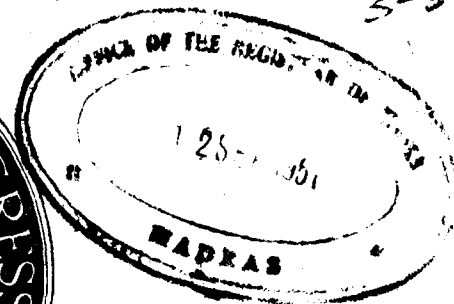


Transport-Communications

MONTHLY REVIEW

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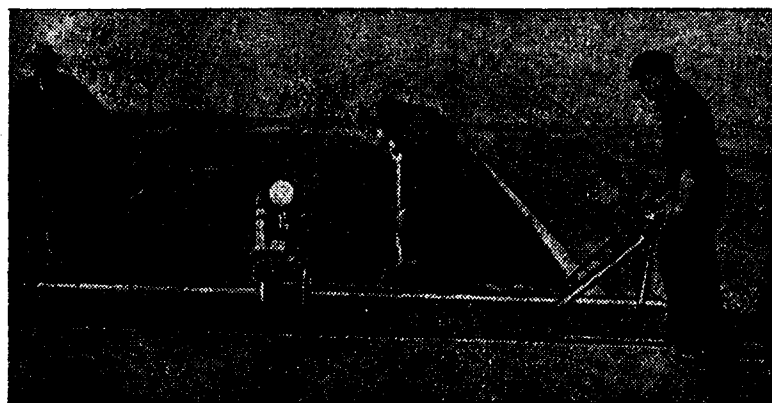
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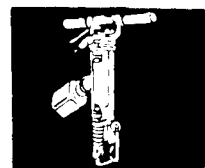
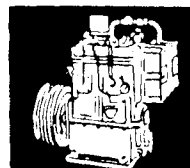
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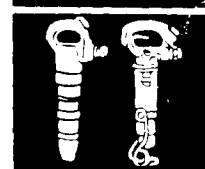
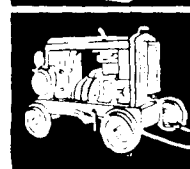
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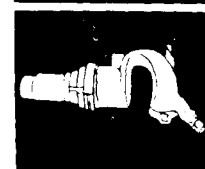
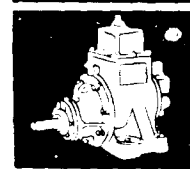
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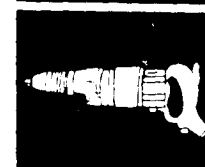
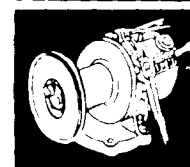
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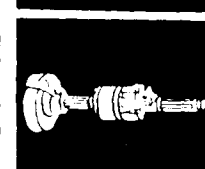
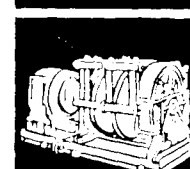
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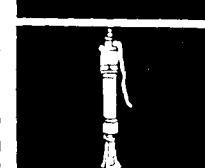
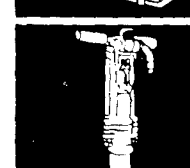
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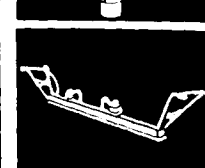
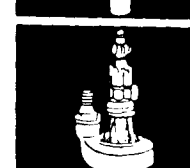
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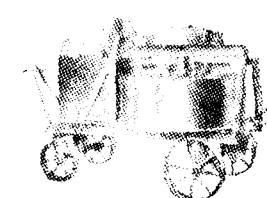
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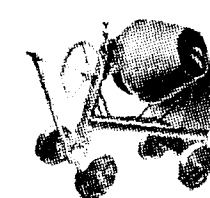
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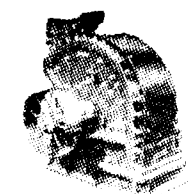
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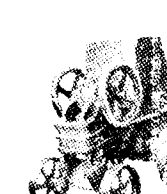
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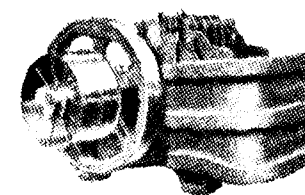
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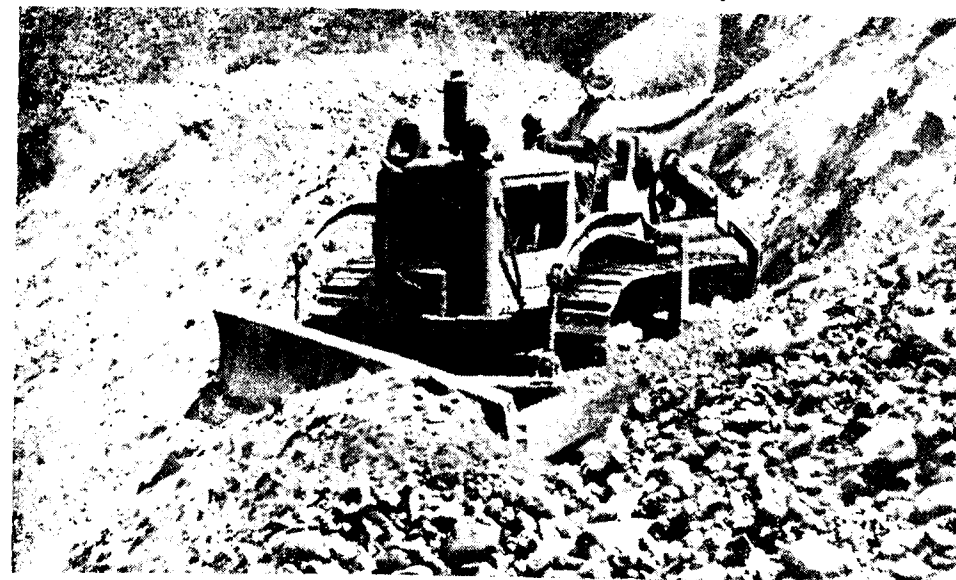
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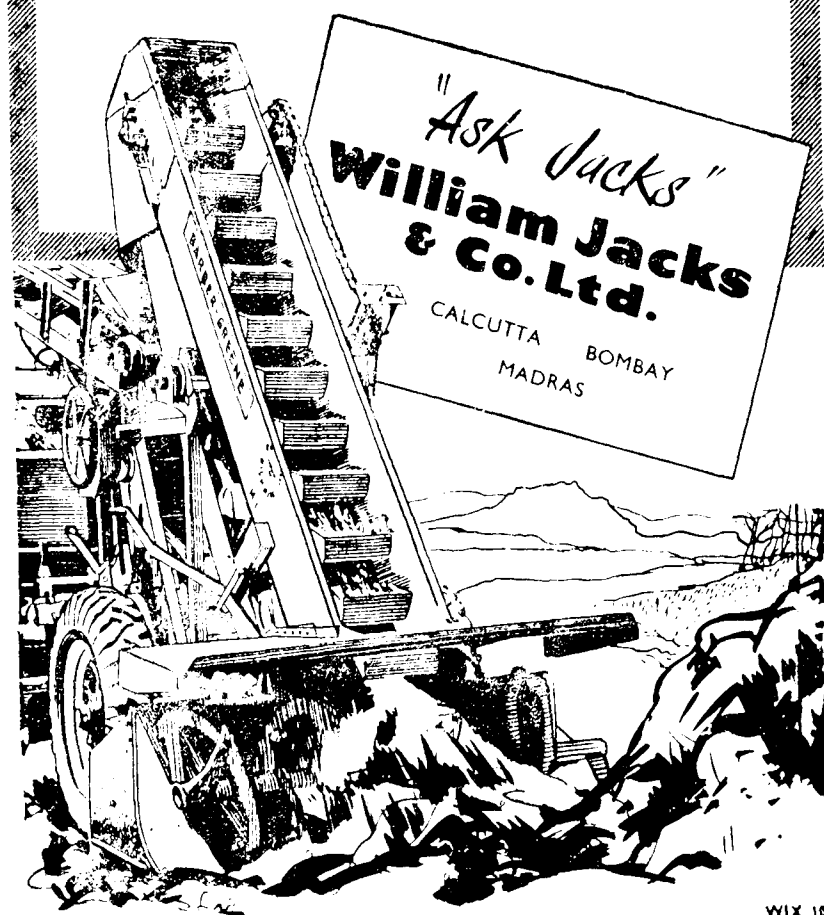
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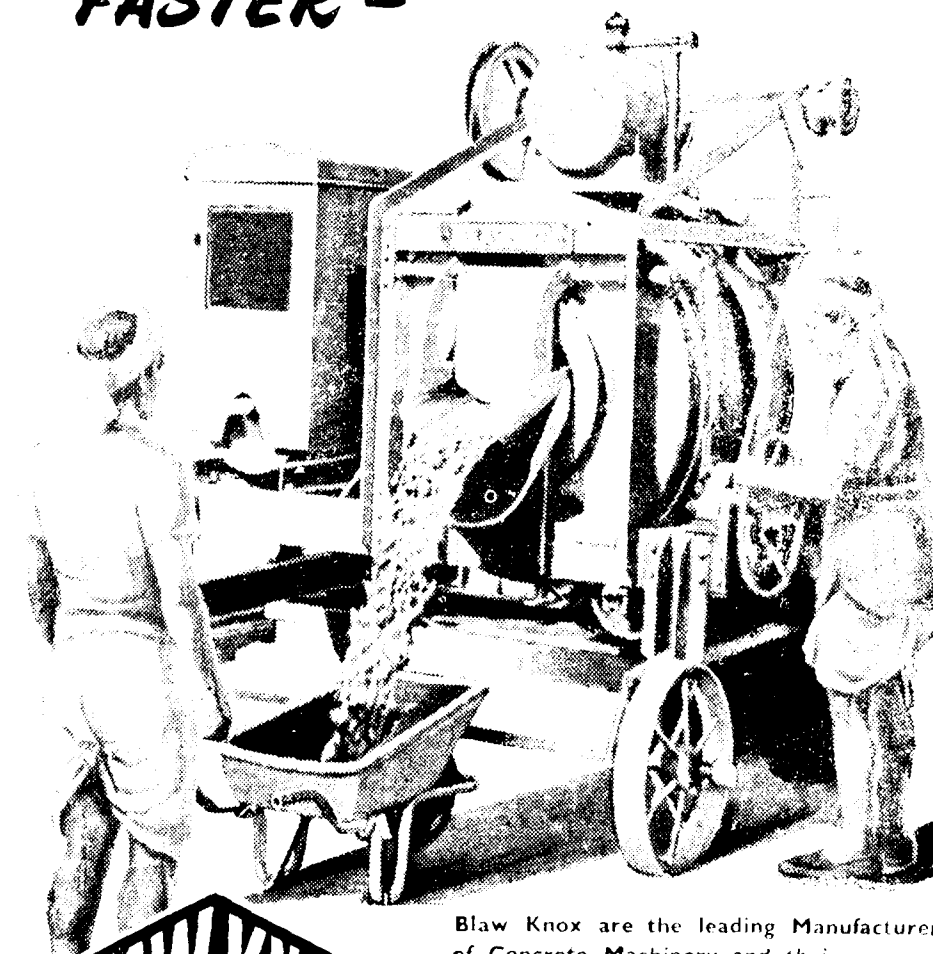
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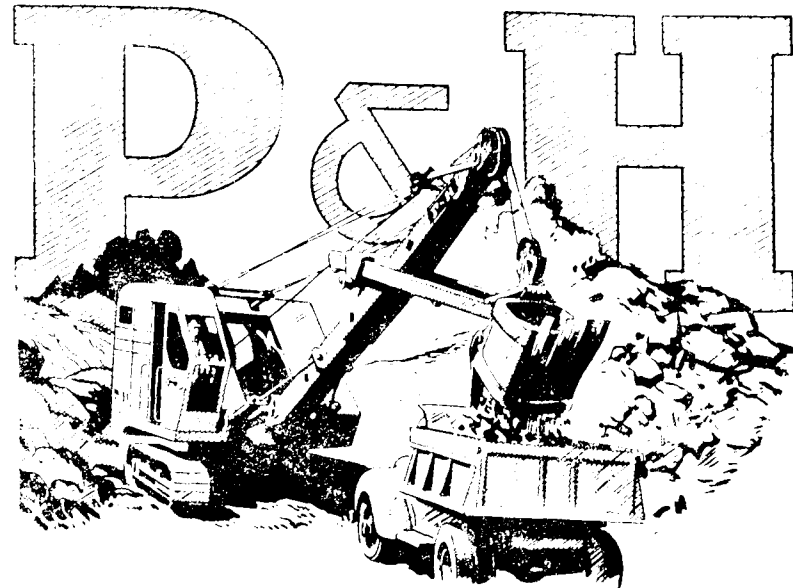
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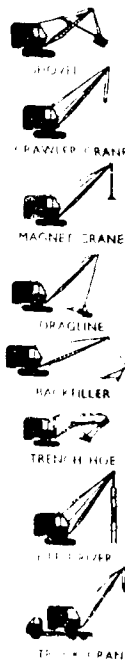
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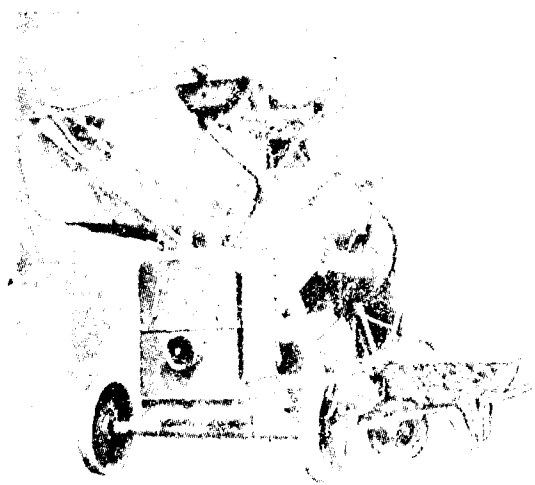
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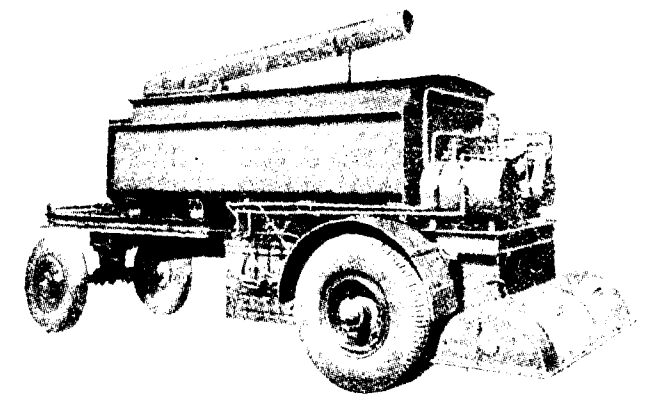
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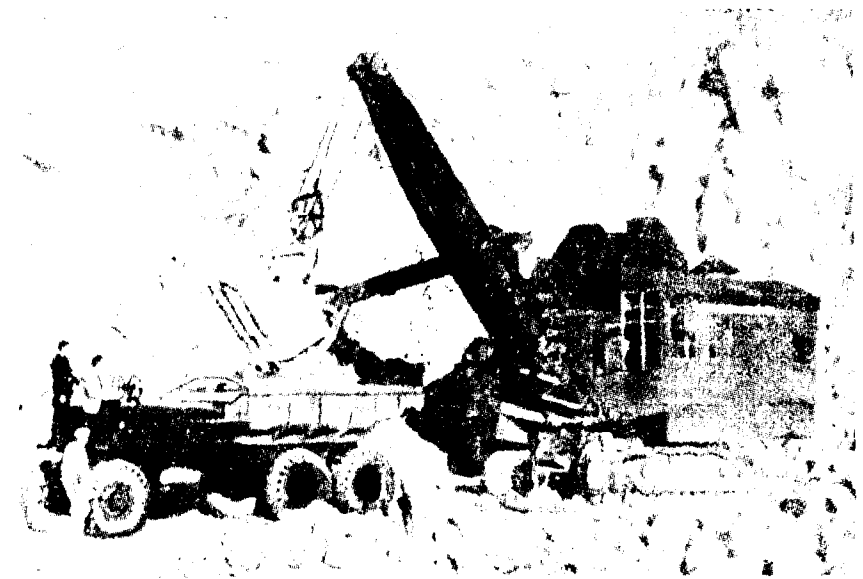
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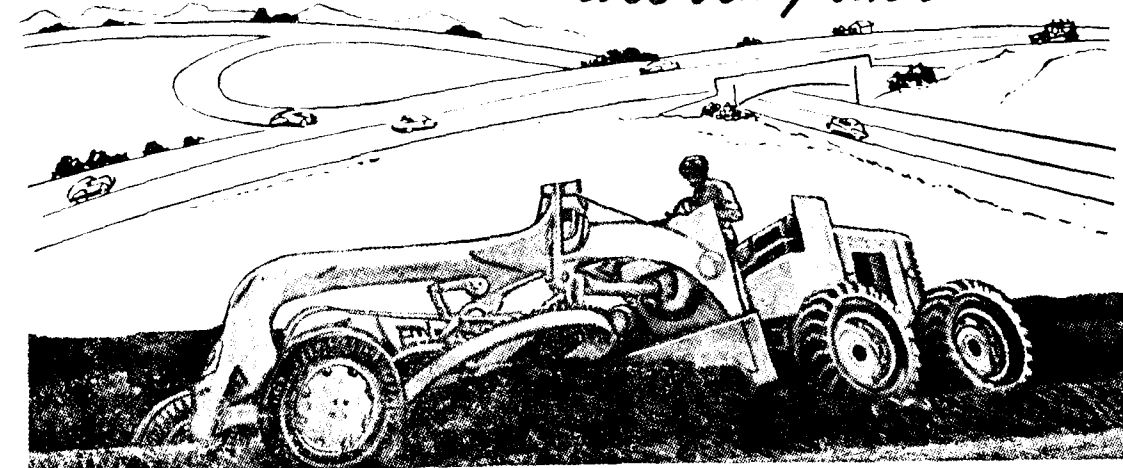
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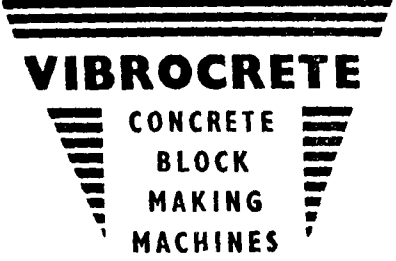
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Editorial

A HARDY ANNUAL

ONCE a year the Indian Roads Congress meets at an annual general session for the main purpose of reading technical papers, reviewing the work of its many technical committees, and discussing highway engineering problems generally. A technical exhibition is now usually held at the time of the session to bring to the notice of the delegates the highway engineering materials and processes in use in the part of the country where the session is held.

At the end of the session the delegates inspect the important works completed and in progress within one or two hundred miles of the place where they meet. Engineers from different parts of the country, two hundred or so of them, are brought together for a whole week, they form new friendships, and get an opportunity to discuss their own technical problems with each other. The session thus provides a wonderful opportunity for the pooling of the road building experience of the country.

At these sessions the President of the Congress delivers a speech, addressed to the delegates but also to the people and the Governments of the States and of the Union of India. The naturally shy engineer tries for once to come out of his shell and tell his countrymen what he thinks should be done for the good of the country. The Press takes up the refrain. For a week there are echoes from every nook and corner of the land—the session is described in detail, the speeches are reported, and editorials appear in most of the important newspapers of the country. Almost invariably the President's suggestions are strongly supported and endorsed by the Press. For a week roads make "News", a week in which roads are "a national **Must**", "the Arteries of the Nation", "Priority No. 1", and so on.

For the rest of the year the country seems content to jog along in its mental bullock-cart which does not seem to need a road. As one newspaper puts it, "The vital importance of good communications for the economic revival of the country is **too patent to need special pleading**." The newspapers and the people generally are content to leave it at that for another year.

Is it because their importance is so obvious that roads are overlooked when development plans are drawn up or when priorities are decided? Why don't the people and the Press keep up their demand for good roads with

greater persistence? Why do they tend to leave it to the engineer to do the talking? The engineer himself should be there to work and not to talk; talking is for those who have not had the advantage of an engineering training.

The commercial interests, the agricultural interests, the administrative authorities, and the general populace, these are the people who need roads for trade and commerce, for marketing, for the maintenance of law and order, for social and political work, for spreading education, improving public health and for a thousand other purposes.

Once a year the road engineer cries out as loudly as he can that roads are a national **must**. He is careful to add, however, since he is a practical man, that it is only possible to have roads if road revenues are reserved for road building. He proves with facts and figures that good roads pay for themselves and more than pay for themselves, that a country pays for its roads whether it has them or not, and that India is paying at the moment, and paying heavily, for roads she does not have.

He quotes what the advanced countries of the world have done and are doing to improve their roads; he shows how in those countries expenditure on road development and upkeep is regarded as **productive** expenditure. After this, all he hears is an echo from the Press, an echo of his words which, as a true echo, ceases in a moment or two after he has ceased speaking himself.

But there are at last signs that the lesson the Indian Roads Congress has been preaching all these years is being learnt throughout the country. India's famous road plan, the Nagpur Plan, now means something to a great many people who, if they don't know much about government finance, have come to appreciate that there is in existence a comprehensive road plan and an active body of road engineers who are fitting themselves by study, experiment and research to carry out that plan. The day is perhaps not now very far off when these engineers will be given the Road Board they have asked for and their own road's budget and told to get on with the job (as more fortunate engineers in the West were allowed to do long ago) of providing the roads their country so badly needs.

DESIGN OF ROADS IN RURAL AREAS IN GREAT BRITAIN

Proposed Revision of Standards: Transport Ministry's Recommendations.

(From the "Surveyor" dated August 25, 1950)

A memorandum, No. 653, which sets out some amendments and additions now considered necessary to memoranda 575 and 577, issued in October, 1943, and March, 1945, and dealing with the lay-out and construction of roads and bridge design and construction respectively, has been sent to English, Welsh, and Scottish highway authorities by the Ministry of Transport.

The memorandum, which has been issued after consultation with the highway authorities' associations, the County Surveyors' Society, and the Institution of Municipal Engineers, is reproduced below:

Recent experience and investigation, particularly in connection with the preparation of Development Plans, have shown the need for revising some of the standards of design of roads in rural areas laid down in Memoranda Nos. 575 and 577, especially as regards carriageway width in relation to traffic density.

Investigations in other countries suggest that the volume of traffic for which the road should be planned should be the hourly traffic which occurs at least 30 times in a year. As, however, the available traffic records do not contain the necessary information, the estimate of future volume will in general need to be based on the 1938 traffic census average daily figures plus an increase to allow for the growth of traffic volume.

It is considered that plans should be based on an estimated future volume of traffic 75 per cent, in excess of the average daily figures obtained in 1938.

Special considerations, e.g., the development of new towns, location of new industries, etc., may, however, justify an increase in this figure in certain areas or on specified roads. On the other hand, the figure of 75 per cent may be too great in certain areas.

The trend in the growth of pedal cycle traffic has been examined by studying the numbers of cyclists counted in the triennial census, production figures of pedal cycles and membership of the cyclists' organizations; it is difficult to say what the general increase will be and discretion will have to be used, but in the absence of exceptional local factors likely to attract cycles, an increase of 25 per cent over the 1938 traffic counts should be assumed.

As the traffic census records are in terms of daily average figures the Minister proposes that for design purposes, having regard to mobility and safety, the limiting capacities of carriageways of various types shall be as follows:—

Two-lane carriageways...up to 3,000 vehicles per day

Three-lane carriageways...3,000 to 6,000 vehicles per day

Dual two-lane carriageways...6,000 to 15,000 vehicles per day

Dual three-lane carriageways...over 15,000 vehicles per day

Investigation indicates that the daily traffic divided by ten gives a figure which can be taken as the hourly traffic for

design purposes. On this basis the hourly capacities of carriageways are as follows:—

Two-lane carriage-ways	... not exceeding 300 vehicles per hour*
Three-lane carriage-ways	... from 300 to 600 vehicles per hour*
Dual two-lane carriageways	... from 600 to 1,500 vehicles per hour@
Dual three-lane carriageways	... over 1,500 vehicles per hour @

For roads leading to some popular resorts, the assumed capacity of the various carriageway widths should be reduced by one-third to make better provision for peak volumes of traffic.

In general, central reservations should not exceed 10 ft in width, but on lengths where special planting of trees or shrubs is intended the width may be increased to 15 ft or 20 ft. It is suggested that in the interests of road safety and amenity development should be kept back from the minimum effective widths given in memorandum No. 575.

Minimum width of two-lane carriageways.—On Trunk, Class I and Class II roads a minimum carriageway width of 22 ft should normally be provided, but the width may be less in special cases where the traffic is light, and on Class III roads.

Thirty-foot carriageways.—It is considered that there is a place in the ultimate road system for a single 30 ft carriageway. The figure of 6,000 vehicles per day given as the capacity of such a carriageway is well below the maximum capacity.

Cycle tracks.—In rural areas cycle tracks need only be provided where the average daily number of cycles is likely to exceed 1,000 per day as recorded in the 1938 census. In cases of doubt the decision should be in favour of providing cycle tracks particularly where a 30 ft carriageway is envisaged.

In considering the provision of cycle tracks it should be borne in mind that:—

- On fully built-up roads the provision of cycle tracks may not be practicable.
- On a road where, in general, cycle tracks are justified, their provision on by-passes to towns or villages may not be required because cyclists may prefer to keep to the existing road through the town or village.

In some cases a two-way single track 12 feet wide for cyclists may be preferable to dual cycle tracks. This may occur through physical conditions or because a large number of cyclists go to premises on one side of the road only.

Footways.—There is little justification for providing paved footways in rural areas except in the vicinity of villages. A level verge should, however, be provided in all cases and when purchasing land or safeguarding it against development, or carrying out major improvements, sufficient land should be taken to enable a footway or verge to be constructed, if necessary, at a later stage.

Combined footway and cycle track.—A combined footway and cycle track should not be adopted,

Distance between outer kerbs on dual carriageway roads.—There is not sufficient justification on traffic grounds for providing a distance of 70 ft between the outside kerbs of dual carriageway layouts. (See Memorandum No. 575)

Gradients.—A gradient of 1 in 25 (in lieu of the 1 in 30 specified in Memorandum No. 575) should ordinarily be regarded as the maximum, but in hilly country a heavier gradient may have to be adopted.

Visibility.—The vertical visibility between points 3 ft 9 in. above the carriageway and horizontal visibility on the centre line of the carriageway should

be related to the speed value of the road as follows:—

Speed Value of Road m. p. h.	Visibility distances* feet	
	Dual Carriageway	Single carriageway
20	100	150
30	150	250
40	250	450
50	350	650
60	500	900
70	650	1,200

A level verge assists visibility and also provides space on to which snow can be thrown.

On all single carriageway roads a solid white line should be laid (with reflecting studs) where the actual visibility distance is less than the appropriate value recommended for the next higher speed in the table; for a speed value of 70 m. p. h. the white line should be used if the visibility is less than 1,500 ft.

Kerbs.—Where there is a footway a "vertical" kerb should be provided; a height of 4 in. is considered suitable. Splayed kerbs or sunken kerbs may be provided for central reservations and along verges where there is no footway. On all heavily trafficked roads it is desirable to provide some kind of continuous kerb. If intermittent kerbs are used, the end stones should be ramped down and the verges maintained.

Width of bridges carrying minor roads.—On Class III roads the minimum width of a bridge between parapets should be 24 ft 6 in.

By-passes to villages.—The width and alignment of a road through a village may alone justify a by-pass, but where the alignment through the village is good, the justification for a by-pass is not strong unless it is not possible to obtain economically through the village (a) a 44 ft carriageway with illuminated refuges and adequate footways where the village is situated on a route justifying the provision generally of a 30 ft carriageway and (b) a 30 ft. carriageway and adequate footways where the village is situated on a route justifying the provision generally of a 22 ft. carriageway.

RUEFUL EDITOR

A correspondent offered us some poetry which we refused perhaps too brusquely. This is what his reply was—

"Sir, I admit your general rule
That every poet is a fool.
But you, my dear sir, go to show it
That every fool is not a poet."

—Ed.

* For practice recommended for India see I. R. C. Journal XV-1 Paper no 149 "Standards for Sight distances on Highways."

* With these low densities one cyclist should be counted as a vehicle.

@ With these densities two cyclists should be counted as one vehicle.

MAGIC CARPETS

(Extracted from "Highways and Bridges", December 27, 1950)

THOSE of us who are sufficiently senile to have read the "Arabian Nights" will well remember the unusual form of transport provided by a magic carpet. It is, indeed, surprising that, in view of the versatility, simplicity and economy of this type of vehicle, its commercial development appears to have received so little subsequent consideration. It is true that there has recently been much comment on the stratospheric peregrinations of domestic crockery, but for a family outing an airborne carpet offers obvious advantages, in both comfort and social status, over the less adaptable saucer, particularly as the latter is believed to rotate at quite uncomfortable speeds.

Carpets do, however, figure quite prominently in present-day transport systems, although, as a matter of convenience, it is usual to allow the carpet to remain static and to move upon it in some form of mechanically propelled vehicle. While the advertisement pages of road journals show that the purveyors of road carpets are not unable, or unwilling, to describe their products in terms other than derogatory, it is seldom nowadays that so strong a word as "magic" is used when indicating their merits. This restraint quite probably arises from an appreciation of the more prosaic role which road carpets are called upon to fulfil, but, nevertheless, it would sometimes seem that properties little short of magical are attributed to this type of surfacing when it is expected to withstand conditions which transcend the limits of normal engineering practice.

Convenient Things for Engineers.

Carpet coats are, of course, such convenient things for road engineers. With appropriate mechanical contrivances they can be made and laid at an astonishing rate, covering the defects of the old road and presenting to the traveller a delightfully even and non-skid surface at a cost which even the impoverished road finances of this country finds possible. Foreign visitors have, in fact, been known to eulogise upon the quality of our road sur-

facings, critical though they may be of our design and layout.

So well have these carpets behaved, and so widely have they been used, that, with the mania for self-deprecation which has hitherto been one of our national characteristics, considerable efforts are now being made to find some defect in them upon which attention may be focussed and thus avoid the immodesty of acclaiming their undoubted success. Pride of place in this self-imposed inquisition naturally falls to the open-textured carpets, or, to speak plainly, those made of bituminous macadam, because they preponderate so largely. The habit is developing for road technologists, singly or in pairs or even in cohorts, to move despondently over miles of normal good carpeting until their jaundiced eye alights with relish upon some blemish in the surface which enables them to rejoice in this apparent evidence of fallibility. One might well imagine some industrious but misanthropic Arabian ant plodding wearily round the magic carpet until his search was rewarded by finding a moth hole!

Having found a blemish, the current procedure is to label it as an "adhesion failure," thus combining advanced thought and emphatic language in one neat phrase. The next step is to leave no stone unturned, literally and metaphorically, to find the cause of this shocking state of affairs. Fortunately, the cause is apparently very easy to find—the binder and stone have evidently had enough of each other's company and have parted. Sometimes heretical nit-wits ask why this lack of harmony manifests itself only in such small localised areas, but the progress of science is not to be balked by trivial questions. The cry goes up that the Achilles heel of open-textured carpets is now revealed, and some inspired road engineers are apparently prepared to disabuse their minds of the excellent service which carpets have rendered and to jump head foremost into the void that their denial opens up. One way of avoiding the risk of a hole in the heel of a sock is to

wear no socks! It might, alternatively, be worth while considering what causes the hole!

The Presence of Water

We need not here concern ourselves with troubles arising from wrongly made, or even wrongly laid, carpets. These are not very frequent and are usually self-evident. We will even pass over the contentious subject of the variability of the old surface. We will think for a moment of the very occasional "adhesion failure," which seems to be receiving much more attention than its occurrence justifies. Firstly, and presumably inevitably, it is associated with the presence of water. This enables us to enjoy the thrill of talking scientifically about surface tensions, interfacial tensions, angles of contact and so forth, or to drop coated stones into bottles of water and cluck our tongues sententiously when some of them show signs of stripping.

Highway engineers, often following a burst of scientific illumination from some laboratory, have been known to transfer their pursuit of the phenomenon of "stripping" from the underworld of the cities to the underside of their highways. It might almost seem that they seek delibe-

rately to cultivate the disease by providing appropriate breeding grounds. Knowing that such carpets remain pervious to water for an appreciable time after laying, they make sure that rain will have the least possible opportunity of removing itself from the scene of action. Concrete haunches abutting on impervious old surfaces, raised gullies without weep-holes, even major depressions in the old surface, are among the devices so used. Where rain or plain water is deemed insufficiently vicious, the really heavy attack is left to mud, which is caused to percolate up into the carpet from some deeper source by the pumping action of traffic on a foundation which is mainly impervious but provided with cracks to localise the effect.

One is inevitably reminded of the story, possibly quite apocryphal, of the practice in a certain foreign country noted for its *pate de foie gras*, of standing their geese in water to promote fattening of the liver. The practice was not favourably regarded by bird lovers elsewhere, and it is probable that the fattening-up of road carpets by standing them in water could equally justify criticism. If carpets could be protected from the injection of mud, there would really remain little cause for throwing mud at them.

ENGINEERING

One of our contributors tells us that after studying very carefully an Indian Roads Congress Paper recently read at Calcutta (wild horses would not make us reveal the name of the Paper or of our contributor) he came to the conclusion that engineering was an exact science—based on assumptions.

—Ed.

Press Comments on the Fifteenth Session of the Indian Roads Congress.

The Indian Express, Madras.

Feb. 19.

Road Development

In the development of a country's economy and resources the role of the engineer has been duly acknowledged. In India particularly, the development of her potentialities being both urgent and necessary, it is perhaps even more significant. **Any representative organization of engineers is therefore entitled to have a say in the matter of planning and when it is devoted to a vital activity like road-building its contribution must be acknowledged with due respect.** When the President of the 15th Session of the Indian Roads Congress therefore complains that in the order of priority highways have received a relatively low place, he must be presumed to have quite a legitimate grievance. For in an agricultural country like India a far-flung network of arterial roads is essential.

It is not as though our governments are not aware of these facts. **The requirement has been accepted in principle but administrative policy has in the past relegated road development to a back place. (The National Planning Committee recently put aside the highway development scheme in preference to the development of irrigation and water power.)** The clue to the phenomenon can be had in the period of financial depression to which Mr. Mukerjee himself has referred more than once.

It follows then that the **road programme must receive a higher priority than heretofore.** A study of traffic potential is needed, and the method of utilising local material at minimum cost is necessary. The President devotes some time to the problem of finance and **his suggestions in this connection are worthy of attention.** He says that just as road revenue must be indirectly encouraged even by relaxing the individual tax bur-

den a little, the proceeds of the tax must be exclusively for use on roads. **Like the railways the roads also will ultimately finance themselves and therefore the initial capital outlay should not be shirked. Recent trends only underline Mr. Mukerjee's optimism.**

And roads, bridges, tunnels, etc., can be made to pay; the manner in which the Triborough Bridge in New York and the Oakland Bay Bridge in San Francisco have almost repaid investments, is an illustration in point and there is no reason why similar toll-charges should not be collected from users of similar facilities in India as well. A betterment tax on roadside lands and sites is another source suggested by the President to make our highways paying. In view of the importance of roads to the general economy of the country, **a contribution from the general revenues also is not out of place. Separation of road finances and assistance through non-lapsing grants, are other methods adopted in more advanced countries.** Many of the ideas thus put forward by Mr. Mukerjee in fact occur in the report of the Motor Vehicles Taxation Enquiry Committee submitted recently to the Government of India.

Bharat Jyoti, Bombay

Feb. 20.

Arteries of the Nation

The presidential address of Mr. A. C. Mukerjee at the fifteenth annual session of the All-India Roads Congress is **note-worthy for several thought-provoking and constructive suggestions.** No elaborate course of argument is necessary to emphasise the vital role that roads have to play in the economic development of a nation. Rightly they have been described as the arteries of commerce and trade. It follows therefore that the **development of highways should be granted priority in national planning.** But in this as in every other matter, the Government's hands are tied by lack of finance. In this connection the Bombay State Transport

has set a noble example which might be followed throughout the country. The profits of the concern are set apart for improving the Roads in the State. It would be good if a similar policy is followed in all places where transport has been nationalised. Even in other areas, **the income from motor vehicle taxation as also tolls should be utilised to finance the cost of constructing suitable bridges and tunnels.** Mr. Mukerjee has suggested that several other taxes can be levied with a view to utilising the revenue for developing roads. It is a moot point as to whether increased taxation is possible at the moment. But **his plea for arousing public interest on the need and value of road development will be widely endorsed.**

"Indian News Chronicle", Delhi

Feb. 20.

Road Development

Mr. A. C. Mukerjee, in the course of his presidential address delivered at the fifteenth session of the Indian Roads Congress, held on February 18, **rightly deplored the insufficient importance attached to roads in the development programme of the country.** Considered in the full perspective of national planning, the crucial role which road development plays in the effective utilization of other development programmes cannot be ignored. If we want to grow more food on unreclaimed wastelands, we cannot do that without providing road links to the market. If we want to spread education we must link up schools with the areas we want to serve. Similarly, no industrial development or public health schemes or administrative efficiency can be maintained without creating a suitable network of road-links. Even our big hydro-electric projects will remain unutilized if we do not build feeder roads for the industries which are expected to consume this power. **Therefore, in any blue-print of overall planning a programme of road building would have to be given urgent priority.**

To those, however, who say that road building and repairing is an unnecessary luxury and it would be impossible to allocate sufficient funds for this purpose

out of the shrinking state revenues, Mr. Mukerjee gives a hearty assurance based on the experience of other countries where **properly planned road systems have never failed to become self-sufficient in course of time.**

Motor transport, which at present, contributes the largest amount to the road revenues can, however, be more profitably developed by reducing its taxation and by providing greater encouragement to private ventures in this field. This money should be earmarked especially for roads.

Other sources which can be usefully tapped to increase road revenues are taxing bullock carts, introduction of tolls and a betterment tax on roadside lands. **While these measures can no doubt help in raising funds for road development, what is of vital importance is the rationalisation of our financial structures so as to separate road finances from general revenues.** That means revenue from road transport should be allocated exclusively for road purposes, both at the Centre and in the States.

"The Mail", Madras

Feb. 20

A National "Must"

When Ministers, Union and State, discuss roads they speak of their importance to the community, and their paramount contribution to the economic development of the country. But they have short memories. Once the occasion—such as the opening of a new bridge, or causeway, or of a new highway—is past, the subject is forgotten, and roads drop back among the "also rans" in the competition for Ministerial favour and Government funds. For instance, roads are not mentioned in Pundit Nehru's written statement to the Union Parliament on the work of the Planning Commission.

He made no mention of communications in general, or of roads in particular.

That one fact alone justifies Mr. A. C. Mukerjee's complaint, in his

address to the Indian Roads Congress, that "in India the importance of roads is not yet fully realised, with the result that roads are given a relatively low priority in the country's development programmes."

* * *

Now that communications are so largely in the hands of the Union and State Governments, one would have thought that roads would occupy much more of the attention of those Governments than they do. State buses run over many hundreds of miles of public highways; the revenue they earn helps to fill the public coffers, yet little is done by the Governments concerned to repair, improve, or re-form the roads which their heavy buses so seriously damage

* * *

There is everything to be said for and little or nothing valid to be said against Mr. Mukerjee's proposal that all revenue derived from motor vehicle taxation should be utilised for road development. The Motor Vehicle Taxation Inquiry Committee very strongly endorsed the proposal, which was put before it by, among others, the Automobile Association of South India.

The Roads Congress was on sound ground when it proposed the financing of highway development by the issue of loans to be repaid by savings effected by the construction of roads on scientific lines. The Roads Congress should hold fast to that proposal, it is far more likely to find favour with the public than suggestions for the revival of tolls, for betterment taxes, and the like. Already holders of land whose value is enhanced by development schemes are required to pay a betterment tax to the local authorities - the Roads Congress can fairly demand that a fair proportion of the receipts from that tax be allocated to road improvement.

"The Statesman," New Delhi,

Feb. 22

India's Roads

The motto of Kipling's Aerial Board of Control was that "transportation is civili-

zation". The claim is extreme, yet without modern transport it is certainly difficult to conceive of a modern industrial State, such as India hopes to become. She has advantages: her railway system is, with the possible exception of Japan's, the best in Asia and easily the most extensive; her air services have grown rapidly. Her roads, unfortunately, have lagged far behind both present reasonable requirements and those of future mechanized transport.

That this was largely due to an excessive pre-war concentration on railways, as suggested at the fifteenth session of the Indian Roads Congress in Calcutta, is certain. More to the point is to discover what is being done now; and the result unhappily appears to be unimpressive. In 1943 provincial chief engineers drew up at Nagpur a minimum programme of highway development suitable for contemporary needs. While some detailed planning has since made more precise the general principles then laid down, the part of the plan actually completed in the ensuing seven years is described as "only a small fraction." This is not surprising. Mr. Santhanam recently told Parliament that Central expenditure on national highways in the same period was but Rs 16 crores. Total State expenditure on roads is difficult to ascertain; but even in a city like Calcutta the road system has not yet recovered from the scars of war. Up country, also, it has been something of a struggle to return to pre-war standards, let alone to provide the more extensive facilities necessary for industrialization or self-sufficiency in food.

* * *

The difficulties are understandable but not necessarily unsoluble. These are certainly times of financial stringency. They are unfortunately also times of waste. Over-ambitious projects have been suddenly curtailed before completion. Another complaint is that what is received from the roads in the shape of transport revenue is not put back into them, as in many other countries and as the Motor Vehicle Taxation Enquiry Committee recommended. If, however, Governments (and local bodies) are reluctant to forego their claims to supplement the general revenues out of such taxation—West Bengal's latest

budget has as its only new impost an enhanced tax on motor vehicles—there are other sources of revenue. More use, it has been suggested, might be made of tolls, archaic and obstructive though these are. It seems not unreasonable that bullock carts, the worst impairers of surfaces, should, when used for transport, pay their share as well as powered vehicles.

"Times of India," Delhi,

Feb. 23

Roads

Twice a year the Indian Roads and Transport Development Association, along with the Indian Roads Congress, urge the importance of highways on the Administration, but to little effect.

The vital importance of good communications for the economic revival of the country is too patent to need special pleading. Ministers vie with one another in singing the praises of what one State Chief Minister described as our national arteries. Achievement does not accord with enthusiasm and the roads figure low on the list of priorities.

Development might be speedier if the yield from motor vehicles taxation were earmarked for road building. The suggestion has been repeated by Mr. A. C. Mukerjee in his presidential address to the 15th session of the Indian Roads Congress. But with Governments, Union and States, obsessed with the need for funds, this hardy annual is unlikely to attract much official attention.

"Commerce", Bombay

Feb. 24

Road Development in India

* * *

At the present time when India is faced with an acute food crisis, the lack of good roads is one of the most important factors standing in the way of progress of Indian agriculture. Some of the best agricultural lands are even to this day, cut off from trunk roads and railways and inaccessible for most of the rainy season. Roads are also necessary to spread education and

culture. All over the world, it has been accepted that the first step in almost all forms of economic development and advancement is the building and proper upkeep of roads. It is to this vital role of roads in the economic development of a nation that Mr. A. C. Mukerjee referred at some length in the course of his presidential address to the 15th annual session of the Indian Roads Congress, held recently in Calcutta. Naturally enough, he also referred to the efforts made by the Indian Roads Congress, which claims to represent the considered views of experienced highway engineers in the country who have striven, for over a decade now, to promote and encourage the science and practice of road building and maintenance in India.

* * *

Coming to finance, the position is obvious, as evidenced by the financial stringency the State and the Central Governments are faced with. But, without finance, no progress can ever be imagined. How then is the finance required to be got? Dealing with this aspect of the question, Mr. Mukerjee stressed the need for the annual revenue derived from taxing motor vehicle users not being diverted by the Central or State Governments to purposes other than roads. It is the realisation of the importance of roads and the beneficial results of road development that goaded many a Western country to allocate such funds solely to road development purposes. This proposition has been very forcibly endorsed by the Motor Vehicles Taxation Enquiry Committee, published recently.

"Hitavada", Nagpur

Feb. 22

* * *

Road Network.

It is evident that roads are the sine qua non of any plan which aims at the economic development of the country. This was realised as far back as 1943 when the very ambitious Nagpur Plan was drawn up by the Chief Engineers of the Provinces and States who met in Conference at Nagpur. The plan, as far as it applies to post-partition India, hopes to raise the

present road mileage from 240,000 to 311,00 miles of National and State Highways, major and minor District roads and village roads. Although the plan was estimated to cost Rs 375 crores, the figure according to present price levels has been almost doubled. The first five-year plan commenced in April 1947 and we have it on the authority of Mr Dalal that of the estimated cost of Rs 150 crores only Rs 30 crores had been spent up to the end of March 1950. From the snail's pace at which the Nagpur Plan is being implemented it is becoming clear that neither the Central nor the State Governments have their heart in it. We have mentioned this deplorably slow rate of progress to show that the annual sessions of the Indian Roads Congress will serve no purpose unless some attempt is made to goad Government to complete the Nagpur Plan. It is perfectly useless to record in voluminous reports suggestions about a scientific system of taxation

of motor vehicles or methods of securing reciprocity in taxation between various taxing authorities. **What must be kept in mind is the fact that the Revenue from motor transport is in the vicinity of Rs 35 crores. This is a large sum and must be devoted more or less entirely for road purposes. We agree with Mr Mukerjee when he says that no real progress in road development will be possible so long as road finances are not separated from General Revenue. We would also press for the establishment of a Central Road Board which will be entrusted with the revenue derived from motor transport to complete, first and foremost, the Nagpur Plan which has been put into cold storage at a time when roads should receive the very highest priority among our nation-building activities. If the Roads Congress can achieve this much it will have more than justified its existence.**

HUMANITY

*Miss Buss & Miss Beale,
Cupid's darts do not feel,
Miss Beale and Miss Buss
They are not in the least like us*

[Said of the Principal and Vice Principal of a girls College]

*First come I: My name is Jowett,
There is no knowledge but I know it.
I am master of this College
What I don't know, isn't knowledge.*

[Said of the Principal of a boys College]

THE FIFTEENTH SESSION

AT the invitation of the West Bengal Government the Fifteenth Annual Session of the Indian Roads Congress was held at Calcutta from the 17th to the 23rd of February 1951. Two hundred and eleven delegates from all over India attended the Session. In addition to the delegates, many local engineers and engineering students attended the deliberations of the Congress by special invitation.

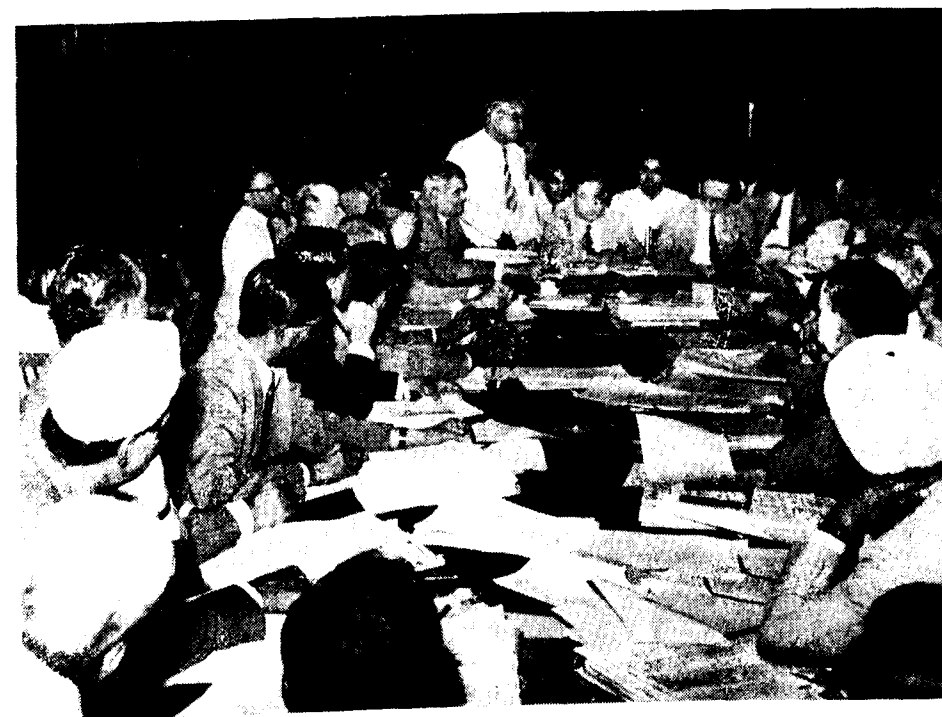
The inaugural ceremony was held in the serene atmosphere of the St. Xavier's College Hall. The outgoing president Shri A. C. Mukerjee delivered the presidential address. The Session was inaugurated by the Hon'ble Dr. B. C. Roy, Chief Minister of West Bengal. Messages of goodwill were received from the Hon'ble Shri K. Santhanam, Sir Kenneth Mitchell, the founder of the Congress, and others.

At the inaugural meeting the "Indian Roads Congress," "Prize Essay Medal" was awarded for "Papers of more than average merit" to Shri A. Nageswara Ayyar and Shri K. G. Bhate.

Papers Meeting.

With the exception of the inaugural ceremony all other meetings were held in the premises of the Institution of Engineers, (India)

Eight Papers covering a wide range of subjects such as the design of bullock-cart wheels, standards for "sight-distances", organization of bridging activities and construction of bridges, planning surveys, tarcrete with brick metal, etc. were discussed. The discussions will appear in detail in the next issue of the Journal of the Congress.



*[By Courtesy: M/S. Dunlop Rubber Co. (India) Ltd., Calcutta,
Chief Engineer's Meeting a feature of I. R. C. Sessions,*

The outgoing and the new Councils met on the 17th and 21st February 51 respectively to dispose of the ordinary business of the Congress.

The various Committees and Sub-Committees of the Congress also met during the Session. Amongst other things they discussed Specification for the permissible stresses on various kinds of masonry used on bridge works; procedure regarding testing of bridge structures; type designs for milestones; standards for vertical curves; classification of Indian soils; construction of soil stabilized roads in sandy stretches with locally available materials; and a programme of further research on bullock-cart wheels. Some of the other subjects dealt with related to the difficul-

ties encountered by road transport in India, ways to encourage the manufacture of certain types of road machinery in India; and the creation of state pools for road making machinery.

Inspection Tours

The last two days of the Session were devoted to inspection tours. On the 22nd the delegates were conducted round some places of engineering interest within the city. The Alipur Test Track where comparative tests on highway specifications are being carried out was one of the places visited. Next day the delegates visited a reinforced concrete overbridge under construction across a busy railway yard at Belgachia, and tarcrete work with



[By Courtesy: M/S. Dunlop Rubber Co. (India) Ltd., Calcutta.
Bridges Committee at Work.

ick metal in progress, a subject which caused much interest when a Paper on was discussed during the Paper meetings. Other items inspected on that day included a upto-date work-shop of the State Transport, the Bengal Chemical Factory at Minihati, and the Gaighata Bridge, a cantilever bridge of solid R. C. Slabs having a central opening of 90 feet.

Exhibition

This year the technical exhibition was a much larger and more elaborate scale than in previous sessions and great credit due to the organisers for the fine job of work they did. Details of the exhibition are given in another part of this issue.

The members of the Congress were pleased to see that the exhibition attracted

so much interest from the public in general and that schools and educational institutions in particular took full advantage of the display of road plans, techniques, and machinery and the hundred and one interesting exhibits to give their students an indication of what road construction and maintenance means-and incidentally of the value of roads in the economy of the country.

Entertainments

There is no dearth of places of entertainment in Calcutta but the Indian Roads Congress did its own part to keep the delegates busy in the evenings with technical films, classical Indian dances, a magic show and so on. We are sure no delegate had a dull moment during the Session.



[By Courtesy: M/S. Dunlop Rubber Co. (India) Ltd., Calcutta.
The Hon'ble Shri Bhupati Majumdar, Minister in Charge of Irrigation and Water Works, West Bengal was "At Home" to the Delegates.

**PRESIDENTIAL ADDRESS
TO THE
FIFTEENTH SESSION
OF THE
INDIAN ROADS CONGRESS**

By

SHRI A. C. MUKERJEE

HON'BLE SIR, LADIES, AND GENTLEMEN,

I feel greatly honoured at having been given the privilege of welcoming you, Sir, on behalf of the Indian Roads Congress to our Fifteenth Session which is being held in this, the premier city of our country and which you have so kindly consented to inaugurate in spite of the heavy pressure there must always be on your time. The Congress is very grateful to you and appreciates your keen interest in its activities and in the development and improvement of transport-communications generally.

Our grateful thanks are also due to the Government of West Bengal for inviting us to hold our Session in this great city and for affording us all necessary facilities. This is not the first time that we have been privileged to hold a Session in Calcutta. We remember with pleasure our Fifth Session held in 1939 in the hall of the Institution of Engineers (India), which they so kindly lent to us then, as now, for our meetings. We look forward to the discussions that will take place here during the next week and to the interesting and instructive programme of visits that has been arranged for us by the Road Engineers of this State.

Since we met last at Bombay an unkind fate has deprived the country of the help, guidance, and services of one of the greatest sons of the land who was a great leader and fighter and also a "great builder, unifier, and consolidator of New India"—Sardar Vallabhbhai Patel—who joined the immortals on the 15th of December last, in full ripeness of age but, unfortunately for



SHRI A. C. MUKHERJEE

us, at a time when a man of his calibre, experience, and sterling qualities was sorely needed by the country to complete the work that he had undertaken in the consolidation of our Independence. Let us pay our respectful homage to him and keep before us the ideal of selfless service which was his ideal and which must be the motto of every engineer.

I shall now read with your permission, Sir, a message from the Hon'ble the Minister of State for Transport to the Indian Roads Congress.

PRESENT SITUATION

We are passing through a very critical period in world history and also a very difficult period in our own history. The country is faced with a multitude of problems of exceptional gravity and complexity and its future depends in a large measure upon their correct appreciation and proper solution. It is not a period when we can afford to make mistakes and proceed in a complacent, happy-go-lucky fashion, without very sharply defined objectives or a clear cut policy embodying a fully well thought out plan and decided ways and means of implementing the plan. We cannot afford to bear any losses brought about by a lack of foresight or major flaws in planning, calculations, or co-ordination.

The country is at present in the severe grip of financial depression and it has become all the more essential that the choice of the objectives on which our financial resources are to be expended, should be as correct as it is possible to make that choice. In the co-operative effort to stabilise the economy of the country by increasing production so that we can attain self-sufficiency in many important directions, all with the object of developing our resources and improving the standard of living of the common man, the Engineer has an important place to fill. The Engineer is a fighter against difficulties and his training and outlook enable him to face these squarely, study them clearly, plan to attack them properly, and then go at them for all that he is worth with the firm will to overcome them and achieve success.

When called upon to do so, the Engineer must be ready to assist in framing the Master Plan of the Nation and to carry out to the best of his ability that part of the plan entrusted to him for execution. The Engineer must give the highest value of the money that he spends. It is for this Congress to deliberate and plan how these objects can be best achieved as far as the problems of road construction and maintenance are concerned and to advise the Government and the people accordingly. This body has a very grave responsibility resting on its shoulders.

THE INDIAN ROADS CONGRESS

Sir, my predecessors in office have described in fair detail, in their presidential addresses, what this Congress stands for and what it has so far achieved. On this occasion I shall merely confine myself to mentioning that the Indian Roads Congress has among its members almost all the road engineers of the country, whether in Government service or outside.

Our Congress has by its efforts to promote and encourage the science and practice of road building and maintenance; by the opportunities it affords its members for pooling their collective experience and ideas on all matters concerning highway engineering problems, including those of research, organization, and administration; by giving expression to its professional opinion on such problems; by the service it has been rendering through its sub-committees of experts in preparing specifications and codes of practice for the use of road engineers; and, finally, by its care in disseminating up-to-date knowledge through its journals and its information and library service; by these and many other means, our Congress has been trying to be of as much utility as possible to road engineers and to the country.

Starting in 1934, it has held fourteen Sessions in different parts of the country at which about 150 Papers on many and varied matters connected with highway engineering have been read and discussed. Its various sub-committees and experts have tackled a number of important road problems and have given definite opinions and advice on their mastery. The Congress has also held some very interesting and instructive exhibitions at its annual Sessions.

The Indian Roads Congress can reasonably claim to represent the considered views of experienced highway engineers of the country and it can therefore be taken to be in a position to offer honest and straight-forward advice, based on the

best available talent and experience, to the Government and to the country in all matters pertaining to road communications. It is matter of gratification to us to know that the advice and recommendations of this body have in the past been given due consideration by the Government and that action has been taken on a very large number of its recommendations.

NEED FOR PUBLICITY

It is a constant source of surprise to many of us that, although all over the world it has been accepted as self-evident that the first step in almost all forms of development and advancement is the building and proper upkeep of roads, in our own country the importance of roads is not yet fully realized so that they are given relatively low priority in the development programme of the country. If we want to grow more food, we must provide roads to get that food to the market; if we want to spread education or culture, we must provide means of access to the villages so that education and culture may be made readily available, if we want to improve public health, if we want to develop industries, if we want good administration throughout the country, we must build roads and keep them in proper order so that these objects may be attained.

Is it because of a deficiency in road engineers, shared by other engineers, that they do not come out of their shells and devote themselves to the very necessary task of explaining their plans and ideas to the public? Is this why there is generally such lack of appreciation of the fundamental need for roads in nation-building? I believe that no important scheme, however inherently good, can really succeed unless it has full public support. At our annual sessions, we have tried to impress on the Government and the public the importance of ROADS in the economy of the country, but we can all take our share personally in discussing road problems with our friends and with all those we come into contact with. I shall return to this subject again shortly.

ROADS ESSENTIAL IN ALL PLANNING

A Great deal of planning has been done in different directions and further planning is in progress. No doubt a vast amount of thought has been expended by the framers of these plans with a view to produce something that would meet the needs of the situation in the best possible manner. But can the engineer view with equanimity a state of affairs where, as has so often happened before our eyes in the recent past, plans have been put into execution with a sudden spurt on an unprecedentedly ambitious scale, in spite of the fact that the bases of the plans were contrary to accepted principles of sound policy? These spurts have too often been followed, owing to a lack of funds, by an abrupt contraction of activities before the projects were completed.

What would we advise as road engineers? We would probably say that priority should be given first to revenue producing schemes or schemes that would increase the general wealth of the country. Having worked out the rough costs of these schemes, we would add a percentage of services, such as roads, houses, education, and public health. No scheme would be complete unless the cost of these services were included in the total cost. Roads would be given first priority in any project, for without roads, the cost of other construction or activities would be needlessly enhanced.

We would also compare the costs of our schemes by adding to the capital expenditure the capitalized value of future maintenance. Thus, there may be two schemes involving a capital expenditure of Rs 5 lakhs and Rs 20 lakhs respectively, but the maintenance of the former might be Rs 4 lakhs a year and the latter Rs 1 lakh a year. The true relative costs of the schemes would be as 138 is to 53 and not as 5 is to 20.

A very good illustration is afforded by the unfortunate food shortage in the country. It is correct that all schemes, which are designed to make up the shortage of

food, must have priority, but it will not do to lose sight of the fact that besides its cheap production food must be transported and distributed cheaply, so that it may be available for sale at economic rates. It is only then that a plan for producing more food can be of help in improving the lot of the common man. Culturable but uncultivated lands can function in the "GROW MORE FOOD CAMPAIGN" only when they are made accessible through easy communications and when it becomes commercially profitable for the peasant to cultivate them.

Similarly in all power schemes however cheaply the power may be produced and in whatever abundant quantities it may be made available, it can be utilised and can benefit the country only if there is scope for its utilization in industries. These industries can be set up and can flourish only if cheap communications and transport are available for bringing in the raw materials and for taking out the manufactured products to suitable markets.

Even the most essential services of providing education and medical aid to the common man suffer from a very heavy handicap if easy means of transport do not exist.

MAIN PROBLEMS

Gentlemen, I would now draw your attention to the principal problems of a general nature which, in my opinion, require to be tackled by us. I shall take a President's privilege of throwing out suggestions and it will be for this Congress to consider them and advise on an agreed policy to be followed by Highway Engineers in regard to these.

1. **Publicity.**—What steps should we recommend to the Highway Engineer for adoption to ensure education of public opinion and to arouse public interest to the need for and value of more and better roads?
2. **Planning.**—What advice should we tender to the Highway Engineer of every State of the Union regarding the planning with which he is concerned and what representation should we make to the Government of India regarding planning in general and highway plans in particular?
3. **Finance.**—What are the avenues that must be explored with a view to find ways and means for obtaining the necessary funds for implementing the plans for highway development?
4. **Research.**—What should be done to co-ordinate research activities of the different States to prevent unnecessary overlapping and to ensure quick progress?
5. **Specifications.**—Keeping in view the limitations imposed by finance on the implementation of an extensive programme of highway development, what should we recommend that would make it possible for every State to maintain as high a mileage as possible of serviceable roads in the present circumstances and what specifications should we lay down for adoption to ensure that our roads give the utmost value at every stage in the development of the ultimate highway programme?
6. **Organization.**—What do we consider to be reasonable staff requirements for different jobs in highway organizations and to what matters concerning staff and administration should we draw the attention of Government?

I am aware that it is not possible to have an agreed and universal solution of every problem since in most cases local factors and circumstances may call for considerable adjustments in our methods of handling particular issues. But by discussing general problems and by bringing valuable experience and knowledge to bear

upon a consideration of the diversities that exist, it should be possible to clear our ideas, determine a joint line of action, and present a united front backed by the weight of opinion of the best available highway engineering talent in the country. I am sure that any opinion given by this body after due study and thought will have everywhere the respect that it deserves. Our advice will also be of the utmost help to our members in the discharge of their individual functions as highway engineers.

PUBLICITY

The importance of publicity cannot be over-emphasised in our country where practically no effort has been made so far to arouse the interest of the public to the need and value of road development. I suggest that:—

- (i) The highway department of every State in our Union should have a Public Relations Officer. It will be the duty of that Officer to keep himself fully posted on all matters regarding personnel, budget allocations for road work, projects sanctioned, projects in hand, methods and media employed in carrying out the projects, objectives of the highway programme, programmes for improvements of roads, highway safety, costs of works and general progress in the highway programmes in the different districts and to supply to the public necessary information as and when required. This function could probably be performed at first by the Personal Assistant to the State Chief Engineer.
- (ii) **Special road-signs** should be erected to indicate works in hand. These have been found to be of great service in advising the travelling public on what was being done in the matter of road development and thus have been of help in spreading among the public information regarding road development.
- (iii) **Pilot schemes** should be carried out in every State. They are very useful in educating the public as to what should be done in the way of road building and improvements and what results could be obtained by effecting these improvements. These schemes give a visual demonstration which is more effective than any amount of talking or explaining.
- (iv) **Visual education** through models, photographs, cinema pictures of works, maps, and drawings is very useful and necessary.

PLANNING

The Nagpur plan, drawn up by the Chief Engineers of the different Provinces in 1943, placed before the public and the Government a plan for highway development indicating a target that must be attained in order that the country may have a reasonably developed highway system to meet its **minimum** transport needs for the development of its material resources and productive capacity. It lays down a realistic target which **can be attained within a reasonable time provided the over-riding necessity of roads is realised** and action taken to ensure that the achievement of road development and maintenance in a year does not fall below a prescribed minimum to be based on our capacity and which must not be less than 6 per cent of the total expenditure.

As a matter of fact this target will have to be passed and left a long way behind before the country can have a road system which can be said to cover in a reasonably full measure all its road transportation needs. But a period of about seven years has already passed since the plan was framed and we have achieved only a small fraction of what it envisaged. Obviously, therefore, there is at present no point in putting up a more ambitious plan before the country. All the energies and available resources must be directed to carry out the Nagpur plan to completion as early as possible.

But the Nagpur plan gives only an outline of what is to be done for the country in the way of highway development. In order to fill up the skeleton, it is necessary to work out in detail the plans for each State and this has been done in a great measure or is being done. For this it is essential to make full use of such guidance as may be available from the experience gained so far in the different States. One of my predecessors had stressed the necessity of what has been termed an economic survey for a proper planning of a road system.

Economic and Traffic Surveys.—I think that economic survey coupled with systematic traffic surveys, and origin and destination studies on existing roads, aided by a study of statistics showing traffic development and its trends on the old as well as the new roads, will be of the utmost help to the road engineer in designing a scientific plan for the development of the highways in an area so that they may function properly to meet the traffic needs of the area and help in its all-round development. We are discussing a Paper on this subject during the present Session and I hope out of this discussion some clear principles will emerge that will be of value to us all.

Traffic Flow.—It is very important for the highway engineer to be able to visualise how traffic would develop in the future on the routes that are taken in a highway plan. It is but natural that traffic must develop along routes which serve the largest percentage of the population of the area, give all weather service and are free from natural obstacles, viz., an unbridged river, difficult terrain, etc. It is also natural that roads which connect industrial centres to market places or to centres which serve as clearing houses to the produce of the area must have a relatively large traffic. Taking into account the natural resources of the locality and the facilities that exist in the production of certain commodities, it is possible to visualise the development of industries and to anticipate the markets that would be served and thence the channels of traffic. In planning a road system due consideration must be given to these channels of potential traffic.

Mixed Traffic.—In planning roads where much mixed traffic is expected to develop, the question of segregation of the slow traffic from the fast traffic has to be kept in view. This is necessary not only from the considerations of the efficiency of the highway and reduction of accidents, but it may give a road more economical to maintain. Trackways are useful for slow heavy traffic, while stabilised earth roads may do for light carts.

Existing Roads.—As regards planning improvements in an existing road system, I think that even though the call for new roads is very urgent with a view to meet the transport needs of the localities that are still deficient in this respect, it will not be advisable to abandon altogether a programme of improvements to the existing roads. In spite of the paucity of funds a certain percentage of the available finance must be devoted to the improvement of sections of high trafficked roads, where improvement makes maintenance more economical or where it reduces traffic hazards.

Records.—For drawing up a rational programme of improvements it is essential for the highway engineer to have a complete record of the existing roads giving all essential information about the road structure, levels, land widths, geometric standards, kind of terrain, soil, drainage, etc. This is fundamental record and all effort and expenditure required in compiling it are fully warranted by its utility.

Maintenance.—Side by side with the construction of new roads the State has also got to consider its capacity for the maintenance of its existing road system. The experience of other countries shows that a properly planned road system is bound to become self-supporting and it does not remain a burden on the general revenues. But the direct income from a highway system must depend upon the extent of transport that it serves. Consequently it is also essential that facilities must be planned for the development of the road transport system of the State along with the highway development.

As at present the largest amount of revenue from road transport is contributed by motor transport, this form of transport must be developed to the largest extent possible. If the motor vehicle receives encouragement, by the reduction to some extent of its crippling burden of taxation, and if through well directed research and effort, it is possible to produce economical fuel for the propulsion of motor vehicles and proper roads are made available, this form of transport is bound to make rapid progress as it has done in the western countries.

Priorities.—This Congress has to impress the Government with all the force that it can command that the development of highways is a national 'must'. Consequently the road programme **must** have a much higher priority than it has been given and, whenever there is financial stringency, it **must not** be the road programme that should be amongst the first to be axed.

FINANCE

In the addresses delivered at the Sessions of the Congress in the past, nearly all our Presidents have taken pains to indicate the sources from which it is possible to obtain the necessary finance for building and maintaining our roads. The most important thing to stress in this connection is that the annual revenue derived from taxing the motor vehicle user must not be diverted by the Central Government or the States to other than road purposes.

It is true that even in the U. S. A. at the outset the revenue from motor vehicles used to be included in the general revenues and was not applied wholly to expenditure on road works, but the importance of roads and the beneficial results of road development have convinced the western countries that the highway industry is one of the most important industries to be developed and that funds applied to its development lead directly and indirectly to a much greater general development of the country than funds devoted to nearly any other purpose.

Road Revenue.—There is, therefore, an increasing tendency in the advanced countries to apply the whole revenue derived from taxing the motor vehicle user to road purposes. It is surely not essential for our country to pass through all these painful stages through which other countries have passed in order to realise that here too the entire tax revenue obtained from motor vehicles must be applied to the road.

Taxation—I am glad to note that this proposition has been very forcibly endorsed by the Motor Vehicle Taxation Enquiry Committee whose report has recently been made public. But I consider the Committee has been weak in accepting that four per cent of the capital expended on roads should be regarded as a contribution to general revenues out of the road transport revenue. In the present stage of road development in our country I consider that Government should not require even this contribution to general revenues.

With the development of transport, the revenue derived from road users is bound to keep on increasing. This revenue is now and will remain for long sufficient to provide for the proper maintenance of our roads and even to provide for some development. It will also pay the interest charges on loans raised for development chargeable to "Capital."

Capital Development.—In this connection, I would observe that development postulates financing from capital. Our Planning Commission appears to have been afraid to accept this fact but they would be hard put to it if asked to quote a single example of development in the world that has not been financed from capital.

In spite of the present financial gloom, it is not unrealistic optimism to say that road upkeep and development will not only be improved and speeded up but the

improvement will quickly bring conviction to sceptic opinion if only the roads, like the railways, were permitted to finance themselves.

Road beneficiaries.—There is, however, no reason why the motor vehicle user should be the only person benefiting from roads that should be subjected to road taxes. The most destructive means of transport on roads, the bullock cart, should also contribute towards their maintenance and I feel we, as engineers, should support the recommendations made by the Motor Vehicle Taxation Enquiry Committee of 1950 in this matter. Inducement should be given also to the adoption of the rubber tyre by concession in taxation on rubber tyred carts.

Tolls provide a third means of revenue and, in my opinion, in the present state of development of road communications in our country, it is very desirable to consider the question of raising loans, funded on toll revenue, to finance the cost of constructing suitable major bridges, tunnels, and perhaps other large structures in our road development programme.

Toll-bridges, tunnels, and roads have been constructed in other countries and these became "free" roads when the toll realisations had liquidated the expenditure incurred on them. In India it is objected that the government have difficulty in raising loans. But experience has shown that Port Authorities, for example, have no such difficulties and it is possible that, in a few localities where conditions are favourable, local loans could be raised to finance road structures provided the public were satisfied that these loans could be repaid from the revenue collected from the users of the structures. I would urge that our government should not be afraid at least to attempt to do in this direction what governments in many advanced countries have already so successfully done. We are also discussing a Paper on this this Session.

Betterment.—As suggested in some previous Presidential addresses, it is possible to raise funds for road purposes by levying a betterment tax on roadside lands, a road cess, and other similar taxes. Too often we find at present that some rich speculator has bought up land in an area being developed by public effort and has later sold that land to the public at profit that might aggregate some thousands per cent on his investment. In the United Kingdom unearned increment on property is now a matter of the past: generally no undeveloped land has more than its 1939 value on the market and development is truly valued. We could do worse than adapt our policy to modern conceptions of equity.

Roads a Service.—Because of the inescapable necessity for roads inherent in every development project, it is only right that a part of the cost of every such project should be set aside for road purposes. This would mean a contribution to roads out of general revenues but such contributions are justified by the importance of roads in the general economy of the country.

Separation of Road Finances.—The main thing, however, is the separation of road finances from general revenues so as to ensure that the revenue from road transport is made available for road purposes both at the Centre and in the States. The distribution of the revenue from the Centre to the different States could be based on well tried principles similar to those adopted in more advanced countries.

Non-lapsing Grant.—Finally I would draw the attention of Government once again to the necessity of accepting the principle of non-lapsing grants for road purposes and of making a minimum provision, which may be fixed for a triannium, for road upkeep and development so that the road engineer may be able to plan his work properly and go about it with confidence.

All the measures I have enumerated have been adopted successfully in most of the advanced countries. It is surely time that the long exploded canons of orthodox finance still, however, respected in our country, were modified to accommodate practices that are progressive and not less sound on that account.

Before leaving this question of finance, may I suggest that during this session we make a special study of the very excellent report published recently by the Motor Vehicle Taxation Enquiry Committee. Much of what I have suggested has already been advised by the Committee. Perhaps if we see our way to endorse some of the Committee's recommendations, they will be given added weight.

RESEARCH

Man has throughout the ages devoted himself to the search for truth as well as to an effort to enlarge the "boundaries of his mastery over his environment". Abstract reasoning and the urge to give practical effect to this reasoning have been said to be the "two principal activities of man, viz, thought and action". Science, as we understand it, embodies both these aspects of man's endeavour: these aspects are interdependent and inseparable in science and in scientific research.

India has made in past ages immense contributions to the world's store of knowledge, to mathematics and to philosophy, but as far as highway engineering is concerned, our contribution to the widening of the bounds of knowledge has so far been negligible—not because of any dearth of talent but because of a want of impetus and suitable opportunities.

It is therefore very gratifying to find that road research laboratories have been or are being set up in the States and at the Centre, to carry out the vast volume of research work that must be done not only for engineering efficiency by tests and quality controls, but also to provide the basic knowledge on which our future research work must be built for the solution of design and construction problems that exist and will keep cropping up.

With the growth of laboratories and the facilities afforded by them and the training that our engineers have had and are having in research methods, it is reasonable to hope that we shall make and keep on making progress in research, but in order to utilize all the laboratories to the best advantage and enable quick progress to be made it is essential that their work proceed unhampered. For this there must be an assurance of funds. One method would be to add 1½ per cent on the cost of every road project of a State or within the orbit of a research centre, and credit it to a research account, where it should be non-lapsable and be available for research work.

Again the work of all such laboratories should be properly co-ordinated.

All laboratories must publish the work done by them during the year.

Where necessary, all road research laboratories ought to be able to receive guidance in their problems from the Central Road Research Laboratory.

SPECIFICATIONS

It is of the utmost importance to devise designs and specifications for roads that can be constructed cheaply in such a manner that they are able to stand up to light traffic of say less than 500 tons in all weathers and serve as the substructure when later on, the roads are improved. Stabilized earth roads containing coarse material in the top course and sprayed with tar or bitumen may provide a solution, while stabilized soil roads with maintenance through mechanised units may probably be a suitable solution for fair weather earth roads. With the labour conditions as they are or are tending to be today, it will be necessary to utilize machinery to an increasing extent in road work including road maintenance.

In certain situations improvement of drainage of the road-bed through suitable drains, raising roads to a suitable level, and stabilising the top layer may result in cheap construction, while in other cases, lowering of the road bed so that the moisture content

of the top layer of soil may not fall quickly through the failure of capillary supplies, may be found to be useful. The correct fixation of the road level is important from these considerations, apart from those of traffic safety, flood level of the area, etc. Co-ordinated research will help solve such problems.

Development of rural communications is a crying necessity which must be met and so research in cheap road construction and maintenance methods must be given high priority.

ORGANIZATION

Highway engineers charged with the responsibility of the construction and maintenance of roads often have difficulty in persuading government of the need for adequate staff for carrying out the jobs entrusted to them. It is not unusual to find the staff requirements cut down arbitrarily and the arguments of the engineer based on his experience and on practice elsewhere ignored. It is therefore essential for us to lay down rough guides on the performance expected of different staff so that the demands of the engineer may find support from the authoritative opinion of this body. It is of course not possible to lay down any absolute yardsticks as the nature of the work and local circumstances may cause major variations, but it is possible to indicate average measures of performance.

Specialists.—With regard to the question of specialization, it is a very difficult matter to decide to what extent this should be encouraged. Undoubtedly, when an engineer shows aptitude for some specialized activity, it would be in the public interest to give him an opportunity to acquire greater knowledge and skill in his subject.

Chief Engineers.—I cannot turn away from the question of P. W. D. organisation without touching on the position of the Chief Engineer of a State as adviser to his government. For quite half a century, the Chief Engineer was also Secretary to his government but now, in many States, the Chief Engineers's advice is communicated to his Ministers second hand, often through a very junior and inexperienced Secretary. Only those Chief Engineers who have suffered in this matter know how much of their time is wasted in ensuring that his Minister is not wrongly advised. In general administration also the Chief Engineer, who has to work through a Secretary having powers to over-rule him, has often to waste a great deal of his time explaining why an order should be passed instead of simply passing the order properly himself. The whole question is being studied by Sister Associations and we should do our part in helping to arrive at a solution.

All Engineers.—Before I close I must say a few words on putting our own house in order. I have been perhaps a little free with my advice to others but we also not require advice? Are we all working wholeheartedly or with the zeal of a man intent on getting our country to take its proper place among the nations of the world? How many of us spend our time in offices "spoiling paper" instead of supervising and even taking part in actual construction work?

FIRST DESERVE, THEN DESIRE

I think of the advice given us by the world-famous engineer-experts who visited our country in 1946. These gentlemen controlled between them (need I say without the intermediary of a non-technical Secretary) practically the whole of the Roads and Buildings work of the Federal Government of the United States of America. Their advice was that no one could be an engineer until he had had "all his finger nails broken." They put it this way to impress on us that we must be prepared to do things rather than write about what should be done. How many of us have feelings of false prestige about living on the job instead of in an office? A good civil engineer is automatically a good administrator because civil engineering is administration and, when the time comes, he will be fit to take over administration with the best. But how many

of us are fitting ourselves by real hard practical work for the positions to which we aspire? Let our motto be "First Deserve, then Desire."

Gentlemen, I have drawn your attention to many problems that are facing us. I have also indicated to some extent what should be done. It is not possible in an address of this kind to go into details; these must be examined by us at our meetings with a view to arrive at clear and agreed solutions. I have no doubt that our united voice will not be ignored and that what we say will be of decided help to the Government in determining their policy regarding road work in our country.

In my address I have laid special emphasis on road finance because without money we can do nothing. It is our duty to spend the money we get to the best advantage of our country, and I have stressed that we must strain every nerve to perform that duty. But we must also tell the Government and the people that we, with the exceptions of the States of Madras and West Bengal, are spending less of our resources on roads, **much less**, than any of the advanced countries in the world. We are spending less because our Governments, with the two notable exceptions I have named, and the people are not educated in this matter. We must try to educate them.

I do not want to tax your patience any longer. The present condition of our country requires of us a grim determination to put forth our utmost and to do whatever is required of us to advance India on the road of economic independence and to effect all-round improvement in the lot of the common man, and I have no doubt that our efforts will succeed.

I thank all who have graced this occasion with their presence and have favoured me with a hearing.

Sir, I request you now kindly to inaugurate this Session.

THE GOLDEN RULE

Mr. Knapp Fisher of the Commission has stated that the golden rule for the design of lighting columns (and of most engineering works...Ed.) is that they should pass unnoticed. M. Gaymond, president of the French Association of Lighting Engineers at the last annual conference of our own Association of Public Lighting Engineers, laid down that complicated shapes and eye-catching colours should be avoided and that there should be perfect balance between the lantern and the column.

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(Extracted from 'Roads and Road Construction' - March '40)

MESSAGES

THE HON'BLE SHRI K. SANTHANAM

Minister of State for Transport and Railways, Government of India.

I AM glad to note that the Indian Roads Congress is setting up a high tradition of co-operation and co-ordination among the Road Engineers of India. The spirit of solidarity is particularly needed in these days when, for reasons of national economy, the expenditure on roads is sought to be reduced to less than the minimum needed for the maintenance of existing roads and the construction of the most indispensable ones. I would suggest to the Road Engineers of India that instead of lamenting over this unfortunate state of affairs, they should convert this period of adversity into one of lasting national advantage through concentrated research on the economies of road building and maintenance. If only we can find a way to tap the inexhaustible resources of manpower which is in all our villages for the construction of roads during the period of seasonal unemployment, great progress can be achieved.

I have great pleasure in sending my good wishes for the success of the 15th Session of the Indian Roads Congress.

SIR KENNETH MITCHELL

(Founder of the Indian Roads Congress)

In sending his "best wishes for a very successful fifteenth Congress" Sir Kenneth adds:

"The Commonwealth group plans for development in South East Asia are a bold conception, to the execution of which India will, I am sure, bring much experience and wisdom. Industrial development without rural uplift and betterment must necessarily be unbalanced; and all rural betterment will be dependent on the provision of good roads at a cost which can be afforded. I do sincerely hope that this basic fact will be realised and, moreover, that the Indian Roads Congress will be afforded and will embrace the opportunity to help with advice.

Conventional high-class roads and motor transport have become together very expensive for areas at present poor and backward and some original thinking will be necessary. For instance taking cost of road and transport together is it not possible that one stage in stage development should be much lower speeds for Motor transport?

Whatever the answer may be, I am sure that much thought will have to be given to it and that the Indian Roads Congress can and should help.

One way might be for the Indian Roads Congress to take the initiative in promoting a regional International Roads Congress for South East Asia. I believe that the time is ripe for this.

INAUGURAL ADDRESS

By

Hon'ble Dr. B. C. Roy, Chief Minister of West Bengal

MR. PRESIDENT, LADIES AND GENTLEMEN,

YOUR President began his speech by welcoming me to this gathering but it is I who should welcome you on behalf of the Government of West Bengal to this City and State where you are to hold the Fifteenth Session of the Indian Roads Congress and it is with great pleasure that I welcome you. I am glad to see here so many engineers from all over the country who are interested in the construction and maintenance of roads.

Your President has stated two facts, which are evident to everyone, namely, that roads today do not have high priority in the nation building schemes of the Centre and of most States, and secondly, that no development is possible in India, such as we desire, unless we obtain the valuable help that the construction and maintenance of good roads can give.

Before Bengal was divided, there was no proper planning so far as roads were concerned. By that I mean the objective and purpose for which roads were required in particular areas was not carefully studied in the past. It is true that this State presents difficulties that hamper road construction. Its terrain is such that roads cannot be effectively built without the construction of many large bridges. The Governments of the past were more busy in collecting raw materials from different parts of the Province for trade purposes, and, therefore, they perhaps were more anxious to lay down communications through railways rather than through ordinary roads for road transport. In many places also, transport communications were planned so cursorily that interference with natural drainage resulted in deterioration of health in many areas. In this connection I would refer you to the well-known report submitted by Sir William Wilcocks when he came here in the year 1926-27.

You all remember what happened during last year's storm in the Darjeeling Area. The roads and the railway system simply tumbled down the hill sides. It was obvious that even in making roads connecting the plains up to the hill tops there was no plan behind it; they just had roads constructed on the edges of the hills for the purpose of carrying the railways as well as road traffic without, to my mind, taking much care to see whether such roads would be able to stand the strain of flood conditions such as occurred last year.

ROAD CONDITIONS IN WEST BENGAL

When this State was partitioned, condition of the West Bengal became very peculiar. Probably most of you have seen (and if you have not seen, I would request every one of you to see as quickly as possible) the map of West Bengal. On seeing this map you will realise that the West Bengal State was cut by partition into three separate parts. There is now practically no direct communication in the State between the top areas of Cooch-Bihar, Darjeeling and Jalpaiguri and the middle portion consisting of Malda and Dinajpur. Those portions again have practically no connection with the rest of West Bengal.

I can assure you, it took me at least eighteen months to convince the Transport Ministry of the Government of India that it was essential for the development of the State, for the safety of the State, and for maintaining services and supplies in this State,

that there should be a connecting road between Calcutta and Darjeeling through the non-Pakistan areas. I am only giving this to you as an example to show that nobody realised even before partition the value of roads and their connection with social services.

THE HEALTH, FOOD, AND DEFENCE ASPECTS OF ROADS

I recall that in 1943-44 the Government of India appointed a Committee to make a survey of requirements for medical relief and to ensure the provision of health measures in different parts of India. One of the main propositions which this Committee laid down, and the proposition was accepted by the Government of India, was that there should be a means of communication between the centre of a State and main towns of each district. There should again be connecting links between the district centres and the sub-divisional centres. And for health purposes, particularly for ensuring health measures amongst the villagers all over the Indian States, it was essential that centres of the sub-divisional areas should be connected with all the primary centres of the villages. I ask you how is it possible to provide these connecting links, unless a complete change comes over the people of this country, and the Government and the people all realise that, even for the purpose of health measures and medical relief, it is essential that there should be such communications, supervision and inspection of rural areas will be impossible.

There is another aspect of the problem which must be considered. Supposing I want to bring relief to a population of 50,000 people distributed over a wide area. If there are good roads, one centre with suitable personnel would be able to control and supervise and take appropriate measures for covering the whole of the area. But as it is today, I have to put a controlling centre in each Union Board area, and, if you sit down to calculate the capital and recurring cost of the present systems you will find that this costs us ten times more than what we would have to spend if we had good roads and one established health centre in each district instead of controlling from five or more sub-centres. The efficiency of service would also be better.

Ladies and Gentlemen, we experienced the difficulty in an acute form last year and the year before because of our not having roads to help us in distributing food. Bengal has, as you all know, always been a deficit State so far as food production is concerned. It produces practically no wheat, and yet nearly one-fourth of its population eat wheat. We must import wheat from outside. But even the food we produce is difficult to distribute to areas which are really deficit. Last year, and in 1949, there was a large surplus of rice and paddy in part of the district of Dinajpur but there was no communication between that part of Dinajpur and the railhead. The result was that for many months we could not reach that area except through Pakistan and Pakistan refused to allow transport of food through their territory to Calcutta or any part of West Bengal.

I feel I have said enough to show that there is an essential relationship between the development of a State and the progress, development, and maintenance of good roads. It is for this reason that we, at least in this State of West Bengal, have not only created a separate department called the "Roads Department" with a separate Chief Engineer, but also we have set apart as much as we can of our resources for the development of roads.

It is not merely the questions of food or medical relief that I am worried about. We have a border of 650 miles with Pakistan and, as you must have read in papers, in many of the areas along this border there are continuous skirmishes going on. People from both sides raid across the border very frequently at one point or another. We have therefore got to put in police on duty to protect our border. Yet we cannot connect one picket with another because of the lack of roads. We cannot even rush in relief when there is any serious trouble.

To give an instance, the head quarters of one district is 40 miles from a border area where incidents took place some time ago. You will be surprised to know it took us 14 hours to cover this distance of 40 miles. We have even had to provide air strips in one or two places to give quick access to danger points.

To get over our general deficiency in road communications I feel that every State should create a department that will be concerned mainly with the construction and maintenance of roads. This department will study methods of constructing cheap roads and will seek to associate villagers and local people with enlarging the road system of every district. The department will also devise ways and means to make people understand the value of good roads.

Most of these points have been referred to in the speech of your President and I can only suggest that your Congress should keep in close touch with the road departments of the States at every stage, giving them advice and guidance and helping the State Governments to continue road construction as far as their means will permit.

ROADS ARE PRODUCTIVE UNDERTAKINGS

There is a misconception that road construction is not a productive proposition. I can think of few State undertakings that will be more productive in the long run. But your President has suggested (and I entirely endorse his suggestion) that as things are today, most of the States are not able to pay from their revenue resources for the construction of roads. In the State of West Bengal the total estimate for the roads we require immediately is about 37 crores. Our State came into being on the 15th of August 1947 with a MINUS reserve of 2.5 crores. Therefore it is not possible for us to draw upon this deficit reserve for the purposes of financing the construction of roads.

The only alternative for a State like West Bengal in such circumstances is to construct roads out of loans. The difficulty is that there are many people in the Government and outside who do not believe roads are a paying proposition. As I have said, I do not agree with them.

I am glad that the Motor Vehicles Taxation Enquiry Committee has suggested an increase in the taxes on motor vehicles, particularly those which are used for trade. I can assure you that we have accepted the report and intend to take advantage of it. We have already put a bill before our Legislature to enable us to increase this source of revenue. The proceeds of the new taxes will be used solely for the purpose of road construction and maintenance. That is absolutely necessary.

I have also approached the Central Government with a proposal for a loan and to set apart a portion of our total income from vehicle taxation and petrol taxation for the purpose of meeting the charges of loans taken for road and bridge construction. Nobody should say that it is not just to impose upon future generations the duty of paying for the roads we are constructing today. I am positive that future generations will realise the advantage of good roads in a difficult State like West Bengal and willingly pay the loan charges out of taxes. In doing so they will bless us for having provided good roads for them and bless the Indian Roads Congress for the lead given in the cause of road building.

I hope your Congress will help us in organising our road departments and furthering our road plans. You will also help us by pressing on with the research work you have in hand.

With these remarks, Mr. President, Ladies, and Gentlemen, I declare this 15th Session of the Roads Congress open. I wish you all success.

EXHIBITION

THANKS to the enthusiasm of the Local Organizing Secretary (Shri S.K. Ghosh) and the encouragement given by his Chief Engineer, the Indian Road Congress Exhibition this year was on a much bigger scale than in the past. The venue of the Session—CALCUTTA—was perhaps a big factor in making the Exhibition an unprecedented success, and in a smaller place it might not have been easy to assemble so much plant and machinery which was on view at Calcutta.

The Exhibition aroused great popular interest and many schools brought their students to see the machines, the scale models of bridges, drawings and drawing instruments, safety first stalls, and so on. The Exhibition was both instructive and interesting for the engineer and laymen alike. Every stall had an individuality and there was sustained interest throughout for the spectator.

The Exhibition was declared open by the Hon'ble Shri Bimal Chandra Sinha, Minister for Works & Buildings on the 18th February 1961 at 5-30 p.m. The Minister then went round every stall.



[By Courtesy: M/S. Dunlop Rubber Co. (India) Ltd., Calcutta.
The Exhibition was opened by the Hon'ble Shri B. C. Sinha.

The following organizations took part in the Exhibition. Brief particulars of the exhibits are recorded below.

1. Government of India :

Roads Organization :

- (a) **Statistical.**—Statistical charts and Graphical presentation of data of road accidents, etc. “Basic Road Statistics”.
- (b) **Standards.**—Nomograms : Pocket Discs of Curve Standards : Standards on Land widths, etc., and type plans of improvements to road junctions.
- (c) **General.**—Charts entitled “Roads for Tomorrow” as programmed in the Nagpur Plan

2. West Bengal: Scale models of three bridges and of the Gandhi Ghat.

Map of West Bengal showing road development plan ; map showing sources of road construction materials : samples of materials.

Architectural plans of projected buildings : Models of Improvement schemes by the Calcutta Improvement Trust.

3. Bombay: Forty-nine photographs of various bridge work in progress together with their details.

4. Orissa: Road plan of Orissa : photographs of bridges and roads.

5. Punjab (I): Exhibits from Soil Research Laboratory, Karnal.

Charts of mechanical analysis, optimum moisture, shrinkage, moisture-density-relationship, etc.

Charts describing stages of construction of stabilised soil road and costs of different types of roads, etc.

Samples of different types of Indian soils.

Models of stabilised soil road unsurfaced, surfaced, base course : Crust samples from roads subjected to traffic for five years.

6. Madras: Soil-cement charts and test blocks.

Models of stabilized soil roads, painted and unpainted.

Soil testing apparatus : photographs : charts, etc.

A booklet giving details of experiments carried out in Madras, the specifications adopted, the apparatus used, and the cost of the experiments was distributed.

7. Madhya Bharat: Road Map.

8. Bihar: Model of Ganga Bridge at Patna : Photos of Roads and Bridges in Bihar.

Others :

- (i) Eighth Bengal Engineering Platoon of the National Cadet Corps provided by the College of Engineering, Jadavpur.
- (ii) Bengal Engineering College, Sibpore.
- (iii) The River Research Institute of West Bengal.
- (iv) U. P. Commercial Corporation, Calcutta.
- (v) Mathematical Instruments Office, Government of India, Calcutta.

- (vi) The Safety First Association of India, Calcutta.
- (vii) Corporation of Calcutta.
- (viii) Calcutta Improvement Trust.
- (ix) M/s. Automobile Association of Bengal, Calcutta.

Firms :

M/s. A. A. B., Calcutta.
M/s. Alsales Ltd., Calcutta.
M/s. Arco Pump Corporation, Calcutta.
M/s. Armco (India) Ltd., Calcutta.
M/s. Associated Instrument Manufacturers (I) Ltd., Calcutta.
M/s. Associated Exports Imports Corporation, Calcutta.
M/s. Bengal Miscellany Ltd., Calcutta.
M/s. Bitumen Emulsions (I), Calcutta.
M/s. Blackstone Products Ltd., Calcutta.
M/s. B. N. Chatterjee & Sons, Calcutta.
M/s. Caltex (India) Ltd., Calcutta.
M/s. Concrete Association of India Ltd., Calcutta.
M/s. Concrete Construction Co., Calcutta.
M/s. Construction Equipment Co., Ltd., Calcutta.
M/s. Dunlop Rubber Co., Calcutta.
M/s. East End (India) Ltd., Calcutta.
M/s. General Electric Co., (India), Ltd., Calcutta.
M/s. Geo Millar & Co., Calcutta.
M/s. Good Year Tyre & Rubber Co., of India, Calcutta.
M/s. Govind Sheet Metal Works & Foundry, Calcutta.
M/s. Heatly & Gresham Ltd., Calcutta.
M/s. Jessop & Co., Ltd., Calcutta.
M/s. Macadam (I) Ltd., Calcutta.
M/s. Marshall Sons, Ltd., Calcutta.
M/s. Mousell and Co., Ltd., Calcutta.
M/s. Phillips Electrical Co., (I) Ltd., Calcutta.
M/s. Phillips & Roy, Calcutta.
M/s. Shalimar Tar Products, Calcutta.
M/s. Tractors (I) Ltd., Calcutta.
M/s. Unit Construction Co., Calcutta.
M/s. Western Manufacturing Co., Bombay.
M/s. Williams Jacks & Co., Calcutta.

Displayed Catalogues, Charts, Photos, Models and in most cases actual machinery for the construction of drainage, latest surveying and mathematical instruments, testing machines, etc.

LECTURES AND TECHNICAL FILMS

Lectures :

An illuminating talk on the Report of the Motor Vehicle Taxation Committee was given by Mr. G. M. McKelvie, Road Development Adviser and Joint Secretary to the Government of India, Ministry of Transport, New Delhi, on the 21st February 1951 in the course of the General Meeting of the Congress.

Geophysical Demonstration :

A demonstration of the "Electrical Resistivity method of Geophysical Sub-surface Exploration" was given by the Geological Survey of India at the Indian Roads Congress Exhibition grounds on the 21st February, 1951.

Technical Films :

The following technical films on highway engineering subjects were shown :—

(1) Government of India, Roads Organization :

- (i) Stabilised Soil for Road Making in India.

(This film has been produced recently in India and illustrates the construction of a stabilized soil road in Madras.)

- (ii) Concrete Road Making.
- (iii) Tar Macadam.
- (iv) Road Stone Testing.
- (v) Arteries of the City.
- (vi) Wet Aggregates.
- (vii) Horizons Unlimited.
- (viii) Road for San Pablo.

(2) West Bengal :

- (ix) Construction of the Mayurakshi Barrage in West Bengal.
- (x) Construction of Coronation Bridge across the Teesta River in West Bengal.

(3) Others.

- (xi) Armco Structures used in Assam Rail Link Project.
- (xii) Boss of Bull Dozers.
- (xiii) "C" Tournapulls Austin-Western Graders.

DISCUSSION ON PAPERS

THE Congress discussed eight technical Papers at the Calcutta Session. Two Papers on "A Design for Bullock-cart Wheels—Parts IV and V" and a Paper on the "Construction of Approaches to the Malaviya Bridge at Banaras" were discussed on the 18th February 1951. They provoked keen discussion.

Four Papers were discussed on the 19th February. One of these was a contribution by the Specifications and Standards Committee of the Indian Roads Congress. This Paper on "Standards for Sight Distances for Highways" dealt with the factors which determine the sight distances required for the safe operation of vehicles on highways and which influence the minimum sight distances necessary for fast vehicles overtaking slower vehicles.



A Paper being Discussed

Another Paper viz., that on the "Organization of Bridging Activities" suggested building bridges under a scheme of self-liquidating loans instead of waiting indefinitely for palmy days. Other Papers discussed on the same day were "Some Examples of Planning Surveys in West Bengal" and Construction of Kuakhai Bridge in Orissa."

On the 20th February a problem of special interest for West Bengal was discussed in the Paper on "Behaviour of Brick Metal in Tar Carpets." In West Bengal road stone is not available and substitutes have to be found, one such being over-burnt brick.

The previous Session's Paper on "An Adaptable Steel Centering for R. C. Bridges" came up for discussion again on the basis of further details contributed by the Author.

FOR TIRED SHOPPERS

A "drive-through shopping center" with eight lanes, laid out so that shoppers need not get out of their automobiles, is planned in Chicago.

TIGHTLY BOUND

An obstinate man doesn't hold opinions; they hold him.

SAFETY AFOOT

Glass reflectors, built into the heels of pedestrian's shoes, are the latest in safety devices for folks who must walk along roads at night.

HERE AND THERE

1. GOOD LAWS ESSENTIAL FOR GOOD ROADS

"TO better the job of improving and maintaining local roads, the first need is better laws." The report makes that flat declaration and then goes on to say what is meant:

"A good law is one which fixes responsibility and accountability, establishes standards of performance, embraces broad guides for administrative bodies in determining procedures, provides for adequate financial support, and creates efficient administrative machinery"

"The backbone of the state-local relations law should be a state-aid program

managed by the counties or local units with state assistance in planning, establishing priorities of improvement, and selecting road systems. Mandatory and voluntary features should be embodied in the law; the former should be confined largely to reporting and accountability of the local units for funds received and expended, state approval of plans and programs, and adequate provisions to insure a minimum standard of performance."

[Extracted from a report submitted in February, 1950 by the Bureau of Public Roads to the Senate in the United States of America].

2. HOW TO BUILD DURABLE ASPHALTIC CONCRETE PAVEMENTS

THE principles which, if adopted and generally practised, would greatly extend the useful life of asphaltic-concrete pavements:

1. Provide an adequate thickness of effective flexible foundation or base to support the expected traffic loads over the particular subgrade.

2. By effective flexible base is meant one constructed of granular, densely graded, mineral aggregate, such as crushed stone, sand-gravel, crushed slag, etc., having non-plastic fines. Open-graded aggregate bases require the subgrade soil to be blanketed with a layer of fine, granular aggregate, such as sand, crusher screenings, granulated slag, etc., prior to placing.

3. The base-course immediately beneath the asphaltic mix should be of densely graded crushed stone, crushed gravel or slag, containing sufficient fine granular material to permit compaction without the incorporation of any clay or similar binding material.

4. Consider the asphalt cement only as a waterproof binder supplying the cohesion necessary to prevent ravelling of the

mineral aggregate and to provide flexibility to the pavement.

5. Secure stability in the pavement by the proper selection of mineral aggregates, bearing in mind that the angularity, surface roughness and size gradation of the mineral particles influence the frictional resistance of the aggregate to displacement.

6. Incorporate the maximum amount of asphalt cement with the mineral aggregate to provide the thickest asphalt coating which will not appreciably reduce the friction in the aggregate.

7. Select a reasonably soft asphalt cement and insure it against hardening during mixing with the hot mineral aggregate by rigidly controlling the aggregate temperature below 350 deg. F.

8. Construct the asphaltic-concrete pavement under climatic conditions which will permit a reasonable period of workability in the mix for proper laying and compaction.

[Extracted from 'Roads & Engineering Construction' September 1950].

3. A MONTH'S WORK IN A MINUTE

THE National Physical Laboratory has completed a pilot Model costing £40,000, which is able to solve intricate arithmetical calculations in a matter of minutes. The automatic electronic computing machine, known as ACA, will be built later.

Its function is to satisfy the ever-increasing need in science, industry, and administration for rapid mathematical calculation which in the past, by traditional methods, would have been physically impossible. The automatic computing engine uses pulses of electricity, generated at a rate of a million of a second, to solve all calculations which resolve themselves into addition, subtraction, multiplication and division.

The 'Memory' section is highly complicated. It depends upon the slower time of travel of supersonic waves, into which the electric pulses are converted through a column of mercury, one thousand pulses—representing digits—can be stored in this way and extracted at the precise moment when they are needed by the "arithmetic section" which handling pulses of electricity, is working 100,000 times faster than the supersonic section. The completed calculation appears in code as a holed card, representing the answer in the binary state, which is translated back into ordinary numbers. The pilot model uses some 800 thermionic valves.

(Condensed from the "Times", London, Nov. 30 1950)

4. THE REAL ENGINEER—A PARAGON OF VIRTUES

"THE qualifications for achieving success in engineering are intellectual and moral honesty, courage, independence of thought, fairness, good sense, sound judgment, perseverance, resourcefulness, ingenuity, orderliness, application, accuracy and endurance. An engineer should have ability to observe, deduce, to correlate cause and effect, and to apply the principles discovered.

"Dealing with men, he should have the ability to co-operate, to organise, to analyse situations and conditions, to formulate problems, and to direct the effort of others. He should know how to inform, convince and win confidence by skillful and right use of facts. He should be alert, ready to learn, open minded but not credulous. He must be able to assemble facts, to investigate thoroughly, to discriminate

clearly between assumption and proven knowledge.

"He should be a man of faith, one who perceives both difficulties and ways to surmount them. He should not only know Mathematics and Mechanics, but should be trained in methods of thought based on these fundamental branches of learning. He should have extensive knowledge of the sciences and other branches of learning besides knowing intensively those things which concern his specialities. He must be a student throughout his career and keep abreast of human progress."

[From the Inaugural Address by Shri C. Rajagopalachari at the joint Session of the World Power Conference, the International Commission on Large Dams and the International Commission on Irrigation and Canals—New Delhi—11—1—51.]

5. AN UNENVIABLE RECORD

OUR own country, one is distressed to note, has perhaps the unenviable record of having the worst roads among civilised countries. Our sin of omission in this matter is particularly inexcusable because responsible and impartial observers have drawn the attention of our Governments to the urgent need for improving the roads of our country for the last three decades. The Royal Commission on Agriculture in

India explained clearly how without good roads there can be no lasting improvement in the conditions of the agriculturists who form three-fourths of our population. During the early forties, Lord Wavell pointed out that what India needs more than anything else is a modern highway system. That in spite of these repeated reminders, neither the Central nor the States' Governments, nor even all

the sections of the public have yet realised, in all its vividness, the grave damage which bad roads have inflicted on our economy was borne out by the facts presented by the Chairman of the Bombay State Road Transport Corporation at the Press conference he held on Monday, July 3, 1950.

How even the most heroic attempt to keep down costs of operating road transport services is rendered Sisyphean if roads are bad is proved by the actual experience of the Corporation. Effect a substantial improvement in the roads, and there will be a reduction in the number of vehicle breakdowns, in the cost of repairs and renewals, in fuel consumption and in several other items of expenditure. That will enable the nationalised transport system to increase the amenities of the travelling public, the conditions of labour and perhaps even to reduce the fares charged. It is utterly uneconomic to stint money on roads; because bad

roads cause vastly more expenditure than it would cost to construct good roads. It is true that no Government—and certainly not a transport organization, however big it may be—can find the money needed for any considerable expansion of roads from out of its current revenues. Capital expenditure of this kind—especially when the experience of other countries clearly proves that it is a self-liquidating expenditure—has to be met out of loans. The citizens of this State have a right to expect that the Corporation and the Government would collaborate with each other and devise a suitable programme of loan finance with which the roads of the State can be substantially improved at as early a date as possible. Delay in a matter of this kind is a costly luxury which a poor country like ours cannot certainly afford.

(Extracted from "Bharat"—Bombay, July 4, 1950).

BOOK REVIEW

The Indian Concrete Journal. International Engineering Conferences Special Number. Volume XXIV - December 1950 - Number 12. published by the Cement Marketing Co. of India, Ltd., Bombay; Pp: 1+57; Paper bound; price Rs 1-8-0.

ON the occasion of the International Engineering Conferences held for the first time in India and attended by large number of foreign delegates all specialists in their own branches of engineering the Cement Marketing Co. of India Ltd., brought out a special number of their monthly Journal, entirely devoted to the Irrigation & Power project development in India.

Many eminent engineers in the field of Irrigation and Power Engineering have contributed articles to this issue. Starting with the Mettur Dam, various hydro-whether completed, under construction or being planned-electric projects in India—are described in the Journal in interesting language, supplemented by well reproduced maps, charts, tables, and drawings. The authors have endeavoured to supply as much detailed information as compatible with the limited scope of the Journal.

Starting with planning and design, the various constructional difficulties have been described and the steps taken to overcome them, enumerated. All the articles are profusely illustrated.

There are many volumes describing the projects separately and in detail. But we have not so far seen any other book or paper giving in such an attractive form the salient features of so many big main projects in one issue. For this reason alone this special issue of the Indian Concrete Journal may very appropriately be termed a "Directory of Hydro-electric Projects in India".

In this era of water power utilisation, it is hoped that, the issue will be very useful to engineers. We recommend that copies of the journal might very appropriately find a place in every engineering library and in the private library of every engineer interested in the subject.

INFORMATION SERVICE

SURFACE DRESSING IN WET WEATHER EFFECTIVE NEW TREATMENT OF STONE

(Extract from the Journal "Surveyor" dated September 22, 1950 - p. 529)

THE Road Research Laboratory has carried out extensive experiments to develop an effective way of ensuring that freshly-laid surface dressings are not spoiled by rain. Fundamental studies of the physics of adhesion of the bituminous binders to stone surfaces in the presence of water were made, using various types of wetting agents mixed with the tar and tried out in surface dressings during summer and winter. All these produced poor results. It was then decided to treat the other surfacing material—the stone chips.

The chips are normally stored on the roadside in piles ready for the work later. The outside layer may be dry, but the inside of each heap is generally wet even in fine weather, so that the stone scattered on the tar is normally wet. The wetness of the stone is no problem in fine weather during the summer, as the stone dries quickly when spread on the road and sticks to the tar. If, however, the atmosphere is humid or cold, the wet stone will not dry out, and there is no adhesion. It was found that the water on wet stone is displaced if the stone is treated with creosote containing a "wetting" agent. This treatment enables the stone to stick to the tar immediately and water cannot later break this bond.

Of the materials tried, it was found that a solution of creosote and cetyl pyridinium

bromide was completely successful. The best method of coating the stone is in a large mixer, for instance, at a quarry, but for stone already dumped at the roadside a concrete mixer is more convenient. The surface dressing will then stay on the road no matter how hard or how soon it rains after the dressing has been laid. It is also possible to spray the solution on the top of the tar film before the stone chips are applied. This method gives good results although it is not quite so effective as using treated stone.

Both methods of treatment were tested in the rainier districts of the country. With the co-operation of road engineers, lengths of surface dressing were laid in Cornwall, North Wales, the Lake District, Lancashire, Dumbarton and Lanarkshire. In each county sections of treated and untreated dressing were laid on the same day so that a good comparison could be made. The results confirmed that the treatment is effective.

The treatment, of course, adds to the cost of surface dressing, but only about a penny or three/halfpence per square yard. Since the expenditure on surface dressing each year is some £8 million to 12 millions considerable economy should, in fact, result from making the process more certain in spite of the increased costs.

TIT FOR TAT

It's true that a rupee doesn't do as much for us as it once did, but how many of us do as much for a rupee as we once did?

List of Approved Works on National Highways

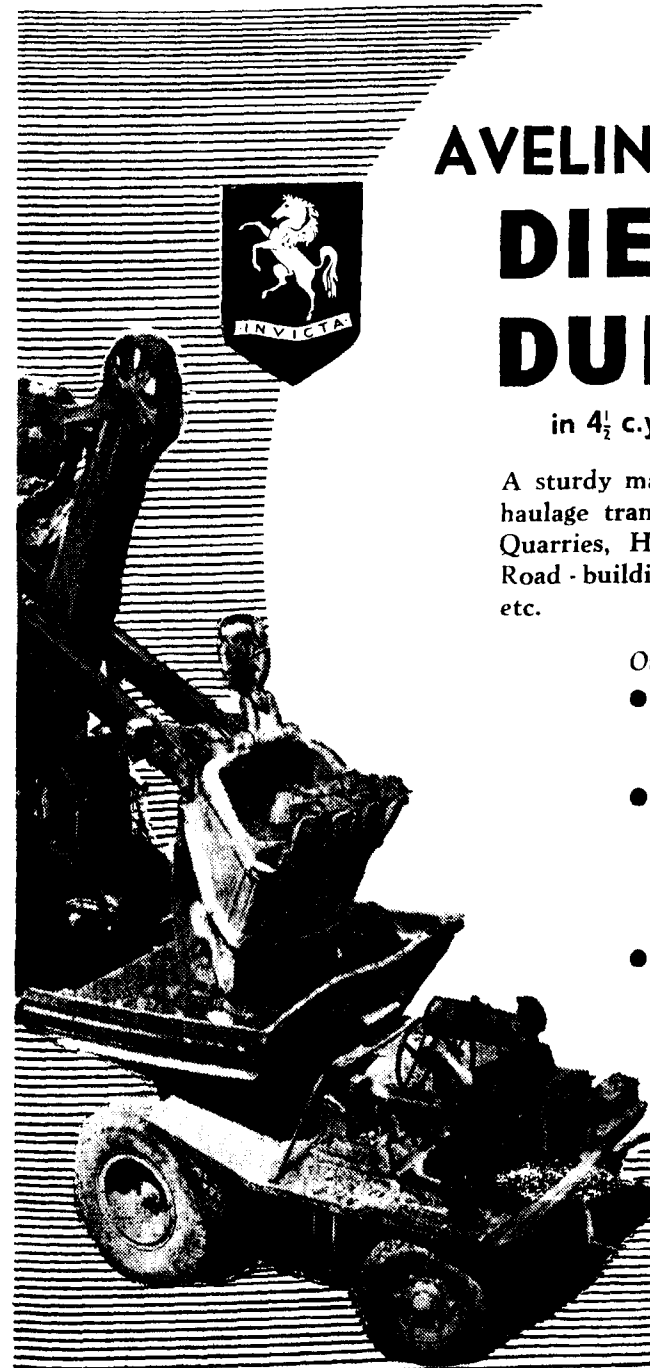
S. No.	Job No.	Name of work.	Amount approved. Rs	REMA
BOMBAY				
1.	434 BM-4	Raising the low lying portions in miles 104/5 to 106/2 of the Poona-Banglore road-N. H. No. 4.	61,000/-	
2.	441 BM 8	Providing dust proof surface in miles 149/3-330 to 150/2-250 of Bombay-Gujarat-Rajputana-Delhi Road-N. H. No. 8.	73,066/-	
WEST BENGAL				
3.	437 BG 31	Widening the portion of Bihar-Assam National Highway No. 31 between Matigara and Bagdogra, from mile 3½ to mile 8.	1,45,000/-	
4.	445 BG 31-A	Permanent restoration of monsoon damage to National Highway No. 31-A, portion lying in West Bengal.	29,44,000/-	
UTTAR PRADESH				
5.	438 UP 28	Construction of a bye-pass in miles 89-92 of the Oudh-Tirhut Road (N. H. No. 28) in Basti District.	1,91,000/-	
6.	442 UP 24	Construction of Baigul Bridge in mile 113 of the Meerut-Bareilly section of Delhi-Lucknow National Highway No. 24.	10,20,200/-	
7.	443 UP 24	Construction of the Bhakra bridge in mile 115 of the Meerut-Bareilly section of Delhi-Lucknow National Highway No. 24.	9,99,300/-	
PUNJAB				
8.	439 PB 10	Widening miles 17/5 to 19 of Delhi-Multan Road (National Highway No. 10) in Rohtak District.	39,300/-	
BIHAR				
9.	433 BR 31	Reconstruction of the Ganga-Darjeeling Road, National Highway No. 31 from its junction with National Highway No. 34 to Chopra.	32,87,000/-	
10.	440 BR 2	Replacement of wooden decking with R. C. Slab on Lilajan causeway in mile 284 III of G. T. Road, National Highway No. 2 in Bihar.	19,800/-	

S. No.	Job No.	Name of work	Amount approved Rs.	Remarks.
<i>Continued:</i>				
11.	A 444 BR 34	Survey of National Highway No. 34, Section from Dalkhola to Bengal border (Bilaspur on Nagar river) in the Distt. of Purnea.	6,520/-	
ORISSA				
12.	435 RS 5	Straightening the bend at 3rd mile IV qr. and 4th mile 1st qr. of Baripada Bamanghaty Road. (National Highway No. 5)	11,200/-	
DELHI				
13.	436 DLH	Widening the portion of Delhi-Karnal Road. (National Highway No. 1) in Delhi State.	2,28,000/-	

Books added to the Roads Organization Library during January, 1951.

1. **Report of the Air Transport Inquiry Committee, 1950.** (Manager of Publications, Delhi).
2. **No. M. 21-48—Indian Railway Standard Specification for Expanded Metal.** (Manager of Publications, Delhi).
3. **Governmental Measures Affecting Investment In India—A Handbook of Information.** (Manager of Publications, Delhi).
4. **Central Public Works Account Code.** (Manager of Publications, Delhi).
5. **Book of Forms referred to in Central Public Works Account Code.** (Manager of Publications, Delhi).
6. **Scientific Research—Its Administration and Organization.** Edited by George P. Bush and Lowell H. Hattery. (The American University Press, Washington, D.C.)
7. **Annual Administration Report of U.P., P.W.D. Buildings and Roads Branch for the year 1947-48.** (Superintendent, Printing & Stationery, U.P., 1950).
8. **The Inelastic Behaviour of Engineering Materials and Structures.** by Alfred M. Freudenthal. (John Wiley & Sons, Inc., New York.)
9. **An Introduction of Experimental Stress Analysis** by George Hamor Lee. (John Wiley & Sons, Inc., New York).
10. **Influences on Concrete** (Translated from the German "Einflüsse Auf Beton" by F. S. Morgenroth) by A. Kleinlogel. (Frederick Ungar Publishing Co., New York, 1950).
11. **Studies of Weaving and Merging Traffic—Technical Paper No. 4** by F. Houston Wynn, S. M. Gorlay and R. I. Strickland. (Eno Foundation for Highway Traffic Control, Bureau of Highway Traffic, Yale University, 1948).
12. **Traffic Engineering Handbook** (2nd edition, 1950) edited by Henry K. Evans. (Institute of Traffic Engineers, New Haven, Connecticut, U.S.A.).

13. **Industrial Tour of Members of Parliament.** (Federation of Indian Chambers of Commerce and Industry, New Delhi).
14. **Proceedings of Meetings of the Standing Finance Committee held on the 13th, 17th and 20th March 1950—Vol. XXVI, No. 10.** (Government of India, Ministry of Finance)
15. **The Local Government of the United Kingdom** by John J. Clark (Sir Isaac Pitman & Sons, Ltd., London).
16. **Quinquennial Report April 1945 to March 1950 of the Central Water-Power, Irrigation and Navigation Commission.** (Government of India, Ministry of Works, Mines and Power).
17. **Sample Survey for the Estimation of Yield of Food Crops—1944-49.** (Indian Council of Agricultural Research, May 1950).
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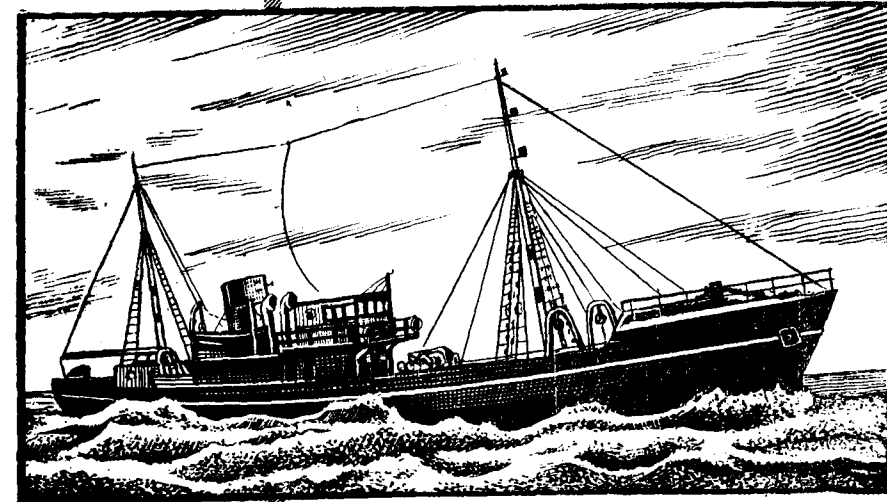
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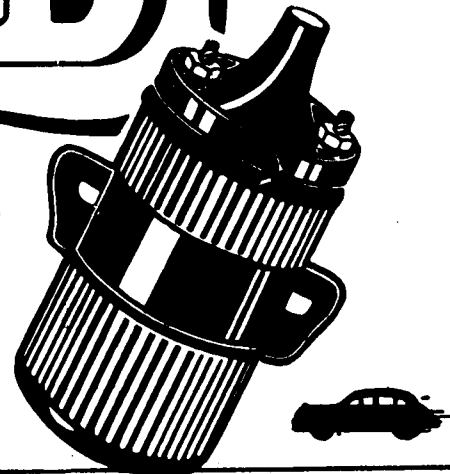
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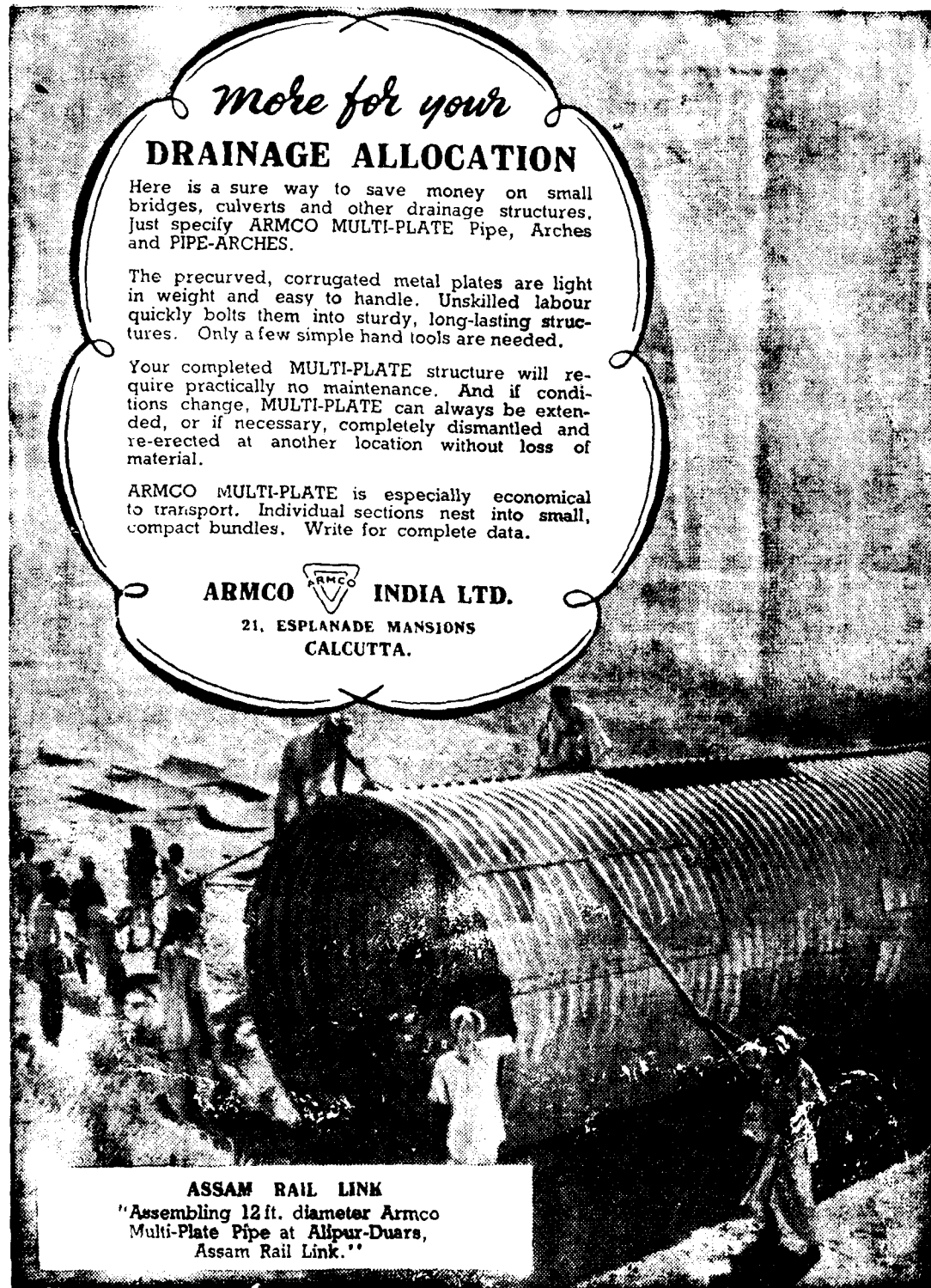
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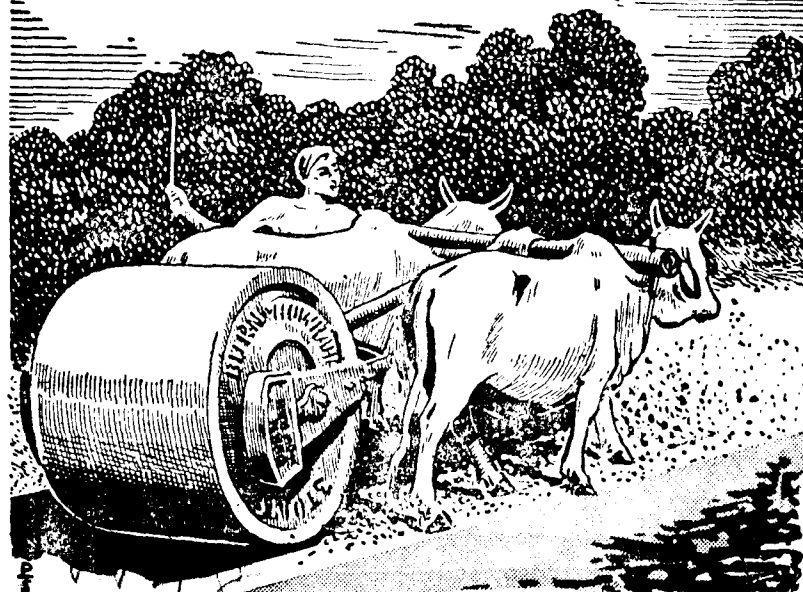
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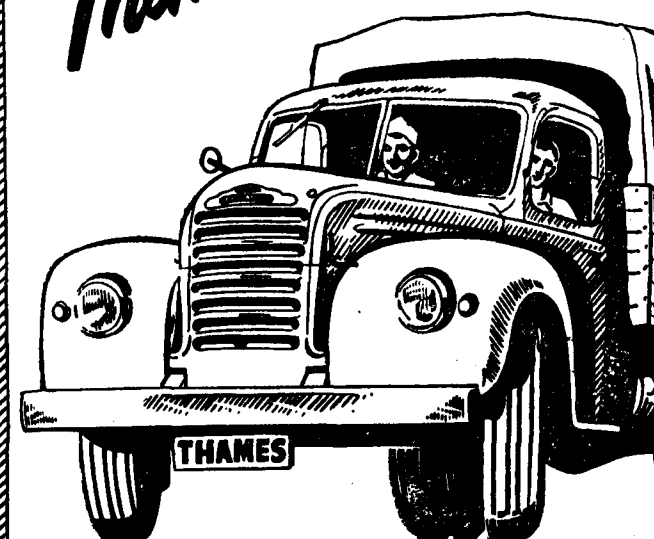
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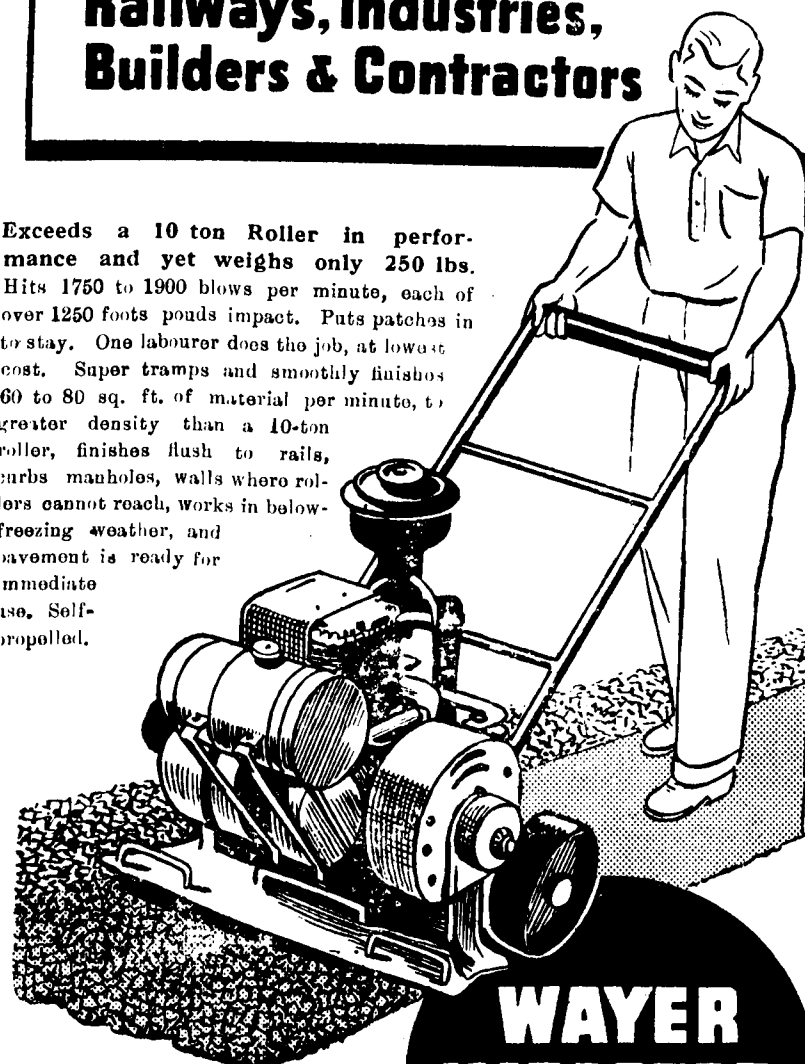


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