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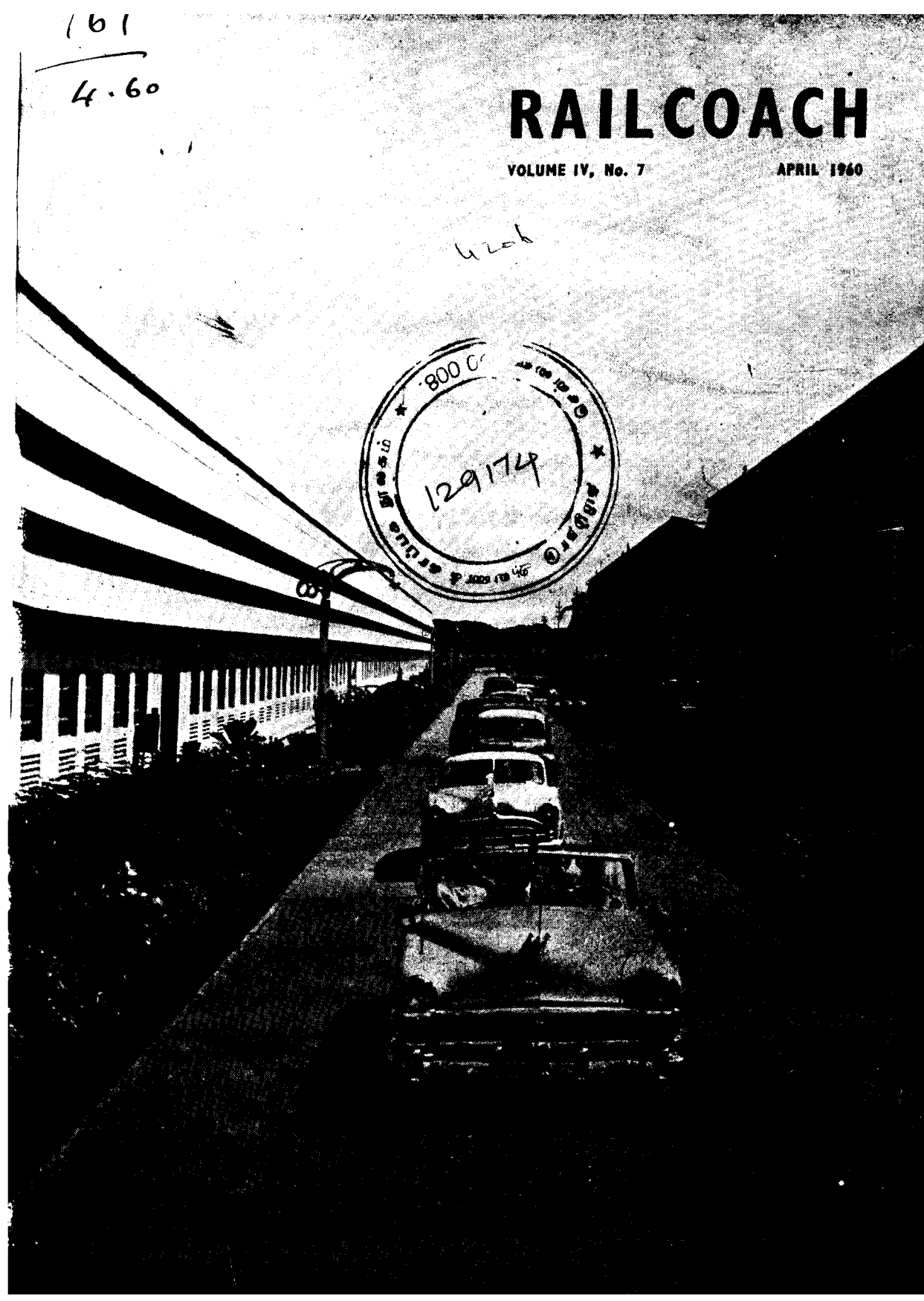
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RAILCOACH

VOLUME IV, No. 7

APRIL 1960

4206



RAILCOACH

Published by the Integral Coach Factory

ISSUED ON THE 15th OF EVERY MONTH

Devoted to all Railway problems, Technical Matters
and other problems of General Interest

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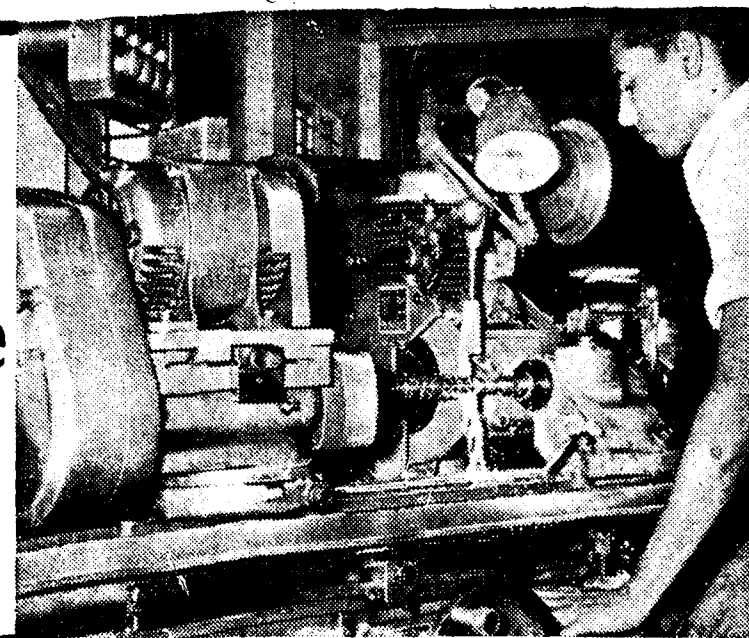
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RAILCOACH

(INTEGRAL COACH FACTORY MAGAZINE)

EDITORIAL NOTICE

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

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

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

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

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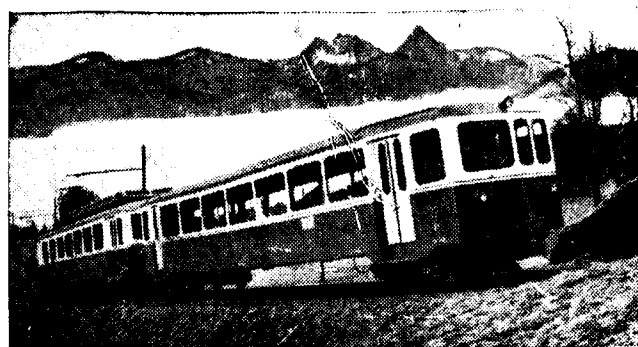
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COVER :

A typical view when a V.I.P. drives round the Factory. Note the clean surroundings of the shops and the well-laid-out gardens.



The Swiss Car and Elevator Manufacturing Corp., Ltd., Schlieren-Zurich (Switzerland) is one of the pioneers in building and technical development of Railway Coaches, Tram Cars, Trolley Buses, Lifts, Escalators



"Railcoach" Invites contributions from staff of the I. C. F. for publication. The subject need not necessarily pertain to Railways. Send us anything that you think will be of interest to readers. Articles should be typewritten on one side of the page in double space. Photographs are also welcome.

editorial

Month of April is very significant to the Indian Railways. It is in this month between 10th and 16th every year that Railway Week is celebrated and this year marks the 107th Anniversary of the founding of the Indian Railways. The purpose of the Railway Week, as is well known, is to focus the mind of the public on the activities of the Railways. This needs to be done as the Railways being the largest nationalised undertaking and as the hub of the activities of the Nation, require all the goodwill of the public at large. The Railway Week offers the general public a glimpse of the responsibilities shouldered by the Railwaymen and the conditions under which they perform their respective tasks.

There is another purpose the Railway Week tends to serve, that is, it offers the staff at all levels to "get together" and know one another better. This no doubt is very essential as this understanding will help Railways function better. A spirit of camaraderie should prevail amongst the Railwaymen to meet the tough demands of the Nation, with a cheerful outlook.

In I.C.F. we can pride ourselves about the already prevailing family spirit and this celebration will only just remind us to stand still together and go ahead in the venture of providing the travelling public with better comforts.

Let us on this occasion thrash out whatever little differences we might have and pledge ourselves to the service of the nation.

Do You Know

THE Ministry of Railways are building six refrigerated vans for the Ministry of Food and Agriculture, in which quickly perishable things like fish could be transported safely. These vans are expected to be put into service by April, 1960.

* * *

THE Central Ticket Checking Organisation originally functioned from January to August 1957. It has been revived again from August, 1959 to assess independently the extent of ticketless travel on the different sections of the railways.

* * *

THE Indian railways require about 28,000 tons of teak wood per year. During 1958, approximately 37,000 tons of teak wood was purchased. Of this, 28,000 tons were imported and 9,000 tons were obtained in the country. Depending on the size, quality and specification, indigenous teak wood costs Rs. 675 to Rs. 1,455 per ton and imported teak wood costs Rs. 726 to Rs. 1,423 per ton.

* * *

ASSAM has supplied 3,73,000 wooden sleepers at a cost of Rs. 44.43 lakhs to the Indian railways during 1958-59.

* * *

ON the Indian railways, in 1959 (up to September) 54 class I, 5003 class III and 12,271 class IV officers were appointed. During 1958, the number of officers appointed in the four categories was 196 in class I, four in class II, 14,187 in class III and 35,787 in class IV.

* * *

THE number of trains cancelled, suspended or terminated short of destination due to floods, rains and cyclones during January-October, 1959, was 4,063. The approximate expenditure incurred or likely to be incurred on repairs to damages to railway track, bridges and other property amounts to Rs. 96.88 lakhs. Western Railway has suffered the most, the number of trains affected being 2,304 and the estimated expenditure being Rs. 40.6 lakhs.

* * *

ON the Northern Railways, "Janata meals" consisting of 12 oz. of cooked rice with a plate of *dal*, one vegetable and *chutni* is being sold at eight stations on an experimental measure.

THE RAILCOACH

VOL IV No. 7

APRIL 60

"WELDING AS A CAREER"

BY

F. KOENIGSBERGER, M.I. Mech. E.

[In this bulletin, we reproduce below a paper issued by Messrs J. B. Advani-Oerlikon which appeared in the British Welding Journal of January 1954. The subject is of great importance in India today since welding is playing a very prominent role and is calling for a large number of specialised welding personnel on various projects. Mr. Koenigsberger is a lecturer at the College of Technology, University of Manchester, and his views as an experienced welding engineer and a teacher in an University should prove valuable to those who are interested in the expansion of welding in India.]

Those who have to decide on their professional future may need to collect as many personal opinions as possible and to digest these opinions so as to form a basis for their own consideration and decisions. This paper, therefore, gives a personal picture, with the object of starting a discussion which should be of more value than the paper itself.

The first question to be answered is: "Is it possible to make welding a career?" Careers have been made in many fields of engineering, and there is no reason why welding should be an exception. A career is really what you make of your job, not what the job provides for you. An aspirant must study his subject, know it, learn more about it, and try to keep up to date with it. To do this, it is first of all necessary to assess without any prejudice or bias, the correct place of welding in engineering.

In its procedures and applications welding is one of several production processes used in the manufacture of engineering structures and components. As such it should be considered on an equal footing with riveting, bolting,

forging, and casting, at least so far as designers, draughtsmen, and planning and production engineers are concerned. Yet welding and casting, through their metallurgical influences present some rather complex problems, differing from the processes and applications of riveting, bolting and even forging.

From the point of view of the general engineer a good understanding of the main problems involved in the application of production processes is essential. In the special field of welding, this means a knowledge of the available processes, the metallurgical implications, and the technical and economic advantages and limitations. Again, so far as the general engineer is concerned, this knowledge need only cover general points. In a factory where welding is used only to a limited extent and where products are more or less standard a general knowledge of welding problems will be often sufficient and satisfactory, even though it may be rather superficial, particularly if this is coupled with practical experience on similar types of product. With the growing

importance of welding as a production method the fundamentals of welding have become more and more an essential part of the general knowledge of every engineer. The fact that welding subjects are incorporated to an increasing extent in the syllabuses of engineering courses of technical colleges and universities is therefore to be welcomed.

Where standard lines of design and production procedure are abandoned and new welding ideas and methods have to be explored and developed, the knowledge of welding acquired during the study of general subjects in engineering courses and from everyday experience in the engineering workshop will be insufficient, and knowledge and experience of a much deeper and more specialised nature will be required. In such a case specialised welding knowledge and experience are essential. What then is the task of the people who have to be called in, those who have obviously made welding their career?

In industrial organization there are always different sections to deal with the various types of work required in a factory. The technical departments usually in operation are the following:

Design: Machines, mechanisms, general engineering structures, building structures, etc.

Planning: Determination of types and sequences of manufacturing operations, costing.

Research and Development: Investigation of materials, development of processes and procedures, diagnosis of difficulties and remedies.

Supervision of operations and production in the workshop: Setting up, progress, inspection.

Installation and maintenance of plant and equipment.

A 'welding engineering department' would not fit into the framework of these sections, as an additional section of equal standing.

The five sections mentioned could work in parallel with some necessary co-ordination and co-operation, but each would carry on its own work. On the other hand, the specialised knowledge about welding subjects would be directly required in the work of almost every one of the five departments. Since there can be no welding designer advising the design department without a sound knowledge of design in general, no production engineer who can plan for welding alone, no maintenance man who can look after only the welding part of the equipment, the welding specialist would need some expert knowledge of the five main sections plus the additional knowledge of welding. This should include a good all-round knowledge and experience of all, or at least the most common welding processes, because it may be necessary to decide which process will be the most suitable for a particular application and just how this application should be carried out.

To obtain satisfactory production, the welding shop must be kept in a state of maximum efficiency. With the development of modern welding equipment, semi-automatic and automatic welding machines, special electrodes, and the like, the state and type of the welding plant and equipment, has an increasing influence upon the quality of the finished weld and the completed welded product. The knowledge of the characteristics, typical features, functions, and possible faults of the devices used in the welding plant and of dangers and safety precautions to be taken, is therefore essential for keeping the welding shop at the required standard.

By balancing controversial requirements and, if necessary, finding an acceptable and technically sound compromise, the efforts of the various departments must be co-ordinated. In the fabricating shop the welding engineer acts, therefore, as a kind of liaison officer and consultant to the people concerned with design, procedure planning, inspecting and testing, and plant maintenance.

The forging shows that it is not feasible to set out to become a welding expert without some knowledge of other fields of engineering. One cannot be an engineering specialist without being first an engineer. From a section of industrial engineering, design, production, or research, a specialised interest in a certain sub-section can be developed. One has to start from the wide field of general knowledge and converge on to the small section of specialised interest, widening the scope in this special section to embrace parts of adjoining fields.

For example, a designer may wish to consider the applications of welding. He will investigate the possible developments and study the metallurgical, mechanical and production implications, and he may in time become a 'welding specialist' and, through his studies, may be able to have a say in the planning, development, and supervising side of production as well as the design. A development such as this would take place in the natural process of specialisation that occurs in every industrial organization, and particularly during a time when new methods and processes are being introduced. Before and during the war years it happened in many companies that the engineers originally concerned with various jobs in the organization created and established their positions as welding engineers in this way. They were not 'welding engineers' in the same sense as the accepted definition of the mechanical, electrical, structural, or production engineer. There can be no such thing as a 'chartered welding engineer.' These men were qualified engineers who acquired by theoretical and practical study, sufficient knowledge and experience on all matters concerned with welding to be able to advise their main technical departments and to supervise developments and operations in the workshop.

Such specialisation in a new field, and the study of new problems, techniques, etc. in this way requires however, a strong personality, critical of his own knowledge and well aware of his limitations in cases where he has to consult other experts.

It has been said that "a little knowledge is not half so dangerous as the man who has it," and the field of welding in industry provides many good examples to illustrate that statement. It seems easy to learn all there is to know about welding by keeping one's eyes open in a welding shop for six months and with a little commonsense, applying all one has seen to future problems. This apparently easy way of becoming a welding expert is really a dangerous one, which has done much harm to welding; such people, with little or no basic engineering knowledge or training, often suggest what they call 'obvious' solutions to problems which would baffle experts thereby causing serious setbacks.

The growth of such 'quacks' in welding has been unavoidable and is part of the price which has to be paid during the days of pioneering, but as things settle down on a sound basis it is necessary to eliminate the 'quacks' and to train engineers as specialists on welding subjects.

The field available to the man who wishes to make welding his career in industry can be divided into three fundamentally different groups:

- (i) The manufacture of welding equipment.
- (ii) Research in the development of welding methods and procedures.
- (iii) The application of welding in engineering design and manufacture.

So far as the first field is concerned little can be said, because it is similar to the manufacture of other specialised products. Just as a mechanical engineer may join a firm of turbine manufacturers or sewing-machine makers, he may enter a firm of resistance—welding machine makers or arc-welding equipment manufacturers, and thereby gather experience in the design and manufacture of this special product.

In the second and third groups are to be found the men who will act as welding advisers to the various departments in the factory and

who may have to develop procedures for welding new materials or see a welding job through from the drawing board to the final inspection. These people need above all a foundation of good engineering knowledge, covering scientific theory, design methods and questions of production. Engineering problems and particularly those connected with new developments are frequently without precedent, and for tackling them successfully a sound knowledge of fundamentals is often the best help in making decisions which will mean progress in the development and towards the final solution of a problem.

Fundamental subjects which should be thoroughly covered are mathematics, physics, chemistry and mechanics. These should be followed by the general engineering subjects which may have a direct bearing on the more specialised field of the future welding engineer, and which are applicable to the installation, running, and maintenance of welding plant, e.g., electro-technics and thermodynamics. Subjects covering material problems (e.g., strength of materials and metallurgy) are, of course, of great importance. Metallurgy and its applications must be particularly stressed, for the task of developing, and testing welding procedures, specifying heat-treatments, and so on, can only be carried out by a man who has a thorough mastery of this subject. Expert judgment of the material structure obtained by a particular method or procedure and a thorough knowledge of the various factors causing undesirable structural deficiencies are essential for deciding on progressive steps, for anticipating possible difficulties, and for viewing critically new ideas and suggestions.

In fact the syllabus, the examination, and the general standard should be that of a degree course or at the very least, of a Higher National Certificate course in engineering. It is perhaps interesting to note that for courses in 'Welding Engineering' in the U.S.A. specialised welding

subjects are studied only in the third or fourth year of the course, an indication that the organizers of these courses have ideas similar to those put forward in this paper.

The welding subjects that should be dealt with after general engineering studies are completed should cover the technology of the most widely used welding processes, their applications and their limitations, the equipment necessary, and a more specialised study of welding metallurgy, together with the testing methods employed for routine inspection and for fundamental investigations. Some special studies in design for welding will be valuable, with emphasis on the choice of the particular processes to be used and, more important still, on the decision as to where welding should not be used.

The road which, in the author's opinion, lies ahead of the young engineers who think of making welding their career, is hard one, but it is the only road which will lead to a successful career in the proper sense of the words. There are unfortunately, even today, many leading people in industry who, misled by 'quacks,' still consider that anybody who has been in some welding shops, read a few books and presented a paper or two can take charge of welding in industry. This is, of course, possible so long as things go smoothly. As soon as difficulties arise these people tend to ascribe the blame to the process, the operator, or the method. They rarely consider the incompetence of their so-called 'welding engineer' who has perhaps been defeated by something outside his experience and beyond his knowledge and capability. Unless there is in industry a class of engineers who are capable of becoming proper welding engineers it will not be possible to obtain the status and recognition, moral and financial, which is the just reward of those who are able to do their job properly.

(Courtesy J. B. Advani Oerlikon Ltd.)



PRESIDENT OF U.A.R. VISITS I.C.F.

His Excellency Mr. Gamal Abdel Nasser, President of the United Arab Republic visited the factory on the April 6. On arrival at the factory His Excellency was received and garlanded by the Chief Administrative Officer. The distinguished visitor was conducted round the shops of the Shell Factory, the Technical Training School and the Staff Colony. At the staff colony His Excellency was accorded a fitting welcome by the colony children. His Excellency also inspected a worker's residence in the colony. At the end of the visit His Excellency was presented with a silver replica of an Integral Coach. In conclusion the President of the United Arab Republic was pleased to give his impressions in a short speech which is reproduced below :

"As a friend to India and as President of the United Arab Republic—friendly country to India—I feel proud of all what I was able to see today and during the last few days. I can say that there is industrial revolution in India, and I can say also that there is a big revo-

lution in India in all sectors for development. By that India is giving the Asian-African countries an example for building up and developing. India by adopting this planning system and also by adopting this revolutionary way to develop herself as quick as possible. I was able to see the perseverance, I was able to see the hardship. I was able to see the spirit of the engineers and the workers everywhere and I can say that I was always feeling proud of that. Today, when I was moving, visiting your Coach Factory, in each workshop I was feeling proud as a friend to India and as a friend to Indian people and as President to the United Arab Republic representing friendly people to you and who look to you with admiration and follow up all your steps of progress. Well, I wish you and wish India all progress and prosperity and happiness. Thank you."

RAILCOACH

News and Views

Fewer Railway Accidents

The Deputy Minister for Railways, Shri S. V. Ramaswamy said in the Lok Sabha on April 29, that the total number of train accidents during 1959-60 was slightly less than the 1958-59 figure, the respective figures for the two years being 2,001 and 2,015. The number of derailments, he said, had gone up from 1,390 to 1,458. Also, during 1959-60, there were 109 collisions, 129 cases of trains running into road traffic on level crossings and 305 fires in trains.

The Deputy Minister gave figures of accidents between November 1959 and February 1960 and also the cause-wise analysis of these accidents, in which eight persons were killed and 272 persons injured.

Class III Sleepers on Delhi-Madras Janata

Third-class sleeping cars for passengers travelling over 500 miles without any surcharge are expected to be introduced on the Delhi-Madras Janata Express trains during May 1960, said Shri S. V. Ramaswamy, Deputy Minister for Railways, in the Lok Sabha on April 29. He said that since the introduction of these cars, the facility had been extended to six pairs of trains, four on broad gauge and two on metre gauge.

Open-Air Schools on Central Railway

The Deputy Minister of Railways, Shri Shah Nawaz Khan, informed the Lok Sabha on April 13, that open-air schools were run by the Central Railway at 55 places. He said that the expenditure on these schools was met from the Staff Benefit Fund and amounted to about Rs. 16,500 annually.

The Deputy Minister added that the open-air school scheme of the Central Railway had been circulated to the other Railways with the remarks that the Staff Benefit Fund committees of those railways might be advised of this activity on the Central Railway.

New Railway Wagons Factory at Nangloi near Delhi

Shri Shah Nawaz Khan, Deputy Minister for Railways told Lok Sabha on April 13 that Messrs. Hindustan General Industries, New Delhi, who were selected on the recommendation of the Railway Equipment Committee for the manufacture of railway wagons, have set up a wagon factory at Nangloi. The Deputy Minister said that against an educational order for 100 C.R. type wagons placed on them, no wagons have so far been supplied. The firm, however, expects to start production shortly.

Refrigerated rail vans this summer

Six refrigerated vans for the transport of fish are being introduced as an experimental measure during the current hot weather.

The first of the vans, which are being constructed at Central Railway's Carriage and Wagon Workshop at Matunga, near Bombay, is expected to be delivered by the end of April. The bogies for the vans are being supplied by the Integral Coach Factory at Perambur, while the underframes are being supplied by a private firm. The refrigeration equipment is being imported.

The Ministry of Food and Agriculture, on whose behalf the vans are being built, had exhibited a model of the van at the recent World Agriculture Fair in New Delhi.

Improved amenities in air-conditioned trains

The Deputy Minister of Railways, Shri Shah Nawaz Khan, confirmed in the Lok Sabha on April 13, that the arrangements to provide foot-rests beneath the seats in the air-conditioned chair cars to enable passengers to stretch their legs had been made. He said that the necessary orders had been issued to provide the foot-rests as early as possible.

Giving the nature and details of the arrangements, the Deputy Minister said that the foot-rest would be a flat bar fixed at a convenient height and angle to the legs of the chair in front.

Hindi examinations on railways

The Deputy Minister for Railways, Shri Shah Nawaz Khan, said in the Lok Sabha on April 26, that railway administrations had instructions that the results of the Hindi examinations conducted by the Ministry of Railways should be published in Railway Gazettes or otherwise notified for the information of staff as soon as these were finalised. He said that it had now been decided to issue certificates to staff declared successful at these examinations.

He added : " To provide an incentive to staff, a scheme of cash awards has recently been instituted in respect of these examinations.

According to this scheme, such awards are given to some of the topmost candidates for each grade of the examination on each railway."

Rail concession to primary school teachers

Replying to a question in the Lok Sabha on April 26, the Deputy Minister for Railways, Shri Shah Nawaz Khan, said in a written answer that the teachers of primary schools were allowed the concession of first class travel on payment of second class mail fares, second class travel on payment of third class mail fares and third class travel on payment of half third class mail fares when travelling on educational tours to visit places of historical, geographical and cultural importance, in parties of not less than four. From June 1, 1959, this concession was granted even when they travelled singly, on production of the requisite certificate.

Monthly Outturn

	Target	Actuals
February 1960 ...	30	41
Cumulative total for the Twelve months of the year 1959-1960 (Financial) ...	353	447

RAILCOACH



An International group of broadcasters visited I. C. F. on March, 2.

VISITORS TO THE FACTORY

An international group of broadcasters under the sponsorship of the United Nations and the Governments of the countries of South East Asia, who visited various development projects in the country, came to see the Integral Coach Factory on the 2nd March 1960. They were shown round the shops of the Shell Factory, the Technical Training School and the Furnishing Annexe. At the conclusion of their visit they held discussions with the Chief Administrative Officer and other senior officers of the factory. They observed that the factory was "an essential part of the national development effort."

Shri Y. N. Sukhtankar, Governor of Orissa, visited the factory on the 4th March 1960. He was received by the Chief Administrative Officer, and conducted round the factory. He remarked at the conclusion of the visit that the factory was "doing a wonderful job."

Dr. Erich Kemna, Vice-President of Demag A. G., Duisburg, West Germany visited the factory on the 10th March 1960. After going round the factory he observed that the work being done by the factory was "most excellent."

Mr. Tatsu Hashizume, Chief of the Unemployment Counter Measures Division of the Ministry of Labour, Tokyo, Japan, who visited India to study India's Employment Policy, visited the factory on the 12th March 1960. After going round the factory he had discussions with the Personnel Officer of this Administration.

During a conducted tour round the country, non-official members of the National Railway Users' Consultative Council visited the factory on the 22nd March 1960. They were shown round the workshops and the Technical Training School. At the conclusion of the visit they expressed a great satisfaction at the progress

the factory had forged and observed that "India goes ahead and we are proud of I.C.F. achievements so far and are looking forward to still further progress."

Messrs. A. Maeda of the Export Import Bank of Japan and H. Fujishima of the Association of Machine Industries of Japan accompanied by the Manager of Mitsubishi Shoji Kaisha, Ltd., Madras, visited the Integral Coach Factory on the 24th March 1960.

Mrs. Galuia Sdasuik, Scientific Assistant in the Department of Geography of the Moscow Ministry, who is a Government of India Scholar doing research work in the Economic Geography of India, visited the factory on the 24th March 1960.

130 Student Officers of the Defence Services Staff College, Wellington, visited the factory on the 24th March 1960.

A party of members of Parliament visited the factory on the 25th March 1960. The members were received by the Chief Administrative Officer, and were conducted round the factory. At the conclusion of the visit they expressed "a deep and sincere appreciation of the magnificent work being done here."

A Productivity Team on "Cost Accounting and Financial Control," consisting of members drawn from private business organisations and an officer from each of the Ministry of Finance and the Ministry of Commerce and Industry, who are scheduled to visit U.K., U.S.A. and West Germany shortly, came to this factory on the 25th March 1960. After going round the factory they held discussions with Senior Accounts Officers of the factory on the subject they are connected with.

ANTI-FLU ULTRAVIOLET RAYS

Doctors may have a new method for preventing the spread of influenza in hospitals and sick rooms at home. According to Dr. Ross McLean of the Emory University School of Medicine in Atlanta, Georgia, the transmission of the influenza virus can be checked by irradiating the upper air of rooms with ultraviolet rays.

In his report, delivered at a recent meeting of the U.S. National Tuberculosis Association, Dr. McLean cited a study made at a California hospital during the Asian flu epidemic in 1957-1958. In an entire building unit that was irradiated, only one patient among 277 non-infected patients came down with the flu. In other areas that were not irradiated, 41 among 200 patients became ill with the flu.

FUTURE TRENDS IN LOCOMOTIVE POWER FOR THE WORLD'S RAILWAYS

BY

F. A. COMPTON,

*Jr. Manager, Locomotive Section, Locomotive and Car Equipment Department,
General Electric Company (U.S.A.)*

Predicting the future is always a fascinating, although quite often a somewhat risky business. This is particularly true in forecasting probable trends in railway motive power developments for the next decade.

Barring a revolutionary technological breakthrough future development of locomotive power in all probability will be limited to (1) refinement of the diesel-electric locomotive, (2) further development of the gas turbine-electric, (3) progress in electrification and (4) application of atomic power to locomotives. Each of these is based on the electric transmission of power from the prime mover to the rail. In the experience of a vast majority of the world's railways, this system is the most efficient, the most reliable, the most easily maintained, the easiest to operate and in the long run by far the least expensive.

Obviously the direction in which motive power will progress is directly related to the operating, maintenance and financial requirements of the railways. In addition, continued economic development in areas throughout the world will also have a decided effect on railway practices. As the industrial output and the demand of the people for more and more goods increases, transportation facilities of necessity will have to become more efficient to keep pace with this stepped-up industrial production and the increased demand for consumer goods. Railways are pre-eminently fitted for such a role as no other form of transportation can approach their efficiency for the mass movement of goods.

In an expanding economy, railways will be unable to afford the luxury of working a freight car only 50 miles per day, or of taking four hours to drag up grade which could be pulled in one hour. More and more power will be needed, and only machines can supply power in the quantities which will be required.

In the light of the requirements of an expanding economy, what are the relative merits and the chances for development of each of the four types of motive power?

Diesel-Electric Locomotive

Considering all the factors on which a sound estimate of the future can be based, it is reasonable to assume that the diesel-electric locomotive will provide the bulk of motive power requirements for at least the next ten years, and probably for quite a bit longer. Diesel engine progress over the past fifty years has been truly significant. The first diesel engine for locomotive service in the U.S. was built by General Electric in 1918. Since it was a naturally aspirated engine and represented a real pioneering effort, it had an output of 25 horsepower per cylinder. In 1935, before turbo-supercharging was perfected, a horsepower of 110 per cylinder was normal. At the present time, the type F engine in the universal line of General Electric (U.S.A.) locomotives is rated 165 horsepower gross per cylinder and under test conditions engines have been run at over 200 horsepower per cylinder. All these ratings are on cylinders of nearly the same size.

With such a record of past progress there is every reason to believe that the diesel-electric locomotive will continue to improve in reliability and specific fuel consumption; that further reductions will be made in maintenance cost; and that it will have even longer life in the future. Considerable sums of money are being spent by private industry in the United States for continued research on diesel locomotive power which is indicative of the confidence we have in the future of the diesel-electric locomotive. Changes which will probably occur within the next ten years will be mostly evolutionary rather than revolutionary. They will include a continued growth in specific horsepower, elimination of maintenance points, increase in reliability, and the perfection of a better adhesion less detection and correction device to allow maximum use of high horsepower per axle.

In connection with maintenance, it is not improbable at all that in the far distant future a locomotive will be sealed at the factory and not require any maintenance during its entire life. Steady progress is already being made along the path of development leading toward such an ideal objective. Many positive steps already taken in this direction include the wide use of synthetic resins in impregnating coils and the complete encapsulation of some control elements. These synthetic materials utilize the good properties of natural oils and resins while eliminating those that are undesirable. Each future step will be made commercially available as soon as it has been thoroughly proved in service as well as in the laboratory. The trend is inescapable — the eventual development of a maintenance-free locomotive.

Gas Turbine-Electric Locomotive

Although General Electric has manufactured a total of 55 gas turbine-electric locomotives, all of these have been purchased by one railway, the Union Pacific. The reason for this lies in several unique factors which make these units well suited to operation on this particular road. In the Western United States there are

large amounts of residual fuel suitable for use in the gas turbines. Even though the specific fuel consumption of the gas turbine is higher than that of a good diesel engine, the resulting overall cost is competitive. Also, Union Pacific has long hauls, with extremely high tonnages at high speed. This requires full power from the locomotive for long periods of time, the condition under which the gas turbine is at its best. It is quite common for one of the 8,500 h.p. locomotives to haul a 6,000 ton freight train at 65 m.p.h. on the level. Although the majority of the run is quite flat, the ruling grade is 1.14% for 34 miles, and good speed must be maintained there also.

What then is the application of the gas turbine other than to Union Pacific? Where conditions are right, that is, where there is a good supply of residual fuel, where average speeds and tonnages are high, and where schedules are frequent enough to ensure high locomotive utilization, the gas turbine is a fine locomotive. But the number of railways in the world where all of these conditions exist is quite small, and we see only limited application of this type of locomotive. Twenty-five of the locomotives built for the Union Pacific are 4,500 h.p., which appears to be just about the lower horsepower limit. The problems, however, are economic, not technological, and accelerated volume of freight traffic may produce a demand for gas turbine locomotives both sooner and in greater quantity than what we now anticipate.

Electric Locomotive

The electric locomotive is another form of motive power that has been hampered by economics rather than engineering. In fact a great many engineers are firmly convinced that the electric is the greatest locomotive ever conceived. It meets all the requirements of good engineering—it is simple, it is clean, it is powerful, it is durable. But unfortunately, where there is not enough traffic, it is also uneconomical.

There are some other factors which influence electrification of railways. The inherent cleanliness of electric power and the ability of electrically-powered trains to operate underground have already forced the electrification of lines which otherwise would not have been ready for that step for quite sometime. Also, steep grades have brought electrification to some lines because of the high power necessary for proper operation of the railway and the ready availability of such power only with electrification.

Without doubt, the future trend of electrification will follow much the same pattern as in the past. It will be used wherever and whenever traffic density is high enough and the price ratio of electrical power to diesel fuel is low enough. Also, the cost must be low enough to permit attractive returns on the large amounts of capital required for overhead structures and substations. Relatively new developments permitting the use of commercial frequency high-voltage a-c make electrification more attractive by reducing this investment.

What of the future? Without question, electrification of additional systems and expansion of existing lines will continue, probably faster than has been the case in the past. However, as is the case with the gas turbine, only in a few places do all the required elements exist, and for some time the percentage of trains hauled with electric motive power will increase rather slowly. In certain areas electrification may be justified as a means of conserving natural resources or obviating dependence on imported fuel, even though the direct economy might not warrant the investment.

Atomic Powered Locomotive

Probably no term has more attention commanding ability these days than "atomic power." Can it, will it, be applied to motive power for railway use? Undoubtedly it will; but we believe that its widest application will be for central station generation of power to be used on the railways via electric locomotives.

The problems which surround railway application of nuclear propulsion by means of a mobile power plant are far greater than any yet approached in either the railway or atomic power engineering fields. According to the most recent studies the weight of the reactor shielding alone would exceed the permissible weight per axle of the locomotive. This figure does not take into account any of the actual propulsion equipment required on the locomotives. Additionally, the danger involved in the day-to-day operation of a locomotive with a reactor on board would present extremely serious hazards to life and property.

It is evident that, at the present state of the art, an atomic locomotive which carries a reactor on board is highly unlikely. But work in progress in laboratories throughout the world may some day make the self-contained atomic locomotive a reality, particularly if a direct conversion device with the required shielding and having a high enough rating can be produced.

Motorized Wheel

Another development along a different line in the motive power field, so new that it really should be included in a discussion of the future, is the motorized wheel. A wheel which incorporates an electric motor inside the hub of a rubber tyre has been designed and thoroughly tested by General Electric. The motor drives directly to the rim through a single set of planetary gears, and the unit can be mounted directly on the side of a vehicle or suspended by means of any type of spring system. Power can be drawn from a diesel-electric or gas turbine power plant, or from an overhead trolley wire or third rail.

Although this wheel was originally designed as a drive system for off-highway vehicles, several studies of rail haulage problems involving particularly severe grades indicates that a rubber-tyred locomotive may be a unique and significant development. A line laid with extra long concrete ties projecting on both sides of the rails would provide a

roadbed for the locomotive, and grades of 15 per cent could be negotiated satisfactorily while hauling conventional freight cars. The rubber-tyred locomotive is not intended as a replacement for the conventional type, but would be used for specific, difficult applications.

Summary

In summary, for the next ten years at least, the diesel-electric locomotive will continue to occupy the major place in the motive power of the world's railways. Electric locomotives will become increasingly important as traffic density increases or other compelling factors enter the picture. Gas turbine-electric

locomotives will fill a special need for some railways, and atomic power will be used in stationary electric generating plants to supply energy for railway electrification. Great strides will be made in reduction of maintenance, and simplification of components. Whatever the form of motive power, standardization on a single locomotive type for entire railway systems will become virtually universal.

All this progress in the development of motive power is aimed at producing railway progress—using electric power and machines to lift the load from the backs of human beings. The more this is done the more sound will be the economic progress of the railways, and a sound railway system is the keystone of a solid national economy—*Globe Press Service*.

PLASTIC MAY REPLACE SOME METALS

A new high-strength plastic which may become a major competitor to metals such as steel, brass, zinc and aluminium, is now being produced in the United States. The plastic, called Delrin, was developed by E. I. du Pont de Nemours and Company. Many years of research went into its discovery.

The du Pont Company emphasized Delrin's strength and rigidity as two of its most important characteristics, pointing out that these qualities are due to its molecular structure. Delrin is also a thermoplastic and can easily be formed on standard high-speed automatic moulding equipment into many intricate shapes.

The new plastic will be produced in a wide range of colours, and it has been tested in refrigerator door handles, automobiles instrument housings, aerosol containers, showerheads and many other items. It will offer strong competition to metals, it is expected, in automobile parts and electric appliances.

Many other probable uses are suggested, such as carburetor parts, gears bearings and bushings, cameras and their appliances, pipe, faucets and other plumbing fixtures, and a diversity of consumer products.

YOU HAVE 12,000,000 YEAR-OLD ANCESTRY

BY

LYNN POOLE

(The Johns Hopkins University)

About three years ago a Swiss paleontologist, Johannes Hurzeler, startled the scientific world with the report that creatures belonging to the human line of evolution lived in Italy at least 12,000,000 years ago—more than 11,000,000 years earlier than any previously known animal with distinctive human characteristics.

Since 1956 bones of more than 60 of these animals have been taken from the soft coal layer of Tuscany in Central Italy, including one nearly complete skeleton found on August 2, 1958.

Brought together at the Natural History Museum at Basel, Switzerland, these fossils have been studied carefully by Dr. Hurzeler and other scientists in an effort to fit the so-called "abominable coal man" into his rightful place in the scale of evolution.

American anthropologist William L. Straus, Jr., who has spent three summers in Europe studying these remains, recently returned from a detailed and systematic study of the new, almost complete skeleton of the creature which is named "Oreopithecus."

"By no stretch of the imagination," reported Dr. Straus, "can it be classified as an old world monkey or as an anthropoid ape."

After careful investigation, Dr. Straus, who is professor of anatomy and physical anthropology at the Johns Hopkins University, found numerous characters of the teeth, skull, limbs, and trunk that resemble characters belonging to the human line of evolution.

The oldest animal having man-like characters, known prior to Oreopithecus, lived no earlier than 750,000 years ago.

Actually, the first specimen of Oreopithecus—a lower jaw bone—was described in 1872. But there had been no agreement on how the animal should be classified. Some investigators have regarded it as an Old World monkey, others as an anthropoid ape, and still others as a link between these groups.

Hurzeler's efforts in collecting these specimens during the past three years have made it possible, finally, to get a good idea of where the creature fits into the evolutionary picture. Nearly all of the bones have been recovered from a lignite deposit at Baccinello, Italy, which at one time formed part of a very large marsh covering a considerable part of Tuscany.

From his studies Dr. Straus has been able to determine that the animal was about four feet high, and weighed a little less than 100 pounds. He has estimated that the brain of Oreopithecus was about the same size as that of the chimpanzee.

Pinning down exactly where this "abominable coal man" fits into the long pattern of evolution is a tough problem. Following up the trunk of the tree of evolution which eventually leads to man, there is one branch going off which leads to the Old World monkeys.

Further up the trunk is another fork. One branch is the line representing the anthropoid apes. The other branch is the line comprising man and his immediate forerunners.

Hurzeler himself first concluded that Oreopithecus belonged on this latter branch, and is thus the earliest known representative of the line that led to man.

Dr. Straus is less certain. He is sure that Oreopithecus is not on the line of the Old World monkeys, but that it must be classified as a member of the superfamily that includes the anthropoid apes and man. He has found that Oreopithecus possesses a number of characters which are similar to those belonging to the line that led to man. On the other hand, he found a lack of similarity to characters which distinguish the apes.

Dr. Straus believes that the animal belongs either on the branch leading directly to man, or on a closely related branch which previously was unknown.

"No matter how it is precisely classified," Dr. Straus commented, "the most important thing about this creature is that it shows us that human characters had begun to make their appearance as early as 12,000,000 years ago. This is more than 11,000,000 years earlier than any we had been able to find up to this time."

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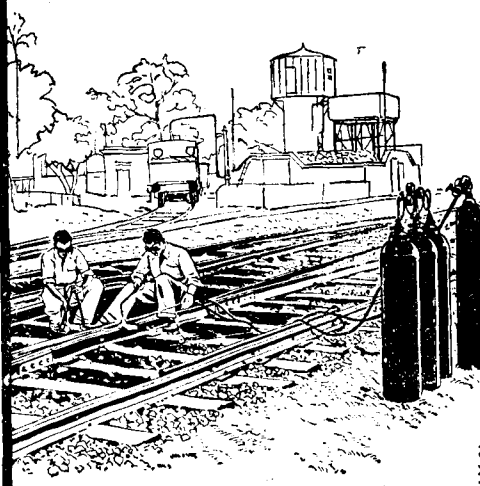


OXYGEN SERVES THE RAILWAYS

The Indian Railway system is Asia's largest and is a vital factor in the country's development.

The nation's arteries have to be maintained in sound health. Railway engineers rely increasingly on welding for maintenance of the permanent way, bridges, locomotives, wagons and coaches.

Indian Oxygen with its countrywide organisation, serves the Indian Railways in many ways. Besides the supply of industrial gases, welding materials, welding and cutting equipment, this service covers technical advice, tuition and expert assistance in all problems relating to welding and its allied processes.



INDIAN OXYGEN LTD

RECENT DEVELOPMENT IN WELDING ELECTRODES AND NEW TESTING PROCEDURES

Part I

BY

DR. ING. K. L. ZEYEN

C. High Efficiency Electrodes

(Iron Powder Electrodes)

The extreme importance of these electrodes, on which the author reported at length in year 1955 (3), is evident from the reception they got in the U.S.A. An American paper published in November 1954 (5) describes the progress of this type after it had been in production for barely one year. It says that this type of electrode caused a sensation to a extent that, on estimate, it will replace 35 per cent of the production of standard electrodes in course of time. Further two American papers (6) and (7) deal with the increasing applications of high efficiency electrodes in the U.S.A.

D. B. Howard has already mentioned in 1955 (8) regarding 23 various American manufactures of this type out of which 18 fulfil the conditions for high efficiency electrodes as laid down in the American specifications while this was not the case in the remaining 5.

A few of the examples of applications of high efficiency electrodes are given in figures 15 and 16. Figure 15 shows trolley wheels in which the hub as also the rim have been welded with these electrodes. Figure 16 shows the housing for a ship's driving machinery, weighing 11.6 tons and involving plate thicknesses between 19 and 180 mm. These heavy weldments have also been completed with these electrodes.

The large variation possible in the welds made with high efficiency electrodes is clear

from Fig. 17. Here we see surface weld beads and fillet welds made at the minimum and maximum speeds of travel. It is evident that the size of the weld in one pass can be controlled as desired by varying the speed of welding.

Fig. 18 shows a section of an all-welded steel bridge during erection on the river Rhine at Speyer which is of special interest from many angles. This bridge is meant to replace the earlier one built in 1935-36 and destroyed in 1945. The new bridge will weigh only 1,580 tons while the older one was 5,000 tons weight. The vertical members of this bridge form an enclosed box section with the top and bottom strappings which distributes the vehicular load, however eccentric, on the entire cross-section of this box. The roadway forms simultaneously the top and bottom plates of the 'box', which along with the intercrossing lengthwise and crosswise ribs, constitute a form of "orthotropic plate."

About 1,000 m. of welded joints across the roadways were executed with high efficiency electrodes. All highly-stressed joints were made with low-hydrogen type electrodes (see the section that follows), and this type was also used for the highly-stressed first pass, while the rest of the welds were made with acidic electrodes. This procedure of using "combination welding" (i.e., using different electrode types for different welds) is becoming more and more common in recent times.

The Rhine bridge at Speyer, for which mostly steel of grade St 52 was used, is a beautiful



Fig. 15. Trolley wheel with the rim and hub welded with high efficiency electrodes.

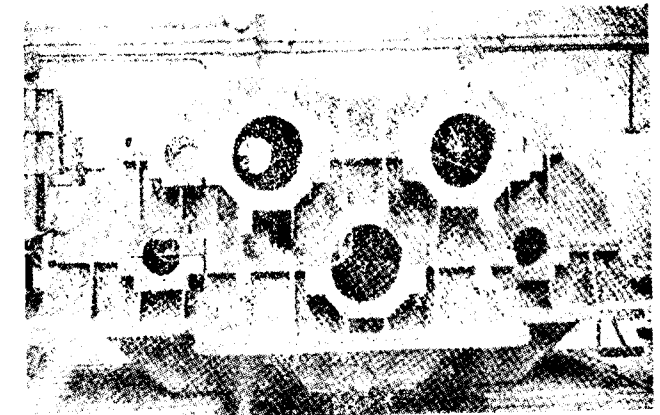
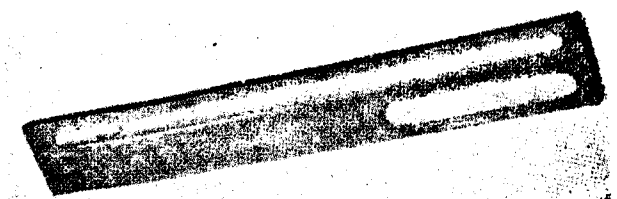


Fig. 16. Housing of Ship's driving machinery (Plate thickness 19 mm. Base Plate and Bearing 40-180 mm. weight 11.6 tons). Welded with high efficiency electrodes. (Photo: ACIM, Mantes-la-jolie, seine-et-oise)



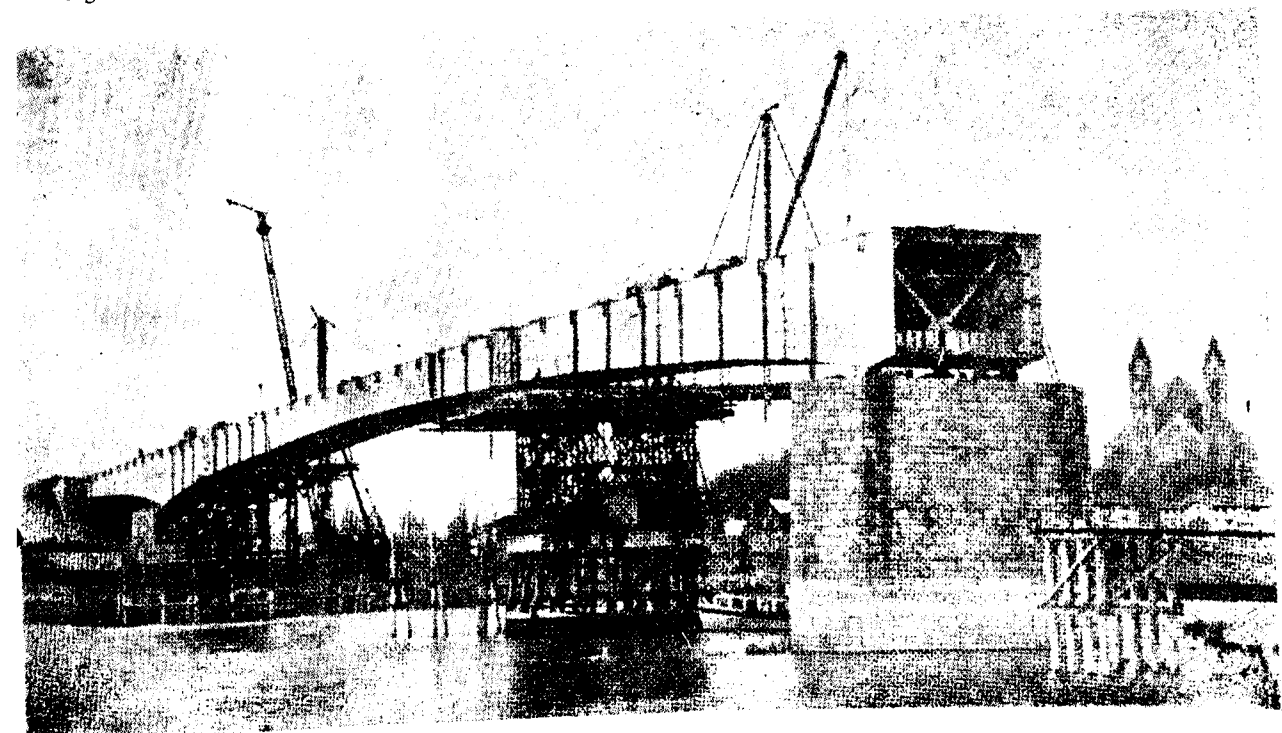
Surface beads



Fillet welds

Fig. 17. Minimum and maximum weld bead lengths possible with high efficiency electrodes.

Fig. 18. New Rhine bridge at Speyer under erection (Photo: Dort-munder Breuckenbau C. H. Jucoh Dortmund)



example of how modern construction and welding technique in combination with correct choice of electrodes and base materials can lead to very economical results.

D. Basic or Low-Hydrogen Electrodes

The ever-increasing importance of low-hydrogen electrodes, on which the author reported at length in 1955, was emphatically underlined once again at the Congress of the International Institute of Welding which assembled in Zurich in September 1955. Of the 34 total papers presented (the author was Hon. Secretary of the Editorial Board responsible for their printing) there was hardly any which did not mention this electrode type. Further we would point out a paper by Mr. W. Krauss (9) in which he has established that there is an all-round increasing demand for low-hydrogen electrodes, a conclusion which is based on his experience during a study tour covering a number of European countries.

The best and, truly speaking, the only correct method of evaluating an electrode or a weld deposit consists, in addition to testing the corresponding welded joints, of comparing the electrode weld deposit with the parent steel on which it will be subsequently used. In such testing work carried on by the author, the methods devised by H. M. Schnadt have been used extensively over a number of years.

At this juncture, we would point out a few publications on the subject of Schnadt's testing methods and also explain their principle.

(Translator's Note : Dr. Zeyen has devoted the next five paragraphs to the introduction of Schnadt's tests and these have been omitted by us in translation with the permission of Dr. Zeyen since our Technical Bulletins Nos. 38-39-40 deal with the subject completely. Reference to these may be necessary to understand the succeeding paragraphs. Figures 19 to 22 which go with the above paragraphs have also been omitted.)

Figure 23 shows Venant-Atopic curves obtained at 0° for high-strength steels as well as for the weld metal of an Oerlikon brand low-hydrogen electrode, based on a series of Schnadt tests carried out recently. The steels show at 0° temperature and at 0 Venant (i.e., when the test-piece has the sharpest notch) a notch impact resistance value of below 2 mkg/cm² while at 0° temperature and 10 Venant, this value is over 8. The weld metal gives a value of over 8 mkg/cm² at 0° temperature and at 0 Venant, and the same value even at the temperature of 20°, which is sometimes met with in the service of welded constructions. So even at these low temperatures, the weld metal can be considered as highly coheracic and therefore absolutely crack-resistant. This electrode, which when tested under various conditions always gave guarantee against porosity and cracking, can consequently be recommended wholeheartedly on the high-strength steels in question. It is equally suited for what H. M. Schnadt has been recommending since 1947 : "Insertion of weld joints of highly coheracic weld metal as 'crack arresters'". This has been repeated by R. Weck (10d) when he says : "Coheracic weld metal may even be used as a crack arrester."

While dealing with low-hydrogen electrodes, we ought to furnish also the results given by them in so-called "classical" material testing methods. The all-weld specimen of the electrode has been prepared after deposition under two different conditions :

- interpass temperature of 100°C (somewhat representative of normal welding work conditions).
- Cooling the test plate to room temperature with cold air after every weld pass is made.

The tensile values of all-weld specimens made in these ways (the test-piece was heated to 250°C for 8 hours and cooled slowly as per German code DIN 1913) are as follows :

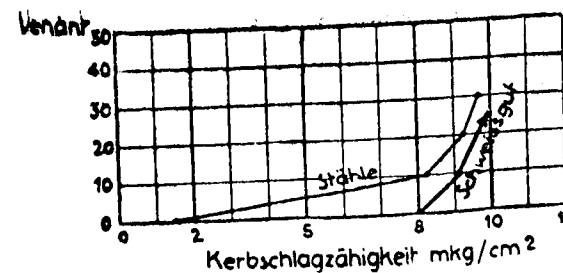


Fig. 23. Mean Venant-Atopic Curves at 0° for high-strength constructional steels and the weld metal of a low-hydrogen electrode.
Stähle = steels. Schweissgut = weld metal.
Kerbschlagzähigkeit = impact value.

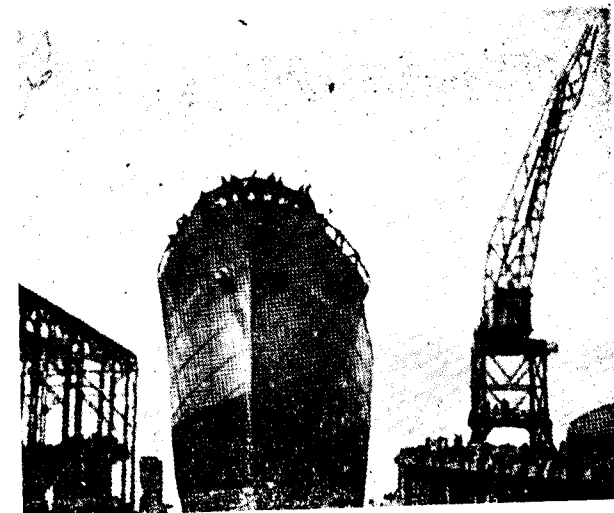
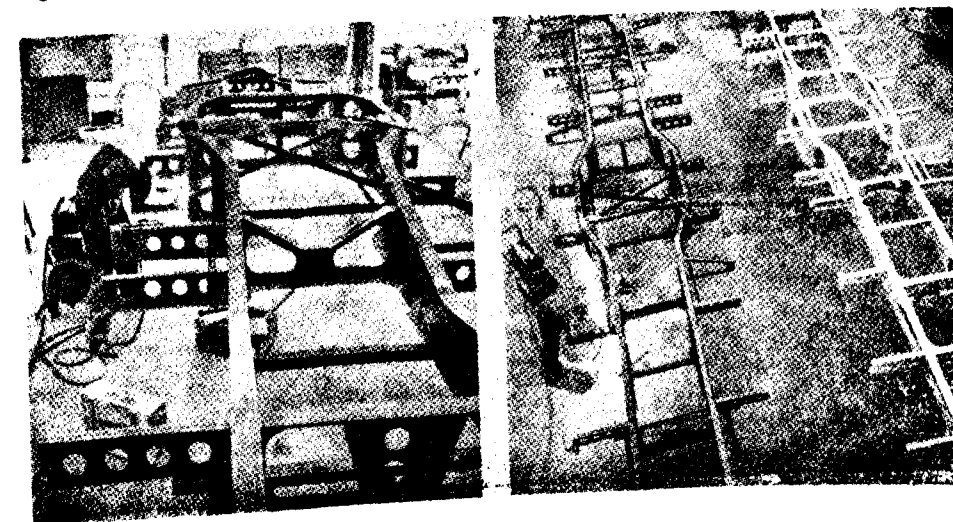


Fig. 24. Launching of the 10,000 ton-cargo ship "Silvretta" for the Reederei Suisse-Atlantique Lausanne, welded with low-hydrogen electrodes. Longitudinal seams riveted as "crack arrestors" (Photo :Werft Rijeka)



Fig. 26. CO-Washer welded with low-hydrogenelectrodes.
(Photo : Johann Stahl, Mannheim-Neckarau).

Fig. 25. Welding of truck chassis with low-hydrogen electrodes. (Photo : Mowag, Kreuzlingen)



Procedure	Yield pt. Kg/mm ²	Ult. Tensile Kg/mm ²	Elongation % (1=5d)	Red area %
<i>a</i>	47.3	55.9	27.2	73.4
<i>b</i>	49.3	65.4	24.6	71.8

Impact values (VSM-tests, which are somewhat like the German DVM-tests) for test made as per procedures *a* and *b* but without any postheat treatment, obtained as the average of 4 tests, were :

at 0° testing temperature 20.0 mkg/cm²
and at -10° testing temperature 19.9 mkg/cm².

Since the most recent impact tests on constructional steels of higher tensile strengths, conducted at 0°, gave an average value of only 10 mkg/cm, it was clear that even by "classical" testing procedures this electrode weld metal was far superior. The electrode in question (we mean the Oerlikon electrode Tenacito) finds application, among others, on the construction of the biggest pipeline in Switzerland which is of high strength steel Aldur 58.

It was already pointed out before that, for the evaluation of an electrode, one must not only take into account its performance and mechanical properties of the weld deposit but also ensure that welds consistently free from porosity and cracks are obtainable on the steel on which it is to be used. It is known and also pointed out in the German Code DIN 1913 that different types of electrode coatings have different reactions to the composition of the parent steel material, especially to higher carbon and sulphur contents, and further to segregations and certain forms of non-metallic inclusions, that acid type coatings are the most sensitive and basic or low-hydrogen coatings are

the most insensitive. For the examination of porosity of a weld deposit, radiography and studies of micro-sections across the weld constitute the best and extensively applicable methods. For testing the crack-resistance of a weld deposit many methods are available, which, however, mostly suffer from the fact that though they involve numerical data which permit an immediate comparison and thereby a graded evaluation, they can hardly be relied upon. In the Development and Research Sections of the author's firm, therefore, methods have been devised which test simultaneously the crack-resistance of a weld deposit and its tendency to porosity formation. This should satisfy a very important practical need. It will be necessary to deal exhaustively with this subject shortly.

Figures 24 to 26 show further recent applications of low-hydrogen electrodes. Figure 24 shows the launching of the 10,000 ton cargo ship "Silvretta" for the Reederei Suisse-Atlantique Lausanne. Besides low-hydrogen electrodes being used, the longitudinal joints have been riveted to serve as "crack arresters".

Fig. 25 depicts the large chassis for a truck while Fig. 26 shows an all-welded carbon-dioxide washer. All these have been made using Oerlikon electrodes.

E. Conclusions

A series of results have been given concerning the experimental work on newer types of electrodes from which it is evident that, besides the usual welding tests and tests that take recourse to classical material testing procedures, newly developed testing methods and examining procedures are currently in use. Their application on a few newer electrode types has been described. Numerous examples of applications of such electrodes have been pointed out.



Looking forward for fun.....

A PICNIC TO KOVALAM

BY

C. R. SWAMINATHAN

About 45 employees of the I.C.F. arranged a holiday Picnic to KOVALAM (Covelong) an ideal picnic spot, about 27 miles away from Madras City on April 9. This place was formerly known as Saadat Bunder. Kovalam is famous for its beautiful beach and is also well known as a fishing centre. Kovalam was originally a port built by Saadat Ali, Nawab of Carnatic and it was here that Labourdonais landed his troops in 1746. It was taken by Clive in 1752 and destroyed. The village is divided from the mainland by an arm of sea through which the Buckingham Canal runs from Madras to Mahabalipuram.

We collected together on the 9th at about 20-30 hrs. at Broadway Bus stand and proceeded by bus to Lattice Bridge. From here we commenced our overnight journey by country boat in moonlight, along the Buckingham Canal. We landed at Kovalam in the early hours of the morning. The boat journey was very thrilling and made us to forget the night, the sleep and ourselves. While a few of us on boat listened to the recorded music, a few others were engaged in fishing from the top of the boat. As the boat was moving, these fishermen of course did not succeed in catching any fish. But surprisingly, for others watching the fun, a long fish, just perhaps out of sympathy for these weiry fishermen flew out of the water and got into the boat, which was of

course very promptly captured by our fishermen. On arrival at the rest-house breakfast was served and then we proceeded to the famous sea-shore known internationally for its scenic beauty, and tasted the tender cocoanut water sold in plenty there. After sight-seeing and sea-bath, we returned to the rest-house. We had then our grand feast, followed by indoor games, relaxation, amusements and the like. At 15 hrs. after tea and snacks, we packed off and marched in the ravishing sun to Kelambakkam, cutting across the salt fields, to cover a distance of 3 miles to reach the bus route. There we boarded a special bus arranged for our party, and reached home before sunset. It was a memorable picnic and the few photos taken on this occasion will give the readers an idea of fun the party had.



MARCH OF SCIENCE

Progress in Colour Photography and Printing

Recently a colour photograph was taken, processed and paper-printed; a set of four-colour blocks produced, etched and proofed; and a full-colour brochure printed and distributed all in the space of 12 hours! It was a unique, fast-moving, precision-timed exercise designed to show how the combination of: (i) the right photographic conditions, (ii) a first-class colour film material and (iii) a fully-gearred, well-equipped colour printing service, can produce a result which, as far as is known—at least for its speed of operation—has hitherto been unexcelled.

It all started with the opening of the new 'Country Life' studios in Tavistock Street, London, which, covering some 2,700 sq.ft. and supported by fully-equipped laboratories, dressing rooms, kitchens, and all possible technical and production facilities, are now certainly among the most advanced in Europe. There, the guests of the evening, were photographed, using the new Ilfacoil negative/positive material—which Ilford Limited have developed in conjunction with ICI—and with the aid of the 30,000 joules of electronic flash with which the new studios are equipped.

Photography started at 7-30 p.m., and continued for roughly half-an-hour. Then, the exposed colour film was taken to an adjoining room and processed. By 10-30 p.m. the colour prints were ready, and the results rushed to St. Clements Press a mile or so away. Here, using the latest Klischograph equipment, a set of four-colour, 120 screen, half-tone blocks were made, fine-etched and printed in brochure form by the early hours of the morning.

The new colour film will be tried out in the amateur market in Britain this summer when it is being made available in popular roll film sizes and will be available later for export. Speed is quoted as A.S.A. 32.

Production of Packaged Houses of Aluminium

Full scale production of aluminium houses, Complete with verandahs and car ports, which can be erected by six men in 12 days, has started at the Wolverhampton Factory of Coseley Buildings Ltd. They are intended primarily for oversea purposes. The house is the result of research and development during 18 months since the first prototype was announced. It is claimed to provide modern standards of comfort swiftly and cheaply in any part of the world.

Unskilled labour, with some supervision, can carry out the erection. The electrical installation is supplied as a readymade unit, carefully labelled, so that no expert help is needed for assembly. Plumbing is similarly simplified and the houses are supplied complete with sinks and sanitary fittings.

Eight basic designs are available, offering alternative styles of two, three and four bedroom houses, as well as a style specially designed as a bachelor block. In addition the length and the internal arrangement can be varied to meet particular requirements, and all basic designs can be enlarged by the addition of "extension" rooms, which may be used in some countries to provide servants' wings.

The basic designs cost from £1,250 upwards before shipment from Britain. The price is for a complete packaged building including the wiring, plumbing, fittings, paint and floor finish.

In the development stages research was concentrated on the problem of providing protection against heat and cold. This was solved by a building of aluminium framework with walls of a composite panelling which insulate more than twice as effectively as a 11-inch thick cavity brick wall. Another revolutionary feature is that the roof is of "stressed skin" construction, a principle

used in aircraft manufacture. This technique entirely eliminates the use of roof trusses. The house has already been selected to serve in great extremes of climate.

New Surface Hardener

A new synthetic resinous agent for the hardening and protection of timber surfaces, which is particularly effective in the treatment of timber used in the shuttering and moulding of concrete, has been developed by Stuart B. Dickens Ltd., the concrete water-proofing consultants and manufacturers of London.

Known as "Moldcote", the new liquid hardener is the product of intensive laboratory research on the improvement of the surface finish of concrete and lengthening of the economic life of formwork. When applied to timber by spray or brush, it imparts, a smooth impermeable and highly-glazed finish which is claimed to afford lasting protection against moisture or alkalis from concrete. The hard protective veneer allows a materially increased number of formwork uses without deterioration and conduces to a fine even concrete surface texture. "Moldcote" is an inexpensive treatment which yields real economies in the construction of formwork by reason of the increased number of uses obtained. Greatly improved surface quality dispenses with the need for lengthy concrete finishing operations.

A New Egg Washing Machine ! !

A new egg washing machine which avoids the harmful effects on eggs usually associated with wet cleaning is soon to be introduced by a U.K. firm, Gascoigne-Crowther, Ltd., of Berkshire, England. The main feature is an electro-magnetic vibrator. Its frequency of vibration—25 per second—makes the eggs slide over, rather than knock against each other. This floating motion of the eggs eliminates the danger of hair cracks usually associated with mechanical cleaning methods. The unit is shaped like an extra tall bucket and has a built-in immersion heater with a 400 watt element. The heater is thermostatically con-

trolled, maintaining the water at roughly 90 degrees Fahrenheit, the optimum temperature for wet cleaning eggs. A plastic coated basket which fits into the bucket holds 8-10 dozen eggs and it takes 8-10 minutes to wash them. Individual handling of eggs for cleaning is avoided.

This firm has also formulated an egg sanitant, for use with the machine and other wet cleaning methods. It contains both wetting and germicidal agents. A colourless, tasteless coating of germicide remains on the egg after drying. This seals off the pores preventing further entry of bacteria. For this reason the eggs must not be rinsed after cleaning. Since there is no strong detergent action—just sufficient to remove the dirt—and no rubbing takes place, none of the bloom associated with fresh eggs is removed.

Electronic One Man Band

An electronic one man band, invented by a Birmingham University Scientist Mr. Kenneth A. Macfayden, Physics Lecturer and amateur musician, was recently played in public for the first time. It gave renderings of a Handel oboe concerto, a Handel flute concerto and a cello solo before an audience of 1,000 Birmingham school children. Mr. Macfayden calls the machine Eskimo which stands for Electronic Solo Keyboard Instrument Model. It is the size of a small record cabinet and has 22 white keys and 15 black keys above which are a variety of knobs, dials and valves. In the U.K. it can be made for about £30 or £40. By setting the knobs Eskimo can reproduce the sounds of most orchestral instruments. Reed and string instruments are faithfully reproduced but wind instruments are, as yet, imperfect. It can be played by anyone with a rudimentary knowledge of the piano.

Mr. Macfayden says that there are hundreds of people in any community who have had some sort of training on a keyboard but it is rarely that people can reach the heights of virtuosity they would like. His idea was to

SPACE TECHNOLOGY TO IMPROVE RAIL TRANSPORT

The transistor, the same miracle device of electronics which has made the space age possible, is making a significant contribution to the betterment of railroad transportation, it was learned in New York recently during a meeting of the American Institute of Electrical Engineers.

Transistors are tiny devices which replace large, bulky vacuum tubes in many electronic applications. Many transistors are not much bigger than the head of a pin.

In a paper presented to the Institute's Committee on Land Transportation, two engineers from General Electric Company's (U.S.A.) Locomotive & Car Equipment Department described the operation and advantages of diesel-electric and gas turbine-electric locomotive control mechanisms utilizing transistors. The engineers, stated that transistors are being used in excitation control circuits.

An excitation control circuit is a system for controlling the amount of power produced by an electrical generator. In a diesel-electric locomotive, the generator is driven by a diesel engine and the current is sent to traction motors mounted on the driving axles. In the gas turbine-electric design, the generator is powered by a turbine rotated by the hot, expanding gasses released from burning oil.

Among the advantages coming from use of transistors in excitation control systems, the engineers cited the following: longer life for all components, ease of interchangeability of parts and entire control units, reduced diesel engine maintenance and less slippage of driving wheels on rail surfaces. Translated into everyday terms, this means more economical and productive railroad transportation — *Globe Press Service*.

An Oxford professor of English wandered into a cafe and ordered figs and cream. The waitress brought him a dish of figs covered with cream. The professor was annoyed. 'I ordered figs *and* cream,' he pointed out acrimoniously.

'Well, you've got them,' said the girl, pointing to the dish.

'I haven't!' snapped the professor.

'This is figs *with* cream,' the girl began bewildered, 'I don't see.'

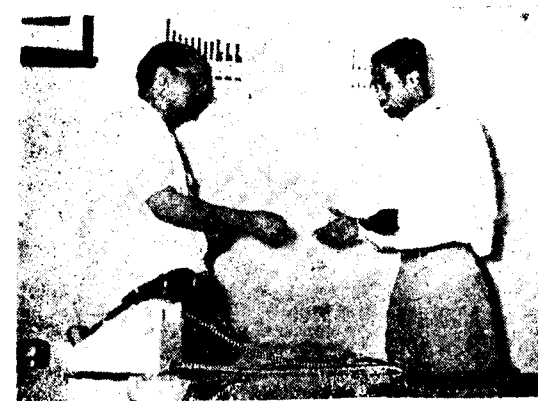
The professor cut in: 'My dear girl,' he said icily, 'would you say a woman *and* child were the same as a woman *with* child?'

(Continued from last page)

design an instrument which would take advantage of widespread skill on a keyboard into which could be built features of orchestral instruments such as a pleasant note, ability to produce vibrato and ability to transpose automatically. "These are things which would be electronically simple," he said. "It is

true that the machine is just imitating other instruments, but we are trying to do this in a way which will make passive people active." He considers that the machine could be used to play solos or to take its part within an orchestra should an instrumentalist become suddenly indisposed—*British Information Services*.

They Cashed their Ideas



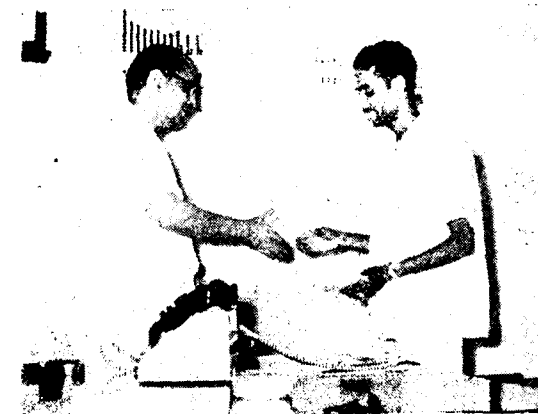
New components from thrown off-cuts
Suggested by Shri E. Ethirajan, Progressman,
Shop 20.

Award Rs. 30.



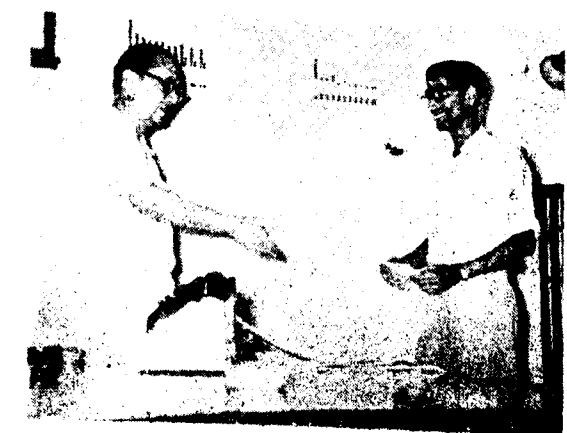
And here too a suggestion suggesting manufacture
of new components from off-cuts by Shri
P. Balasubramanian, progress chaser, Shop 10.

Award Rs. 150.



Suggestions effecting a save of Rs. 1,135-32 per
year by Shri A. Arul, Tech. progressman, Shop 13.

Award Rs. 50.



Suggestion by Shri A. Subramaniam, welder,
resulting in savings of Rs. 3,563-28 per year.

Award Rs. 100. (This is the fourth occasion Shri
Subramaniam is winning an award).

THE QUILON-ERNAKULAM RAIL LINK

BY

(M. D. PADMA KUMAR)

The Quilon-Ernakulam railway, a cherished dream of the people of central Kerala for the last fifty years became a reality, thanks to the engineers and workers of the Indian Railways, in 1959. This link, extending from Quilon to Ernakulam for about 60 miles, passes through the most beautiful part of Kerala. It is a joy to watch the metre-gauge train passing through the evergreen meadows and over the murmuring ravines. And the visitor will be enchanted by the scenic splendour of this ancient land famous for its cultural heritage. Even the small stations are provided with modern facilities, and this rail-link is a model in architecture, engineering skill and efficient planning. Especially the railway station at Kottayam which is designed in harmony with the local landscape is one of the most charming railway stations in the West Coast.

This railway connects the up-coming city of Ernakulam, Vaikam,—famous for its Hindu temple, Ettumanur—where there is a fine Siva temple, Kottayam, a business centre, and Thiruvella with Quilon.

Many workers lost their lives, while the difficult earth-work was in progress. The memory of those labour heroes, who sacrificed their lives is enshrined in a marble slab on the way. Every passing train slows down near that spot as a mark of respect to the martyrs.

Another peculiarity of this railway is that you can find houses on both sides of the railway line for the whole length of sixty miles. Sometimes the railway line may be cutting across two houses. The life on the way is going on as usual though the steaming trains may whistle and passby. I hope many of you will go to Kerala and see for yourselves,—“How green is Kerala.”

HEMINGWAY ON THE STAGE

Extracts from prose books by Ernest Hemingway have been dramatized by A. E. Hotchner and will be presented under the title “Scenes of Love and Death” in New York in the spring of 1961. The world premiere may possibly take place in the summer of 1960 at the Edinburgh Festival. The extracts are from “To Have and Have Not,” “A Farewell to Arms,” “The Sea Change,” “Hills Like White Elephants,” “The Light of the World,” “Up in Michigan,” and “The fifth Column.” Instead of scenery, a number of platforms will be utilized in the dramatization and production of the various stories in New York. The five-character cast will probably be directed by Frank Corsaro.

Ernest Hemingway's new book will probably be published by Charles Scribner's Sons, New York publishers, this fall. It is not a novel but reminiscences, memories of the days when Hemingway lived in Paris, more than 30 years ago. No title has yet been announced for the new book.

“ART THEATRES” FOR DISCRIMINATING EYES

BY

NORMAN SMITH

One of the most interesting phenomena is the American entertainment world is the burgeoning of the so-called “art” theatre.

This, we hasten to point out, does not mean a theatre devoted to spoken drama of quality, or even one presenting exclusively motion pictures on the fine arts. Rather, the term has come to mean the intimate theatre showing exceptional foreign and domestic films.

Physically such a theatre is modest in size (it usually seats about 500). Along with its smallness has come a certain elegance, far removed from the mirrored-and-gilded decor of the larger and older film theatres. For example, instead of gigantic posters proclaiming coming attractions, the new-style cinemas often hang paintings by promising artists.

All this is in keeping with the exhibitors' avowed aim of offering to a discriminating public productions of originality and freshness from film-makers all over the world.

A glance at current programme listings shows how well exhibitors by and large uphold such standards. New York audiences, for example, can choose from “Ikiru” (Japan), “Rosemary” (Germany), “Black Orphus” (France), “A Lesson in Love” (Sweden) and “Expresso Bongo” (England), to mention only a few.

The same films are being shown elsewhere as well, for art houses are not indigenous only to New York. They are, in fact, cropping up in cities and suburbs throughout the nation like the proverbial mushrooms after a rain, and at latest count they numbered close to 500.

What makes this growth significant is the fact that it has taken place while the number of

“old-fashioned” film theatres has declined. There are now some 10,000 “four-walled” motion picture houses in the United States. To these must be added some 8,500 “drive-in” theatres, a phenomenal increase in the wake of the migration to the suburbs, but an increase which in no way minimizes the growing popularity of art theatres.

Not that every film exhibited at such theatres is necessarily a superior product—any more than every film shown at “commercial” theatres is automatically mediocre. Some of Hollywood's best products, shown only at the big theatres, have, in fact, reaped high artistic acclaim.

What the art houses do offer is an intriguing assortment of productions representing almost every major language, culture, view point and dramatic idiom extant today—obviously elements of attraction in this age of the jet plane and ever-growing international contacts.

But cultural curiosity extends also to that which is fresh and new in American creativity. Thus an important part of the art theatres' programmes is devoted either to independently produced films by Hollywood's rugged individualists—men like Elia Kazan, John Huston and Paddy Chayefsky—who pursue their own artistic visions, or to the products turned out by a growing group of young *avant-garde* moviemakers.

Two interesting examples of the latter are currently on display at local art cinemas. The first, “Pull My Daisy,” deserves mention only because of its experimental nature. It is a 29-minute effort to probe the moods and feelings of a group of poets and musicians. Written and narrated by Jack Kerouac—the

unofficial laureate of the so-called "beat" movement whose members can best be described as puerile escapists from reality—the film is technically amateurish and substantively vapid. Yet it does have touches of humour and subtle scorn, and the very grotesqueness of the subject fascinates.

In happy contrast to this venture is the eloquent visual and aural portrait of the famous Newport Jazz Festival called "Jazz on a Summer's Day." The first production of a successful young commercial photographer, Bert Stern, it has captivated devotees of the cinema art—even those normally not under the spell of jazz.

For Mr. Stern and his colleagues have captured in their feature-length film not only the faces of the participating musicians and the sound of their instruments, but the whole multi-faceted image of a jazzy summer day.

The camera hovers lovingly over Newport Bay and its graceful yachts, then skips through

winding streets, catching glimpses of musicians rehearsing in homes, in gardens and on piers. Finally it sketches the Festival itself where fifty artists, from trumpeter Louis Armstrong to gospel singer Mahalia Jackson, cover the full range of jazz.

Pictorially the film is exceptionally rewarding—sensitive use of colour, rhythmic flow of scenes and snatches of humour. The musical patterns also are effective.

Although the production as such is almost too formless—its director-photographer, in keeping with his subject, deliberately relied on improvisation—it gives evidence of a strong new creative talent that will bear watching.

It is through the presentation of such experimental works and of foreign dramas (which are the bulk of their fare) that the art theatres have carved out for themselves a place of their own.

U.S.I.S.

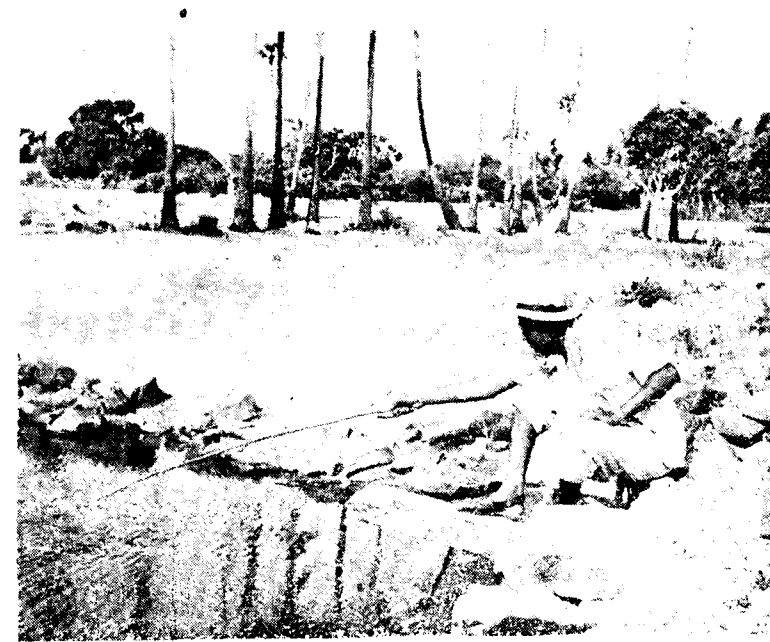
ELECTRICITY WITHOUT WIRES

For more than half a century scientists have discussed the possibility of transmitting electric power through the atmosphere without the use of wires or so-called transmission lines. This scientific dream has finally become a reality.

The device that makes wireless transmission of electricity possible is a revolutionary high-frequency, high-power microwave tube developed by the Raytheon Company at Waltham, Massachusetts, in the United States.

Microwaves are extremely short-length radio waves that can be transmitted in very narrow, pencil-like beams. It is the rapid development of microwave technology in recent years that has made possible the transmission of electricity without the use of wires.

Called the Amplitron, the Raytheon Company's tube "converts nearly all of the raw input energy (electricity) as supplied by a public utilities system, directly to microwave energy, at efficiencies in the order of 80 per cent, leaving little to be dissipated in the tube in the form of heat."



Photographs of
Kovalam picnic.

Sure.....he was fishing in the right pond but dam'nd ill-luck
he didn't get any fish.

Looks like a march past—
Its our friends returning
from Kovalam.....Quite a
pastime it must have been
to walk with the sun blazing
mercilessly.





President Nasser addressing the officers of the Integral Coach Factory

Here we see the President stepping out after inspecting a coach.



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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.
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3. Cheques should be drawn in favour of the Editor, "Railcoach", Integral Coach Factory, Perambur, Madras 23.
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The Editor

RAILCOACH

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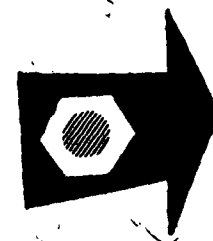
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SIMPLE
SYSTEM**

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On October 1, 1958, Metric Weights were permitted in selected areas of the States and Union Territories. In these areas, only Metric Weights will be legal from October this year.

From April 1960, Metric Weights are allowed also in the rest of the country excepting Jammu and Kashmir.

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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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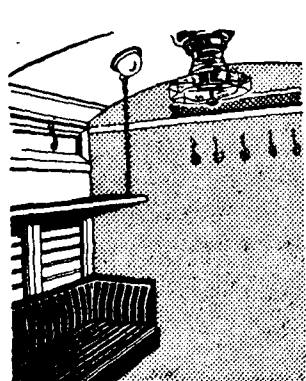
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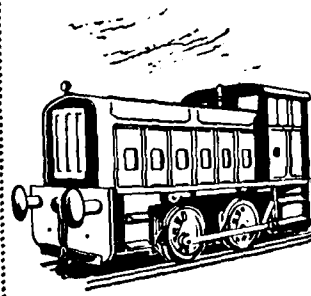
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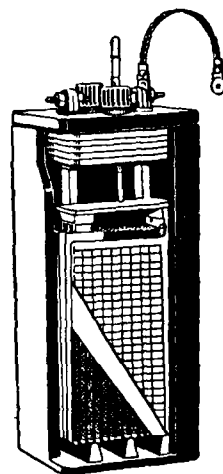
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Battery, with patented
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STANDARD BATTERIES LIMITED, Bombay 25

editorial

PAY COMMISSION'S RECOMMENDATIONS

Whoever has read the statements of the Railway Minister made recently while addressing the Fourth Annual Convention of the National Federation of Indian Railwaymen would, without fail, be able to comprehend the pains that are being taken by the Railway Administration to do their best to give maximum benefit out of the accepted recommendations of the Pay Commission to its employees. Shri Jagjivan Ram disclosed that the initial cost of implementing the Pay Commission's recommendations itself would be approximately Rs. 13 crores per annum and this would progressively increase in coming years.

Nobody would deny that we are now passing through a critical period of our history. We are striving hard to make a prosperous and happy India. Only after we have built up its prosperity and ensured peaceful conditions that we will have enough for all of us to share and live happily. Once this is understood, then why this agitational attitude amongst a section of railwaymen over the recommendations of the Pay Commission?

The Pay Commission made their recommendations after taking into full consideration all the points of view placed before them by various parties and of course taking into consideration the present economic condition of the country as also the future trends. As advocated by our Hon'ble Minister one should shake of this agitational approach to settle any dispute but instead should cultivate the spirit of discussing things out round the table, that would ultimately result in resolving any difficulties and differences.

As the staff are well aware, there are many beneficial things resulting out of the Pay Commission's recommendations (an abridged version of Pay Commission's recommendations is published on pages 43 and 44). One should not ignore them and create a feeling that nothing tangible has come out of the recommendations.

The country is on the threshold of a great social and economic upheaval. National discipline is the need of the hour. Let us have implicit faith in our great leaders, who, with an abundance of experience, are trying their best to make our country prosperous.

Schlieren

The Swiss Car and Elevator Manufacturing Corp., Ltd., Schlieren-Zurich (Switzerland) is one of the pioneers in building and technical development of Railway Coaches, Tram Cars, Trolley Buses, Lifts, Escalators

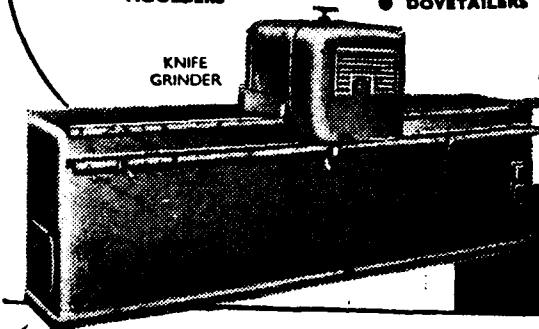


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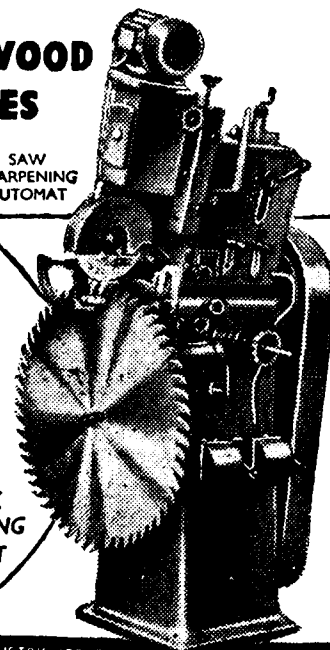
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THE RAILCOACH

JUNE 60

"PRODUCTIVITY" TOOLS AND TECHNIQUE

(Paper read by Shri K. Swarup, Chief Administrative Officer, Integral Coach Factory, at the Seminar of the Madras Productivity Council on June 28, 1960.)

I am happy indeed that I have an opportunity to participate in the Productivity Conference organised by the Madras Productivity Council. The Productivity movement today is of greatest importance and value and the Madras Productivity Council is doing an excellent work in putting through several training and other programmes successfully.

We are passing through an industrial revolution in the country—similar to what England faced in the sixteenth century and America from 1910-1920 to obtain ascendancy in the industrial world.

India was predominantly an agricultural country. We grew more foodstuff than what we required—we sold it and bought the consumer goods. The position has gradually changed due to increase in our population. We do not grow enough food to meet our own requirements and still have to buy our consumer goods, with the result that our foreign exchange problem is becoming acuter day by day.

This, therefore, is a challenge to us—to balance our foreign exchange, raise our status in the world and at the same time increase our own standards of living to provide a fuller life for everyone. How is this challenge to be met?

We could do this by increasing our low productivity from fields, from forests and from our industries by adopting more radical and more modern methods. If other countries have done it, we surely can also do it provided there is a will.

Our Government has already set the model for us. It has produced well-thought-out Five Year Plans and laid down the objectives for us. It has asked us to make sacrifices by cutting the imports of consumer goods and has set up a National Productivity Council to stimulate higher productivity from the existing plants and resources and eliminate waste.

We are meeting today under the auspices of this body to find out ways and means by which employers, employees and technicians can play their role in this laudable cause of improving our status as a nation and improving the standard of the common man.

Increasing of productivity will generate more wealth and if it is equitably shared among the three parties concerned, I have no doubt in my mind that each party will play its part full. I may be permitted to quote a dialogue from a Court scene in which Henry Ford was involved, to illustrate how this can work.

RAILCOACH

Stevenson : “ Now, I will ask you again, do you still think that those profits were ‘ awful ’ profits? ”

Ford : “ Well, I guess, I do, yes. ”

Stevenson : “ And for that reason you were not satisfied to continue making such awful profits? ”

Ford : “ We don’t seem to be able to keep the profits down. ”

Stevenson : “ Are you trying to keep them down? What is the Ford Motor Company organised for except profits, will you tell me, Mr. Ford? ”

Ford : “ Organised to do as much good as we can, everywhere, for everybody concerned. To do as much as possible for everybody concerned. To make money and use it, give employment and send out the car where people can use it. And incidentally to make money. ”

Stevenson : “ Incidentally make money? ”

Ford : “ Yes, sir. ”

Stevenson : “ But your controlling feature is to employ a great army of men at high wages, to reduce the selling price of your car, so that a lot of people can buy it at a cheap price and give everybody a car that wants one. ”

Ford : “ If you give all that, the money will fall into your hands. You can’t get of it. ”

This dialogue I have repeated on purpose, to show what should be the primary aim of business and towards what is all business to be directed. Traditional capitalists claimed that business is essentially and principally aimed at profit and therefore higher and higher dividends, but Henry Ford took an entirely different view of industrial business. He thought of business and industry first and foremost as a public service. For him, profits were merely what enabled him to keep the factories going, to carry out his plans of expansion and to maintain his company’s independence. Profits were also the proof of success, the proof that he was right and that his methods were

sound. He continued to say that “ a reasonable profits is right but not too much. So it has been my policy to force the price of the car down as fast as production would permit and give the benefits to users and labourers with resulting surprisingly enormous benefits to ourselves. ”

The lessons from this are :

- (1) Demands increase as the prices come down within the reach of common man.
- (2) Turnover increases resulting in better wages and more profits to the shareholders.
- (3) These processes stimulate industrial growth beyond conception.

The problem of demand and supply is one function of administration and management, and the other is economical production. Technicians are mainly responsible for bringing the prices down within the reach of common man and this aspect of the problem I have been asked to dwell upon today.

Management

This is one of the most important factors in the success of a factory. The popular generalisation “ A manager does his work by getting other people to do theirs ” tells only part of the story. Leadership is, of course, an essential part of management and finding leaders is a problem that grows more difficult as industry expands and becomes more complicated. In the newer industries of developing countries like ours, the demand for leadership cannot be fully met from traditional sources. At the same time, foreign management is being imported less and less, so that men must be chosen and trained from a wider section of the community. If management were an exact science this could be a comparatively simple matter but management is not learnt by reading books or even by participating in set courses of study. We should, therefore, not confine ourselves to higher management by administrative officers only, but encourage scientists, technicians, labour lea-

ders, professors, lawyers and politicians to come forward to join the higher management.

The new technology of management in a rapidly industrialising country was recently pointed out at the Duke of Edinburgh’s study conference on the Human Problems of industrial communities within the Commonwealth and Empire, held at Oxford in 1956. Mr. A. B. Waring said : “ We have as a target the doubling of the standard of living, which can be brought about only as a result of reducing production costs by economising product designs and developing advanced manufacturing processes and facilities. ”

The already changing pattern of employment will be influenced considerably as a consequence of this development ; furthermore, there will be a large number of people employed in technical administrative and other capacities many of whom will be diverted from the ranks of those manually employed and if account is also taken of shorter working hours it can be assumed that the output of a smaller force of manual workers will have to be increased three or four times to achieve the aim of doubling the standards of living for all !

Who are best suited to win the confidence of manual workers to achieve this result? Naturally those who have moved with them and know their difficulties.

The new technology also demands that the least production worker be capable of a good deal of planning. The more planning he can do, the more responsibility he can take for what he does and the more productive a worker he will be. Our problem will be that many workers of tomorrow may have to be able to do more planning than a good many people who call themselves managers, are capable of.

To sum up, a good management should be capable of good deal of planning to get the best out of machinery and men at their disposal. This is very important as Hawthorne experiments thirty-five years ago showed, that no matter how highly developed the technique of production, how excellent the physical

working conditions, or how high the amount of pay received, more important factors were whether or not the worker liked or trusted his supervisor ; whether he found a source of pride and satisfaction in his job or whether he found his contacts with his co-workers pleasant. All these had a much greater effect upon his output even in a routine assembly job.

It must be remembered that the labour of human being is no longer a commodity, and the worker no longer sells his labour but enters into an association with management in order that what they produce together will provide a livelihood for both and at the same time better service for the customers.

Taking these experiments, and experiences into consideration, the most important thing for any progressive management would be to develop good human relationship between management and workers.

Once this is achieved, the technical department can play its role successfully or organising the efforts of workers to higher productivity.

Reducing production costs can be achieved by co-ordinated action of the whole organisation. In a good organisation, while the production according to certain preconceived ideas will be left as the entire responsibility of the Works Manager, there will be design office, a separate unit under the Production Engineer for proper work study, method study, planning and scheduling, a third unit in charge of the quality control and inspection and a fourth unit forming the Cost Accounting Section.

(1) *Design Office* : The aim of the technicians in the Design Office should be to standardize the product in conformity with the requirements of the consumer and of manufacture. Standards are at once a cause and an effect of increased output. Standardization has been historically an important factor in the ascendancy of the factory system of mechanical production and later in the development of mass production technique and automation. A standard must, however, remain your servant and must never tend to become your master.

Standardization also leads to simplification in industry. The advantages of standardization can be summarised as follows :

To the producer :

1. Longer runs with fewer changes on the production line.
2. Reduced tooling and set-up time.
3. Possibilities of increased mechanisation and special-purpose plant.
4. Easier training of operatives.
5. Simpler and cheaper inspection.
6. Less capital invested in ideal plant, tools and space.
7. Reduction of stocks of materials, components and end-products.
8. Reduced call on drawing office and designing staff for special orders, leaving them free for work on new designs or improvements.
9. Simpler clerical and administrative work.
10. Easier service and maintenance.

11. Concentration of sales and advertising effort on a narrower range.

12. And hence, increased productivity, leading to reduction in costs and prices and to increased sales.

To the User :

1. Lower price for a given quality or performance.
2. Reduced variety and level of stocks at all distribution points.
3. Readier availability.
4. Improved service and maintenance facilities.

It is no gainsaying the fact that variety of output increases costs. The more mechanised a factory, the more pronounced is this effect. Most products, engineering products at any rate, constitute an assembly of parts and sub-assemblies. There is a fallacious general impression that the freezing of the parts design must lead to a freezing of the product design.

It is, therefore, necessary that the Design Department on the one hand and the purchasing and the manufacturing departments on the other hand should co-ordinate in an effective manner, to develop a design which is commendable from the designer's point of view and is able to be economically manufactured with the available machines and tools or from readily procurable materials and yet satisfies as varied a demand as required. For component manufacture, standardization is also necessary in order to lay down practical limits of tolerances and allowances. It is generally found that the design office tends to lay down tolerances which are difficult to be achieved and, therefore, the productivity suffers. With more co-ordination between the designer and manufacturer it would be possible to design a product which would be good in quality, which would be standard and easy to manufacture from the raw materials available in the market.

This brings me to another important phase in the development of our industries in India. We are entering into technical collaborations with different countries and different firms who are used to different standard specifications and possibly have more highly developed machinery and plant at their command. To get the highest productivity it is necessary that the various collaborators are asked to adhere to the Indian Standard Specifications and design products which would be more suited under our climatic conditions. To sum up, elimination of diversified product and adopting standardisation as far as possible and using raw materials to I.S.I. or other Indian Standard Specifications would lead to better productivity and reduction in production costs.

(2) *Production Methods* : After a decision has been taken on the products to be manufactured, it is very necessary to make detailed studies of how to produce that article in the most efficient manner eliminating waste wherever possible. This could be achieved by technicians well trained in planning, work study, motion study, time study, etc., etc. So far we banked on cheap labour. This, however,

must change now with a rapid rise in the standard of living, and as mentioned before the important thing now is to produce consumer goods at comparatively cheaper prices within the reach of the common man. It, therefore, means that planning, work studies, method studies, time studies, need careful attention. There is, however, one thing to be remembered in this connection. Automation is now being adopted in the western countries but we in India have to be careful in this regard, because single-purpose machines suitable for automation are more complicated and are not yet being manufactured in India. They have, therefore, to be obtained from abroad at a much higher price and their maintenance is also a problem. The manpower in the western countries is not available and therefore automation for them is a necessity. In our country, still there is plenty of unemployment and manpower is available at command. We have, therefore, to provide more employment to wipe off the large unemployment existing in our country. To the technicians, therefore, I have to advise that these different circumstances should be given due weight before coming to decisions in their anxiety to increase productivity. I cannot but stress the importance of organising good production flow, eliminating multiple handling as far as possible. You will get surprisingly good results in productivity by giving it a good thought. Introduction of incentives to the workers and technicians is recognised to be one of the best methods of increasing productivity. The fallacy that by increasing production the strength of man power employed decreases has been exploded by Henry Ford, as already explained in detail above. It actually leads to more employment.

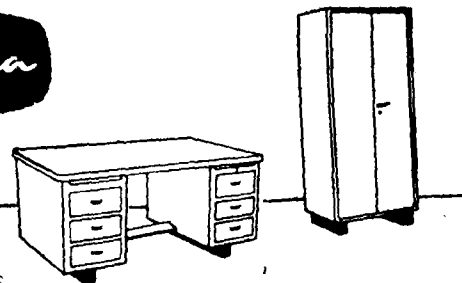
(3) *Quality Control and Inspection* : Quality control in India is again not receiving the attention of the technicians. As mentioned before, quality control is very necessary for standardisation and it is of absolute importance that the specifications laid down should be worked to. Then only the designers would be able to standardise products. Experience has shown that most of the industries who

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could offload some of their components and assemblies to the medium-sized and small scale industries do not like to do so because they cannot depend upon the qualities and deliveries.

In many manufacturing organisations, rejections and re-working of defective products present a problem of considerable magnitude causing increased production costs. Defective production results from a complexity of cause and effect which may indicate lack of adequate supervision, inefficient production methods or indifferent quality of raw materials and tools.

(4) *Cost Accounting* : This is another useful instrument which can provide technicians and the management a useful guide to higher productivity. By proper analysis in the cost accounting section, the management and technicians can be given an idea of the sections of the factory or components which are not coming up to the expectations. Those particular sections or components could be studied in detail and more attention paid as to why things are going wrong. Cost accounting is now come to be established as a very useful aid to the managers and more and more, factories are adopting it to obtain better productivity and reduce production costs.

Material Control and Wastage

Very little attention has so far been given to the economics that can be effected by judicious use of material which will best suit the requirements. With the Steel Mills going into production, the range of products available would increase and I would urge on our technicians to make the best use of the bigger range of material that will be available. Full use of scrap and waste is another useful source of bringing the production costs down. All the scrap and waste produced should be carefully studied and steps taken to re-use it or offer it to another industry who can usefully employ it as raw material for their products.

Training of Technicians

This is one of the most important things for increasing productivity in the country. We

have been an agricultural country and it is only in the last twenty to thirty years that we have started developing our own industries. The background that the westerners have is, therefore, lacking. We have to pull it up by intensified training methods.

It is, therefore, important to give the management and the executive the training in proper productivity methods. More and more management courses have to be organised to improve the morale and outlook. While these courses can cover the theoretical aspect of management, the practical problems should also be encouraged to be discussed by having group discussions of the problems that are met with by the executives in the course of everyday activity.

As I have mentioned before, I personally am of the opinion that more and more managers should be taken from the technicians and ranks who show the aptitude of making a good executive. Training of the intermediate supervisory staff is very important and has not received the attention that it should. In most of our industries, especially in the public sector, we insist Degrees or Diplomas as a minimum qualification for the intermediate supervisory staff. The courses in most of our technical institutes comprises mainly of theoretical subjects and do not develop the man to handle practical responsibilities and develop his personality to meet situations. The intermediate supervisory staff, after getting employment, also does not have the facilities for improving their knowledge and, therefore, becomes a tool for just carrying out orders given to him. Intermediate supervisory staff is a vital link between the management and the workers. He is also expected to be an expert in his own particular trade.

From my experience I find that the difficulty in the case of the intermediate supervisory staff is not entirely lack of his desire to learn more and better his prospects but the lack of facilities given to him. I would strongly commend for the consideration of the National Productivity Council to start night classes in certain selected

localities for the benefit of the intermediate supervisory staff, to train them in the methods leading to better productivity, to make them cost-minded and to train them to develop better human relationship between those below and those above them. They are our potential managers and leaders of tomorrow and the more we can do for them the more will be productivity drive gain stimulus in its efforts.

As regards technicians, our ideas of training also have to change, as the worker of tomorrow will no longer be required to do the respective routine chores of machine feeding and material handling; instead he will have to build, maintain and control machines that do the repetitive routine work. To do this, he must be able to do many operations, must have the largest rather than the smallest content to his job, must be able to co-ordinate. The new worker will also have to do a good deal of planning. The more planning he can do, the more he can take responsibility for what he does and the more productive a worker will he be. Our experience in I.C.F. and Railway Workshops has established beyond doubt that talent exists in the supervisory staff as well as amongst skilled artisans. A number of good suggestions are being received from them to increase productivity and to improve upon methods. It, however, needs to be properly harnessed and developed.

It is now generally recognised that mass production methods would increase productivity. The ordinary citizen would define mass-production as large scale production by the use of interchangeable parts, but as Henry Ford himself showed, mass-production is the focussing upon a manufacturing operation of seven different principles, i.e., power, accuracy, economy, continuity, system, speed and repetition. When all seven are used to make a car, tractor, refrigerator, airplane or other complicated commodity, then mass-production throws open the door to plenty, low prices and an improved standard of living. Arming a people, in peace against want, in

war against enemies, it becomes an instrument to alter the shape of civilisation.

In concluding I will recapitulate what our President has said in his message to the Productivity magazines :

"While we think of the targets of investment and production, we should also think of human character without which we cannot even dream of success for our Plans. We often hear that such and such a thing has failed. The machine was all right, everything that could be done was done all right, yet it failed because of human failure. What we should do is to attach the same importance to the human side that we attach to the material side of things.

Looking at the country's economic problems one is struck by wastage all round. If this could be stopped, there would be tremendous progress."

I would request my fellow technicians to take note of this and not to give any cause of complaint as far as human failure is concerned. I would also request labour and management to forget all differences and work as a team with a view to crossing the river and reaching the other shores.

In highly developed countries it is now appreciated that a modern factory depends for its survival and success on the 'know-how' of its engineers. Another point of importance is that even the most highly mechanised factory will be useless without the mental and physical faculties of man. Increasing automation has occasionally given rise, in recent years, to the belief that technical progress must finally lead to the replacement of human effort by machine. In reality nothing could be farther from the truth. The machine does not make man's work unnecessary, but enables it to be applied on a higher plane. The human being is, and will remain, the central figure of every industrial undertaking about whom the machinery of production will continue to perform an essentially subservient task. It is, therefore, very

important that we should look after our technicians who can lead to the industrial progress and growth of the country by their inventions and improved working methods.

We, technicians have played and will continue to play a most vital role in building up the India of our dreams. We have made a notable contribution in the successful completion of the First Five-Year Plan, and in the current implementation of the Second Five-Year Plan. We will be shortly entering into the Third Five-Year Plan which will make the critical phase in the history of development of this country, laying as it does a special emphasis, besides agriculture, on heavy industries. The engineer of tomorrow will have to have a much wider grounding in the science and greater aptitude for research, for it will no longer be a question of carrying out projects based on the knowledge and equipment imported from abroad. This knowledge must henceforth spring from within the country and be at par with similar current knowledge abroad.

There is no mistaking the fact that there is a certain amount of lurking frustration among the present generation of engineers. This may be as a result of many factors. Through selfless service the engineering profession should continue to rise in its stature and it is my humble submission that the engineers and technicians should be given the rightful place in the social structure of the country and their value recognized by all. It is only when the technicians are paid well and are content in their jobs that the real progress and productivity drives will come. Dependence on foreign engineers and technicians should no longer be encouraged and even if our technicians and engineers made mistakes it will be for the good, as no country has developed without making mistakes. I can confidently say that mistakes lead to knowledge and experience so necessary in developing new techniques.

I thank the Secretary of the Madras Productivity Council for inviting me and thus enabling me to associate myself with the deliberations of the Conference.

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INDIA NOW MAKES ELECTRIC LOCOS

BY
K. C. LALL
General Manager, Chittaranjan Locomotive Works

With the changing pattern of railway traffic in India, the Chittaranjan Locomotive Works, hitherto engaged in the manufacture of heavy goods steam locomotives only, is now executing an order for ten prototype tank locomotives for suburban and shuttle services, and has another order on hand for broad gauge passenger and express locomotives. Chittaranjan is also about to begin manufacture of India's first ten D.C. electric locomotives for the Central Railway.

The Indian Railways had 8,209 steam locomotives at the beginning of the first Five-Year Plan period, of which 2,112 were overaged and required replacement. Another 1,484 were expected to complete their economic life during the plan period.

The first Plan initially provided for the procurement of 1,038 locomotives only. The bulk of these locomotives had to be imported, and the rate of procurement was dictated by the ability of the foreign manufacturers to meet our urgent requirements. With improved capacity abroad, the procurement of locomotives was stepped up in the later portion of the Plan. A total of 1,589 locomotives were received during the first Plan period, 1,093 from abroad and 496 from indigenous sources.

At the beginning of the Second Five-Year Plan period, the Indian Railways had a total of 9,262 locomotives, against 8,209 at the beginning of the first Plan period. Of these, however, 2,873 were overaged and were due replacement. Thus, inspite of having procured nearly 1,600 locomotives during the first Plan period, the arrears of replacement to be overtaken were heavier at the beginning of the second than at the beginning of the first Plan period.

At the time of the preparation of the second Plan, it was proposed to procure 1,595 broad

gauge, 582 metre gauge and 81 narrow gauge locomotives, making a total of 2,258. The table below gives details of the rehabilitation programme and the additional requirements for development separately :

		Broad gauge	Metre gauge	Narrow gauge
Rehabilitation	...	1,062	209	81
Development	...	533	373	...
Total	...	1,595	582	81

Subsequently, the requirements of steam locomotives were reassessed and provision was made in the second Plan for the following :—

Broad gauge	...	1,018
Metre gauge	...	934
Narrow gauge	...	24
Total	...	1,976

The number of overaged locomotives is expected to be reduced considerably by the end of the second Plan period. The percentage of overaged stock expected by March 31, 1961

and the percentage at the beginning of the first and the second Plan periods are shown below :

	Broad gauge	Metre gauge	Narrow gauge
	PER CENT	PER CENT	PER CENT
On March 31, 1951.	23.0	31.0	13.3
On March 31, 1956.	32.5	26.0	16.5
On March 31, 1961.	16.2	22.5	6.6

Self-sufficiency Reached

The Indian Railways' requirements are now fully met by the Chittaranjan Locomotive Works so far as broad gauge steam locomotives are concerned, and by the Tata Locomotive and Engineering Co. so far as metre gauge locomotives are concerned. Chittaranjan Locomotive Works produced 341 broad gauge locomotives in the first Plan period, while about 826 are likely to be produced before the end of the second Five-Year Plan period. The output of the Tata Locomotive and Engineering Co. was 155 locomotives in the first Plan period and it is expected to be about 500 during the current Plan period.

Even though Chittaranjan has been building broad gauge locomotives and Telco metre gauge locomotives, both are capable of building steam locomotives for any gauge.

Again, Chittaranjan has had only one type of locomotive to build, namely, broad gauge heavy goods locomotives, while Telco have built two types, namely heavy goods metre gauge locomotives and heavy passenger metre gauge locomotives. Both these types had a number of inter-changeable parts. This pattern in turn was due to the transportation requirements of the railways.

Changing Pattern

However, the pattern is beginning to change now and with the introduction of electric and diesel traction on the lines which are carrying the heaviest goods traffic, the demand for heavy goods steam locomotives will fall off.

Chittaranjan is already in the process of completing an order for ten prototype tank locomotives meant for suburban and shuttle services and has another order for broad gauge passenger and express locomotives. In future a greater variety in the types to be built may be expected.

The increased self-sufficiency in the matter of steam locomotives during the second Plan period compared with the first, is brought out in the following statement :—

	Total number of locomotives procured	Indigenous manufacture	Percentage
First Plan	...	1,589	496 31.0
Second Plan	...	1,952	1,326 68.0

Apart from making the country self-sufficient in board gauge steam locomotives, the Chittaranjan Locomotive Works in conjunction with the Research, Designs and Standards Organisation of the Railway Board has reduced the imported content of the locomotives by making increasing use of materials available indigenously. Success in this direction is reflected in the following figures, which show a progressive fall in the cost of the imported element per locomotive—

	Rs.
1954-55	...
1955-56	...
1956-57	...
1957-58	...
1958-59	...
1959-60	...

When the new steel plants in the country go into full production and adequate supplies of indigenous steels are available, the imported element will drop sharply to less than Rs. 5,000 per steam locomotive.

Design Works

These bare figures, however, do not tell the whole story of the patient investigation and hard

work involved in increasing capacity to build locomotives and making the locomotives themselves were indigenous. This story is of interest.

The bed-rock of self-sufficiency in the building of locomotives like any other item of rolling stock or mechanical equipment is the ability to design locomotives or rolling stock or mechanical equipment. From the inception of railways in India, each Railway had its consulting engineers in Britain and locomotives and rolling stock were built to the designs and specifications of these consulting engineers. By the time independence was attained, most of the Railways belonged to the Government and the Railway Board's consulting engineers for rolling stock were a British firm. The only organisation dealing with designs and specifications for locomotives and rolling stock though in a very restricted sphere available on the Indian railways was the Central Standards Office which, apart from being engaged in standardization work, provided liaison between the consulting engineers and the Indian Railways.

A big step forward in self-sufficiency in locomotives was taken when the Railway Board decided soon after independence to develop this small Standards Office into the Research, Designs and Standards Organisation for the Railways and to terminate their agreement with the British consulting engineers. Ever since, the ability to prepare designs and specifications, to guide and control manufacture, of steam locomotives has been built up step by step, and the Research, Designs and Standards Organisation is today a full-fledged consulting engineers' organisation for the Indian Railways.

The ten prototype tank locomotives being manufactured at Chittaranjan were designed by the Research, Designs and Standards Organisations. It is this ability to design which is primarily responsible for the large measure of self-sufficiency which has been attained in the field of steam locomotives. Designs and speci-

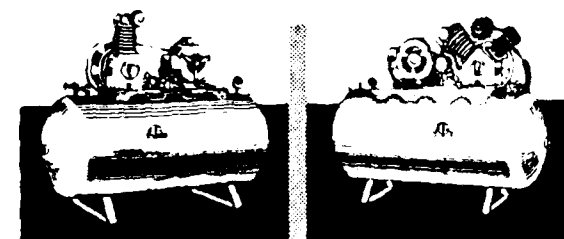
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fications originally meant to suit British practices have been progressively modified to enable the best use to be made of indigenous plant, equipment and materials. This build up of design know-how is of the utmost importance to the building of steam locomotives in India.

Higher Output, Lower Cost

The Chittaranjan Locomotive Works completed its 1,000th locomotive in March this year. The yearly output and all-in cost per locomotive since production started in 1950 is given in the following statement. The heavy goods locomotives under manufacture are being turned out well below the cost at which they were last imported in 1955. These figures, which show a progressive rise in output and a progressive fall in price despite rising wage rates and rising costs of raw materials, suggest that the Chittaranjan Locomotive Works has already come of age in steam locomotive manufacture.

		Number of locomotives turned out	Cost per locomotive (In thou- sands of rupees)
1950-51	...	7	841
1951-52	...	17	875
1952-53	...	33	922
1953-54	...	64	724
1954-55	...	98	606
1955-56	...	129	500
1956-57	...	156	455
1957-58	...	164	454
1958-59	...	165	457
1959-60	...	173 (anticip- ated)	460 (approx.)

India is now perhaps the only country in which steam locomotives are being manufactured on a large scale. The manufacturing units which were producing steam locomotives in other industrialised countries have gone over

to the manufacture of either diesel or electric or both diesel and electric locomotives. The change-over of production from steam to other types of locomotives was accomplished by modifying the plant, layout, etc.

At Chittaranjan, plans are under consideration for the manufacture of electric locomotives in addition to steam locomotives.

The electrical equipment for these electric locomotives will be purchased. Considerable work is involved in this connection but the Chittaranjan Locomotive Works and the Research, Designs and Standards Organisation have entered this new venture confidently and it is hoped that the same measure of success will be attained as in the case of steam locomotives.

A Londoner recently saw his wife off safely in a jetliner at London airport on a trip to New York.

When he had at last fought his way back home through the traffic, he found a cable reading: "Arrived safely. Love, Mary."

A young author's first novel became a best-seller overnight. Asked how he accounted for it, the author gleefully explained: "Just a lucky break. A book critic on a nationwide network said it contained a knotty problem, and most of the listeners thought he said 'naughty'."

The pretty young girl attending night classes looked surprised when the English teacher said: "Now, tomorrow night we will take up syntax."

"Goodness," trilled the girl, "if they are going to collect that, I'll never be able to pay the tuition fees."

I.C.F. HOCKEY TEAM WINS KOVILPATTI TOURNAMENT

The Hockey Team has added yet another feather to its winning cap this season by winning the Shri G. Kuppuswamy Naidu Memorial trophy at Kovilpatti. The team with its gallant show defeated quite a number of strong teams and has won for itself a very big and beautiful trophy.

The team left on 23rd May to participate in the above tournament at Kovilpatti with Shri D'Cruz, Foreman of Shop 41 as Manager and Shri Murugesh as captain of the team. Murugesh had to lead the team in the absence of Bhaskaran, who could not accompany the team due to some unavoidable circumstances and it should be said that Murugesh did a grand job as the captain.

The first encounter between I.C.F. and Maharastra XI ended in a draw. In the replay played on 27th morning, the decision went in favour of the I.C.F., Padmanabhan scoring the only goal for the Factory. It was a much fought game and it goes to the credit of the I.C.F. team to have defeated such a strong team from Maharastra.

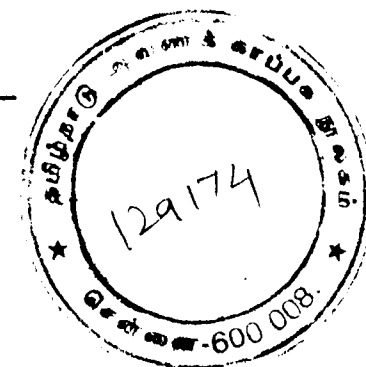
Again on the 27th evening I.C.F. played against Inspectorate of Electronic Equipment, Bangalore, but it also ended in a draw. But the replay on the 28th morning saw I.C.F. score a victory again. Syed Ahmed enabled the Factory to win by scoring the only goal.

On 28th evening I.C.F. beat Kovilpatti Sports Club by a solitary goal, scored by Murugesh the captain of the Team and qualified themselves to enter the Finals to meet the Lakshmi Mills, Kovilpatti (who beat M.E.G. last year's holders).

The Finals between I.C.F. and Lakshmi Mills was a thrilling one. In the 30th minute, getting a through pass from Smith, the I.C.F. right-half, Syed Ahmed took the ball on his own and scooped it to the roof of the net to give the winner to the I.C.F., and thus to lift the big and beautiful trophy, said to be the best of its kind in India, to Madras.

Our congratulations go to the I.C.F. Hockey Team, who had to undergo such great stress and strain, by playing both in the mornings and evenings continuously and who finally bagged a well merited trophy. It may be recalled here that the I.C.F. Team were runners up last year in this tournament. They have still many more engagements in the City in the All-India Invitation Tournament and the League matches conducted by the Madras Hockey Association, and let us hope that they will march from success to success.

—A. R. VENKAT



News and Views

Railway Federation meets Railway Board

A delegation of the National Federation of Indian Railwaymen led by Shri S. R. Vasavada met the Railway Board on May 9 and 10, 1960. The importance of referring unresolved issues of sufficient importance to tribunals, under the existing standing arrangements was appreciated by both sides. It was felt that within the framework of Government's decision on the Pay Commission's recommendations, it should be possible to settle a number of issues through negotiation. The Railway Board assured the Federation that utmost consideration would be given to the problems relating to railwaymen, and full justice would be meted out.

Fewer Railway Accidents

The Deputy Minister for Railways, Shri S. V. Ramaswamy said in Lok Sabha on April 29, that the total number of train accidents during 1959-60 was slightly less than the 1958-59 figure, the respective figures for the two years being 2,001 and 2,015. The number of derailments, he said, had gone up from 1,390 to 1,458. Also, during 1959-60, there were 109 collisions, 129 cases of trains running into road traffic on level crossings and 305 fires in trains.

Replying to further questions, the Deputy Minister gave figures of accidents between November 1959 and February 1960 and also the cause-wise analysis of these accidents, in which eight persons were killed and 272 injured.

New Design Third Class Sleeper Coaches

New design third class sleeper coaches, in which passengers travelling over 500 miles will be allowed to travel without any surcharge, are soon to be introduced on six long-distance trains, replacing the old-type three tier sleepers

for which a surcharge of Rs. 3 per night per passenger is payable.

The trains are Delhi-Howrah Janata Express, Bombay - Dehra Dun Express, Madras-Delhi Janata Express, New Delhi-Howrah Air-conditioned Express, and New Delhi-Madras Central Air-conditioned Express.

The actual date of the change-over will be decided by the Railway Administrations concerned.

As additional new design third class sleepers become available during the next four months or so, they will also be introduced on the following trains in order of priority: G.T. Express, Panjab Mail, Howrah-Kalka Mail, Sealdah-Pathankot Express, Frontier Mail, Toofan Express, Howrah-Amritsar Mail, Howrah-Bombay Mail, Howrah-Hyderabad Express, Madras-Bombay Express, Upper India Express, Pathankot Express, Howrah-Dehra Dun Express, Madras-Mangalore Mail, Howrah Bombay Express, and Bombay-Varanasi Express.

The Railway Minister recently announced that by the middle of next year all trains in the country covering more than 500 miles will be provided with at least one new design third class sleeper coach.

Railway Territorial Army Units

A Meeting of the Group Commanders of the Railway Territorial Army Units was inaugurated in New Delhi on May 10 by Shri Shah Nawaz Khan, Deputy Minister for Railways.

The meeting, which was attended among others by representatives of the Ministry of Railways and Defence discussed a number of subjects covering problems of recruitment of railwaymen to territorial army units, creation

(Continued on page 22)

VISITORS TO THE FACTORY



Mr. Smeliakov, Russian Deputy Minister for Foreign Trade visited I.C.F. on 27-5-60

Mrs. Violet Alva, Dy. Home Minister, Govt. of India, visited I.C.F. on 9-5-60. To her left is Shri R. B. Misra, Minister for Labour and Housing, Orissa, who also visited the factory on the same date.

A team on "Training of Supervisory Personnel" sponsored by the National Productivity Council, visited I.C.F. on 20-5-60.



(Continued from page 20)

of more such units on certain Railways, the relief of railwaymen from certain routine duties during the period of training camps, etc. The meeting also discussed training programmes for Railway Territorial Army Units for 1960-61.

Addressing the meeting Shri Shah Nawaz Khan said that Railway Territorial Army Units had an important duty to perform in keeping the line of communications open if and when required in an emergency. He said the Railway Board and Railway Administrations would fully co-operate with the Territorial Army Administration to make the Units more effective.

Shri D. C. Baijal, Member (Staff), Railway Board who also addressed the meeting expressed the hope that railwaymen would come forward in larger numbers to strengthen the Railway Territorial Army Units. He suggested readjustment in the timings of training camp so that railwaymen could be spared from their normal duties easily. The meeting was also addressed by Brig. Harbhajan Singh, Director of the Territorial Army.

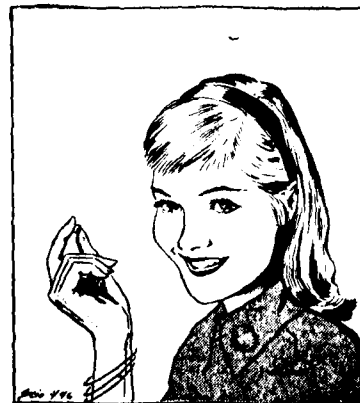
Shri D. B. Singh, Director of Training, Railway Territorial Army Units, has been placed in overall charge of training to railway staff who join the Territorial Army.

DID YOU KNOW?

By SCIO



The story of electricity started over 2,500 years ago with amusing games, and nothing startling was added to it until the modern era. None of the Greeks who observed the philosopher Thales of Miletus (about 600 B.C.) pick up straws with an amber rod that had been rubbed with a cloth could have suspected that the force behind the toy would become one of man's major sciences.



Eye glasses worn directly on the eyeballs, or contact lenses, are not a modern phenomenon as many people believe. Leonardo da Vinci developed the theory in the 1500's, and people began wearing contact lenses for brief periods about 1880. Today they are being comfortably worn for 16 hours or more a day.



The porpoise, a sea-going mammal with a bigger brain than man's, is gaining recognition as a mental giant of the animal kingdom, according to the U.S. National Geographic Society. A captive porpoise at Marineland, Florida, is reported to have imitated a brain researcher's voice so well that his wife burst out laughing. Then the porpoise imitated her laughter.

INTEGRAL COACH FACTORY—FURNISHING PROJECT

BY

SHRI K. M. AIANA

(Deputy Chief Mechanical Engineer/Furnishing, Integral Coach Factory)

The present article makes a contribution of interest on the conditions in which endeavours are being made in setting up a Coach Furnishing Factory in an expansion scheme, as an Annexe to the existing Coach Factory. This is a project of quite a major financial involvement, but has been accepted as a specific and inescapable necessity, being of national importance in the expanding economy of the country. Under the extraordinary circumstances prevailing in the country, the technical achievements herein dealt with are noteworthy.)

The introduction of the "Integral Coach" of a modern design, and with modern amenities provided, is one of those exciting ideas, which has engendered high enthusiasm in all quarters. The users believe that it will ensure safer, better and comfortable travel, and the Railway technicians see prospects of maintenance problems diminishing.

In this important sector of national activity, the Furnishing Project, at a capital outlay of about 3.7 crores, was expected to go into production by the end of the Second Five Year Plan Period. The primary purpose of this large extension is to enable us to undertake the manufacture of a complete coach, duly furnished, ready for traffic, as the existing Coach Factory produces only unfurnished steel coaches.

In projects of such complexity and magnitude, the causes of delay can unavoidably spring up from the most unexpected quarters, as will be appreciated from the details given below:

Project in hand

The genesis of this project was a report prepared and submitted by my predecessor Shri R. Rajagopalan in October 1956, after which the Ministry of Railways authorised this project in November 1956. The present stage of the works, being undertaken, makes it worthwhile, however, to describe the salient features of this project, despite the fact that work is still going on and that completion is

now scheduled for 1962. It is felt, moreover, that a brief account of this project cannot fail to be of interest.

On receipt of the sanction to the project, the necessary Construction Organisation was immediately set up, and as soon as design drawings for the workshop structures were finalised, global tenders were called for in the middle of 1957, and received. However, in view of the stringent ways and means position, the tenders could not be progressed further, as the necessity of setting up of this project was under examination and review by the Planning Commission. After obtaining the necessary clearance from the Planning Commission, it was decided early in 1959 to go ahead with the construction of the workshop structures in pre-fabricated reinforced concrete, a technique, which, it is believed, is being tried out for the first time in this sector, with a view to conserving as much steel as possible.

Progress so far made—difficult problems

The contract has, since, been placed on Messrs. Hindustan Construction Company, Bombay, who are collaborating with their Hungarian Technical Consultants. The design drawings are now ready, and so also the detailed drawings for the installation of pile foundations. The actual work on the installation of the pile foundation, has since commenced, under a contract placed on a specialist in this field.

At this stage, the work being carried out, is largely on the Civil Engineering side, along with some progress made on the electrical side. All the land required for the establishment of the factory and future expansion, has been acquired and a two-mile long railway siding, leading from Villivakam Railway Station to the site of the factory, has been completed and brought into use. Ancillary works such as roads, a compound wall for the factory, the works entrance, the electrical receiving station with a temporary power supply connection, etc., have been completed, to enable the construction of the main workshop structures being taken in hand. The necessary pipe line from the Kilpauk Waterworks of the Madras Corporation, required for water supply to the new factory, has also been laid. The construction of a 3 lakh gallon capacity underground reservoir and a 2 lakh gallon capacity overhead tank, is in hand. Side by side, the construction of the Main Works Office is also well in hand.

On the mechanical engineering side, pre-planning work such as preparation of shop layouts and various other details are in hand, and are being finalised to keep pace with the construction of the various shop structures. As regards Machinery and Plant, procurement has, per force, to be arranged in three phases, keeping in view, the financial stringency and an embargo placed on import at present, due to a serious shortage of foreign exchange. In addition to importing a few items of Machinery and Plant, the procurement of which is inescapable, full advantage is being taken, in selecting some American Excess Machines graciously offered by the International Co-operation Administration of the U.S. Government, to the Indian Railways, and some machinery to be spared with co-operation from Railway Workshops, so that the bare minimum number, required to set up production, will be made available for installation, as the project advances.

In the project estimate, a colony to house 200 employees and consisting of various types

of quarters, has been provided for. Out of these, 80 have been completed and brought into use. 72 more are under construction, and it is proposed to take up the construction of the remaining quarters also during the course of this year.

At the time of the submission of the project estimate, it had been visualised that this project would be completed and the factory would go into production within the Second Five Year Plan Period ending in March 1961. In view, however, of the difficult ways and means position prevailing in the country, it was proposed, after weighing all factors carefully, to restrict the overall expenditure during the plan period, with also a curtailment in the foreign exchange content. The present pace of work is therefore directly correlated to the limited expenditure to be incurred during the Second Plan period, and the balance of the work is being thrown forward to be completed during the Third Plan period.

Interim arrangements adopted and results achieved

In order to avoid the normal time lag between the physical completion of the workshops and the establishment of full production, the establishment of a Temporary Furnishing Unit had been visualised right from the outset and a proposal had also been made to set up a production organisation simultaneously with the construction of the project. It was envisaged that this would enable, firstly, to create some initial capacity, which would be of advantage to the project itself for developing the necessary production technique, the know-how and training of staff, and, secondly, to determine the actual capacity of the trade to supply finished fittings to the quantity and quality required, so that the target production level about 400 furnished coaches a year in one shift would be attained within a short period, after completion of the construction of the Permanent Factory, instead of the production having to be phased over a period of some years. Accordingly, for a start, furnishing work on a small scale, making use of covered

space wherever available in the existing Coach Factory, was commenced and the first furnished Third Class Coach was ceremoniously launched by H.E. the Governor of Madras, late Shri A. J. John on the 21st February 1957. In order to speed up the production of furnished coaches, the construction of the Temporary Furnishing Unit, sanctioned at an estimated cost of Rs. 24 lakhs was also taken in hand early in 1957, utilising some temporary sheds procured from the Avadi Military base nearby, and keeping in view as comfortable working conditions as possible for the workers. The construction of this unit together with siding facilities were all completed in a very short time, and furnishing work was commenced from May 1957. The 100th furnished coach was launched on 19th June 1958. Although the pyramid of skill is still in the process of building up, besides Indian engineers and other staff, the strength of workshop staff is now nearly 1000. Hitherto over a hundred trade apprentices have been trained in our school and employed as artisans, and nearly 200 are under training which provides for the supervisory category as well. Initially, the staff was built up with the co-operation of the railways, and by direct recruitment from the open market.

Performance vis-a-vis targets

The targets fixed, visualising the setting up of the Permanent Furnishing Factory according to schedule and the actual out-turn from the Temporary Unit are given in the table below year by year :

Year	Target	Actuals	
1956-57 ...	...	2	
1957-58 ...	50	72	
1958-59 ...	175	171	
1959-60 ...	250	250	(Anticipated out-turn upto 31-3-1960)
1960-61 ...	350	...	
	Total	495	

A capacity to furnish 22 coaches per month has so far been developed upto 31-3-1960, despite the limited facilities for a good production flow.

Types of coaches

At present there is by far the largest demand for Third Class coaches. Hitherto, out of the 495 coaches, so far furnished, 455 are Third Class coaches and 40 are TLR coaches (Third class with luggage and Guard's compartments) the prototype of which was launched on the 3rd January 1959 when the ceremony was honoured by the presence of the Hon'ble Deputy Minister for Railways Shri S. V. Ramaswamy. During the year 1960-61, the furnishing of 150 Third Class Sleeper coaches on first priority and thereafter 155 First Class coaches will be undertaken, and the out-turn is expected to be stepped upto 25 coaches per month.

Consequent to the increase in the out-turn, and with the gradual building up of the production technique, it has been gratifying to note that it has already been possible to considerably reduce not only the direct manhours per coach, but also the cost of furnishing. The materials used for furnishing, are now of indigenous manufacture to the extent of about 90 per cent. There is no doubt that such a corporate effort, on the part of our workers will produce even better results in due course when our overall manufacturing facilities substantially increase.

Tribute to ancillary industries

Numerous parts required in the furnishing of coaches of different types are being attempted to be produced by different small units around Madras and elsewhere in the country, on a basis which would prove to be more economical than if we ourselves tried to manufacture all these parts under one roof. Therefore, the setting up of a Coach Furnishing Unit, it is envisaged, will also largely contribute to the growth and establishment of several ancillary industries, and scope for further development as years advance. With the impetus and encouragement, already extended in the interim stage of activities of the Temporary Furnishing

Unit, the industrialists, even despite difficulties encountered by them, have risen to the occasion and are helping us in a considerable measure to tide over a difficult period.

Future prospects

The Second Plan has entered its final year, and the first of the Third Plan is in sight. If not all the physical targets have been hit, sufficient ground work would have been done for the take-off for the Third Plan, even though it may seem too early to assess in our thinking on our Third Plan achievements. However, it is envisaged that the first year of the Third Plan, should enable us to gear up to our planned capacity.

After the Permanent Furnishing Unit is established during 1962, as anticipated, the production already commenced in a small way is expected to be stepped up in due course in keeping with the production of coach body shells, the ultimate targetted out-turn aimed at being of the order of 700 coaches a year.

The Furnishing Unit as an Annexe to the Integral Coach Factory, when completed, will also have an important role to play in the context of the Second and Third Five Year Plans, by contributing in a great measure to the Rolling Stock assets of the Indian Railways, besides fuller opportunities for employment within and outside, and in extending to the travelling public modern amenities and comfort.

In the meanwhile, it is proposed to make the best use of the temporary furnishing facilities available, and to continue obtaining assistance from some of the Zonal Railway

Workshops, where Integral Coaches are also being furnished as a temporary measure, to keep pace with the increasing out-turn of coach body shells.

A word to the user

Reactions to exhortations or incentives to achieve standards of performance are taken as axiomatic in more developed countries. In our motherland, we look to our users whom we have a desire to serve, to look after Railway property as if it were their own.

Conclusions

What we have, so far, achieved, has been the sequel of the closest and untiring team work of our Indian engineers and workers, who, despite the great deal of hard work still to be done till the factory is established and capacity consolidated, look forward with pride, to achieve still better results, in the service of the industrial progress of the nation and our conscious pursuit.

Some critical years lie ahead, which even the most optimistic planner has to admit. It is in fact a time for only sober rejoicing in having progressed so far along a difficult road. It is said that enthusiasm is the essential prime mover to an expanding technique. It is also said that enthusiasm is capable of over-riding all obstacles and of breaking new ground on inspired lines, if tempered with patience and a prudent approach.

It is always pleasant to hear a good word about our achievements and the occasions of those numerous visits of our countrymen and people from overseas, to the Integral Coach Factory, continue to be full of appreciation.

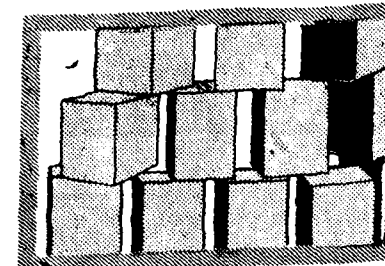
The crystal-grazer who collected twenty-five rupees for a reading, informed her visitor, "My fee entitles you to ask me two questions."

"Isn't that a lot of money for only two questions?" the startled sitter queried.

"Yes, madam, it is," answered the fortuneteller gravely. "And now, what is your second question?"

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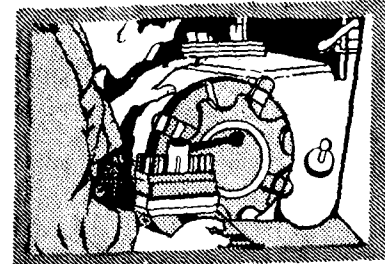
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DREAM—Columbus' dream of a shorter route to India and the Orient occupied him more and more. With his brother Bartholomew, he pored over maps, charts, and books, attempting to find references to the subject, and plotting possible routes. He planned the project for eight years, letting nothing interfere with it.



SPAIN—His plan was finally complete, and with no little difficulty Columbus obtained an audience with King Ferdinand and Queen Isabella of Spain, whom he hoped would finance his voyage. After much deliberation the sovereigns of Spain agreed to provide financial backing for Columbus. In return, any new lands Columbus discovered were to be claimed in the name of Spain.



START—On August 3, 1492, with less than 100 men, Christopher Columbus set sail in three tiny ships from Palos, Spain, for the Canary Islands, the first leg of his voyage. The Santa Maria, Columbus' flagship, was only 90 feet long. The other two, the Pinta and the Nina were about 70 feet. Compasses were the only reliable navigation aid they carried.



CANARY ISLANDS—The little fleet arrived at the Canary Islands on August 12, nine days later. Here they took on final supplies and made repairs to the rudder of the Pinta, which had been damaged. When they sailed westward on September 6, they were entering waters that had never before been navigated, the Canary Islands being the westward extent of man's explorations at that time.



THE UNKNOWN—As the last of the Canary Islands dropped below the horizon Columbus and his crew were truly in the "Unknown Sea." There were no maps or charts to guide them and nothing to do but sail straight west until they sighted land again, an event many of the sailors and some of the officers were certain would not happen.



UNREST—The small fleet sailed due west for three weeks, and though the weather and winds were favourable, the crew grew fearful and finally rose in mutinous anger. They never before had been this long at sea. They insisted that Columbus turn back, for they believed that no land lay ahead. Columbus succeeded in calming them.

(To be continued)

METALLURGICAL CONSIDERATIONS IN THE WELDING OF ARMOUR STEEL—Part I

(This is a reproduction of the paper presented by Mrs. Advani Oerlikon's Chief Welding Technician, Mr. S. V. NADKARNI, at the Defence Metallurgical Conference and the 12th Annual Technical Meeting of the Indian Institute of Metals held in Delhi in December 1958.)

1. What is armour steel?

1.1 Armour steel is essentially a C-Mn-Ni-Cr-Mo steel having high tensile strength combined with a reasonable amount of ductility and toughness. The tensile strength is above 100,000 p.s.i. (45 T/sq. in or 70 kg/mm²) and elongation above 18% on 1 = 5d. The ballistic qualities necessary for meeting Ordnance requirements are usually attained only after heat-treatment, and therefore steels commercially heat-treated in heavy and sometime complex sections are used for structures in fighting vehicles.

1.2 The actual composition of the armour steel plate and the heat-treatment required to attain ballistic qualities are not specified, and are left to the discretion of the steel-maker. Each country has its own grade or grades of this material; their compositions and method of heat-treatment are kept confidential for obvious reasons. Literature on the subject is, therefore, scarce. Under the circumstances, this paper cannot claim to be exhaustive or to present results or conclusions based on personal experience. It deals briefly and generally with the trends and problems in the welding of armour plate as gleaned from the literature available.

2. Weldability of Armour Steel

2.1 It is well-known that high tensile strengths can be attained in steels either by increasing the carbon content or by increasing the proportions of the alloying elements. From the view point of weldability, carbon and manganese contents are kept to a minimum, since tendency to hardening and cracking of the heat-affected zone in the weld joint depends

on the "carbon equivalent" as given by the well-known formula:

$$C_{eqt.} = C + \frac{Mn}{6} + \frac{Ni}{15} + \frac{Cr}{5} + \frac{Mo}{4} \text{ in } \%$$

2.2. In the manufacture of Centurion MK III armoured vehicles at the Royal Ordnance Factory at Barnbow in Britain, the weldability level for armour steel plated is taken at 0.25% C and 0.4% Mn (1). In the U.S.A. too, the carbon content in armour plate is limited to 0.3% only. Due to these restrictions on C and Mn, the total alloying element content is relatively high (Cr, V and, above all, Mo). In Germany and some other countries, the carbon content can be as high as 0.45% while the alloying element content is lower.

3. Effect of Hydrogen on Weldability

3.1 Welding of armour steel presents the same difficulties as are associated with the welding of high-tensile steels: the formation of a hard brittle martensitic zone adjacent to the weld in which cracks may occur. The cracking may be the result of additional stresses caused by hydrogen, which is released by certain constituents of the electrode coating in the arc during welding. The commonly accepted theory for the behaviour of hydrogen in weld joints is given by Stout and Doty as follows: (2)

"Welds made with hydrogen-producing electrodes absorb hydrogen in the molten metal pool. Some escapes when it solidifies and some is retained and diffuses from the molten weld metal to adjacent base metal

which has been austenitized by the heat of welding and which in this state has a high capacity for hydrogen absorption. As the weld metal cools, its capacity for holding hydrogen in solution diminishes. Thus the base metal immediately adjacent to the weld becomes highly charged. The austenite, if rapidly cooled which results from welding heavy structures, may retain large amounts of hydrogen. The retained austenite may be supersaturated with hydrogen and, when the austenite transforms to martensite, cracking may occur in the newly formed microstructure. The cracking is brought about, through (a) the embrittling effects of hydrogen in the martensite lattice, (b) the dynamic stresses of the austenite-martensite transformation superimposed on shrinkage stresses the high aerostatic pressure of molecular hydrogen in microholes."

3.3 The hydrogen is released in the arc by the organic compounds, combined water and present in the flux coatings of conventional electrodes. When such electrodes are used for the welding of high tensile steels, a preheat of 300-500°F (150-260°C) is necessary to prevent cracking in the heat-affected zone. Alternatively, such cracking and the preheat necessary can be avoided by using what are called "Low-hydrogen" electrodes.

4. "Low-hydrogen ferritic" versus Austenitic Electrodes

4.1 "Low-hydrogen" electrodes are so called because their flux coating is devoid of hydrogen-forming constituents and moisture. Even the moisture associated with the coating binder (silicate of sodium or potassium) is removed almost completely by baking the electrodes finally at over 300°C, and packing them, immediately on cooling, in air-tight containers. Such low-hydrogen coatings may contain alloying elements like Cr, Ni, Mo, V in the form of ferro-alloys or metallic powders

to give an alloy steel weld deposit of higher tensile strengths.

4.2 For the welding of armour steel, low-hydrogen ferritic electrodes have been rarely used because cracking in the hardened zone or what is called "underbead cracking" is difficult to avoid, at least in thick sections unless preheating is resorted to. Preheating is often impossible and/or impractical in large-scale production of armoured vehicles. An easy way out has been found with the use of austenitic stainless steel electrodes types 310, 307 and 308 Mo.

4.3 Austenitic electrodes have an advantage over low-hydrogen ferritic electrodes due to their following properties :

- The austenitic weld deposit has a reasonably high yield strength and excellent ductility at practically all rates of strain and these can relieve stresses in the weld joint sufficiently to prevent cracking.
- The austenitic weld metal dissolves the hydrogen from the arc atmosphere in the molten state and it remains in solution as the weld metal cools to ambient temperature whereas, the ferritic weld metal rejects the hydrogen and enough of it diffuses into the heat-affected zone to cause cracking.
- Results of work done for the Ordnance Corps, U.S. Army (3), showed that 1.1/2 inches thick armour plate weld under high restraint did not develop underbead cracking with austenitic electrodes with moisture contents upto 3%. This same armour plate welded with low-hydrogen ferritic electrodes developed underbead cracking with moistures as low as 0.3 in the coatings.

4.4 From limited information available it could be cited examples of types of electrodes used for armour steel welding in various countries. Germany and England use entirely

austenitic electrodes. A typical British 18/8 Mo electrode designed for armour steel welding has the following composition :

Composition	Mechanical Properties
C — 0.08%	1% proof stress 33.2 T/Sq.in.
Mn — 1.55%	Max. stress 49.4 "
Si — 0.6%	Elongation on } 30%
Cr — 19.3%	3.54 D }
Ni — 9%	Izod 57 ft. lbs.
Mo — 2.5%	Hardness 20 V.P.N.

During World War II, as a consequence of the scarcity of various alloying elements, a range of countries shifted from welding with austenitic electrodes to welding with low-hydrogen ferritic electrodes. This welding practice became generalised in Germany during the War, and 5,000 tanks at least were welded ferritically in England during the same period. Since Germany and England went back to austenitic electrodes as soon as the war was over, one may presume that the few tanks welded with ferritic electrodes during the war did not meet the required standards.

4.5 On the other hand, it could be that when ferritic electrodes were used in war emergency, the armour steel material had lower alloying elements and higher carbon content due to scarcity of alloying metals. With controlled grades of armour steel plates, it should be possible to weld satisfactorily with ferritic electrodes. For instance, in Sweden today tanks are being welded with ferritic electrodes and apparently, with good success. For this purpose, use is made of a ferritic electrode with about 1.7% Ni and a low vanadium content. This electrode yields a weld metal tensile strength of about 80 kg/sq., mm. (50.8 T/Sq.in.). In Germany, the possibility of replacing austenitic electrodes by ferritic electrodes is being

made the subject of investigations. These investigations cover the following :

- Trials with low-hydrogen electrodes with the lowest possible weld metal strength (Tensile strength approx. 45 kg/Sq.mm. (28.5 T/Sq.in.)). This method has already proved unsuccessful.
- Trials with low-hydrogen electrodes giving weld metal of medium tensile strength (Tensile strength approx. 55-60 kg/Sq. mm. or 35-38 T/Sq.in.). Good results have been achieved with such an electrode. For example, Oerlikon Electrode Factory have evolved an electrode TENACITO which belongs to this class possesses exceptional notch toughness, and has proved very promising. This electrode could be made in India too. The properties of TENACITO are as follows :

Tenacito

Composition	Tensile Properties
C = 0.08%	Yield Pt. ... 48 kg/mm ² (30 T/Sq.in.).
Mn = 1%	Tensile Strength. 55-60" (35-38 T/Sq.in.).
Si = 0.3%	Elongation (l=5d) 25%
S = 0.02%	Impact Value ... 25mkg/cm ² .
P = 0.02%	

- Trials with low-hydrogen electrodes giving weld metal deposit of 80 kg/sq. mm. (50.8 T/Sq.in) tensile strength, similar to those in use in Sweden. This electrode may be adopted for armour plates with a relatively low carbon content.

(Courtesy M/s. J. B. Advani Oerlikon Electrodes Ltd.)

EMBELIA--THAT CURES PYORRHOEA

Embelia (Babrang), berries of a climber commonly found in India, Ceylon and Singapore, has proved a positive cure for almsot all the dental, oral and throat troubles except Ptyalism and cancer of the lip.

Pyorrhoea will not be regarded incurable now.

For the first time in the history of medicine, Embelia has been found effective in curing these ailments. It was generally used as an anthelmintic (vermifuge) for the past three thousand years.

Noted dental and general hospitals in different parts of the globe have been provided with the drug for further investigation. Such institutions include Bellove Hospital, New York, Saskatchewan Hospital, Batleford and General Hospital, Madalay.

Dr. Sushila Nayar, former Health Minister Delhi State, is conducting further research on the drug.

This is the second distinguished discovery of the Ayurved Research Council of Delhi. The first one was Punarnava which proved panacea for eye-trecbles and created sensation throughout the world by eliminating spectacles.

The German, U.K. and U.S. Scientists busied themselves in making use of its curative properties.

During his sojourn in India, President Eisenhower carried Punarnava to White House.

Research scholars from abroad are calling upon the President of the Council, Kaviraj K. L. Khetal, to secure details of how Eastern perparations are going ahead of even the Western ones.

A TRIP TO GINGEE KOTTAI

BY
N. BOSE

"A picnic to some distant place"—decided the staff of Shop 15 who were well aware of the fact that such outings go a long away in creating a closer and friendlier understanding among all staff. Though some contraversies arose as regards the selection of place, rate of subscription etc., it was finally agreed by the majority to go to "Gingee" a place of historical importance, 100 miles away from Madras city.

The party left Egmore on Saturday, the 1st May 1960 in the evening for Gingee. All of them travelled althrough in the III class. Though some of the supervisors were eligible for upper class travel, they purposely travelled in the III class to be in one group. Emphasis was laid on the necessity of developing such an ideal team spirit for a common cause—which helps totally to forget the differences between supervisors and workers and also any feelings of a complex. The group reached Tindivanam at about 3 in the morning of Sunday, the 1st May, wherefrom they took a bus for "Gingee" and arrived at the destination at about 5 O'clock. After a sumptuous breakfast, the party went out for sight-seeing.

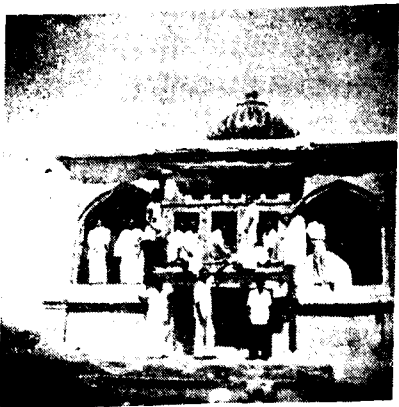
Before proceeding, Sri Bose, Foreman, Shep 15, explained to all present, the idea and purpose

of such an outing. In the workshop the distinction between different categories of staff is required to be maintained in the interest of turning out quality work and for proper maintenance of discipline. In day-to-day work sometimes bitterness, misunderstandings, tension are likely to develop, and a social outing would shake of these feelings and create a better understanding and closer relation between supervisors and staff.

In the morning light the picturesque view obtained of the range of nice hills raising their heads here and there around made a deep impression on the party. After walking a distance of nearly two miles they came to the foot of the highest hill "Krishnagiri"—the fort of "King Desing" who lost his life for the cause of freedom of the country he ruled, in a battle with Nawab of Arcot. The activities and bravery of the king are still sung by the villagers and form a inspiring chain of folk songs. As they climbed up the hill, they were struck with wonder to see the art, technique and skill utilised in building and maintaining such a fort as this. The fort consists of, amongst other things, underground tunnels, temple, tower,

Monthly Outturn

	Target	Actuals
May 1960 ...	30	38
Cumulative total for the first two months of the year 1960-61 (Financial) ...	60	84



The party at
Rajagiri
Hills



Tindivanam
Station



A view of the Fort from the foot of the hills



A group of poses for a photograph at the top of the hill

a cave-pool of spring water, cold and very clear etc. The party got down at about 8-30 a.m. and then at the foot of hills, they saw an old tower, a swimming pool, a big tank, treasury, prison house etc.

Therefrom the group started for the "Rajagiri" the King's palace, situated at a distance of some 1½ miles. It was very hard to climb up this hill due to the deep vertical ascent, the party felt.

From the peak they had a picturesque view of the surroundings. The party left the hill in an hour when the sun was already in the meridian. They were, therefore, in a hurry to come back to their camp. By availing of the 4 p.m. train at Tindivanam, the party arrived at Madras Egmore at about 9 in the night and proceeded towards their respective homes dragging tired bodies but with sweet and pleasant memories huddled in their mind.

Think of a recipe for a biscuit. Press a few buttons—and soon hundreds of thousands of the biscuits are dropping into their packing cases ready for dispatch to countries all over the world.

The push-button age of biscuit making was shown recently in the English cathedral City of Carlisle by a family firm who pioneered biscuit making by machine in 1831. Then the founder of the firm, Jonathan Dodgson Carr, "printed" biscuits on a kind of hand printing press. It cut out many biscuits from one square of dough instead of each having to be cut by hand. That was the beginning of modern biscuit making.

Now, in what is claimed to be the most modern biscuit making plant of its kind anywhere, Carr's has brought in automation right from the start of manufacture. One man in the main control room can now select any one of at present 80 recipes—later on a limitless number—and electronic controls then do the rest.

The recipe on a punched card is fed into a system of electronic controls which "order" all ingredients such as flour, sugar, glucose, fats and water. Exact amounts are fed into mixers in any predetermined order. Automatic control from mixers onwards through such processes as baking and packing and labelling have been general in this factory for some years. Automation in the initial stages of manufacture has recently been introduced.

POPULAR SUBSCRIPTIONS FINANCE U.S. OLYMPIC PARTICIPATION

How many participants the United States will send to the Olympic Games depends entirely upon the success of the U.S. Olympic Association in raising the money required to train the athletes and transport them.

It will also have to provide for the coaches, managers, trainers, chaperones and others from their homes to the games and return. In addition, the Association will also have to equip the group with attractive uniforms on and off the field, and to house and feed them en route and while attending the games.

In many countries these expenses are paid by the government. However, this is not the case in the United States. In the United States, the U.S. Olympic Association designates on Olympic Committee which has always financed the team's participation by popular subscription because it believes that the sport-loving public would prefer to finance the team on a purely democratic basis. Contributors to the fund then have a justifiable pride in the accomplishments of their team. No funds are solicited from the government.

During the last quadriennium, 1953-1957, the U.S. Olympic Committee raised \$ 2,939,170. Out of this sum it financed the cost of participation in the 1955 Pan-American Games, the 1956 Winter Olympic Games, and the Games of the XVIth Olympiad in Australia, plus the cost of administrative, fund raising, and miscellaneous committee activities. The surplus of \$ 1,563,302.78 has been invested so that interest derived from this source would cover most of the over-head required for the activities of the U.S. Olympic Association and the U.S. Olympic Committee between Olympiads. Currently the Olympic organization needs to collect more than \$ 500,000 to meet its obligations connected with the 1960 Rome Games.

Each of the bodies in the United States that govern Olympic sports in which U.S. teams or

individuals participate, holds membership in the International Federation which governs that sport. Each such sport-governing body in the U.S. carries on the active fund raising campaign, principally in the interest of the particular sport or sports which it governs. Their activities to raise funds include the use of contribution stubs attached to tickets sold at sports events, taking up collections at various contents, benefits, etc., soliciting contributions from individuals, organizations and member clubs.

At the time the U.S. Olympic Committee is organized, a group for each game or competition for the coming Olympic Games is elected. A considerable portion of the fund comes from the activities of these committees, particularly admission fees from the final try-outs to select the members of the teams.

The colleges and universities of the United States play an important role in helping to raise the Olympic funds. The U.S. National Collegiate Athletic Association (NCAA) has a special Olympic money-raising group. Among other things, members of the NCAA are asked to include an appeal for funds with their football ticket application mailings and many colleges make outright contributions to the Olympic fund in varying amounts.

Outstanding leaders in the U.S. business world are invited to serve on a National Businessmen's Committee. Their confidence in the U.S. Olympic Committee and their efforts in behalf of the fund campaign inspire the confidence and support of other outstanding industrial and financial executives.

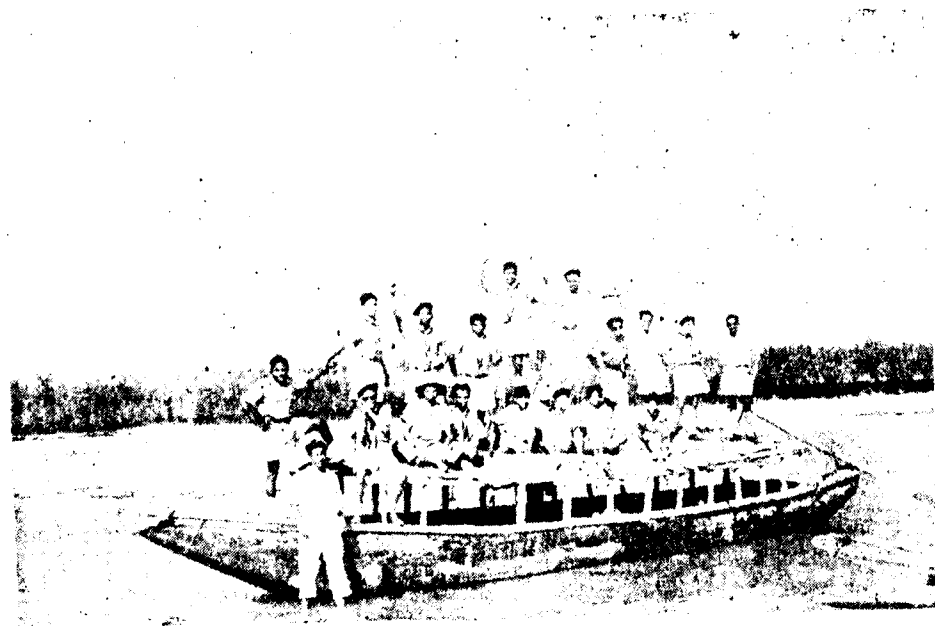
The U.S. Olympic Committee tries to organize finance committees in every city and town of any size in the United States where leadership can be found. The territory assigned to these committees is generally that of the city plus its suburbs, unless the suburb is large enough and wants to form its own committee.

AGAIN TO KOVALAM —BUT THIS TIME IT'S SCOUT'S

Kovalam is a village situated on a strip of land on the shores of the Bay of Bengal, 22 miles south of Madras, separated by the backwaters from the mainland.

Sixteen employees of the Integral Coach Factory belonging to the Kattabomman Scout Group proceeded on the night of 29th April

conducted on "Selecting camp sites" and "Improvising Gadgets." Before lunch, the Rovers had a sea bath which was indeed very enjoyable. A crew council was conducted after dinner. Sessions on "Finding directions without the compass" were then held. The evening was spent by playing the "Scouts



KATTA-
BOMMAN
SCOUT
GROUP AT
KOVALAM

1960 by boat on the Buckingham Canal for 14 miles from Lattice Bridge and reached the place on the morning of the 30th April 1960.

The Parish-Priest of the Mount Carmel Church at Kovalam, Fr. Joseph Thyparamjul was kind enough to permit them to encamp for the day in the Casuarina woodland belonging to the Church. The roaring sea was visible from the camp site and the invisible magic casements floating on the foam of the calm sea were perceptible to the imagination of such of the campers who were inclined to be poetic.

The three patrols of the group pitched improvised shelters. After breakfast, the flag was unfurled ceremoniously. Sessions were

Relay." After dinner, there was a camp fire. The rovers then retired to bed after duly posting sentries for the night.

The next day (Sunday, the 1st May 1960) the "rouse-call" was given at 5-30 a.m. Christians among the crew who desired to attend Sunday Service were permitted to go to the local Church.

After kit inspection, the Prathap Patrol, led by Shri C. Krishnan, was given the flag of honour for the best kept tent, when the flag hoisting ceremony was held.

The camp was visited by the Parish-Priest, Mount Carmel Church, Kovalam and his

impressions as recorded in the Group's Visitors' Book are reproduced below :

"Today at about 11 a.m. I visited this camp. The camp is kept very clean. I found everything properly arranged in the three sections by the patrols. The tents are properly pitched. The provisionary arrangements made show the originality of the scouts. The scouts are happy and are in cheerful spirits."

The Rovers then participated in "Treasure Hunt," after which they went into the village by patrols and collected information about the village.

The Assistant District Commissioner (Cubs) and the District Secretary who visited the camp addressed the Rovers after lunch. Their impressions about the camp are as under.

"Camp proved in every way that it was a very well-planned one. Selection of the camp site, improvised gadgets and turn-out have all been well done to make the camp an ideal one."



The Rovers at the sea

"We wish the crew all success."

The Hawk Eye Patrol led by Shri T. S. Govindarajan was the recipient of the flag of Honour for outstanding camping standard.

The first fully automatic copying machine which produces high-quality copies on ordinary plain paper by automatic xerography—electrical photography—was recently demonstrated in London. Designed as the latest form of equipment for the modern office it requires no exposure setting. It will copy from anything written, typed, printed or drawn and also produce in black and white from all colours, including reds and blues.

Xerography is a completely dry process and the prints emerge six a minute ready for use. As the operator does not handle the copy paper or rehandle the original for multiple copies the machine is similar in principle to a short run duplicator which needs no special master copy or stencil. The original can be anything from a letter to a bound book.

All that the operator does is to lay the document on a recessed glass plate, dial the number of copies required and push a button. When the machine has made the ordered number of copies it automatically shuts itself off.

The machine is not intended to be for casual use and is, therefore, not in direct competition with small desk-top copiers. It was shown at the Hanover Fair last month where two units were sold to German banks and it will be seen at the Business Efficiency Exhibition in London in October.

heard this one...?

"My deceased uncle was the most polite gentleman in the world. He was making a trip on a river when the boat sank. He got his head above water for once, took off his hat, and said: 'Ladies and gentlemen, will you please excuse me?' and down he went."

* * *

He did just about everything wrong that could be done on a golf course and, finally, began to take out his wrath upon the caddy. "You must be the worst caddy in the world!" he sputtered.

"Mister," smiled the little fellow, tolerantly, "that would just be too much of a coincidence."

* * *

A couple of ministers, each convinced of the superiority of his own faith but tolerant of the other's, were having a good-natured discussion.

"Who is to say which is the better?" concluded one. "After all, we both do the Lord's work, don't we?"

"That's right," said the other, with a mischievous twinkle in his eye. "You do it in your way, and I in His."

* * *

"He's the biggest liar in Washington," Abraham Lincoln said about a well-known lawyer. "He reminds me of an old fisherman who got a reputation for stretching the truth. He got a pair of scales and insisted on weighing each fish he caught before witnesses. One day a doctor borrowed the scales to weigh a new baby. The baby weighed forty-seven pounds."

* * *

Oil had been struck on land owned by a church and after paying off the debt the church voted that the remainder be divided among the membership. Forthwith a member of the congregation arose and said: "I make a motion that we take in no new members!"

"I want a divorce," said the unhappy young matron to her lawyer. "Bob has been neglecting me more and more and he frequently comes home drunk."

"Why not give yourselves another chance?" counselled the lawyer. "Try a different approach. No man likes being nagged. Try patience and love. If he comes home plastered, so what? Shrug it off with kindness."

The wife decided to try it. Next night, when Bob came home feeling no pain, she met him at the door with a warm embrace, and made him comfortable on the sofa. She brought his slippers and kissed him and told him how sweet he was.

After an hour of this treatment she said, "Honey, it's getting late. Let's go upstairs to bed."

"Might as well," said the husband. "I'll catch the devil when I get home anyway."

* * *

Doubtfully the young mother examined the toy. "Isn't this rather complicated for a small child?" she asked.

The clerk replied: "It's an educational toy, madam, designed to adjust a child to live in the world of today. Any way he puts it together, it is wrong."

* * *

Two elderly gentlemen were rocking on the porch of a hotel. "I've had some mighty strange experiences with doctors," said one.

"That so?"

"Yep," the first man continued. "I had an operation once and the doctor left a sponge inside me. He wanted to go back after it, but I wouldn't let him. No, Sir!"

"Doesn't it ever hurt you?"

"Nope!" replied the oldster, rocking energetically. "Only thing is, I do get awful thirsty sometimes."

PAPERBACK BOOKS ARE A CENTURY OLD

Last year 300 million paperback books were sold in the United States. This mass offering of information and culture to Americans in the form of inexpensive books has been heralded as a recent development of great significance.

It is certainly significant. However, it is not exactly a recent development.

A century ago in the summer of 1860 – a man named Erastus Beadle in New York began publishing "Dime Novels," small booklets in bright orange covers. Their success was instant and widespread. In the course of the next five years, during the Civil War, they sold more than 4,000,000 copies. His best-seller was called "Seth Jones," a story of the New York wilderness in 1785. It sold nearly half a million copies of 1865.

During the Civil War soldiers "literally absorbed the convenient little books by the million. The volumes were exchanged, passed from hand to hand, read to tatters, and then thrown away."

This situation is remarkably similar to that which existed during World War II when the contemporary Pocket Books line was put on sale in 1939. G.I.'s read millions of books like their civil war predecessors.

Mr. Beadle published nearly 2,000 books during more than the 30 years in which his line was supreme. And, like the books of today they came out in all colours: orange, brown, blue, tan, green, yellow, red and buff.

Generally, the books represented the pioneer spirit of America. They "portrayed the struggles, exploits, trials, dangers, feats, hardships, and daily lives of the American pioneers from the days of the Puritans."

As the years went by, variety became the keynote of Beadle and Company. After the Dime Novels came Pocket Novels. Then there was the Boy's Library of Sport, Story and Adventure and the New Dime Novels.

"American Tales" were next on the list, soon followed by Beadle's "Half-Dime Library" which, rightly enough, sold for a nickel.

The titles of the books were as varied as the series in which they appeared.

Here are some: "Sam Sheridan, the Secret Service Special, or The Jamboree at Early Bird Bar"; "The Rough Riders, or Sharp Eye, the Seminole Scourge"; "Sky:Rocket Rob, the Life-Saver"; "Spitfire Saul, King of the Rustlers"; "The Down-East Detective in Nevada"; "Garry Kean, the Man with Backbone"; and the "Buffalo Bill" and "Deadwood Dick" series. Even "Deadwood Dick, Jr." showed up a couple of years later.

Not all of the books were pure adventure, however. A significant series was published around 1870 called "Lives of Great Americans."

It contained biographies of George Washington, John Paul Jones, Anthony Wayne, Lafayette Davy Crockett, Lincoln, Pontiac, Grant, Daniel Boone and Kit Carson.

Mr. Beadle also published song books, joke books, books on sports and several specialized items such as the "Ladies Letter Writer," "Housewife," "The Debater," "The Elocutionist," and three "Books of Fun."

The "Wild West" was not the only region to provide subject matter for Mr. Beadle's books, which were written by scores of authors. New York City was the scene of several of the novels, including "The Wolves of New York," "The Phantom Hand, or the Heiress of Fifth Avenue," and "The Wall Street Blood, or Tick, Tick, the Telegraph Girl."

Despite the titles of Mr. Beadle's books, and the sometimes fierce-looking cover illustrations, they were generally high in tone. One reviewer said: "Ethically they were uplifting." Mr. Beadle was proud that persons of all ages read the books, including Abraham Lincoln.

MARCH OF SCIENCE

Miniaturization makes possible Sugar-cube size Radios

By using the newly-developing micro-module method of miniaturization, the Radio Corporation of America has made a working model of a radio receiver that is about the same size as a cube of sugar.

Micro-modules are described as miniature "building blocks" for electronic circuits. They are so small that 27 of them can be assembled in a cubic inch. Each module is made up of "micro-elements" (miniaturized elements) that are in the form of tiny ceramic wafers. On these are fused materials that enable each wafer to perform the functions of a transistor, resistor, capacitor, or some other component of an electronic circuit.

According to Dr. Charles B. Jolliffe, RCA technical director, the micro-module is a revolutionary concept in the field of electronics, and not just a new method of making components or packaging them. It involves a new order of reliability in component performance, he says, adding that the use of micro-modules will "bring about sweeping changes in all electronic design and construction."

New device aids cancer treatment

A new radiation detector, smaller than the head of a pin, will have important applications in the treatment of cancer, as well as in other fields, such as space exploration, nuclear power control and industrial process control, its manufacturers believe.

The device, called a "solid state ionization chamber," was developed by the Hughes Aircraft Company of Los Angeles, California. Its function is to measure the number and energy of atomic particles travelling at extremely high speeds.

Essentially, the detector is a slice of specially treated silicon so thin that it is barely discernible to the human eye. When struck by a charged nuclear particle, it emits a pulse that can be

measured and analysed. The detector's value lies in its ability to make measurements that upto now could not be made by any existing device, according to Dr. Stephen S. Friedland, a Hughes Aircraft Physicist.

Dr. Friedland said that the new detector has several major advantages over earlier devices. It is so small that it can be packaged in the tip of a hypodermic needle. It requires no cumbersome power pack because it operates at very low voltage.

Furthermore, it can detect particles 1,000 times faster than previous devices and is so accurate that it can analyse particle energy to less than one-half of one percent error.

Dr. Friedland described the potential use of the new device in the treatment of cancer as follows. Boron, an element that tends to concentrate in malignant tissue for a limited length of time, would be injected into a cancer patient. The detector, placed in a hypodermic needle, would then be inserted into the diseased area.

A stream of neutrons would then be directed at the diseased area. When the boron reached its heaviest concentration, neutrons striking it would create alpha particles. These would "flash through and destroy" diseased tissue, Dr. Friedland said.

Pellets seal off dangerous blood vessel growth in brain

Two Georgetown University surgeons have reported a unique operation in which tiny plastic pellets were used to block the blood flow to an unnatural and dangerous tangle of blood vessels in a woman patient's brain.

Sealing off the blood flow permitted a step up to normal circulation along the natural blood pathways of the brain.

Drs. Alfred J. Luessenhop and William T. Spence reported the pioneering operation in the *Journal of the American Medical Association*.

Dr. Luessenhop said the technique offers hope to relatively numerous people with inoperable brain disorders such as aneurysms, enlargements or bubbling out of arterial walls. He noted that the first operation was for a rare defect, technically known as arteriovenous malformation.

Since the operation in September 1959, the 47 year-old patient has lived a near-normal life at home, no longer plagued by numbness and weakness of the limbs and a speech defect that had persisted since early childhood.

In the operation, four plastic pellets graduated in size from 2.5 to 4.2 millimeters were inserted 15 minutes apart into the carotid artery of the neck on the left side. The pellets worked their way up to the middle cerebral artery, which is the natural continuation of the carotid, and lodged just short of the faulty area. The pellets were big enough not to branch off into smaller feeder arteries along the carotid and cerebral vessels.

The surgeons said that X-ray pictures and arteriograms taken since the operation show just a trace of the unnatural tangle remaining and good, brisk blood flow through the brain's normal network.

Aneurysms could be corrected, they said, if pellets introduced on either side to block the blood flow could be removed after the artery wall had time to strengthen and heal itself.

"Piggyback" flights predicted by aircraft official

A new method of flying at high speed over great distances has been predicted by Leston Faneuf, chairman of Bell Aircraft Corporation in the United States. Faneuf calls it "piggyback" flight.

For such flights a huge, swept-wing jet would take off carrying on its back a winged rocket with seats for 30 passengers. At 20

miles altitude, the rocket would separate from the jet, accelerate briefly through space, and glide to its destination anywhere in the world—in an hour.

Rocket and space techniques now under development will make piggyback planes and flight a commercial reality around 1980 or 1990, Faneuf believes. These flights would be especially suitable, he said, for intercontinental flights of 5,000 miles or more.

Frozen milk foreseen

Dairy scientists at the University of Wisconsin in the United States have developed a method of producing frozen concentrated milk. The method will make it possible to keep milk fresh and full-flavoured for several months.

The processing method duplicates many of the steps for sterilization of concentrated milk. High quality raw milk is pasteurized, homogenized and concentrated to contain 36 per cent total solids. It is then put into cans and given another heat treatment. After this, the canned concentrate is cooled and frozen. When stored at a low temperature, the milk retains its flavour for at least three and one-half months, university scientists said.

Cheap De-Salted water

The U. S. Department of the Interior is building a plant at Freeport, Texas, to turn sea water into pure drinking water. The plant will use what is described as a "simple evaporation system," and will produce 1,000,000 gallons a day.

The plant will produce fresh water from the Gulf of Mexico at a cost of about one dollar per 1,000 gallons. But a similar plant of 10 times the size could produce fresh water for about 35 cents per 1,000 gallons. This is considered to be an economical price.

—U.S.I.S.

WELFARE NEWS

Lunch-cum-Rest Shed

An additional building to be used by the workers as lunch-cum-rest shed was opened on 2nd May 1960. This attractive building which has a floor area of about 7,200 sq. ft. is situated in front of the existing canteen building and is provided with ample facilities like electric fans, lights, water coolers and sanitary fittings. Snacks such as sweets and savories are being sold to workers in this building during lunch hour.

Industrial workers' programme

The public address system for broadcasting the Industrial Workers programme and light music during lunch hour has been extended to the Factory Canteen and the Lunch-cum-Rest Shed also, during the 3rd week of May 1960.

Childrens' excursion

Thirty seven children of employees of ICF were taken on a holiday-camp by Welfare

Officer. The party left Madras on the night of 21-5-1960 and camped at Trivandrum, Courtallam, Madurai and Thiruchirappalli. The children were taken round various places of interest in and around the centres mentioned above. After a pleasant and educative tour the children happily arrived back at Madras on the evening of 30th May 1960.

Visit to patients

The Welfare Inspectors visited the Railway Hospital at Perambur, and the Government General Hospital, Madras to enquire about the health of the I.C.F. employees undergoing treatment as in-patients. Besides, they visited the residence of few employees suffering from T.B. to watch and report on the condition of their health with a view to afford relief from the Staff Benefit Fund. In addition the Personnel Officer visited the Rajaji T.B. Sanatorium at Thiruchirappalli to make kind enquiries about the health of five of our employees who are in-patients in this hospital.

A fire detection system which sounds alarm bells and shows by light signals the site of the fire can be used for buildings and for individual items of industrial or technical equipment, say the manufacturers, The Minerva Detector Co., Ltd. The sensitive element of the new system is an ionisation chamber which responds to traces of the combustion products given off when smouldering or burning starts. The Minerva detectors are connected to a central control unit which can bring fire-fighting equipment into action, close smoke doors and send an alarm signal to the fire brigade.

A particularly important application of the new system is the protection it offers individual assemblies of industrial and test equipment which are used in process control in life-testing electronic valves and components and in electric computing.

The company has also developed the 91C Fire Prevention Unit, specially designed for racks of process control or electric or electronic equipment left running unattended for long periods. Used with Minerva detectors, the unit switches off the mains supply as soon as an alarm is raised and indicates by bells, buzzers and light signals which rack is on fire.

Built-in emergency power supplies ensure continued operation, and alarm signals can be supplied to turn on CO₂ gas, isolate mains supplies, shut down ventilating systems and bring on-the-spot fire fighting equipment into action.

PAY COMMISSION RECOMMENDATIONS

Do You Know?

THAT the initial cost of implementing the above recommendations in respect of employees of all Railways alone would be approximately Rs. 13 crores per annum and this would progressively increase in the coming years.

* * * *

THAT the revised scales of pay and allowances would be given effect to from 1st November, 1959, but in respect of actual service rendered during the period of 1st July, 1959 to 31st October, 1959 the Government will make an ex gratis contribution of a suitable amount (worked out on the basis of revised rates of pay and allowances) to the Provident Fund accounts of the employees in due course.

* * * *

THAT the average monthly emoluments of the lowest grade Class IV employee on the Railways would increase from Rs. 78.33 to Rs. 88.75, a raise of nearly 13%.

* * * *

THAT the initial pay of an employee who comes on to the authorised scale of pay will be fixed on the "Point to Point" basis, the board's intention of which is to put an employee into the revised scale at the point he would have reached had it been in force from the time he entered the grade and that the fixation would be subject to the condition that refixation would not result

(a) in reduction of existing emoluments,

and

(b) the additional emoluments should not exceed certain specified limits ranging from Rs. 5 to Rs. 50.

* * * *

THAT the rate of increment has been increased in the case of all Class IV staff. As regards Class III scales, the rate has been increased in the case of most of the scales.

* * * *

THAT the rates of House Rent and Compensatory Allowance are being enhanced. (e.g.) a Class IV employee in the grade of Rs. 30-35 living in Area 'B' will get Rs. 5 as compensatory allowance instead of Rs. 3 as at present. Similarly, a Class III employee drawing Rs. 105 in the grade of Rs. 60-130—(PS) living in Area 'A' will get Rs. 24 as House Rent Allowance instead of Rs. 20 as at present.

* * * *

THAT in future, employees, whose place of duty, though outside, is in the proximity of a qualified city, and who, of necessity, reside within the city will also be given the House Rent Allowance admissible in that city.

THAT the recovery on account of House Rent from staff drawing pay below Rs. 150 in the revised terms would be limited to 7½% of pay instead of 10% of pay as at present.

THAT the replacement of the present lower scale of Rs. 30-35 and the Dearness Pay and Dearness Allowance which go with it, by the Authorised Scale Rs. 70-1-85 with Dearness Allowance of Rs. 10 per month would raise the overall pensionary benefits of the lowest paid employees by about 50%.

THAT the monthly pension alone of an employee in the lowest scale of pay Rs. 30-35 will raise from Rs. 20-50 to Rs. 32 and that the Death-Cum-Retirement Gratuity (excluding the special additional gratuity granted to Class IV staff who retire with more than 30 years service) will increase from Rs. 825 to 1,275.

THAT temporary service when followed by permanency, whether in the same or any other post, would count in full for pension against the present practice of reckoning it to the extent of only half of the temporary service.

THAT half of the officiating pay would be reckoned as emoluments for pensionary benefits in all cases.

THAT the maximum amount of Death-Cum-Retirement Gratuity, viz. 15 months pay, payable to a pension optee would accrue to him on completion of 30 years qualifying service instead of 34 years qualifying service as at present.

THAT when the total period of qualifying service exceeds completed years by 6 months or more, an additional benefit of half a year's pension/Death-Cum-Retirement Gratuity would be allowed for the purpose of determining the quantum of pensionary benefits.

THAT it is proposed to give another opportunity to staff to elect pensionable or non-pensionable status.

THAT the office and similar staff of the Railways constitute only a very small percentage (about 10%) of the total strength of staff on Railway and it is only in respect of this small group of Railwaymen that the slight increase in the hours of work and a small reduction in the casual leave benefits and holidays have been made and that no change in the hours of work or casual leave benefits has been made in respect of the vast majority of Railwaymen.

THAT the status-quo is being maintained in the matter of Passes and Privilege Ticket Orders and that no change would be effected without consultation with the Federations of Railway Trade Unions.



Indian Railway Equipment Advisory Committee Meeting was held in the I.C.F. on 12.5.60

Shri S. V. Ramaswamy, Dy. Minister for Railways who presided over the deliberations at the meeting is seen here in the photographs having a discussion with members of the committee.





Shri S. Srinivasan, Chief Auditor, Southern Railway, I.C.F., retired from service recently. Picture shows Shri K. Swarup, Chief Administrative Officer, I.C.F., presenting a coach model to Shri Srinivasan at a farewell party arranged by officers of the I.C.F.



Shri M. Lal, Mechanical Engineer (G) I.C.F. (Also Editor, Railcoach) has been transferred to the Eastern Railway. In the photograph Shri Lal is seen at a farewell party arranged by the officers of the I.C.F. in his honour.

JL
D 515 on 21.1.61, NSYRE

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