to powerfully influence young people, so that in their case the desire of the reputation to be gained in competitive examinations is a much stronger motive. As they grow older and approach the time of waking their own way in the world, the necessity of study as a preparation for success in life becomes more apparent; but, to the very last the prospect of success in competitive examinations is a great encouragement to hard study, even if the student has no reason to expect that a high place in the list will be a recommendation to some appointment he wishes to obtain. Thus competitive examinations do good service in the encourage of study.

But however they are not without their accompanying disadvantages. In some cases competition is such an excessively powerful stimulus that it leads to over-work and the ruin of the physical health of too ambitious people. There is also a serious danger of harm to the moral character. In a competitive examination the successful candidate gains honour at the expense of his defeated

rival. Owing to this fact unrestricted competition is apt to encourage selfishness, and extinguish the kindly feelings which ought to exist between the young students at Schools and Colleges. In such struggles for success the competitors are tempted to stoop to actual dishonesty, and it too often happens that they yield to the temptation. These are grave dangers, against which it is the duty of the teacher to do his best to defend his pupils, but in spite of their gravity the competitive system is so necessary for efficient education that it could not be abandoned without ruinous results. As a means of testing fitness for Government service, competitive examinations are also on the whole most serviceable. It was objected against the Indian Civil Service and other such examinations on the contention that those who take a high place in the list are often mere book worms destitute of energy and practical ability. This may be admitted to be true in a certain number of cases, but the admission merely amounts to that that the system of selection by competitive examination is, like almost everything else in the world, imperfect; that it sometimes admits the worse and rejects the better man amongst the candidates. It is, however, quite certain that a large majority of the successful candidates in a competitive examination are superior to the unfortunately unsuccessful candidates. Cleverness in mastering languages, literature and science, is, as a rule, associated with general ability and the accurate knowledge of various books is a proof of either great intellectual ability or else of determined industry, which is as useful a qualification in a Government servant as intellectual ability.

Thus on the whole, the best men come to the front in competitive examinations, and, until a better system of selection is devised, the competitive system should be retained. At present the only alternative seems to be selection by patronage which is for more likely to admit incapable men into the public service and is open to other serious objections also.

THE AEROMOBILE OR THE FLYING CAR

An uncommon vehicle, which has neither wings nor wheels but travels at a speed of sixty miles an hour on an 'air cushion', will be among the exhibits in the American Pavilion at the Indian Industries Fair, opening in Delhi on November 14.

The "aeromobile," as this vehicle is called, is symbolic not only of the technological advances taking place in transportation in the United States but also of individual initiative and enterprise. For the first "ground effect machine" — the technical name for a vehicle moving on an air cushion — was conceived, designed, and fabricated by an individual American because he felt the need for such a vehicle.

Dr. William R. Bertelsen of Neponset, Illinois, a general medical practitioner, found rural winter roads frequently impassable for ordinary vehicles. Dr. Bertelsen's rural practice takes him over a lot of ground, including some roads made impassable to automobiles by seasonal snow and mud. Such driving hazards started the doctor thinking about other means of getting himself and his patients around. His first thought was a helicopter, but he realised that would be too expensive. A ground effect machine riding on a cushion of air appeared to offer a logical solution, and Dr. Bertelsen went to work.

The 'aeromobile' 200-2, which will be on display and in operation at the American pavilion, has a maximum gross weight of 2000 pounds and operates at a height of about one foot above the ground, at a maximum forward speed of 60 miles per hour. It can climb long grades of 15 per cent and short ones of 20 per cent.

What is this air cushion phenomenon? How does it enable a vehicle to travel above the earth at great speed?

The air cushion phenomenon, or 'ground effect' as it is commonly called, is not new. Scientists have known for years that a jet of air forced out of the bottom of a vehicle against a hard surface, such as the ground or water, forms a cushion that reduces friction and provides lifting power. Such a cushion provides lift to an aeroplane and helicopter at take-off when air from propellers strikes the ground. This ground effect does not aid flight at high altitudes, but a vehicle designed to travel up to a few feet above the earth's surface can be continuously suspended in the air as long as a compressed air cushion is maintained beneath it. Freed of friction from land or water, the buoyant vehicle requires very little power to attain great forward speed.

One of the great benefits of 'ground effect' travel would be its convenience. People isolated because of the lack of highways and bridges could 'fly' wherever they pleased. Farmers could transport food to market, and manufacturers could make deliveries quickly and by more direct routes. The family vehicles could serve as transportation and as pleasure vehicle, able to operate as an automobile or a boat. Any field would be a good road, any beach would be a good harbour.

"Ground effect" travel would be economical, an advantage of equal or greater importance than convenience. The two engines, one for lift and the other for propulsion, could be in a low horse-power range, would be inexpensive to produce and simple to operate. One engine would operate the 'lift' mechanism, which is a simple fan-like device to draw in and blow out air. Scientists in the United States are perfecting several types of devices to provide lift, each of which is considered efficient and capable of mass-production at low cost. The engine used for propulsion need not be extremely powerful and, therefore, would be simple, inexpensive, and economical to operate and

maintain. The two engines together would require much less fuel than an automobile or a boat because they would use no power to overcome the friction that inhibits today's conventional vehicles.

In the future we shall probably see many vastly improved ground effect machines. Some will travel at high speed, along rivers and over the sea, and other will scoot down simple grass-lined ditches guiding themselves. Still others will be used in rough country where there are no roads at all.

Tomorrow's travellers will offer a vote of thanks to a rural doctor from America's farm belt who used his imagination as well as his heart to better serve his patients.

(USIS)

RAILCOACH

Invites contributions from staff of the I.C.F. for publication. Photographs of their children and family may also be sent. Articles should be typewritten on one side of the page in double space.

DO YOU KNOW?

The originating traffic on the Indian Railways has shot up from 91.5 million tons in 1950-51 to 154 million tons in 1960-61.

The average load of freight traffic has gone up from 470 kms. (292 miles) to 570 kms. (354 miles) during this period.

Of the total of Rs. 50 crores proposed for staff welfare in the Third Plan, Rs. 35 crores are intended to be utilised for the construction of staff quarters.

The Third Plan provides for Rs. 15 crores for more and improved amenities at stations and in trains.

The daily average loading on the Indian Railways during the period from December 1960, to July 1961, increased by 5.4 per cent on the broad gauge and 2.5 per cent on the metre gauge as compared to the corresponding period of the previous year.

Departmental catering on the Indian Railways has now been introduced at 107 stations and in 20 dining or buffet cars.

The cost of plant and machinery, proposed to be imported for railway transport during the Third Five-Year Plan period, is likely to be about Rs. 12.50 crores.

Dr. EMILIO G. SEGRE DISCOVERER OF THE ANTI-PROTON

An indefatigable worker in his efforts to discover more about the nature of the universe and the atoms of which it is compassed, Dr. Emilio Segre won world-wide fame in 1959 when he was awarded the Nobel Prize in physics. The award was given to him in recognition of his discovery, working with his colleagues, of the mysterious negatively charged particle within the atom called the anti-proton.

This particle, after its discovery, was called by the U.S. Atomic Energy Commission, "a nuclear ghost that had haunted the world's physicists for a generation. A complete understanding of it would bring science much closer to understanding the nature and origin of the universe."

Scientists hailed Dr. Segre's discovery, made in 1955, as an epochal step forward in the long inquiry into the nature and construction of the universe. The scientific world had long suspected the existence of the anti-proton. But it had never before been possible to prove its existence.

Just what is this strange particle?

As is now well known, an atom is a tiny solar system, in which one or more neutrons and positively charged protons constitute the "sun," or nucleus of the atom. Circling around the protons — like the planets around the sun — are negatively charged particles called electrons.

The anti-proton does not exist in the nucleus of the atom. It is a particle of the same mass as the proton, but of the opposite, negative, electric charge. It is born and "lives" only outside the nucleus, coming into existence after some high-energy nuclear event such as a "collision" resulting from bombardment in a powerful atom smashing device. Until the bevatron — the high-energy atom smasher at the University of California — was

constructed, nuclear bombardment of sufficient energy could not be carried out.

Speaking of the discovery of the anti-proton, Dr. Willard F. Libby, then acting chairman of the U.S. Atomic Energy Commission, said: "The discovery of the anti-proton will open the way toward fuller understanding of the basic nuclear processes, which are fundamental to the entire atomic energy programme."

Born in Tivoli, Italy, in 1905, Emilio Segre was studying engineering at the University of Rome when his friend Enrico Fermi invited him in the early 1930's to work with him and a small group of other young scientists on the production of artificial radioactivity. As a member of this group, Dr. Segre participated in the discovery of slow neutrons and collaborated with Fermi and others on a series of epoch-making studies which laid the groundwork for the development of atomic energy. Fermi later came to the United States and in 1942 succeeded in harnessing uranium fission to produce the world's first nuclear chain reaction. In 1938 Dr. Segre came to the United States, and six years later, like his friend Fermi, became a citizen. Meanwhile, he worked as a research associate at the University of California's Radiation Laboratory at Berkeley and lectured in the University's physics department.

Little by little, his steady and determined day-to-day research yielded more and more information concerning the nature of the atom and the process of splitting, or fissioning it. With Dr. Glenn T. Seaborg and others he discovered plutonium 239, producing it in the Berkeley cyclotron by fissioning uranium. In 1941 Dr. Segre and Dr. Seaborg announced that they had split atoms of uranium and thorium into equal parts.

From 1946 on, Segre conducted experiments on the scattering of neutrons and protons, including measurements of the effects of proton polarisation. This research proved to be one of the important keys to an understanding of the forces that are interchanged between atomic particles, a subject about which nuclear scientists had long been seeking more specific information.

Dr. Segre next collaborated with a colleague, Dr. Owen Chamberlain, who also was working on proton polarisation. Together they carried out a classical series of experiments which eventually resulted in the discovery of the anti-proton.

Many other anti-particles have since been found, including anti-electrons, anti-neutrons, and anti-mesons. Segre believes that in the end a complete set of anti-particles will be

discovered — one for each atomic particle — in the debris left by high-energy collisions.

The concept of symmetry in the universe, Dr. Segre says, calls for equal numbers of particles and anti-particles. Some of the galaxies seen in far-off space, he believes, may actually be anti-galaxies made up of anti-stars with anti-planets revolving around them.

Dr. Segre has described his research work in scientific journals in Europe and the United States, has lectured in many countries, and is an honorary faculty member of San Marcos University in Lima, Peru. He has been elected to a Fellowship in the Societa Italiana di Fisica and has been honoured with membership in the scientific academies of Germany, Peru, and Uruguay. He is now continuing his research work at the University of California.

The new maid had received all her instructions, and before the mistress of the house left she reminded the maid : " Now don't forget, the children must all be in bed by eight o'clock at the latest."

When she returned she asked the maid how the children had behaved. " Oh, they were all just fine," the maid said, " All except the oldest boy the redheaded one. He just refused to" " The redheaded one ! " screamed the woman, " That's my husband ! "

SPORTS

INTER-DEPARTMENTAL FOOTBALL TOURNAMENT

BY

A. R. VENKAT

'B' SHOP ANNEXES 'GENERAL CARRIAPPA' SHIELD

'B' Shop annexed the 'General Cariappa' Shield this year by beating J Shop last year's holders in the finals played on 27th October 1961 at the ICF grounds.

I am giving below a brief review of the matches.

TOP HALF

E Shop had a easy win over CAOR's office by 8:1, but E Shop lost to B Shop by 7:0, in the next round.

A Shop beat Stores Department by 2:0. The match between Furnishing and Mechanical Department on the first day ended in a draw, each side scoring twice, but the replay was won by Furnishing with 2 goals to their credit. In the quarter-finals Furnishing beat A Shop by two goals to one, and qualified to meet B Shop in the semi-finals.

BOTTOM HALF

The Electrical Department beat Civil Engineering by one goal to nil and C shop beat R.P.F. by two goals to one in the first round.

F Shop scored a facile victory over D Shop by five goals to nil, but F Shop was very unlucky to face defeat at the hands of J Shop by a solitary goal.

By their win over C Shop, by four goals to two, Electrical Department moved to the semi-finals to meet J shop.

SEMI-FINALS

B Shops win over Furnishing

B Shop, last year's runners-up beat Furnishing by one nil and qualified themselves for the finals.

In the first half neither side scored although Furnishing had better of the exchanges. Stephen, the B Shop's custodian had some anxious moments. D'ecruz sent a powerful shot at the goal, but the Furnishing custodian Sivashanmugham saved it very nicely.

Soon after resumption, B Shop missed some chances. Ramayya of Furnishing took an accurate aim at the goal, but Stephen Shadrack, the State and ICF Goalie didn't fail to thwart it. In the 18th minute after resumption, Kuppuswamy accepting a pass from Ganapathy scored the match winner.

Williams at the Furnishing defence played top class soccer, which was well enjoyed by the spectators. No wonder in his wearing the Indian Railway's colours this year in the National Championship! Mention should also be made of his team mates Sarangan, Xavier, Gnanasekaran and Ramayya, who tried their best for an equaliser.

J Shop's victory over Electrical

In the other semi-finals, J shop beat Electrical Department by 4:1.

The Electrical Department didn't function as properly as it did against C Shop in their previous engagement. It was J Shop who drew the first blood through Lazar in the 20th minute.

In the 10th minute after lemon time, Paramasivam, off a pass from Gajendran, increased the margin. At the 15th minute, Lazar scored the third goal for his side in a beautiful manner. Damodaran, who substituted Joseph

The Winners



in the first half, proved worthy of his inclusion, by scoring the fourth goal for J Shop. During the closing stages Electricals reduced the margin through Dhanapathi, but the final whistle ended in favour of J Shop.

Special mention should be made of Kannappan and Gajendran at J Shop's defence and Dhanapathi and Vivekanandam of Electricals for their good efforts.

FINALS

B Shop beats J Shop - the Holder

The B Shop regained the 'General Cariappa' Shield and avenged their last year's defeat by beating J Shop, the holders, by three goals to nil. The finals was watched by a record crowd at the ICF grounds.

Neither side scored in the first half. In the 5th minute D'ecruz didn't utilise a pass from Joseph Krishnan of B Shop. In the 7th minute a powerful shot from Radhakrishnan was well blocked by Stephen.

After resumption, the tussle was very exciting. In the 10th minute, Lazar of J Shop could have scored a goal, but he passed to

Damodaran, who failed to convert it. In the next minute, a good kick by Joseph Krishnan was well gathered by Jothivelu under the bar.

In the 18th minute, B Shop drew first blood through D'ecruz, off a pass from Joseph Krishnan. At the 20th minute, Kannappan of J Shop took a very good aim from 20 yards range, but missed the mark by an inch.

In the 25th minute, Bhattachari scored the second one for B Shop. Five minutes from close, Abdul Rahiman from a pass from Antony shot across into the net for their third goal. Had Antony used all the chances that came on his way, B Shop could have won by a bigger margin.

Thus B Shop, who were the holders in the year 1959, regained the General Cariappa Shield this year. It is noteworthy to mention here that this is the only shop which defended from any of the team's scoring against them in their engagements.

Shri K. Swarup, Chief Administrative Officer, who presided over the evening, was introduced to the players and officials of the



and the Runners

tournament by Shri D.R.R. Sastri, Secretary, I.C.F. Sports Council.

Shri Swarup distributed the 'General Cariappa' Shield and cups to the winners and runners-up. He congratulated the B Shop (who are having six regular players in their ranks), for their victory and added that in other shops there may not be at present any 'A' team players, but talent can be developed and all young players can aspire to wear the I.C.F. colours. The Inter-Departmental competitions should help largely in this direction.

"WELFARE NEWS"

I.C.F. Colony School

The Annual School Day of the I.C.F. colony Schools was celebrated on the 2nd October, 1961. Sri R. M. Sambamoorthy, Dy. C.E. and Chairman of the I.C.F. School Committee of Management presided over this function. Sri V. T. Titus, Dy. D.P.I., Madras was the Chief Guest of the function. The function concluded with a variety entertainment got up by the children themselves.

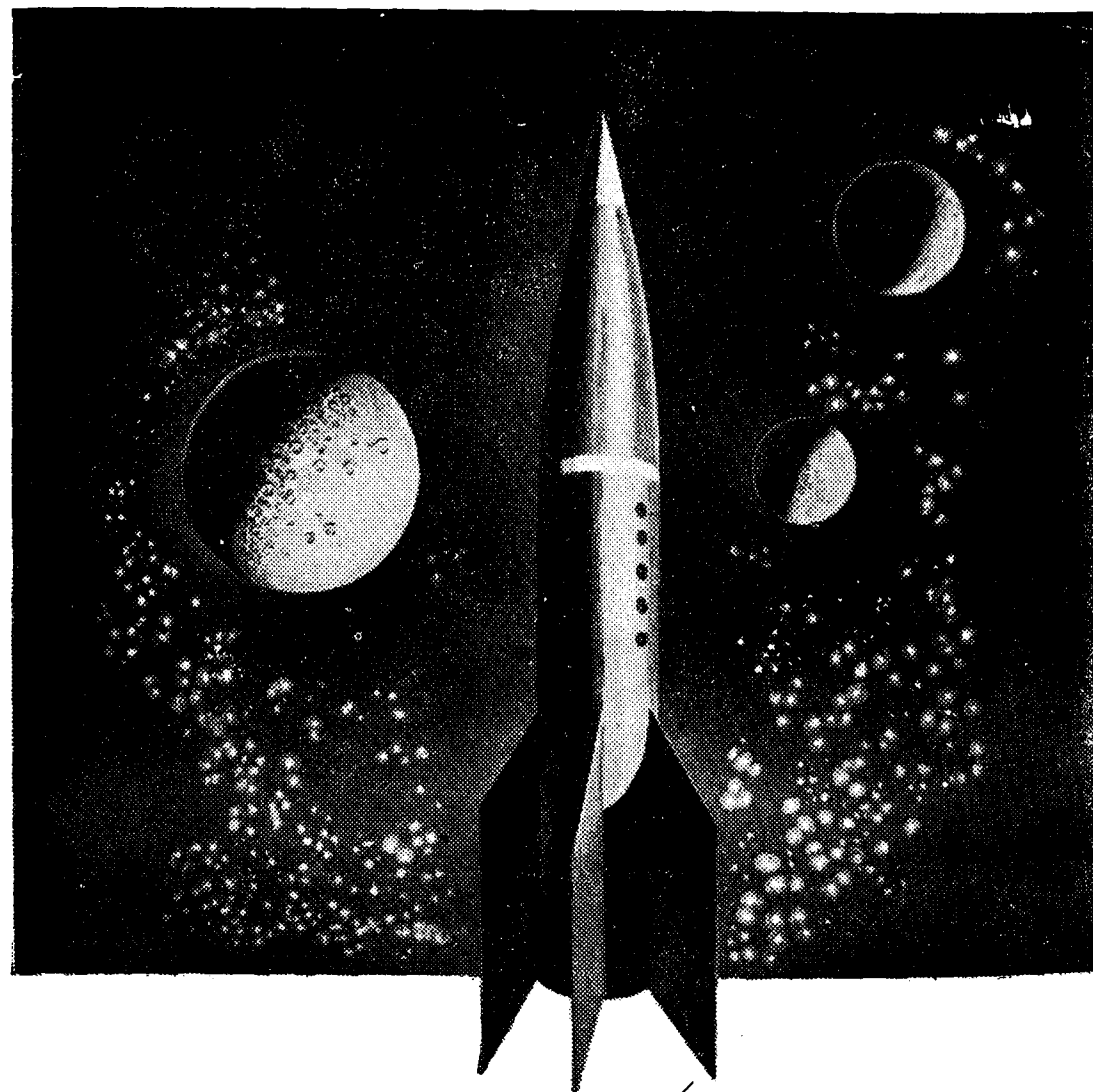
Third Annual Variety Entertainment

The welfare wing of the I.C.F. has sponsored a variety entertainment on the 28th October, 1961 for the third consecutive year. Sri K. Swarup, CAO (R)/I.C.F. who presided over this function complimented the welfare organisation on its successful conduct of this function. The variety programme was recorded by the All-India Radio, Madras on the 28th October, 1961 who would relay the same as part of the "Industrial Workers' Programme" very shortly. For the first time, a few of the artistes were also awarded prizes, with a view to encourage local talent.

Definition : Pole Vault—A safe where lumber is kept.

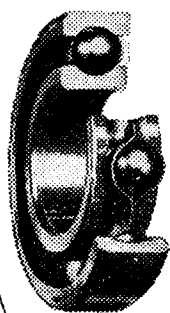
RAILCOACH

F 4



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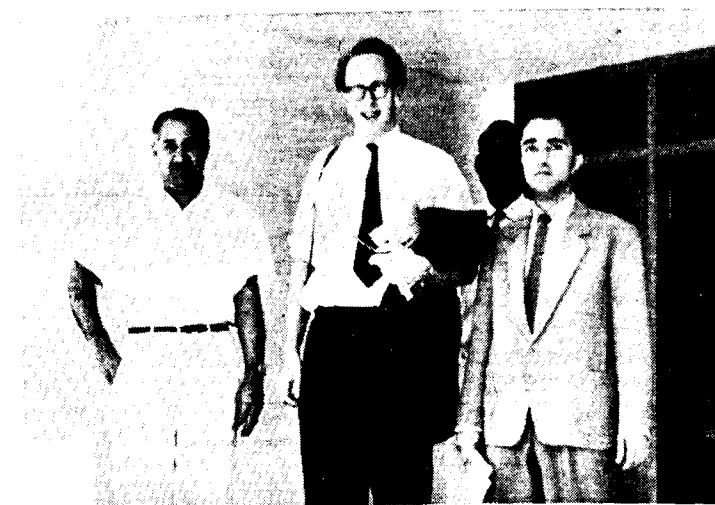
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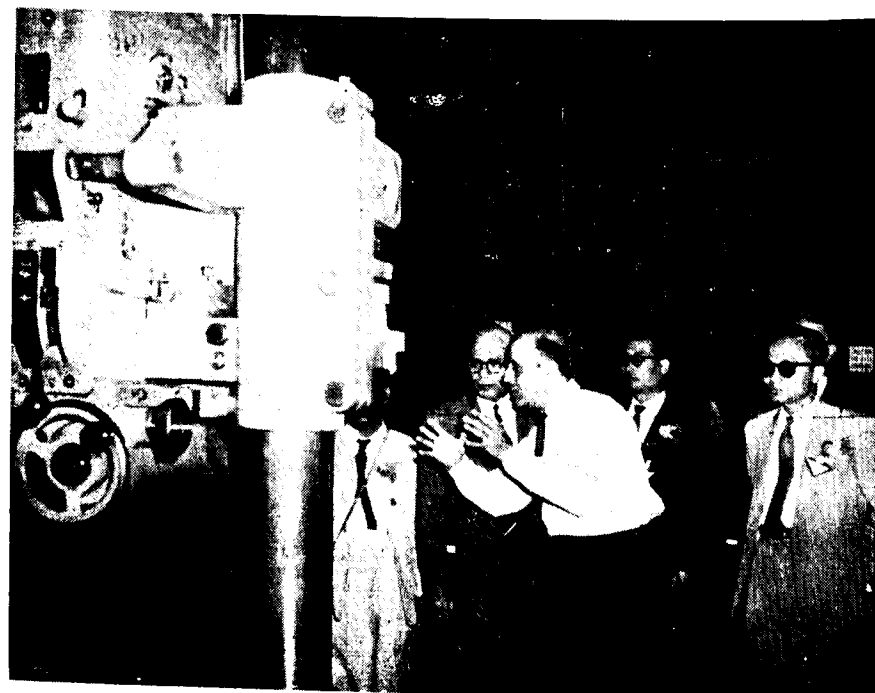
Mr. Ronald Hurman, editor of DAILY MIRROR seen with Sri Swarup, CAOR during his visit to ICF on the 2nd November 1961.

Mr. Nigel Calder, the science editor of "New Scientist" who visited the Factory on 27-11-61 seen with Sri K. T. Jethmalani, Secretary to CAOR.





Sri Swarup explaining the salient details of the Factory to the delegates of the Asian Railway conference.



Delegates seen evincing keen interest in another section of the Factory.