

37 Transport-Communications

MONTHLY REVIEW



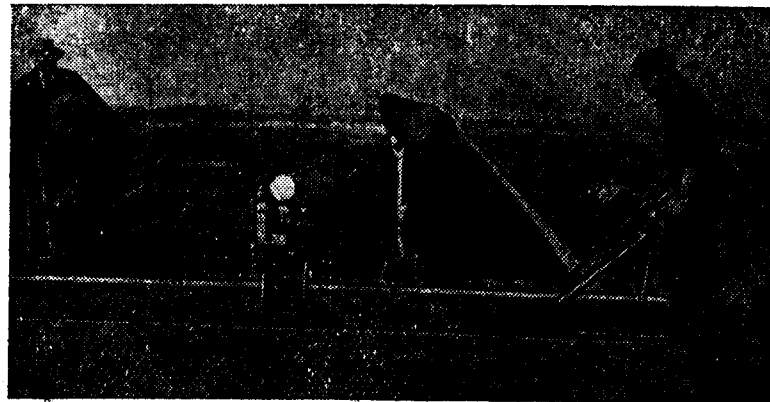
No. 46

February 1951

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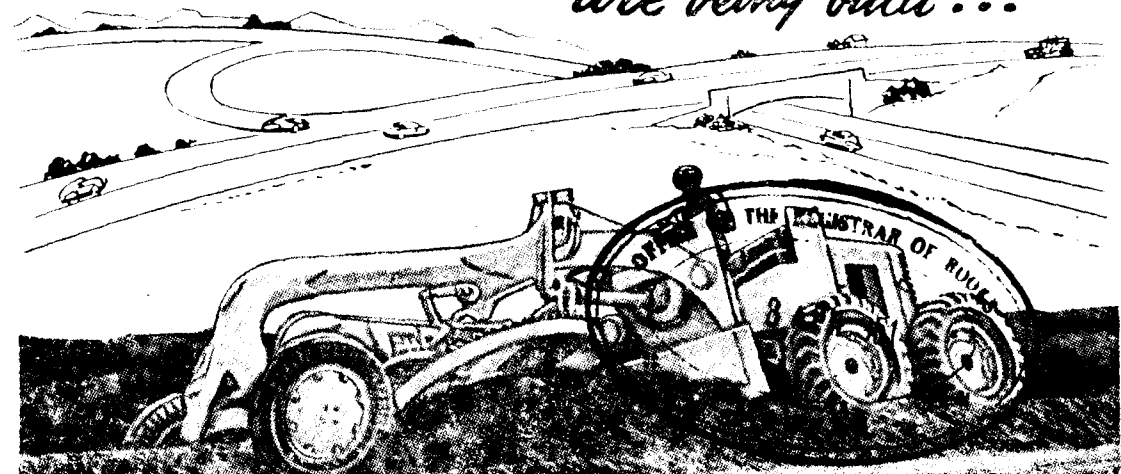
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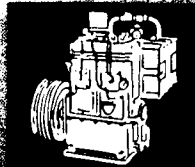
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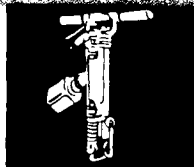
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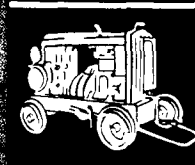
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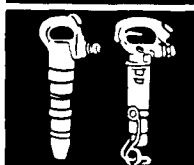
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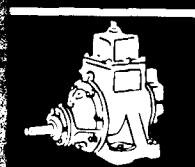
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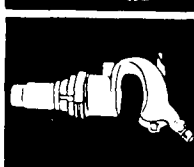
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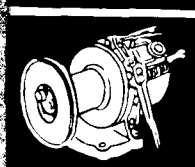
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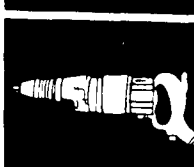
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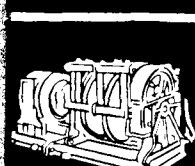
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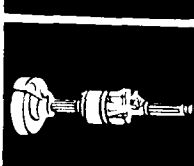
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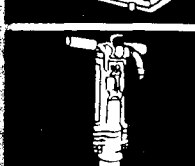
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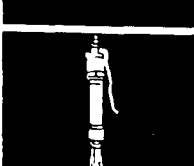
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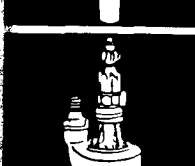
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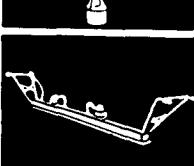
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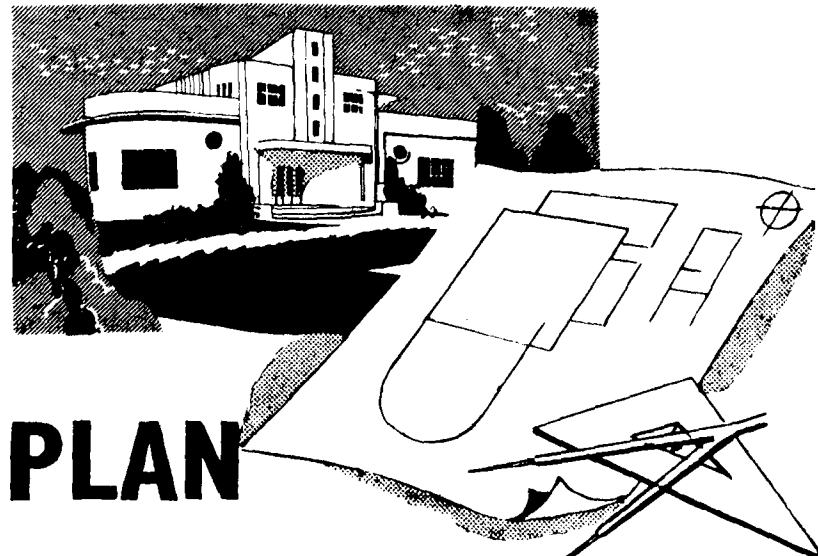
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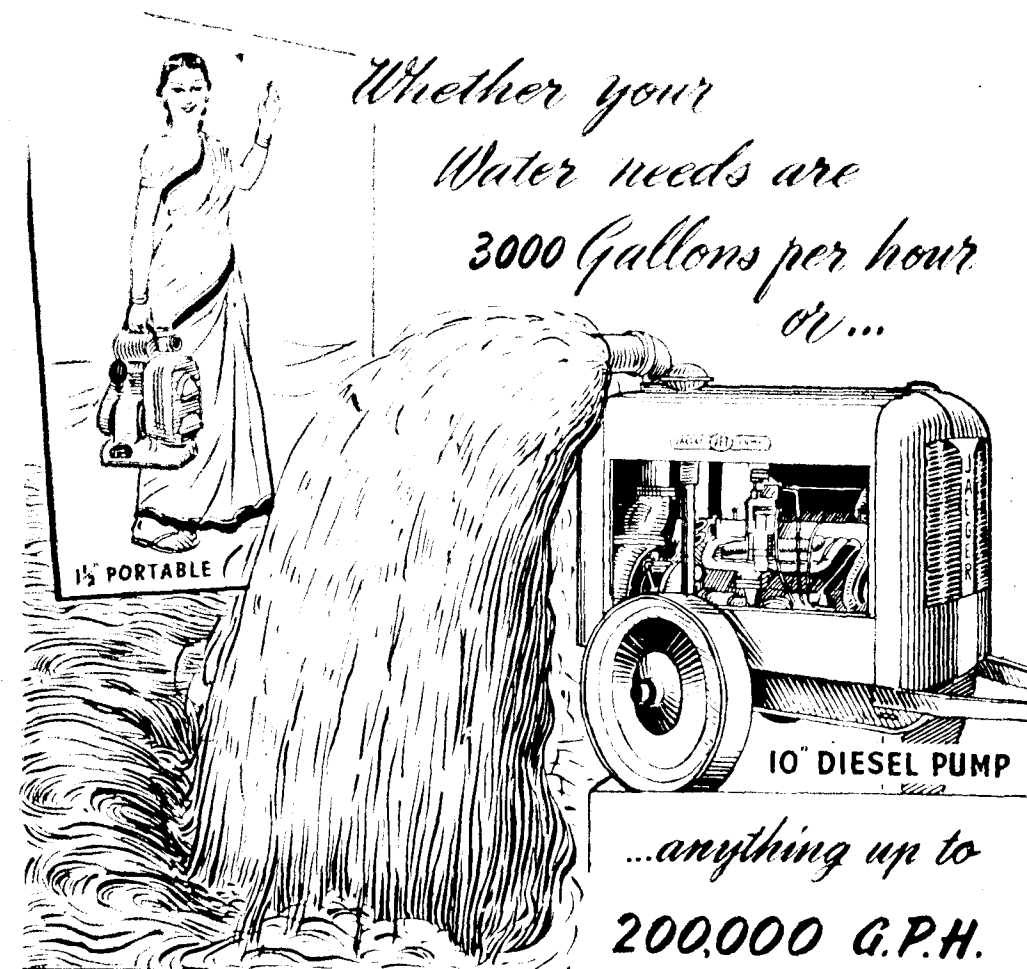
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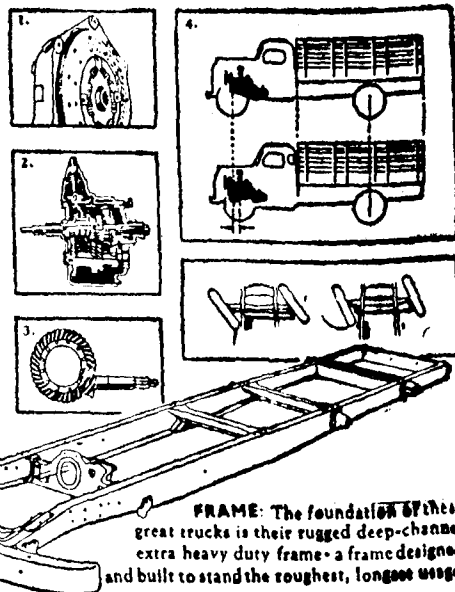
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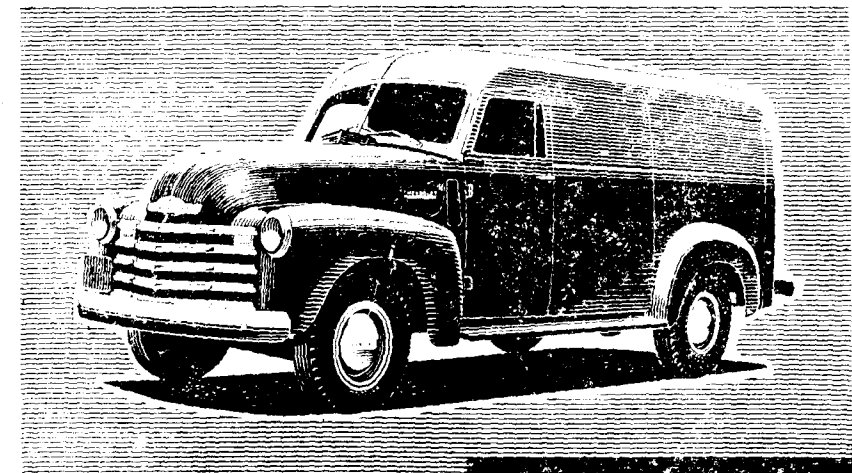
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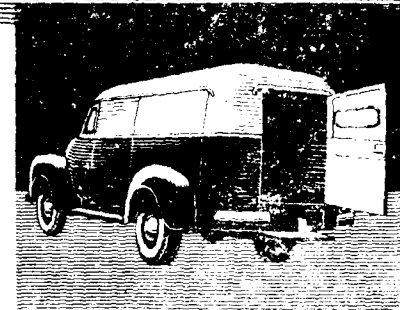
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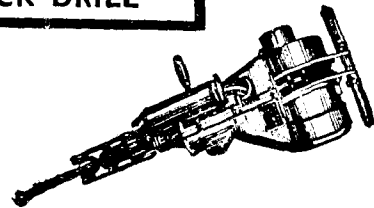
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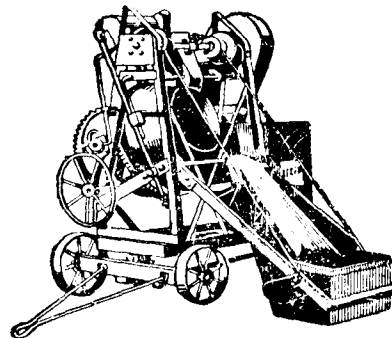
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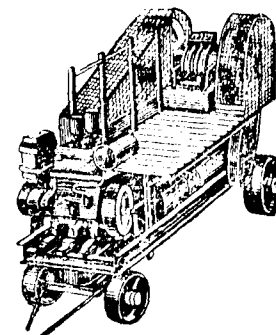
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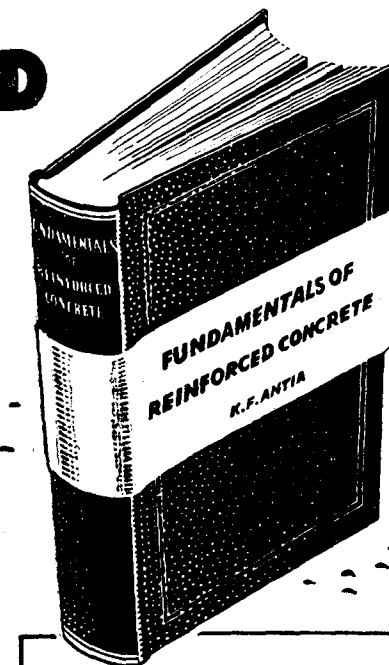
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Editorial

MOTOR VEHICLE TAXATION

THE Report of the Motor Vehicle Taxation Enquiry Committee, recently released to the public, is an outstanding contribution to the study of transport problems in India. The Committee have not confined themselves to discussing taxes on motor vehicles although they have many hard things to say on the existing taxation policy (if it can be called a policy) and the resulting anomalies, even injustices, arising from the independent and unco-ordinated exercise of taxation powers by the Central and State Governments and by local bodies. The Committee have sought to rationalize the tax structure by recommending that **taxation policy** throughout the country should be based on a commonly accepted, logical transport policy.

Road-Rail Competition

Of particular interest is the conclusion of the Committee that road-rail competition in India is, for the most part, non-existent at present and not likely to exist in the near future. They have pointed out that motor vehicles are so heavily taxed that the average goods lorry, for example, pays per ton-mile twice as much in taxes alone as the average earning per ton-mile (including taxes) on goods carried by rail; and they have shown that whereas there are nearly 38 goods vehicles per route-mile of railway in the United Kingdom and 20 in the United States of America, India has only two goods lorries per mile of rail. These two lorries, heavily handicapped by taxation as they are, cannot be serious competitors of the mighty railways.

The Committee have even gone out of their way to suggest that if the railways were to confine themselves to the traffic for which they were "best suited" (long-distance traffic and heavy goods traffic) and were to resist unenlightened de-

mands for the restoration or construction of unremunerative, short railway links, they would both reduce their own overhead costs and be free to use badly needed rolling stock to more advantage for the country as a whole. We may, however, expect fierce opposition from vested interests to the commonsense recommendation that non-paying, short railway links should not be constructed where alternative transport facilities are available.

Roads are a Part of Road Transport

The Committee have argued an excellent case for freedom in road transport. But they have gone further by emphasising that roads are a part of road transport, perhaps the greater part, and certainly the part contributed by Government. Put in this way, it is a self-evident truth that roads are a part of road transport but the logical implications of this are not always appreciated. A story is told about Columbus after he had returned from discovering America. A big dinner was given in his honour but while he was sitting at the table he heard some of the stay-at-home, self-important people saying that anyone could have discovered America. All one had to do was to point one's ship towards the West and keep on sailing till one struck America.

Columbus took a hard-boiled hen's egg that had been served with one of the courses at the dinner and asked the other guests if they could stand it on one end. Many tried and failed. Then Columbus gave the egg a hard crack on the table and stood it up on the broken-in end saying "You could all have done that if you had thought of it. Perfectly simple, isn't it? But you didn't think of it, nor did you think of logically following up the idea that there might be land lying to the West of Europe."

The Committee have followed up logically the implications of the fact that roads are a part of road transport and their taxation recommendations concern themselves not only with taxation of the motor vehicle user (as also the taxation of other road users and beneficiaries from roads), but with the relation between the upkeep of roads and the taxes collected for their use and availability. The Committee have said that the difficulties at present being experienced in India in the matter of transport-communications, are due to an antiquated approach by the various governments to the real problems of transport. They have even claimed that "the present taxation policies of the Central and State governments do not conform with their overall policy of developing road transport as a National enterprise." It is, we think, a bold man who will say the Committee is wrong.

Briefly, the Committee have said that, just as the money spent on the purchase of a railway ticket goes first to pay for railway rolling stock, administration, and the permanent-way and only afterwards, what is left over, is credited to general revenues, so the money spent on a bus ticket, for example, should go first to pay for the running of the bus and for the upkeep of the road on which the bus runs, and only afterwards, what is left over, should go to general revenues. At present about a quarter of what the public pay in bus fares goes to Central revenues as an unrequited tax.

Road-Rent

Critics of the Report will say that it is neither feasible nor practical to regard, as

advised by the Committee, a large proportion of the taxes on motor vehicles as rents or tolls for the use the vehicles make of the roads—they will say that the governments concerned will never give up so much revenue. But, if good transport-communications are the first, and most essential requirement for the development of India, and we sincerely believe they are, then, the truth will have to be faced that the neglect of roads is the neglect of road transport and, therefore, of every form of inland transport, since all transport is initially or finally served by roads.

The Committee say they came to the conclusion with regret that motor vehicle taxes could not be reduced in the immediate future to much below the present all-India average rates. This will be bad news to many transport operators but these are bad times and the cost of maintaining our roads is so heavy that it would not be reasonable to expect the government willingly to give up a source of revenue that will finance road upkeep. The Committee have recommended, however, that motor vehicle taxes (which bring in more to the exchequer than the land revenue from the whole of India) should be substantially reduced as soon as the financial position of the country improves.

Is it not a strange thought that one motor vehicle in India contributes more revenue to government than six square miles of land? India is a unique country in many ways.

LOYALTY

George, a highway contractor, lived in the outskirts of a North Carolina town and had to drive several miles to and from work each day. One night his car wouldn't start.

When midnight came and George hadn't arrived home, his distracted wife sent telegrams to five of George's closest friends, asking them if they had seen George. The next morning she received five answers. They all read—"George stayed with me last night."

THE YOUNG ENGINEER

(From the "Civil Engineer" September, 1950)

LAST May the Right Hon. C. D. Howe delivered an extremely interesting address to the graduates of the University of British Columbia. This address has a significance not only to the graduates of this particular university but to those of universities all over the world irrespective of their nationality, and even to the experienced and thoroughly trained engineer.

Each succeeding generation of young engineers appears to have the feeling that the prospects of a prosperous career are far from being as bright as those of past generations. There is often a feeling that the great engineering developments of the past have exhausted the possibilities of distinction for men and the openings for original work, and that the future has little more prospect for succeeding generations than carrying on in the same path as has been established by their forebears.

There is nothing new in this attitude. All engineers on recalling to mind the days of their graduation can very vividly remember many who expressed the same depressing attitude to the future. They can also, as a result of their experience of life, understand how little foundation there was for those fears and trepidations.

There is no such thing as complete stagnation as there must be either progress or retrogression. There is no such thing as remaining stationary.

Few professions stand to gain more than the engineering from the almost miraculous advance of our knowledge of physics and chemistry that is so startling the present-day world. It is well to bear in mind that never in the world's history has man's knowledge, of the material things and the laws governing their existence expanded at such a speed as during the past few years and that this knowledge is being extended faster at the present moment than ever before.

Very naturally all engineers, the older as well as the younger, at times have a

sense of anxiety as to what the future will bring. But is there any reason to think that the professional risks of the engineer are any greater than in the past? There seems little doubt that the opportunities for professional employment are better and wider in scope than hitherto.

One of the very great changes that has come over the profession during the recent past is the part its members are commencing to take in the direction and management of businesses involving technical skill and knowledge. In the past this was not so, for such management invariably was in the hands of the "business" man and the engineer had little say in the direction of policy. Today, in whatever direction one may look, it will be found that engineers are taking their place in company management and control. As Mr. Howe, in his address, very aptly said:—"This invasion by engineers of fields that are not strictly technical is another proof of the great importance of science and technology in the industrial and economic life of modern days."

There can be little doubt that this development in the prospects for advancement of engineers has opened up a field of employment that was undreamed of twenty-five years ago and which is capable of absorbing an almost unlimited number of trained engineers with the instinct for control and management.

This new field for the employment of the talented engineer will not be open to those who are not prepared to face its hazards. Mr. Howe, in his address, very rightly says:—"I am old fashioned enough to believe that personal ambition, initiative, industry, faith and willingness to take a chance are still better avenues to personal and national success than the rigid adherence to security considerations and social and economic planning."

In no direction more than in a business career is the truth of Mr. Howe's remarks more apparent.

Turning to the possibilities for those whose talents do not lean towards management. Are their prospects any less bright? Certainly not, for the engineering field is definitely expanding day by day and is providing an ever growing scope for the employment of original thought and knowledge.

The development and growth of scientific research are rapidly expanding our knowledge and making possible many new and, at present, unknown industries. It was such research in the past that gave the world the internal combustion engine (with the vast engineering expansion its utilisation has made possible), the radio industry as well as many chemical-engineering undertakings.

In recent years few chemical discoveries have been of more importance than those forming the basis of the artificial rubber industry, which is capable of an expansion far beyond its present dimensions as it was only born as a result of the last war.

Probably the future holds no greater prospects for the engineer than in the application of atomic energy. Who can see the extent this will affect our whole outlook on the problem of power? It is far too soon for anyone to even attempt any forecast, but the one thing that is certain is that its application to the needs of our everyday life will provide a new field of employment for the engineer which will be as revolutionary in its effect as was the development of the internal combustion engine.

Mr. SILKIN AND BROWNING

"When an admirer of Browning asked him what one of his poems meant he replied that 'Only I and the Almighty know, and I have forgotten.' It seems to me only the Almighty and Mr. Silkin know what the Town and Country Planning Act means, and Mr. Silkin has forgotten."— (Mr. Walter Elliot, M. P., at a lunch of the Association of London Property Owners.)

RESEARCH

Reporter — "What is the professor's research work?"

Professor's House-keeper — "It consists principally of hunting for his spectacles."

ROLE OF TRANSPORT IN NATIONAL ECONOMY

Mr. *Misra's Address at Roorkee.

(From "Hindustan Times," 27th November, 1950). 16

* * *

IN respect of road transport the position is still less satisfactory than on railways, or waterways. Through a strange coincidence there are four controlling authorities for development of traffic on roads—the Central Government, State Governments, District and Municipal Boards. The tragedy of the situation is that roads are not looked upon as directly self-supporting with the result that for over a century they have been financed out of revenues available and, as there are so many other demands on the revenues of the Authority—Central, Provincial, District, or Municipal, the amount left for the maintenance of the road is very small and still smaller for financing new road projects which have to be relegated to a still more obscure corner.

In tracts where country-craft cannot ply, roads form the only means of communication and, unless they develop, the economy of the whole countryside would remain dislocated. The Government is making very strenuous efforts in the 'grow more food' campaign, but unless roads are opened up, it would be impossible to carry the produce to the consumer markets expeditiously and cheaply.

Forms of Transport

Referring to the need of co-ordination between road, rail, air, and water transport, Mr. Misra pleaded for the creation of a Transport Ministry in charge of a single Minister. **The four forms of transport are no longer competitive but complementary.** It is, however, essential that the transport requirements of each area should be carefully studied with a view to finding out which of the forms of transport would best serve the interests of a particular area and the extent to which each

should be developed for a balanced development of the area.

The first essential is to secure a ministry of transport in the Centre which should control all the four forms of transport. This question has been considered by the Government on a number of occasions in the past and somehow or other the four forms could not be left to the control of one Minister. The argument generally given was that such a portfolio would become much too heavy for one Minister. We have to reorganize our procedure and decentralize the work involved. It would then be found not as heavy as it is imagined to be.

Immediate Need of a Road Board

Maintenance and operation of Railways have been entrusted to a Board which has been functioning in the country for a long time and has relieved the Minister for Railways of a considerable amount of work which would normally have been thrown on him if the Railways were run departmentally as part of the Secretariat organization.

A Board was created on similar lines a few years back for the development of waterways in the country. It is not yet fully developed. If it is organized and if it functions on the lines laid down by the Government for the Railway Board, it is bound to relieve the Minister in charge of a good deal of work.

When the Nagpur Plan for the development of roads in India was evolved by the Chief Engineers of States and provinces about five years back, a **Road Board** on the lines of the Railway Board was strongly pressed for. Political pre-occupations of the Government and also lack of enthusiasm for the scheme in the

* Mr. Misra, General Manager, Hindustan Motors, addressing the Old Thomasonian Society at Roorkee on 25-11-1950.

Indian States militated to a certain extent against its materialization. Now that the Indian States have been mostly integrated with the old provinces or merged among themselves and the Centre has become much stronger than it was under the 1935 Scheme of Reforms, some of the difficulties which militated against the materialization of the recommendations no longer exist while others have considerably decreased. What is required therefore is the immediate establishment of a **Road Board** more or less on the lines of the Railway Board and a similar but smaller Board for air transport in India.

Functions of the Boards

Each of the four Boards mentioned above will be responsible for its earnings, expenditure, maintenance, operation and development. They will frame their own budgets which would be consolidated and submitted by the Transport Minister to the Parliament more or less on the lines of what the Minister for Railways does for the Railways. The States would be vitally interested in this scheme as it would affect their industrial, economic and agricultural developments. They should, therefore, be intimately associated with the Transport Minister at the Centre through their Transport Ministers. The Transport Minister

should be assisted in the allotment of funds for new works by an executive committee consisting of the Ministers of the various States who will in their respective areas be in charge of the problems pertaining to all the four forms of transport. They will be in a better position to decide the extent to which any particular form of transport is to be developed in any particular area out of the funds available for their States. The net savings of each one of the four boards will be drawn on for development of road, air, railways or waterways on loan from one board to another and spent in the State according to the requirements pressed through their respective Ministers.

The Railways and Aviation are already Central subjects. In respect of roads and waterways, they are what are called "concurrent" subjects with the states. Some powers may have to be transferred to the Centre and the rest will remain with the States. It is true that the States may not like to part with any of their powers but after all the interests of the country should have an overriding consideration in such matters. In fact, the Boards recommended above can function satisfactorily even under the existing powers.

DEVIL'S ADVOCATES

Because this article concerns highways principally, the writer has seen fit to assume the role of a "devil's advocate," which is defined as a "critic who picks flaws to provoke controversy or to bring out the whole truth."

THE CENTRAL ROAD RESEARCH INSTITUTE, DELHI

A REVIEW

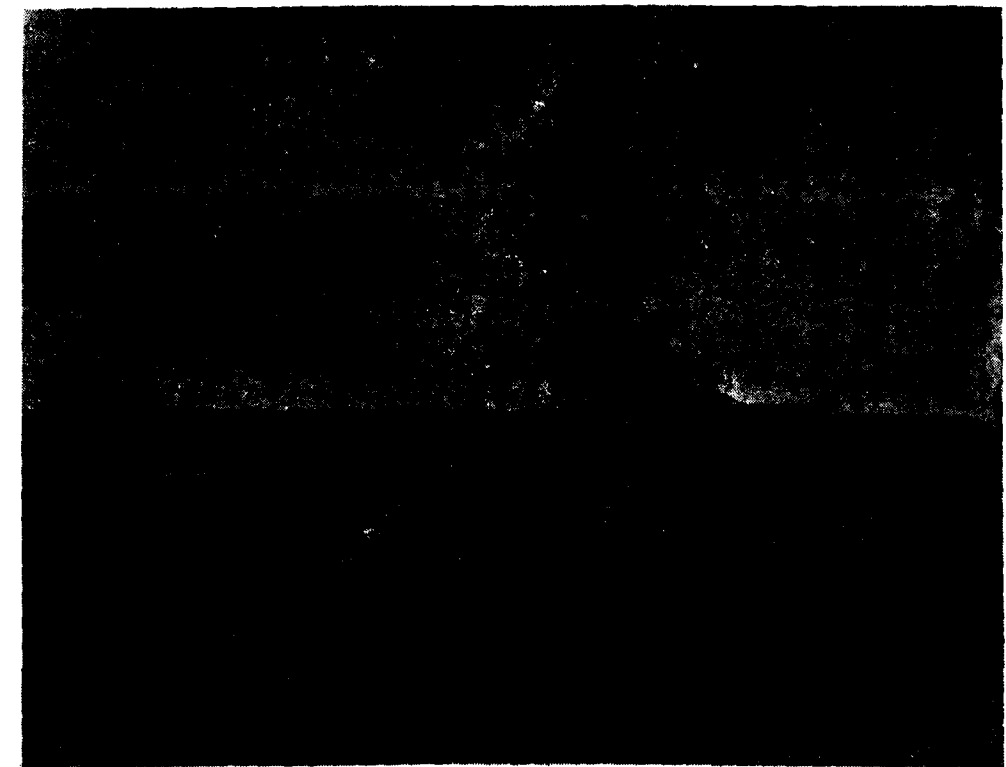
(Contributed)

AFTER protracted negotiations and correspondence, an area of land measuring about 31 acres and located at the 7th mile of Delhi-Mathura Road was acquired. This land was donated as a gift by His Grace the Archbishop of Delhi-Simla to the Council of Scientific and Industrial Research, for establishing the Central Road Research Institute. Possession of this land was taken in March, 1950.

Buildings

As it was expected that the planning and designing of the main buildings as well as their construction might take about two years, some temporary buildings were erected so that urgent research problems could be undertaken at once. These

buildings consist of four units of pre-cast American huts measuring 48 ft. x 20 ft and were erected at one end of the site to serve as a temporary laboratory to two research wings namely, Soils and Flexible Pavements (Bitumen). An administrative Block, a small Workshop, Canteen, and Chowkidars quarter's have also been constructed during the period March-August, 1950. All these buildings now constitute a complete unit to serve our purpose for the present till the main buildings are completed. The foundation stone of the Central Road Research Institute was laid by the Hon'ble Shri N. Gopalaswamy Ayyangar, Minister for Transport, Government of India, on the 6th September, 1950.



Central Road Research Institute. (Temporary Buildings)

The 4th meeting of the Road Research Planning & Advisory Committee was held on the 23rd September, when comments received from several road research institutions in India and abroad on the tentative proposals were considered and the report finalized. The committee approved that research work of the Institute should be carried out in the following Divisions: (1) Soils, (2) Flexible Pavements, (3) Rigid Pavements, (4) Roads and (5) Traffic and Economic Research.

An architectural competition limited to local architects in Delhi was held on the initiative of the Director, Central Road Research Institute, to obtain the best designs for the main buildings of the Institute. The Assessors selected the designs submitted by Messrs G.C. Sharma and Sons, Architects, Delhi, and agreed to adopt the same with modifications. Tenders for the construction of the first stage of the main buildings of the Institute were called. A firm of contractors are being selected shortly and it is expected that the construction work will be started within a month and the first part of the buildings, consisting of the technological blocks and a part of the adminis-

tration block, will be completed before the end of 1951.

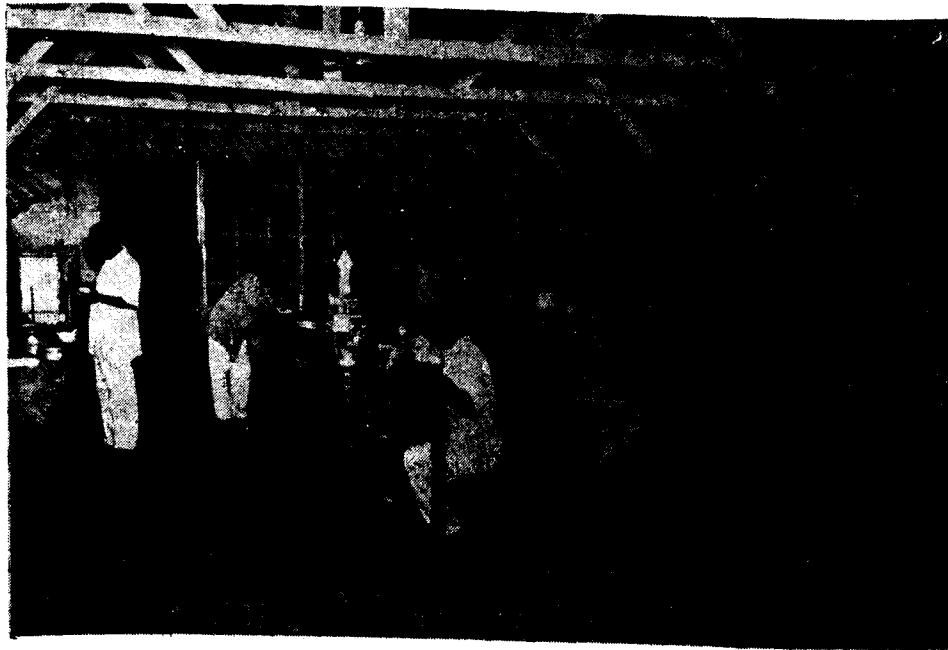
Staff

Dr. Ernst Zipkes, formerly Head of the Road Research Department in the Federal Institute of Technology, Zurich, Switzerland, was appointed as Director of the Institute, and took over charge of his duties on the 26th May, 1950.

In July 1950, Dr. H. L. Uppal was appointed as Assistant Director for the Soils Division. A Senior Scientific Officer for the Flexible Pavements Division, an Officer on Special Duty, 4 Senior Scientific Assistants, 3 Junior Scientific Assistants, and some Laboratory Assistants have been appointed for Research work in the Soils and Flexible Pavements Divisions.

Equipment, and Library

The Roads Organization of the Ministry of Transport have given us some equipment for research work on soils. More laboratory equipment for the two research divisions has been purchased recently and some other laboratory apparatus are on order.



Inside the Soil Research Laboratory

Some machines have been purchased for the temporary Workshop of the Institute from the Surplus Stores of the Directorate General of Disposals.

A number of books and technical journals about roads, road research, and allied subjects have been acquired, and a good number more are on order.

Research Problems under Study

One hundred & thirty-five samples of Black Cotton soil, mostly from Bombay, Hyderabad, and Madras have been received through the Indian Roads Congress, and the work has been taken up in the Laboratory to find their suitability or use in construction of stabilized soil roads in those States.

Settlements of alluvial soils, under load are being studied to find their suitability or use in sub-grades.

The effect on the properties of bricks of the addition of different fluxes to soils is being studied with the object of impro-

ving the quality of bricks for use in road construction.

The problem regarding the soil investigations on the Hindon Air Strip has been transferred from the Building Research Institute, Roorkee, and negotiations with the Engineer-in-Chief's Branch are being conducted.

The problem of improving locally made bricks for use on roads, specially in deltaic areas was referred to by the Roads Organization, Ministry of Transport. The brick earth and the experimental bricks are now being subjected to several tests and further work is being carried out in this connection.

Investigation and comparative tests with a number of different compounds for use in aerodrome runways and concrete road slabs, a problem referred to by the Ministry of Defence, is being taken in hand.

A study on different types of bullock-cart wheels will also come under investigation.

SUPPLY AND DEMAND

"Now gentlemen," said the president of the Cutie Baby Feeding Bottle Co., "we have 50,000 of these feeding bottles on hand and the company expects you to go out and create the demand."

[This reminds us of a report issued a few years ago by the Punjab Irrigation Department. The report described the big irrigation schemes in progress and the colonies that were being set up. One chapter was headed "what the canal officers are doing to increase the population of the colonies."—Ed.]

BRITISH ROAD ADMINISTRATION

(Extracted from 'Civil Engineering' — August 1950)

The Ministry of Transport was brought into being by the Act of 1919 with the stated object of improving the means and facilities for locomotion and transport. These facilities include railways, light railways, tramways, canals, and inland navigation, roads, bridges, ferries, and the vehicles and traffic thereon, harbours, docks, etc. During the last war shipping was added to the activities over which the Ministry exercises general control. The Minister's jurisdiction extends over England, Scotland and Wales and since the Ministry came into existence, a very considerable volume of new legislation affecting roads and transport has been placed on the Statute Book. The Minister of Transport, a senior member of the Government, is head of the department. He has a Parliamentary Secretary, who must be a member of parliament, and he takes on certain blocks of work and in a sense acts as the Minister's deputy in the House of Commons and also within the department. Ministers change frequently, and the average tenure of office in the Ministry of Transport is about eighteen months. The permanent head of the Department is a civil servant, known as the Permanent Secretary. Immediately under him there are two Deputy Secretaries, a Chief Engineer for roads, a Deputy Chief Engineer, four Assistant Chief Engineers, and seven Under Secretaries.

There are ten Divisional Road Engineers who have their offices in the provinces, in Birmingham, Manchester, Edinburgh, Cardiff, Exeter, Nottingham, Leeds, and Bedford, and two in London. The divisions of work for the Assistant Chief Engineers at H. Q. are: Planning, Traffic and Vehicles, Construction Section, which looks after the largest schemes where consultants are employed, the location of motorways and all bridges, and General Engineering, which is concerned with trunk and classified roads, excluding bridges. The divisions correspond almost exactly with the Civil Defence regions of the late

war, and also with those areas into which the country has been divided for the purpose of planning. There are a few variations from these planning areas, and the North Eastern Division, for example, covers two of these planning areas. The Divisional Road Engineers each have five or more counties for which they are responsible. In Scotland they have more, as one Divisional Road Engineer is responsible for the whole of Scotland, which has 33 counties, or for road purposes 31 counties. In Wales and Monmouthshire there are 13 counties under one D. R. E.

The Ministry does very little of the actual work on the roads; the other highway authorities in the country are employed to do this work as the Ministry's agents on trunk roads. The Ministry are tending to do more themselves because the Minister of Transport is now himself the Highway Authority for some 8,189 miles of the principal traffic routes in the country, which are known as trunk roads. Work is also done by contract, and the larger the work is, the more likely it is to be done by contract in present circumstances.

The roads in the kingdom are, for the purpose of administration, including financial support, divided into five categories. There are trunk roads which, as mentioned above, are the principal traffic routes, and for which the Minister is the highway authority and he can, therefore, do as he sees fit with them. The second class roads are of lesser importance, and third class roads are of still less importance from the through-traffic point of view. Finally, there are unclassified roads which, in towns, consist mainly of residential streets which have very little, if any, through-traffic value, and which in the country are roads of minor importance. All routes were given a number and lettered A for first class and B for second class; but so far, the third class roads, which group only came into being in 1946, have not been numbered.

On the trunk roads the Government pays the whole cost of maintenance and improvement, and the Ministry of Transport pay their agent authorities 5 or 6 per cent for doing the work for them. On the other first class roads, the Government pays 75 per cent, on the second class 60 per cent, and on the third class roads 50 per cent. Nothing is contributed towards unclassified roads. In this way, the Department has some control over what is done. The total mileage of roads in Great Britain is 183,000.

For non-trunk roads responsibility rests in the Highway Authority, which may be County Councils, County Boroughs, Municipal Boroughs or Urban Districts. At least, in theory, they can maintain and improve their roads in such ways as they please, but in fact most of them discuss with the county engineer any large scheme of road-surfacing which they may contemplate, and, of course, the Ministry of Transport has some control if they want a grant. Whereas the Department is responsible to a Minister, the

engineers of other highway authorities are responsible to their Highway committees, and the Ministry, by reason of financial contributions, has usually an indirect control over what a highway authority does to its roads. The highway authorities send plans, estimates, and details of their works to the Ministry for approval. All these must be examined and vetted. Often alterations are required and these are effected either by correspondence or discussion. The Department tries to get uniform standards adopted, and also suggests and advises highway authorities on their engineering layouts and construction and on their specifications.

All proposals for new roads are submitted and where there is any substantial opposition to a proposed new road or widening, the Minister will hold a public enquiry, which is taken by one of the engineers of the Department, except in cases where the line of a new trunk road is concerned, when some outside person holds the enquiry.

PRACTICAL POLITICS

Political Speaker — "What we need is a working majority and then —"

A Voice — "Better reverse it, mister. What we really need is a majority working."

THE MASTER KEY

We have had proof, time and time again, that the worst bottlenecks in the production drive are caused by inefficient transport, and in almost every other country in the world but this it has been recognised that the master-key to transport problems is the provision of up-to-date roads.

Extracted from "Highways and Bridges" — December 27, 1950.

THE PRESS ON THE MOTOR VEHICLE TAXATION ENQUIRY COMMITTEE REPORT

The "Economic Weekly", Bombay
dated January 6, 1961.

One of the most painstaking and carefully reasoned reports which have been published recently on behalf of the Government of India is that of the Committee on Motor Vehicles Taxation, which argues an excellent case for freedom in road transport.

Several people have said a good word about the report, which is very painstaking and has also got perspective.

It is clear that the States will not surrender their revenues so easily for road development. They will choose to retain their freedom to levy sales tax. And the automobile assembling plants will not, if they can help it, submit their production accounts, and claim a subsidy from the Central Government instead of the present high tariff wall. What then is left of this report? Freedom for private enterprise, and the killing for ever of the old bogey of road-rail competition may be about the only gains of this enquiry, when the recommendations of this report are at last implemented. What exactly these will mean by way of better transport on our roads for short distances remains, therefore, to be seen.

The Statesman, Delhi,
January 12, 1961.

The Committee urges principles which in general seem sound; but because it stresses, rightly, greater expenditure on roads, "the burden of taxation on

the average motor vehicle user will not be reduced," except that local taxes will be less or non-existent and his repair bill will be cut because of better roads.

The centre, said to collect Rs 14 crores in revenue and spend only Rs 2 crores on roads (comparable figures for States are Rs 7 crores and Rs 14 crores), is exhorted to pay more into the Central Road Fund. States should levy only two taxes, designated fuel and vehicles, in place of the present "host"; they should have their own non-lapsing road funds, to which the ubiquitous bullock-cart is invited to contribute. With uniform scales, as recommended, impediments to inter-State and inter-regional traffic will be removable, and by this simplification, combined with diversion to roads of funds attributable to them, the nation may get "cheap, rapid and efficient transport." The Committee has propounded ideas for discussion, and such as prove intrinsically sound deserve earnest consideration.

The Leader, Allahabad,
January 1, 1961.

In its report the Motor Vehicle Taxation Enquiry Committee has suggested a number of reforms. Among these are a simplification of the tax structure on road users, rationalisation of the Government's transport policy, and proper co-ordination of the road development programmes of the Central and State Governments.

In the case of States the expenditure on road repairing, road maintenance, and road construction is conditioned by the exigencies of current revenue. This has resulted in low expenditure to the neglect of roads.

The Committee has recommended that as has been suggested by the Planning Commission in connection with India's irrigation development programme, a definite sum of money should be put into a 'ways and means' fund every year by each State from general revenues, from loans, and from savings. This should constitute a non-lapsable fund out of which money may be spent on road programmes. The suggestion deserves careful consideration. The Nagpur Conference had recommended, and the Committee has supported, the constitution of an independent Central Road Board on the model of the Bureau of Public Roads in the U. S. A. It is unfortunate that the Government of India have not as yet accepted this recommendation. In order to undertake a unified programme of road development such a central board with counterparts in the different States is absolutely necessary.

The Committee has recommended that as a matter of policy, and deliberately, scope should be given to private enterprise to develop new routes and traffic as they did in the past. As it is in marked contrast to the policies of State Governments, this recommendation of the Committee should make them take stock of the situation and consider whether, and to what extent, the present road transport policies of State Governments should continue in the future.

The Hindu, Madras,
January 2, 1961.

The Motor Vehicles Taxation Enquiry Committee has produced a very competent report. The Committee has been concerned to see that motor vehicle taxation throughout the country is placed on a uniform, reasonable basis and that the user of motor transport gets a fair return by way of improved roads for the heavy burden of taxation he bears. The Committee has found that motor taxation in this country is among the highest in the world. The bulk of the proceeds from taxation of motor vehicles goes to the Central Exchequer, while the

main burden of responsibility for the construction and maintenance of roads rests on the States.

The main recommendation of the Dalal Committee is aimed at remedying a situation in which the Centre gets all the money while the States have to bear all the expenditure on account of the development of motor transport in the country.

In recommending a uniform basis for the taxation of motor vehicles by the States, the Committee has been impressed by the fact that the present system is not based on any principle. The taxation of public carriers is unduly heavy in some States and the Committee calculates that an average lorry pays in Central and State taxes alone an amount per ton-mile on the goods it carries twice as much as the railway freight per ton-mile.

The Finance Minister of Madras has admitted that the rates here are the highest in the world and that a measure of relief is due. It should be noted, moreover, that while the taxes collected by the States themselves may be less in the case of the Punjab, Bihar, Assam and West Bengal, there will be substantial increases the total resources available to all the States for road development will be much more than before if the Committee's recommendations are implemented. It is to be hoped that the State Governments, whom the Union Government propose to consult before taking a decision on the Committee's report, will adopt a constructive attitude towards its recommendations.

Indian Express, Madras,
January 2, 1961.

The survey of transport and taxation is accompanied by more than a mention of private enterprise. State monopolies will not cover the whole area. On cross routes the independent bus-owner will remain and the encouragement of private services is demanded by the lack of adequate

facilities. The picture drawn as to inland transport leaves the impression that road transport must get State aid, also that road tax like that levied in Turkey and spent on local schemes along with a fuel tax imposed for road development will give more satisfaction than the present double-decker tax system in vogue. On one point the Committee is positive. It argues that the railway mileage in India is sufficient and the railways require no protection against road transport while controlled competition is a true guarantee of progress.

The advocacy of lower taxes is certainly combined with a precise appreciation of the problems. It is noted that working costs are uniform and taxation should be uniform. The Centre should make non-lapsing grants for road development and transport policy must be related to economic planning. The segregation of funds for road improvement is derived from the Committee's view that inter-State transport must be encouraged, subject only to rules about weights of vehicles. The caution given as to nationalisation may contradict the law adopted lately about road transport but it has certainly to be borne in mind. A better and cheaper service must be available to justify nationalisation. That is likely to please the public as well as the road transport interests who have had an assurance as to a square deal.

The Mail Madras,

January 3, 1951.

There is no gainsaying the fact that the policy enunciated by the Committee that there should be uniformity of taxation throughout the country has much to be said in favour of its adoption, especially if there is a reduction of the high rates of taxation which are now levied in many States. The fact that high local taxation is harmful to trade is another point which the Committee stresses, a point of view which has been emphasised by bodies and associations interested in the development of motor transport for the past quarter of a century.

It is one that has been steadily ignored by administrators who have ever been in search of sources of taxation to finance socio-political schemes. It is to be hoped that they will now take the heed of the advice contained in this report.

If the suggestions of the new committee are accepted there might be a reasonable chance that the next few years will see much-needed improvement, and ensure the development of road transport as a national enterprise.

Bharat, Bombay,

January 3, 1951.

The Motor Vehicle Taxation Enquiry Committee (Chairman: Mr. M. N. Dalal), which inquired into the burden of taxation on motor vehicles, has, in an admirably comprehensive and lucid report, drawn the pointed attention of Government to the wide disparity in the methods of taxation of motor vehicles and, appropriately enough, to the heavy burden of these taxes. The average goods lorry pays in Central and State taxes alone, according to the Committee, twice the average earnings per ton-mile of goods carried by rail. The Committee has further revealed that in the Part A States, the motor vehicle user paid in taxes in 1949 more than twice the cost of maintaining the roads.

Tribune, Ambala Cantt.,

January 4, 1951.

The motor Vehicle Taxation Enquiry Committee.....has made recommendations of far-reaching importance.

In order that road transport services should be cheap and efficient we need adequate funds, partly through loans and partly through taxation, for the maintenance and development of roads, a fair tax system which does not hinder the growth and expansion of the road transport industry and a co-ordinated plan to ensure maximum co-operation among various transport agencies. The Committee has made recommendations which are calculated to achieve all these objects.

The most important recommendation of the Committee relates to the creation of two road development funds—Central Road Fund and the States' Road Funds.

The second important recommendation of the Committee is the achievement of uniformity in the scheme of taxation.

The Committee's taxation proposals are, on the whole, framed on right lines. Since the State Governments are responsible for the maintenance and development of roads other than National Highways, it is but right that the Central Government should make a substantial contribution to the States' Road Funds from the import duty on petrol.

The Committee's suggestion for imposing a tax of Rs 60 a year on bullock carts plying as public carriers in and near the towns is unacceptable. Most of the bullock cart owners will find this burden very heavy. There will also be strong objection to the levy of the road cess of one anna in the rupee on land revenue. The proposal of a road cess is defended on the ground that while the prices of agricultural produce have increased very considerably land revenue has not increased.

Though we strongly support the policy of nationalisation of road transport, we agree with the Committee that the States ought not to embark upon nationalisation of road transport services unless they make sure that they can provide more efficient and more economical service than the private operator. There is, however, a very great need, as the Committee rightly points out, for strict regulation of motor transport and enforcement of regulations and for the scrutiny of all demands for increases in bus fares.

Pioneer, Lucknow,

January 3, 1951.

The Motor Vehicles Taxation Enquiry Committee presided over by Mr. M. N. Dalal which has just released its report has pointed out the anomalies resulting from the operation of these rival interests and recommended a new scheme of taxation to be allocated equitably between the various authorities.

Despite the key role that road transport plays in the economy of a country of large distances like India, it is surprising that motor buses and lorries and the commodities required for their maintenance and working are still classed officially as "luxuries", and the import duty payable on them averages 75 per cent, and that on motor spirit 105 per cent as compared to 30 per cent which is the standard rate of tariffs on goods classed as "non-luxuries". It is also strange that while motor goods are classed as luxuries, railway goods are not. It is high time that the Central and State Governments studied the practical effects of their taxation and regulatory measures on Indian economy as distinct from their effect on Government revenues. The Motor vehicle user in India is the highest taxed person in the world and Indian roads are the most exorbitant rates in the world. The Committee has recommended a drastic reduction in the rate of taxation and a progressive increase in the expenditure on road development. A Government of India Administration report early in this century described roads "as the rock on which the Moghul Empire finally split" and unless the Government reverse their policy of not merely taxing but taxing out the motor vehicles we may run up against the same rock and meet with the same result.

"QUIZ" FOR MOTORISTS

PLEASE ANSWER HONESTLY

(Extracted from 'Automobile News' — October, 1950)

EACH question in Part I of the MOTORISTS' QUIZ, to which you can give a definite "yes" and each question in Part II to which a definite "no" is given scores 5 points. If you cannot honestly answer "yes" or "no" please allot 1, 2, 3 or 4 points according to your own judgement or, better still, try the questions with a friend.

If the total score is 100 you can consider yourself a safe driver.

If the score is 80 you are an average driver.

If the score is below 80 you are not a safe driver.

If your score is below 60 you are a public danger.

Part I (five points for each question if the answer is "yes")

1. Is your vehicle in a fit condition to be used on the roads?
2. Do you have your brakes, steering, tyres regularly attended to?
3. Do you know the distance in which your vehicle can be stopped from any given speed — say 30 m.p.h.?
4. Do you always bear in mind the fact that the faster you travel the smaller will be the margin of safety in an emergency?
5. Do you know the proper signals to be given to indicate your intentions to other traffic and to members of the Police on point duty?
6. Do you always give these signals at the proper time?

7. Do you always show courtesy and consideration to other road users and pedestrians?
8. Do you drive within the limits of your lights?
9. Do you use the anti-dazzle or dipping device fitted to your vehicle when meeting other traffic?
10. Are you capable of correcting a skid on a slippery surface?
11. Do you make a practice of using your driving mirror, especially when about to drive off, turn, overtake, stop, or open the door?
12. Are you constantly on the alert for children and pedestrians who may step suddenly on to the road?
13. Do you keep a look out for traffic lights and traffic signs?
14. Do you promptly obey signals given by a member of the Police on point duty?
15. Do you take special care at cross-roads and give way to traffic on major roads?

Part II (five points for each question if the answer is "no")

1. Do you invariably try to pass the car in front of you?
2. Do you accelerate when another car tries to pass you?
3. Do you drive on your brakes and horn?
4. Do you overtake on corners, bends or at cross-roads?
5. Do you stop or park your vehicle where it may endanger or obstruct other road users?

PAVEMENT DESIGN

[FROM A TALK BY SHRI C. B. PATEL]

[IN a series of talks on technical and administrative subjects arranged by the Central P. W. D. at Delhi, one of the talks made a plea for a rational design of highway pavements. The speaker condemned the practice of making roads too strong for the traffic requirements as much as he condemned making them too weak. This "overdesigning" or "underdesigning" comes from treating the subject in a haphazard way, and from lack of research i.e., lack of research—type of thinking—in the country.

Research in the West, according to the speaker, had led to the reversal of certain fundamental conceptions about the functions of a pavement. It is generally thought that a pavement serves to distribute traffic loads on the subsoil and thus enables the subsoil to stand heavy loads. Test track data and experiments with granular materials, however, had shown that a pavement was more useful in restraining the upward movement of the soil beyond the area covered by load than in distributing the load under the wheel. This restraining effect depended upon the flexural strength of the pavement. This meant that the upper portion of the pavement was under tension and the lower portion under compression. For this reason the reinforcement in all the cement concrete pavements in the U. S. A. was placed above the neutral axis near the top. The restraining effect of the pavement was of course enhanced by its weight and the weight of the sub-base. This, therefore, directly gave a thicker pavement for poorer soils.

To determine the resistance value of soil a machine called the Stabilometer had been devised which measured the horizontal pressure in a given sample resulting from applied vertical pressure.

Another important and handy instrument devised was Hveem's cohesiometer which gave the modulus of rupture of the sample. The simplicity of this apparatus made it suitable for use in field laboratories to find

the modulus of rupture of the samples of concrete laid every day.

Coming to the various factors governing the thickness of a pavement and its base, the following relationships had been found by actual experiments on test tracks:—

The total thickness of the base and the surface.

(1) was directly proportional to the tyre contact pressure;

(2) was proportional to the width of the loaded area or to the square root of tyre contact area. (It had been found by experiment that the thickness of pavement was proportional to the tyre pressure multiplied by the square root of the area);

(3) was proportional to the logarithm of the load repetitions. (Experiments had shown that the total load repetition which a road surface had to stand played an important part in its life);

(4) was a linear function of the Stabilometer value Ph/P_v which represented the resistance value of the soil. (As explained above the relationship between the horizontal pressure which the soil sample transmitted for a given vertical pressure was a very important factor to determine the type of soil and its ability to withstand the loads. This experiment was conducted with a sample of the soil in the worst physical condition which the soil might have to face in actual practice, i.e. if the soil was expected to be waterlogged then this test would be conducted with the sample of soil fully saturated with water, and

(5) was inversely proportional to the fifth root of the cohesive value of the pavement material in gms./sq. in. as measured by the Cohesiometer. (It was necessary that the top part of the base and the surface should possess high cohesive strength in order to resist tensile deformation).

The above requirements were represented by the equation:—

$$T = \frac{(KP \sqrt{a \log r}) (Ph/P_v - 0.10)}{\sqrt{C}}$$

where T = Thickness of cover (Base and Pavement) in inches.

K = Constant, 0.0175 for best correlation. For design purpose it may be taken as 0.02.

P = Effective tyre pressure (lb per sq. in.)

a = Effective tyre area in sq. in.

r = Number of load repetitions expected in the life of the pavement.

P_v = Vertical pressure applied in the Stabilometer (typically 160 lb. per sq. in.).

Ph = Transmitted horizontal pressure in the Stabilometer (lb per sq. in.).

C = Tensile strength of the cover material as measured by the Cohesimeter in gm. per sq. in. (approximately = modulus of rupture × 454).

This formula which, in the speaker's view, was rather complicated had been reduced to a chart which straightaway gave the thickness of the base required. To simplify the matter the tyre pressure, tyre area, and load repetitions had been combined into one factor which was known as "the equivalent wheel load" (EWL).

The speaker then exhibited some tables and charts used in the U.S.A. for designing pavements and for the benefit of the audience he worked out an example of pavement design.

Concluding the speaker brought out two important points for consideration by road engineers:

- (1) that the total thickness of pavement and base should be determined according to the requirement of each case.
- (2) that the type of the base to be adopted should be determined on the basis of the availability and rates of materials.

تنگ دنیا میں دل اس دور فلک سے اُگیا
جس جگہ میں نے بنایا گھر سڑک میں اُگیا
اکبر الہ آبادی

*Tang duniya men dil is daure falak se a gaya;
Jis Jagah main ne banaya ghar sarak men a gaya.*

—Akbar Allahabadi.

Translation:

I am fed up with Heaven's persecution;

Wherever I built a house, the land was acquired for a road.

(Heaven appears to believe in the greatest good for the greatest number—Ed.)

TRAFFIC SURVEYS

CALCUTTA'S TRANSPORT BOTTLENECKS *

TO engineers, town planners, and traffic authorities who aim at providing roads that will reduce accidents, congestion, and vexatious delays at crossings, a traffic survey gives valuable information, useful for a scientific approach to the problem. Sometimes back the Government of West Bengal set up a Committee to investigate traffic problems in and around Calcutta. The problems need early solution as, in the face of the rapid development of the suburbs and the construction of satellite towns around Calcutta, haphazard planning is sure to lead to strangulation of traffic. The Com-

mittee has, therefore, started investigations in right earnest.

Among other things the Committee will undertake a through investigation of the volume, nature and duration of traffic at the outlets and inlets of the city and at selected points within the city, draw up proposals for relieving the existing congestion at all points, in a manner commensurate with the hardships involved, suggest a road plan for better traffic movement in the future, work out the rough costs of suggested projects, and determine priorities.



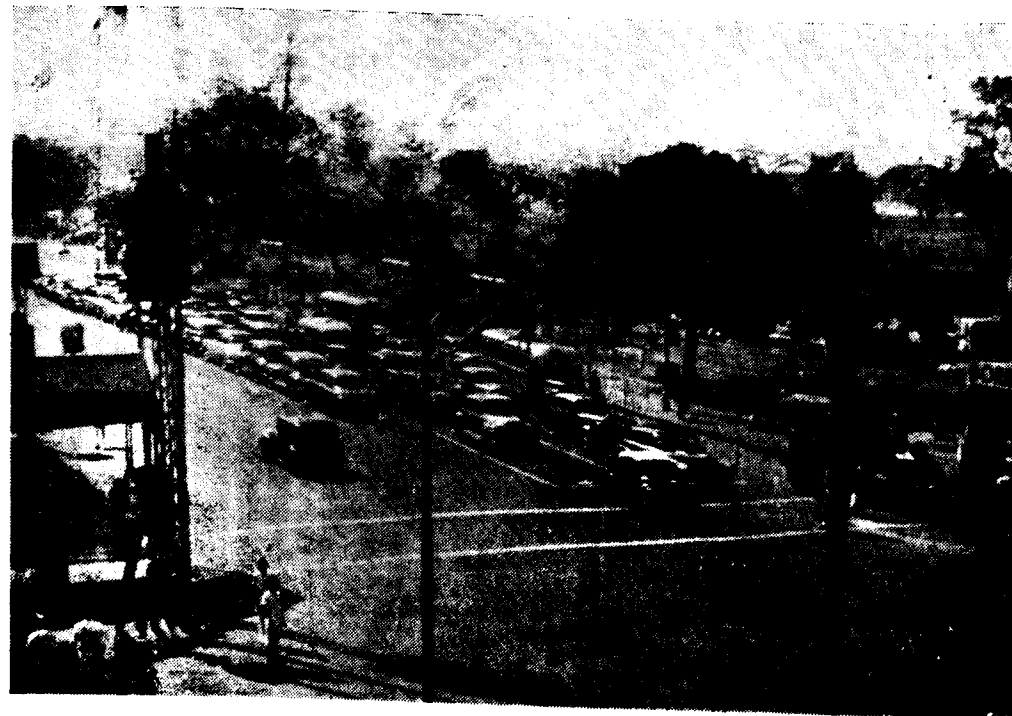
Esplanade Crossing at 11-30 A. M.

* For further details please see "Some Examples of Planning Surveys" by R. P. Chanda published in the Indian Roads Congress Journal, Volume XV, part 3.

As a first step, traffic censuses are being taken at selected points along the main arterial routes. For internal surveys no attempt is being made to interfere with the flow of traffic in order to make enquiries regarding origins and destinations. Such information will be collect-

the best location of main thoroughfares and the subsidiary routes.

The traffic census now in progress in the city is being taken only during daily peak traffic periods lasting from six to eight hours. A notable feature of these surveys is that records are kept of the durations of



Whiteway Laidlaw Crossing at 11-15 A. M.

ed at external points in order to assess the volume of traffic bound for different parts of the city as well as for zones beyond it. Such information will help in deciding

traffic blocks caused by traffic signals and the number of motor vehicles detained each time. The two photos given here show such traffic blocks.

WAYS AND MEANS

Little Mable: "Mother, dear, do missionaries go to heaven?"

Mother: "Why, of course, my dear."

Little Mable: "Do cannibals?"

Mother: "No, I'm afraid they don't."

Little Mable: "But, mother, if a cannibal eats a missionary, he'll have to go, won't he?"

OUR INDIA

Area and Population of the States

Name of State.	Estimated Population (in millions) as on 1st March 1950.	Percentage of Population.	Area in Sq. miles.	Percentage of Areas.
PART 'A' STATES				
1. Assam	8.51	2.45	53,084	4.38
2. Bihar	39.42	11.35	70,368	5.80
3. Bombay	32.68	9.41	110,130	9.08
4. Madhya Pradesh	20.92	6.02	130,323	10.74
5. Madras	54.29	15.63	127,768	10.53
6. Orissa	14.41	4.15	59,869	4.94
7. Punjab	12.61	3.63	37,428	3.08
8. Uttar Pradesh	61.62	17.74	112,523	9.28
9. West Bengal	24.32	7.00	29,476	2.43
Total Part A States :	268.78	77.38	730,969	60.26
PART 'B' STATES				
1. Hyderabad	17.69	5.09	82,313	6.79
2. Jammu & Kashmir	4.37	1.26	82,258	6.78
3. Madhya Bharat	7.87	2.26	46,742	3.85
4. Mysore	8.06	2.32	29,458	2.43
5. P.E.P.S.U.	3.32	0.96	10,099	0.83
6. Rajasthan	14.69	4.23	128,424	10.59
7. Saurashtra	3.96	1.14	25,345	2.09
8. Travancore-Cochin	8.58	2.47	9,155	0.75
Total Part B States :	68.54	19.73	413,794	34.11
PART 'C' STATES				
1. Ajmer	0.73	0.21	2,400	0.20
2. Bhopal	0.85	0.24	6,921	0.57
3. Bilaspur	0.13	0.04	453	0.04
4. Coorg	0.17	0.05	1,593	0.13
5. Delhi	1.51	0.44	574	0.05
6. Himachal Pradesh	1.08	0.31	10,600	0.87
7. Kutch	0.55	0.16	8,461	0.70
8. Manipur	0.54	0.15	8,620	0.71
9. Tripura	0.58	0.17	4,049	0.33
10. Vindhya Pradesh	3.88	1.12	24,600	2.03
Total Part C States :	10.02	2.89	68,271	5.63
GRAND TOTAL (INDIA)	347.34	100.00	1213,034	100.00

Note :—Population figures without percentages were also printed in T. C. M. R. for September, 1950, page 25.

HERE AND THERE

1. MEASUREMENT OF A DRIVER'S ALERTNESS

A portable "Alertness Indicator" which signals dangerous or undesirable lethargy in performing monotonous routine tasks on long duration, has been developed by the Laboratory of Sensory Psychology and Physiology of Tufts College, Medford, Mass.

Electronic pickups strapped to the head of a person performing the task, relay "muscle spikes" from the facial muscles in the region of the forehead to the indicator. The readings obtained give an indication of any rise or fall of alertness experienced by the driver of a vehicle, a pilot, or any person performing a monotonous task over an extended period of time.

Tests on a truck driver, operating a large truck and trailer from New York City to Boston, Mass., over a period of 11 hours showed that several situations gave rise to a relatively high degree of alertness while other situations caused levelling off or a substantial drop in alertness.

In terms of electrical output from the driver, the following tabulated data on driving conditions and accompanying alertness indicator readings show the

differences between easy and difficult driving conditions.

Driving Conditions	Electrical output from forehead of driver in micro-volts.
Turning trailer round	10
Heavy Traffic	9.1
Sharp curves	9
Sudden stop	9
Sudden speeding up	8
Shifting gears	7.2
Passing vehicles (overtaking)	7.2
Rain, snow	6
Intersections	6
Easy driving along straight way	3.5
Good driving conditions	3.5
Stopping and waiting at traffic lights	2
During ferry trip	1.2

These data indicate great differences in energy demands on the driver while driving under various conditions of traffic and weather.

(From *Journal of the Franklin Institute*—July 1950)

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2. ROLE OF RESEARCH IN BASIC DESIGN

LET us realize for once and for all that even object-directed research can be done only in phases of fields of science that support certain classes of end products, not in the end products themselves. As a consequence of this realization, let us cease the assignment of object-classified research projects; and, instead assign to research establishments broad categories of research or Research programs. The projects (or problems) under these categories that can be undertaken at one time depend upon the competence and enthusiasm of the available scientific staff. One can look to the scientists themselves to suggest in large part the specific

problems that they feel qualified to attack, and as long as the solution to a problem appears to be in support of the general field of end-products in which interest lies, the work should be approved. This liberality in work assignment is not extravagant—it is economic, because the morale and working enthusiasm engendered, the class of men attracted, and the class of men developed under such conditions make a group that can do more useful things while working only part-time on those things than a group of similar size working full-time on object-classified projects. This change in orientation of assignments is step one.

Having acquired a good research staff under step one, let us use them. The tendency has been to call on research only after the design is in grave trouble in the test stage, and after it is uneconomical to make basic changes. Under these circumstances, research must confine itself to trying to make the best thing that it can while following principles that it is too late to change.

The practically useful product of research is basic design data. **Let us not demean research by assigning to it a design problem under the guise of research.** Let us instead frankly ask the qualified scientists to take time off from their fundamental studies to produce a technical discussion, tabular data, and curves from which the design engineer can make intelligent choices of his design parameters. Giving research an initial place at the council table is step two in this discussion.

The third step in the more effective use of research is its greater exercise in a consultative and advisory capacity. Whereas its responsibility ceases with basic design data, research should be used **to check upon design** to see to it that none of its design principles are violated without good cause. Its initial participation in design makes research especially useful in giving expert help to design and development engineers.

The three steps discussed can be summarized as understanding the role of research and giving it an appropriate place on the user-research-design-development team.

* * *

[Colonel L. E. Simon Chief Research and Development Division, U. S. Army Ordnance]

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3. ENGINEERS AND WORLD ECONOMY

THE engineering profession in all its branches, and the scientists, have many truly great achievements to their credit; and, justly, they are proud of their accomplishments. But while they have made possible the physical basis of modern civilization, they have been content to permit other, **self-styled experts**, to take the lead in determining national policies as to how their inventions and improvements should be utilized. The result is

worldwide chaos; and, for the second time in one generation, the repeated breakdown of the world economy brought civilization to the brink of disaster which engineers might have prevented had they accepted a task for which they are peculiarly fitted. From the broad point of view, what else, but bringing order out of chaos is an engineer's work?

(From the "Civil Engineering" December 1941).

4. EIGHTY THREE PER CENT OF DRIVERS DON'T CAUSE ACCIDENTS

AN analysis of National Safety Council records discloses that out of 51,469,000 licensed drivers in the United States, 8,845,000 - or 17 per cent - were causing all of the accidents as results of traffic violations.

The remaining 83 per cent of the drivers did not cause any accidents, and 70 per cent were not even involved in an accident. The other 13 per cent of the nation's drivers were innocent or careless victims of another's violation.

These figures are based on 8,200,000 motor vehicle accidents involving 15,500,000 drivers. Police records reveal that 57 per cent of drivers involved in accidents were guilty of traffic law violations and were to blame for the accidents.

Nine violations were responsible for 85 per cent of the accidents. They were: Drunk driving and speeding, 24 per cent; failing to yield right of way, 17 per cent; following too closely, driving on wrong

side of road and giving no or improper signal on turning, 36 per cent equally divided; improper turning, parking and starting up and disregarding stop sign account for the remaining 14 per cent.

More than two million motorists in one year caused death and serious injury by speeding and drunk driving, and one and a half million drivers barged through

traffic and intersections, claiming a right of way that was not there, to bring about tragedy and suffering.

The cheerful note is, however, that more than 36 million drivers never even become involved in an accident, let alone cause one.

(From 'Highway Research Abstracts'—April 1950.)

5. DOING AND SHOWING

WE cannot conclude without reminding our countrymen that their strong point has always been doing, in contradistinction from exhibiting. We are not sensible of any more striking moral characteristic between the Saxon and Celtic races than that the Saxons perform while the Celts exhibit. The former, though abundantly self-willed, self-confident, and self-conceited, are withal awkward and retiring. They are not gaceous. What they do is done for themselves, or because the thing is worthy to be done, and it is not done for show. The Celts, on the contrary,

always display all their virtues. Whether it be at the fair, flourishing a shillelah, dancing on the village green, erecting magnificent castles, or constituting a state, their desire is to attract admiration. They prefer the arts which dazzle others to those which comfort the artist and his neighbours.

(Extracted from 'The Economist'—October 12, 1850)

(This is what the Sassenach thought a hundred years ago. Does he think so in the "Festival" year 1951?—Ed.)

6. REMINISCENCES

No Autos for Engineers.

"WHEN I first went to work for the State (1914), employees were not permitted to have automobiles in District 11. Saddle horses were at first permitted for transportation, and horse and buggies were later provided for resident engineers. The State called for bids and livery stablemen would bid on furnishing a horse and buggy. I recall that I succeeded in obtaining a very beautiful pacer. This animal, a mare named Molly, was reputed to be the fastest horse in Tehama County at that time and was raced every year at county fairs.

In going to work, the roads were dusty and no young engineer worth his salt desired to have anyone pass him on the road. I vividly recall that I quickly learned to take the reins up short, cluck to Molly when anyone tried to pass us, and down the road we would go pacing in a cloud of dust. Early in 1916 I was

permitted to have a motorcycle which I had to buy with my own money.

When the motorcycle was used on state business, the State allowed 14 cents per mile reimbursement, but I had to furnish the gas, oil, repairs, and tires. Tires were the principal cost since they only lasted one or two thousand miles.

Banked Curves

"In the early days, the pavements were 15 feet wide, four inches thick, and 1-2½-5 mix. **Superelevation of curves was not permitted (banking of curves).** I recall that on an early job on which I was resident engineer I went ahead and banked all the curves without obtaining my authority from the division engineer or from the Sacramento office. County ordinances usually limited the speed of traffic to 25 miles per hour, and this was the case in Tehama County at that time; so,

banking of curves was really hardly necessary.

"After the job was finished a big celebration was held and officials came from Sacramento, including the Governor. I was very proud of my banked curves as I had received a good deal of favorable comment from the local people. They were just like the railroad curves with which I had been familiar in my earlier railroad experience. I recall, however, an extremely sharp reprimand, both from the division engineer and the chief engineer, who came to the celebration. I was asked

to explain in a formal letter by what authority I had superelevated the curves. I remember that I hoped they would fire me; I would then have gone back to Paramount at greatly increased pay. However nothing came of it. The following year all new contracts provided for banked curves.

(Extracted from 'California Highways & Public Works'—July-Aug. 1950.)

(We would appreciate if Indian Engineers could let us have similar interesting details and anecdotes from their lives.—Ed.)

7. FALSE ECONOMY

IT is false economy to cut the grants for roads in this State as such reduction will inevitably be followed by increased costs or loss in other services. Yet that is what the Madras Government is doing. The Government expects to save Rs 50 lakhs under Highways in connexion with the economics, amounting to Rs 3.12 crores, which it proposes to effect in the administration as a whole. Although the total saving is to be applied to important capital works, **the expenditure on roads is already inadequate and does not permit of a reduction.**

Asked whether the saving would affect the development of roads in rural areas, the Finance Minister, in the Legislative Assembly, said that "any expenditure deferred will have its own repercussions and, to that extent, roads will not come up to the standard of efficiency expected." This statement will cause great disappointment to the people. The latter pay very heavy taxes for the use of the roads, and it would be unjust on the part of the State to maintain such a high level of taxation and reduce the expenditure necessary for the proper maintenance of roads.

Roads in the rural areas generally are in a deplorable condition. To improve and extend them is one of the most urgent needs of the State. The lack of proper roads interferes with all efforts to improve villages, to develop agriculture, and the marketing of commodities, and to spread

education, medical relief, public health activities, and other services. In a recent broadcast the Public Works Minister drew attention to the lack of communications. He said: "It is necessary to bring about a balance between urban and rural roads. The gaps in the present network of roads are large and must be filled by new roads to form a road grid in the country. Rural roads form the bulk of these gaps." He was right. But how can roads be maintained efficiently and extended, as they should be, if the Government reduces the budget allotments?

In 1945 the Government adopted a Post-War Development Scheme to provide access by road to all villages, having each a population of 500 or more, and to extend highways so as to bring all villages within two miles of a district road or a highway in densely populated areas, and within five miles of such roads in thinly populated areas. There are 12,000 villages of that size which remain to be linked with main roads. The Government's scheme is to construct 18,000 miles of road in those areas, and in 1947 it took in hand a programme for the construction of 10,600 miles in a period of five years. Against this, only 1,000 miles of road have been opened. Unless more funds are provided for these works, no greater progress can be expected.

(Extracted from 'The Mail'—Madras Dec. 9, 1960.)

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8. RAINBOW ROADS

RAINBOW coloured roads are being tested along a country highway north of London for possible use in the Festival of Britain next year.

Government road research scientists are trying out the durability of a range of colours which may be incorporated in the pavements of the London show grounds.

Motorists on a by-pass near Colnbrook, Buckinghamshire, are now passing over

two and a half miles of red, white and blue surfaces.

Special transport bitumen pigmented with a variety of hues have been assigned to the experiment and the road scientists will report which stands up best for wear. Some colours are also considered "safer" than others for traffic problems.

(Extracted from 'The Hindustan Times'
—December 24, 1950)

9. 200 "TRAFFICONES" ON STREETS AT ONE TIME



One of the "witches' Hats" used by maintenance crews when repairs are being undertaken. The real name of this popular safety device is "Trafficone".

running over wet-paint lines. These flexible cones are also used occasionally when other traffic improvements are made on streets, but their major use is in the summer time during pavement-stripping operations. One other advantage of these Trafficones is that they can be nested very easily and a great many carried in a small space. They are easy to set out and easy to pick up.

THE city of Wichita now owns approximately 250 Trafficones, which are used in pavement-marking operations. As many as 200 of these cones have been used on the streets at one time. They have been very effective in keeping traffic from

(Extracted from 'The American City'—
August 1950.)

10. POLICE COURTESY VERSUS LAXITY

MANY visitors receive a lasting impression of the town by the appearance and manner of the police. A ticket for a traffic violation, particularly if not quite justified, can make that town mean trouble in the memory of the motorist receiving the ticket.

Municipal officials know this, and many are calling their policemen "Salesmen of the town." Several cities have tried courtesy notes instead of tickets for overstaying parking-meter time. The note says that the police department has deposited the overtime nickel which the motorist may refund if he desires to do so.

At first there is great appreciation and acclaim; carelessness and callousness

come later. For instance, in Hoquiam, Wash, there were 256 tickets issued during the month before the courtesy plan was tried. Thereafter, violations ran 400 to 500 per month, with the latter figure in the last two months of the plan. The trend was toward general disregard of the parking meters.

Leniency is good in particular instances where it fits. As a general policy it is demoralizing. Police courtesy is universally appreciated. It had better be confined to answering questions and giving directions than include indulgence for misdemeanors.

(Extracted from 'The American City'
—August 1950).

11. A RAILWAY ENGINEER SPEAKS OUT

IN talking of Railways, it may not be out of place to touch on a subject of local interest here: The link from Cochin to Quilon or Kottarakara. We have heard it mentioned more than once not only in the local assembly, but also in the Central Parliament. From a casual look at the map, this appears to be a desirable link. But has anyone worked out the commercial value of it? We have a very thickly populated country. In fact ours is a vast garden city. We need practically house to house service. This is as regards movement of people. Is a railway going to help us much or at all in this respect? To me it appears that what we want is the intensive development and improvement of our road transport. A mile of railway line will cost Rs 3 lakhs at least to build. Maintenance per mile will cost about Rs 5,000/- and total working expenses Rs 20,000/- per mile. And how is a railway going to benefit anyone here?

An economic passenger train should take at least 200 passengers, and there must be many such trains. I doubt if this number will travel by local trains. An economic goods train should take at least 400 tons every day. Have we got this traffic? I doubt. Except as a strategic link for defence purposes I do not consider that this line is commercially justifiable. This is a very thickly populated country. There is considerable short distance movement of people. Give additional roads. Perfect the existing ones with concrete surfaces, provide comfortable house to house road transport. These appear to me to be very much more important than the Railway link.

[From the Chairman's Address by Sri S. K. Panikkar, M. A., B. Sc., M. I. E., Chairman, Travancore Centre of the Institution of Engineers (India) —17-12-1949.]

12. AND NOW A SURGEON

LEADING for the development of village communications, Dr. Narasimhan said that without proper transport facilities in villages the "production of a large number of doctors would not in itself solve the problem of affording medical relief to the millions of people of India."

[Mr. Narasimhan at the 12th Annual Conference of the Association of Surgeons—New Delhi—30.12.1950.]

13. DETROIT JAILS RECKLESS DRIVERS

THAT ordinances already existent in many municipalities have only to be enforced to reduce traffic crashes, fatalities, and disorder, is being shown in the case of Detroit. In the 12 days from May 7 to May 19 more than 120 reckless drivers were sentenced to jail. Only one traffic fatality occurred during that period against a fine that were due by past experience.

Those jailed were apprehended while driving 15 miles or more above the official speed limit, or were under the influence of

liquor, or driving recklessly under the state law. Sentences ranged from 5 to 60 days, and suspension of drivers' licenses for a minimum of 60 days.

The campaign has lifted the morale of police officers, according to Judge John D. Watts. He says they no longer fear that the speeders they sometimes risk their lives to arrest will be discharged by the Court.

(Extracted from 'The American City'—August 1950)

14. FACTS ABOUT ROADS & ROAD TRANSPORT

ROAD transport is now the third largest industry in the United Kingdom, having one and a third millions employees. Only agriculture and building are larger.

On a road carrying six thousand motor vehicles a day one minutes' traffic delay per vehicle costs Rs 65,000/- a year.

When William the Conqueror invaded England, in 1066, King Harold marched his own army to meet him along the Roman Road from York to London, covering more than forty five miles a day. (In these modern days an army does not even run away as fast as this).

The first "motorway" was built more than twenty-five years ago in America and was a great success. There were no sharp curves, no cross-roads, and only

motor vehicles were allowed to go along it (carts, cyclists, and pedestrians being banned.)

There are now more than six thousand miles of motorways in the United States of America and many hundreds of miles of "autobahnen" in Germany, autostrade in Italy, and similar roads in Sweden, Holland, France and Belgium.

The average paved width of the old Roman roads was from fourteen to sixteen feet: the average width of surfaced roads in India is less than twelve feet.

As far as is known, not one new road was constructed in Britain between the time when the Romans left—A. D. 407—and about A. D. 1800 i.e. for 1200 years.

Progress of RAIL-ROAD CO-ORDINATION IN INDIA

OCTOBER 1950.

BOMBAY—The Bombay High Court recently ruled that the Bombay State Road Transport Corporation was illegally constituted and therefore in law did not exist. The Government of Bombay was however permitted to appeal to the Supreme Court of India. In the meantime, the Bombay Government applied for and obtained temporary permits to operate bus services on all routes where the State Road Transport Corporation were running prior to the High Court's judgment. The Government of Bombay have assumed charges of all assets and responsibilities of the Corporation pending the passing of the Road Transport Corporation Bill, 1949 in the Union Parliament. In view of the Bombay High Court's judgment, the payment of Rs 31.63 lakhs, representing 25 per cent of the share capital allotted to Railways in the Bombay scheme during the current financial year, has been withheld for the present.

ORISSA—The Railway Board have agreed to the investment by Railways of Rs 3 lakhs representing 20 per cent of the initial capital required in the first year in the tripartite Joint Stock Company to be formed in the Ganjam Zone.

MADHYA PRADESH—The Directors of the Provincial Transport Co. have

allotted 15,000 shares to the Railway administration in consideration of Rs 3.75 lakhs already paid. It is reported that the response from the public in the matter of purchase of shares has by no means been very encouraging and the period allowed for their sale has been further extended at the instance of the State Government who have agreed to take up all shares if not subscribed by the public. It is also understood that the State Government have decided to contribute Rs 15 lakhs only towards additional capital during the first official year. The shares for the remaining Rs 5 lakhs will be placed on the market in the year 1951-52.

PUNJAB (I)—The Punjab Government have agreed to give to the Railways a 20 per cent share in all the nationalised transport services including those running on local and suburban routes. They have further proposed to set up an *ad hoc* committee, as required under clause 6 of the "Code of Principles, and practice" on which the E. P. Railway will be represented. The constitution and rules of procedure etc. of the said Committee will be communicated by the State Government shortly.

MATHEMATICAL SECTION

At a conference of engineers, the order of priority for the construction of four bridges A, B, C, and D, was under discussion.

One of the engineers suggested the order B, C, D, A, "That" said the chairman, "has got only two of the bridges in the right place according to my list."

Another suggested the order A, B, C, D, "No" said the chairman. Only one in this is correct according to my list. My list is the best because in that C, and A, are not next to each other which is as it should be."

Can you guess what order the Chairman's list contemplated?

Mechanical Aids to Road Construction and Maintenance and Their Extent of Application in Orissa

BY SHRI E. V. S. IYER

IN Orissa transport is still to a large extent dominated by the forces of Nature. There are no good roads for all weather traffic. The Government have recently approved a five year programme for the more important roads and another five year programme is under consideration. Given the money, it will be the job of the Engineers to carry out the work within the programmed period. In this context it has to be considered that machinery can be used to speed up the construction programme. Our road programme is aimed at doing as much as possible with the limited funds available. This makes it necessary to "tailor the roads" to the needs of the present day traffic and not for the anticipated traffic requirements of a distant future which cannot be foreseen or estimated with any degree of accuracy.

The principal items of road construction work in Orissa are: (1) earth work, (2) soling and metalling where necessary, (3) bridging streams, and (4) black topping the town and village portions of roads. Many of Orissa's roads may have to remain earthen or gravelled for the present. There is nothing wrong in this, provided it is possible to secure a stable well-drained surface to suit the narrow iron-tired bullock cart which is, still, the only means of transport in many parts of the State.

The above mentioned items of road construction work are more or less common to any road work in any country but construction practices vary. The road construction methods in common use in the United States of America are markedly different from those prevalent in this country. The chief difference lies in the application of mechanical aids to facilitate rapid construction and reduce labour costs. The extensive use of machinery in the United States is mainly due to its lower cost compared with the general price and wage level, abundance of manufacture of all kinds of road machinery, availability of skilled labour to handle machinery

efficiently, a large number of big jobs to justify necessary capital outlay on equipment, and above all non-lapsing funds. Good plant performance in the United States is due to the excellent arrangements made for its efficient maintenance.

These facilities do not exist in this country at present and it should, therefore, be obvious that large-scale mechanisation of road construction work here is out of question. It is also not desirable to employ machinery for every kind of road-work, regardless of cost and the time factor. Whatever machinery it may be decided upon to use, it would be necessary, above all, to ensure **continuity of work** for the plant and to the contractors who may be prepared to invest on road-making equipment. Without this, there will be no incentive for the development and use of mechanical aids to construction work.

Then again, we have not yet cultivated an aptitude for mechanical methods of construction and cannot achieve good results without the requisite training and experience in such methods of work. But a beginning must be made whether results be good or bad. That is the only way to becoming machine-minded and, in time to come, the experience gained would go a long way to produce the desired results.

At the same time it is being gradually realised that our five-year programme cannot be successfully achieved according to schedule unless some road-making machinery is obtained to cope with the work.

For road work, several kinds of equipment are used, some for multiple use and others for specified purposes only. In the U. S. A. the bull dozer is the traditional "Work horse" of earth moving jobs; for short hauls, bull dozer and scraper units operating together are economical. Rubber tyred tractors move faster than crawler tractors. The latter are good for use on soft ground.

It is good practice, when selecting equipment, to standardise on one make and type of power unit, to the greatest extent possible. With some planning, it should be possible to obtain equipment of the same make, type and model of power unit. With identical power units, the problem of repair parts and mechanical servicing is simplified. It is a major consideration when equipment is being used at great distances from the source of spare parts and service facilities.

Selection of Plant

The size of equipment and also the type most suited to the job is necessary to be determined, and consideration should be given to the roadway on which it has to work. This purpose will be best served if manufacturers or their representatives are supplied with as much data concerning the work as possible so that they may suggest most suitable equipment. In this connection, the buyer should supply to the manufacturers or their representatives the following general information in addition to any other particular information:—

- (a) General Description and location of work.
- (b) Kind and character of material to be excavated or handled.
- (c) Excavation, whether above or below ground level.
- (d) Disposal of excavation material—whether by dumping on a bank (if so, what are the limiting dimensions, or factors) or by loading in hauling units, (describe size and type of hauling units).
- (e) Output required in specified period.
- (f) Skill or experience of operators available.
- (g) Altitude of operation.
- (h) Climatic conditions.
- (i) Topography of the country.

Large equipment which cannot be used efficiently, or small equipment involving high operating and repairing costs on account of excessive use and wear, are

important factors to be reckoned. Equipment that is best adapted to the length of haul that predominates the job should be used. Final costs are affected materially by the proper choice and use of the equipment. Skilled operation is necessary in obtaining economical use.

The selection of equipment should ensure:

- that actual needs are satisfied and proper quality of work obtained;
- that they should be in operation for a number of years, utilising few types for a number of jobs, and concentrating on the minimum number of models, sizes, parts and attachments;
- that trained men to fit the equipment to working conditions are available;
- that equipment charge should work out to about 15 to 20 per cent of the total cost of the work.

The introduction of machinery on our road works, it is believed, would tend to stabilise the unskilled wages and facilitate the rapid execution of road work with a smaller number of unskilled labourers.

As the improvement of her roads is going to cost Orissa over Rs 10 crores, it would be worth-while to spend about Rs 25 lakhs on equipment which works out to only 2½ per cent of the total cost of the works. The following useful and very common equipment is suggested to be purchased to expedite the State's road construction programme.

Equipment needed for each Division:

1. A TRACTOR CRAWLER-Cable Controlled with bull dozer and trail builder attachments.
2. A TRACTOR-WHEEL MOUNTED with angle dozer attachments (cable controlled).
3. A SCRAPER-self propelled or semi-trailer.
4. A Motor Grader: with
 - (i) Bull dozer blades.
 - (ii) Loader.
 - (iii) Roller attachment.

5. A 3/8 Cu. Yd. Excavator with front end attachments :
 - (i) Dragline.
 - (ii) Clampshell.
 - (iii) Crane.
 - (iv) Pile driver.
6. A 1½ H. P. Gasoline Engine ; Multi-purpose machine with attachments :
 - (i) Sump pump.
 - (ii) Vibrator.
 - (iii) 0 to ½" Drill check with drills.
 - (iv) Grinding wheels.
 - (v) Edge type wire brush.
7. An Air Compressor : with pneumatic tools.
8. Asphalt, pitch, and tar kettles in 115—165 gallon capacity fitted on pneumatic tired wheels with barrel hoist and power spray attachments.
9. A 3-in. Portable Self priming centrifugal pump (15,000 gallons per hour).
10. Dump trucks :
 - (i) A rear-dumping truck with gravity spreader attachment.
 - (ii) A truck with bottom dump arrangements.
11. Lubricating equipment.
12. Spare parts for maintaining and servicing the machines for one year.

Allowing for variations in prices the above equipment would roughly cost about Rs 5,00,000/-. If similar equipment be supplied to five construction divisions, the total would amount to Rs 25 lakhs.

Some of the manufacturers undertake to train personnel in the working of the machinery on the job. These trained workmen, can in their turn train others in the use of the machinery.

EXPLANATION

A lawyer thus illustrates the language of his craft :

"If a man were to give another an orange, he would simply say, 'Have an Orange'."

But when the transaction is entrusted to a lawyer to be put in writing he adopts this form :

"I hereby give and convey to you, all and singular, my estate and interests, right, title, claim and advantages of and in said orange, together with all its rind, juice, pulp and pips, and all rights and advantages therein, with full power to bite, cut, suck and otherwise to eat the same, or give the same away with or without the rind, juice, pulp or pips, anything hereinbefore or hereinafter, or in any other means of whatever nature or kind whatsoever to the contrary in anywise notwithstanding."

And then another lawyer comes along and takes it away from you.

INFORMATION SERVICE

(i) SURFACE DRESSING IN WET WEATHER

(Extracted from 'Highways and Bridges' Sept. 27, 1950).

New Treatment of Stone Proves Effective

THE Road Research Laboratory (U. K.) 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.

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 dressings 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 about a 1 d. or 1½ d. per sq. yd.

(ii) SYSTEMS OF ROAD SIGNS AND SIGNALS

(Extracted from 'Transport and Communications Review' July — September, 1950)

THERE are in use at present two major systems of road signs and signals, (a) the "international" or "European" system, a modernized version of which was incorporated in the Protocol on Road Signs and Signals, and (b) the "American" system. The former is in general use in Europe and its principles are also the basis for the systems in use in many Asian and African countries and territories. The American system is in use in the United States and, with modifications, in Canada, Mexico, and some

Central and South American countries, although a few South American countries include the use of the triangular danger sign of the European system. The third Inter-American Travel Congress, held in San Carlos de Bariloche, Argentina, in February 1949, recommended a single American system of road signs, to be drawn up on the basis of the standards and explanations contained in the United States "Manual on Uniform Traffic Control Devices". In Australia, meanwhile, a new system of road signs has

been prepared by the Standards Association of Australia, taking into account both the European and American systems.

"European" or "International" System of Road Signs and Signals

The international system of road signs and signals has been in the process of development since 1909, when the first International Convention relative to motor traffic was signed at Paris. This Convention, which contained rules concerning documentation and some other conditions for international motor traffic, provided, *inter alia*, that the Contracting States should indicate dangerous places by means of four different triangular signs, each containing a symbol within the triangle indicating the specific nature of the sign. This Convention was widely accepted in Europe.

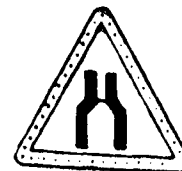
The revised International Convention signed at Paris in 1926 retained the four previously adopted danger signs and added

danger signs of the 1909 and 1926 Conventions and added two new danger signs. It also introduced two additional categories of sign, i.e., (1) "Signs giving definite instructions," circular in shape, which indicated either a prohibition or an obligation; (2) "Signs giving indications only," which were rectangular in shape. Fifteen continental European countries and Egypt ratified or adhered to this Convention.

The Protocol on Road Signs and Signals adopted by the United Nations Conference on Road and Motor Transport is intended to supersede the 1931 Convention (see above) and contains what is essentially an improved and expanded version of the system adopted in 1931. It contains (a) provisions for the three types of roadside traffic signs, signs giving definite instructions and informative signs; (b) supplementary provisions concerning level-crossings; (c) provisions for signals to be made by traffic police; (d) provisions for traffic light signs, and (e) provisions for road markings.



American



International

two additional ones. This Convention was ratified or adhered to by all European countries, a number of African countries and territories, five Middle Eastern countries, five American countries (Brazil, Chile, Cuba, Mexico and Uruguay) as well as some Far Eastern territories of European countries.

A Convention concerning the Unification of Road Signals was concluded in 1931 in Geneva by the European Conference on Road Transport, held under the auspices of the League of Nations. This Convention included the triangular

The greater part of the Protocol is concerned with the three types of roadside traffic signs. The number of danger signs has been increased from eight to thirty, including four contained in the supplementary provisions concerning level crossings. They are triangular, except for some signs at level crossings, and have a red border with a black or darkish symbol on a light ground, indicating the nature of the danger. At the same time the number of circular "signs giving definite instructions" has been increased to twenty. Eighteen of these are "prohibitory signs" and generally

have a red border and black or dark symbol on a white ground, and two are "mandatory signs" with a blue ground on which a white symbol indicates the nature of the obligation. Lastly, the Protocol contains sixteen rectangular "informative signs," consisting of "indication signs," "advance direction signs" and "direction signs," and finally place and route identification signs.

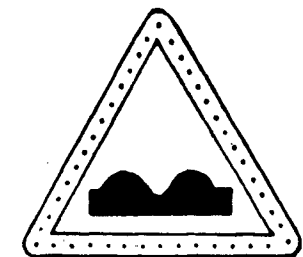
Officials, the Institute of Traffic Engineers and the National Conference on Street and Highway Safety.

The **Manual** contains provisions for road signs, markings, traffic signals and islands.

The standard system of road signs contains three categories: warning signs, regulatory signs and guide signs. These



American



International

American System of Road Signs and Signals

Uniform traffic laws and regulations have gradually been developed in the United States through agreement among the forty-eight States and the District of Columbia, each of which has authority over its own highways and their traffic, by means of national conferences which began in 1924. The resulting standard system of road signs is embodied in a **Manual on uniform Traffic Control Devices for Streets and Highways**, the current (and fourth) edition of which was published in 1948 by the United States Public Roads Administration, Washington, D. C. The **Manual** is prepared by the Joint Committee on Uniform Traffic Control Devices, which is now made up of the American Association of Highway

categories correspond to the three European categories of road signs. Warning signs are used to warn drivers of hazardous conditions either on or adjacent to the road. They are usually diamond-shaped and have a yellow background with a black border and black symbol or lettering, indicating the character of the danger. Symbols are used to indicate curves, intersections and side roads, while the presence of other hazards is conveyed to drivers by means of word messages.

Regulatory signs notify the highway user of traffic laws and regulations which apply at a given place or on a given highway, disregard of which constitutes a misdemeanor. They are usually rectangular with the longer dimension vertical and, with few exceptions, are white with black lettering and border.

Guide signs show route designations, destinations, directions, points of interest and other geographical or cultural information. They are black and white and, with the exception of route markers, are rectangular, with the larger dimension horizontal.



American.

former, yellow and black the latter. Signs giving definite instructions in the European system are circular with red or blue dominating. The corresponding "regulatory signs" in the American system are rectangular and generally have a white background with black lettering. The differ-



International.

Comparison of
"European" and
"American"
Systems.

Differences between the European and American systems of road signs are to be found mainly in the use of symbols versus words, and in the shape and the colours of the various categories of signs.

Thus the European system uses symbols as a rule; the American system uses word indications as a rule and symbols exceptionally to indicate certain dangers. (See figures.) Danger signs in the European system are triangular, while warning signs, the corresponding category in the American system, are diamond-shaped; the red border dominates the

American Road Signs & Signals

Ground—Yellow
Letters & Border—Black

International Road Signs & Signals

Ground—White
Border—Red
Signs—Black

ces in colour and shape between the European informative signs and American guide signs are less basic.

The essential features of the provisions concerning traffic light signals and level crossing signals contained in the Protocol on Road Signs and Signals are to a very large extent similar to those of the *Manual on Uniform Traffic Control Devices*, although

the latter provisions are more detailed. The Protocol refers only in two articles to road markings, while the *Manual* contains detailed provisions concerning pavement markings, curb markings, object markings and reflection markers.

Administration Report of Uttar Pradesh Public Works
Department, Buildings & Roads Branch
for the year 1947-48.

THE year under report records considerable achievement to the credit of the Public Works Department in its buildings and roads Programme establishing, in the words of the Report, "a record for India". This was inspite of great difficulties which the Department had to encounter in respect of acute and continued shortages and transport difficulties.

The following statement gives figures of expenditure of the Public Works Department on original and maintenance works in a few recent years and the pre-war years 1937-38.

(Figures in lakhs of Rs)

Years.	Original works.	Maintenance.	Total.
1947-48.	332.84	102.32	435.16
1946-47.	239.06	86.87	315.93
1945-46.	76.46	98.75	175.21
1937-38.	23.10	32.61	55.71

The total expenditure in 1947-48 was nearly 140 per cent of the expenditure in the preceding year and nearly eight times the expenditure in 1937-38. The expenditure on communications during 1947-48 under the head Original Works and maintenance came to Rs 359.96 lakhs or more than 80 per cent of total expenditure on Civil Works (Original Works and maintenance).

When the work carried out during the year in the sphere of roads is considered, it is found that out of a total of 1,578 miles of the new metalled roads to be constructed, of 2212 miles of metalled

roads to be reconstructed, and of 5,575 miles of unmetalled roads representing the remaining work in phase I of the Provincial programme, 650 miles, 1325 miles and over 2,000 miles respectively were completed during the year. On account of the shortage of cement, only 110 miles of cement concrete tracks could be completed out of 496 miles included in the programme.

The work to be done on National Highways, apart from maintenance, consisted of cement concreting 124 miles of road, conversion from old kanker or stone surfaces to black top surface in 112 miles, and the construction of certain major bridges. The lack of transport entailed a heavy curtailment of these works so that it was possible during the year to complete only 38 miles of concrete and 88 miles of black top roads.

The following statement shows the length of roads maintained by public Works Department during the year 1947-48.

	Miles
(1) Treated roads	1941
(2) Water-bound roads	3314
(3) Roads of other Departments maintained by P. W. D.	504
(4) State roads maintained by other departments.	17
(5) Unmetalled roads :	
i. State	1732
ii. Local.	593
Total	8101

List of Approved Works on National Highways

S. No.	Job No.	Name of work	Amount approved Rs	REMARKS.
BOMBAY				
1.	429 BM-8	Additions and alterations to culvert No. 41 in mile 286/3 of the Broach-Jambusar Road.	11,600/-	
WEST BENGAL				
2.	424 BG 31	Construction of a bridge over the Kaljani River on Bihar-Assam National Highway No. 31, in Cooch Behar District.	10,45,800/-	
3.	425 BG 31	Construction of a Bridge over the Gadadhar river on Bihar-Assam National Highway No. 31, in Cooch Behar District.	4,11,300/-	
4.	426 BG 31	Construction of a bridge over the Raidak river on Bihar-Assam National Highway No. 31, in Cooch Behar District.	10,13,900/-	
5.	A 430 BG 31	Preliminary survey of the Rajerhat-Falakata Road (direct), National Highway No. 31 in Cooch Behar and Jalpaiguri districts.	6,400/-	
6.	A 431 BG 31	Preliminary survey of the river Torsa at three different places in Cooch Behar district on National Highway No. 31.	15,750/-	
UTTAR PRADESH				
7.	423 UP 28	Painting miles 167-168 (local miles 3-4 of the Gurakhpur-Kasia Road) of the Oudh-Tirhat Road, National Highway No. 28.	1,09,800/-	
8.	427 UP 2	Cement concreting miles 312/0+232' to 313 (local mile 616/7+428' to 616 of the G. T. Road) of National Highway No. 2.	61,293/-	
MADHYA PRADESH				
9.	432 CP 6	Surfacing miles 4/3-12/8 of Khamgaon-Nandura Section of N. H. No. 6.	88,963/-	

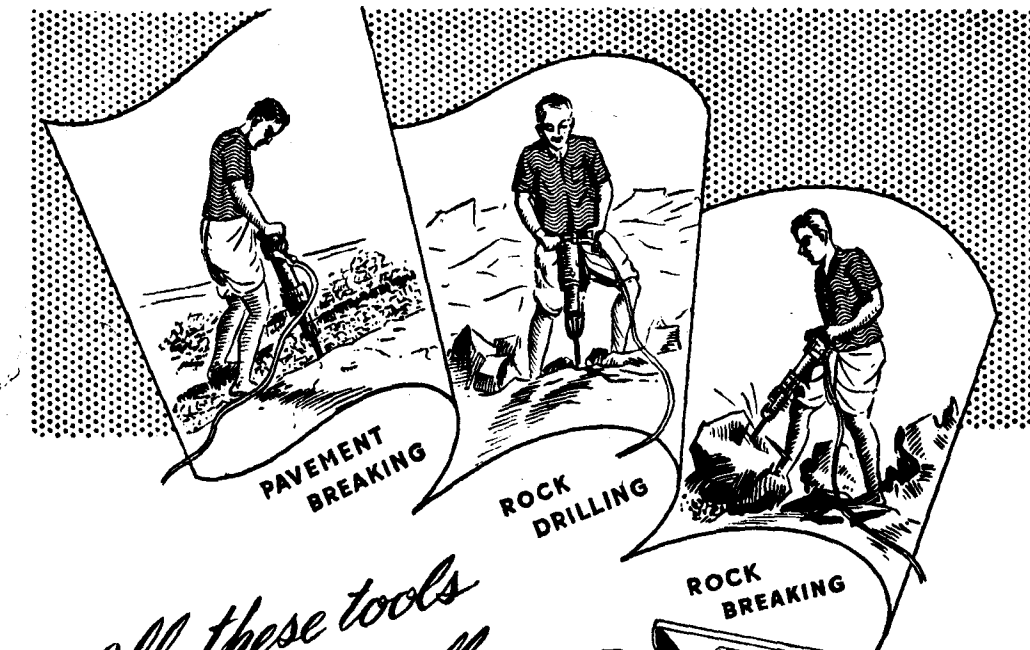
S. No.	Job No.	Name of work	Amount approved Rs	REMARKS.
PUNJAB				
10.	422 PB 2	Widening of miles 11.68 to 18.2 of the Delhi-Mathura Road.	1,57,000/-	
BIHAR				
11.	428 BR 31	Construction of diversion of N. H. No. 31 due to the construction of Tilaiya Dam.	16,03,500/-	Expenditure sanction restricted to Rs 2 Lakhs in the first instance.
ORISSA				
12.	421 RS 6	Construction of culverts in Ghat Section of Badarma (Bamra State) Orissa, from mile 195 to 198 N. H. No. 6.	1,01,650/-	

Books added to the Roads Organization Library during December, 1950.

- Reinforced Concrete Buildings** by Rai Sahib Raj Bansi Lal. (Raj & Sons, Regal Lodge, Delhi 5, 1950).
- The Technical Aspect of the Design of Roads** by Stewart Champion. (The Technical Press Ltd., Gloucester Road, Kingston Hall, Surrey, London). ... 3 copies
- Reinforced Concrete** by R. A. Caughey. (D. Van Nostrand Company Inc., 250 Fourth Avenue, New York).
- The Design, Construction and Maintenance of Docks, Wharves and Piers** by F. M. Du-Plant-Taylor (3rd edition revised and enlarged). (Eyre Spottiswoode Publishers Ltd., 15 Bedford Street, Strand, London, W. C. 2 1949).
- Memorandum on Parking Places: Memorandum No. 597.** (His Majesty's Stationery Office, London).
- Permanent International Road Congress, Paris. Report of the Proceedings of the Congress, 8th International Road Congress-The Hague 1938:** (Permanent International Association of Road Congresses, Paris).
- Final Report of 7th Public Health and Municipal Engineering Congress and Exhibition 1948:** (The Congress Organising Council, 84 Eccleston square, London, S. W. 1).
- Fatigue Strength of various Types of Butt Welds connecting Steel Plates. Bulletin No. 384:** by W. M. Wilson, W. H. Munsee, and I. Sterling Snyder.
- Moments in Two-way Concrete Floor Slabs: Bulletin No. 385:** by

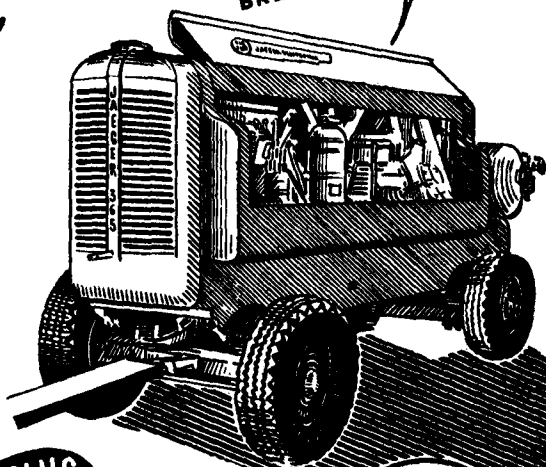
- Chester P. Siess and Nathan M. Newmark.
10. **Studies of Highway Skew Slab Bridges with Curbs: Part II: Laboratory Research Bulletin No. 386:** by Myron L. Gossard, Chester P. Siess, Nathan M. Newmark, and Lawrence E. Goodman.
 11. **Lectures on Foundation Engineering: Circular No 60,** by A. E. Cummings.
 12. **A Rapid Method for determining the moisture content of soils: Research Report No. 9,** by Albert James Bonar.
(Texas Engineering Experiment Station).
 13. **Technical Paper No. 291: Controlled Concrete** by A. W. Crips Villiers.
 14. **Technical Paper No. 293: Simplified Design of Masonry Arch by the Elastic Theory,** by Messrs. A. Vasudevan and Gurdial Singh.
 15. **Technical Paper No. 294: Frame Arch Spans for Railway Loadings,** by H. J. Nichols.
 16. **Technical Paper No. 300: Report on Investigation into Modern Methods of Introducing Transition Curves Economically into Existing Lines of Railway** by R. H. Martin.
 17. **Technical Paper No. 301: Note on Reconditioning of Curves** by R. Strick.
 18. **Technical Paper No. 305: Primary Stresses in Railway Tracks** by W. E. Gelson.
 19. **Technical Paper No. 308: Braking Distances of Metre-Gauge Trains** by E. W. Baker.

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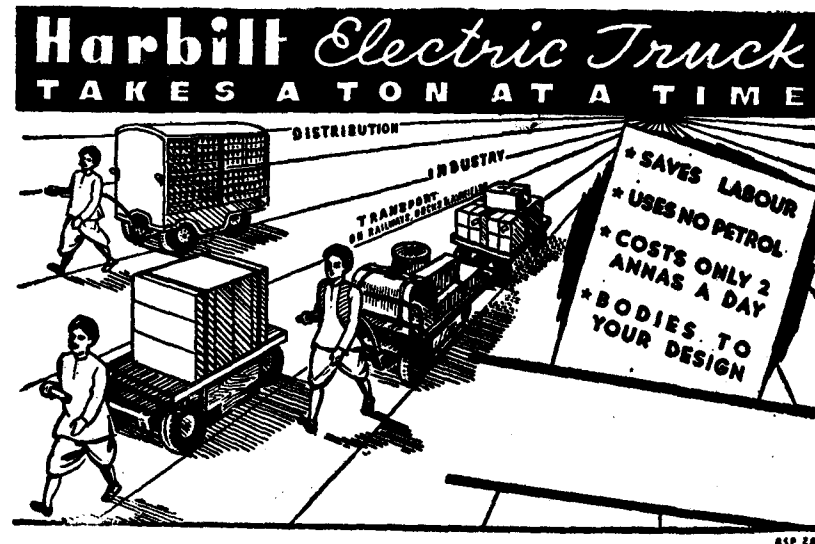
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for every need
is born!

DUNLOP

*equips the wheels
of the Nation*



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CIVIL, SANITARY & CONSTRUCTIONAL ENGINEERS

Specialists in Design and Construction of R. C. C.
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FOR CAR 

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autopulse

FUEL PUMPS

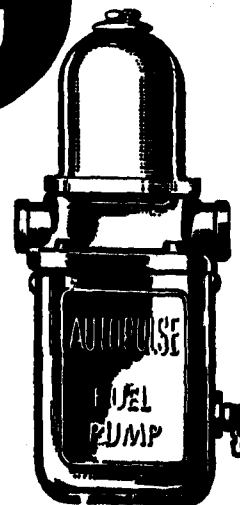
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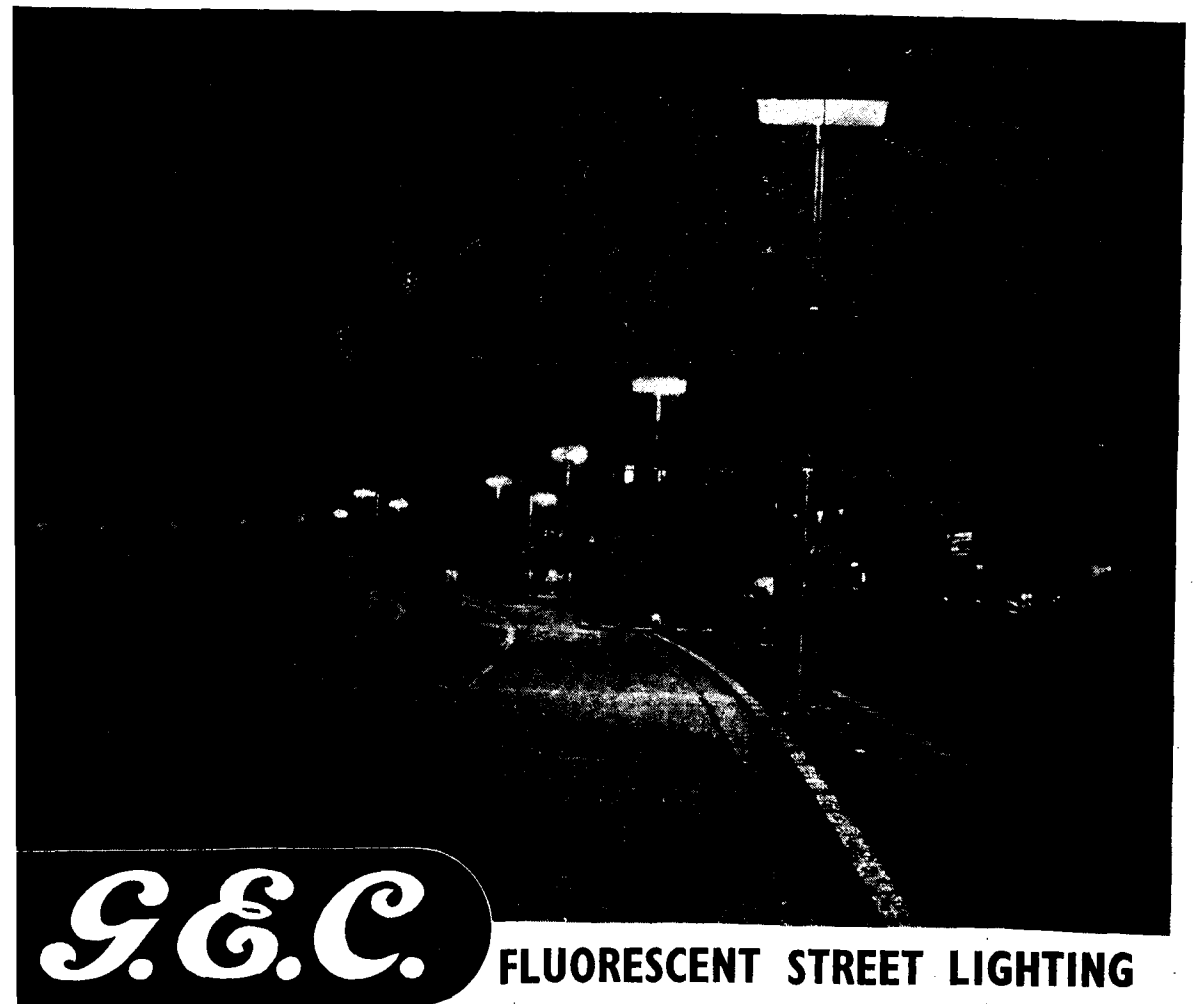
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SW 14/1

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FLUORESCENT STREET LIGHTING
at BOMBAY

This installation on the Chowpatty Seaface is the first permanent one of its kind in India. Three 80 watt OSRAM Fluorescent lamps are used in each "Three Eighty" lantern.

The combination of a staff of expert Illuminating Engineers, and an up-to-date and highly efficient Design Office, backed by Illumination Research Laboratories which are the best equipped of any in the Commonwealth, places the G.E.C. in a unique position to offer the most efficient and comprehensive lighting service available throughout the world. This service is at your disposal without obligation, to advise on any lighting problem.

THE GENERAL ELECTRIC CO. OF INDIA LTD.

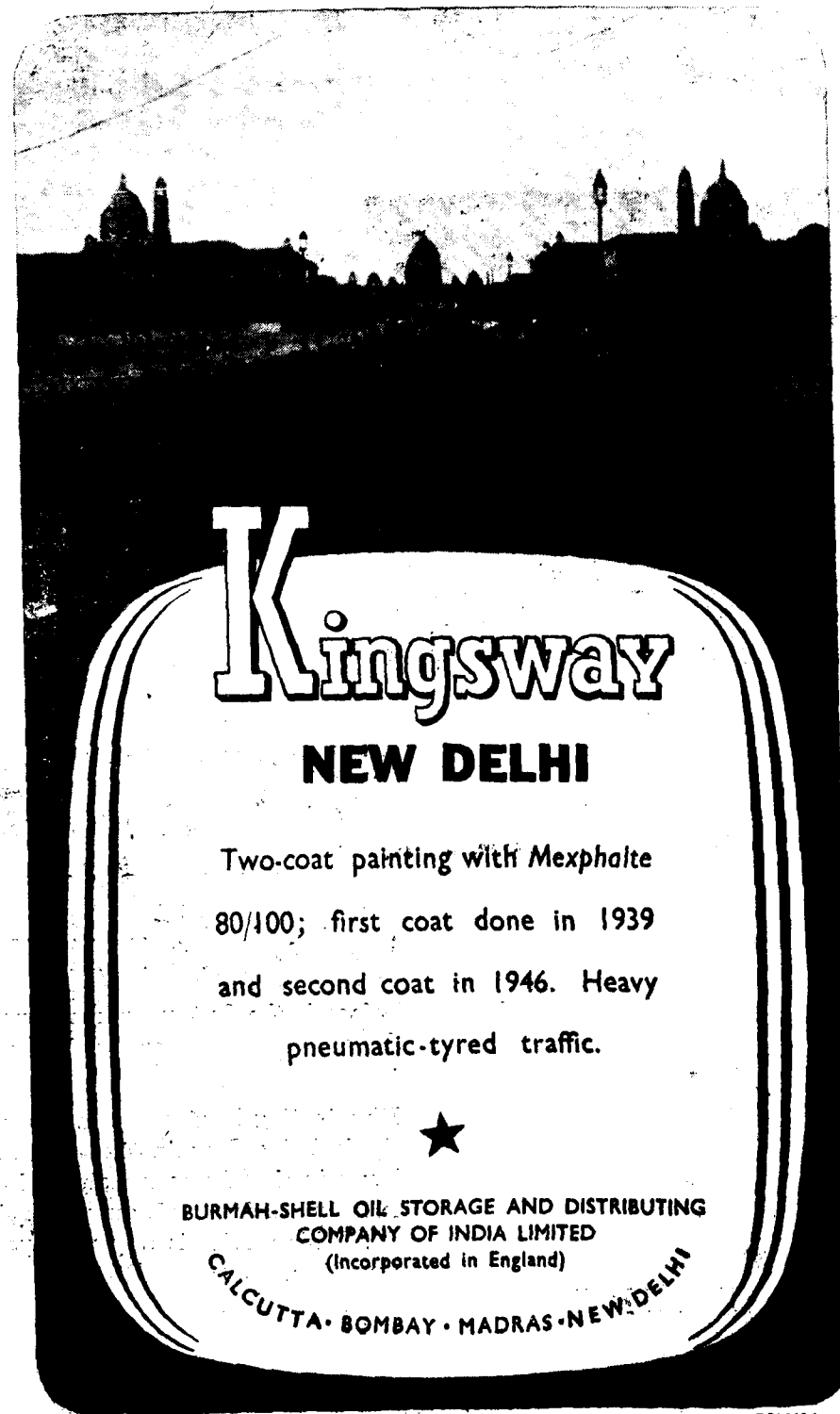
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THE GENERAL ELECTRIC CO. LTD. OF ENGLAND

CALCUTTA - KANPUR - DELHI - BOMBAY - MADRAS

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Two-coat painting with Mexphalte
80/100; first coat done in 1939
and second coat in 1946. Heavy
pneumatic-tyred traffic.

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(Incorporated in England)

CALCUTTA • BOMBAY • MADRAS • NEW DELHI

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This time by
Rai Bahadur Rungta for his Chaibasa
Manganese Mines.

Because the **JUMBO** does the work
BETTER - FASTER - CHEAPER



THE OLD WAY
(Manual)

TIME 8 HOURS

Tonnage handled	25 tons
Operational cost	(If you are lucky) Rs. 62/8/- (25 labourers, at Rs. 2/8/- each)
Cost per ton	2/8/-

In addition, there are other aspects as detailed below:—

Accidents	... Very high
Breakages	... Too numerous
Doctors' fees due to exhaustion, worries, high blood pressure etc.	Exorbitant

Total Result: Increased cost Low output

TIME 8 HOURS

Tonnage handled	300 tons
Operational cost	Rs. 56/4/-
Cost per ton	... Annas - 8/-

In addition, there are other aspects as detailed below:—

Accidents	... Nil
Breakages	... Nil
Doctors' fees due to exhaustion, worries, high blood pressure etc.	Nil (as health perfect)

Total Result: Increased output Low cost

THE 3 TON HYDRAULIC

TAYLOR JUMBO

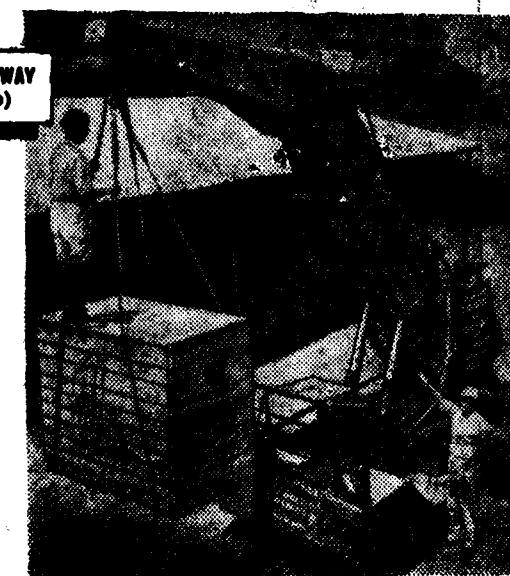
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For details and demonstration apply to Sole Agents in India

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A briquette of paving mix is tested on Hubbard-Field Stability Testing Machine to determine the shear strength of the compacted mix.



Penetration test determines the hardness of asphalt.

STANDARD - VACUUM
Marketers of Quality Asphalt Products

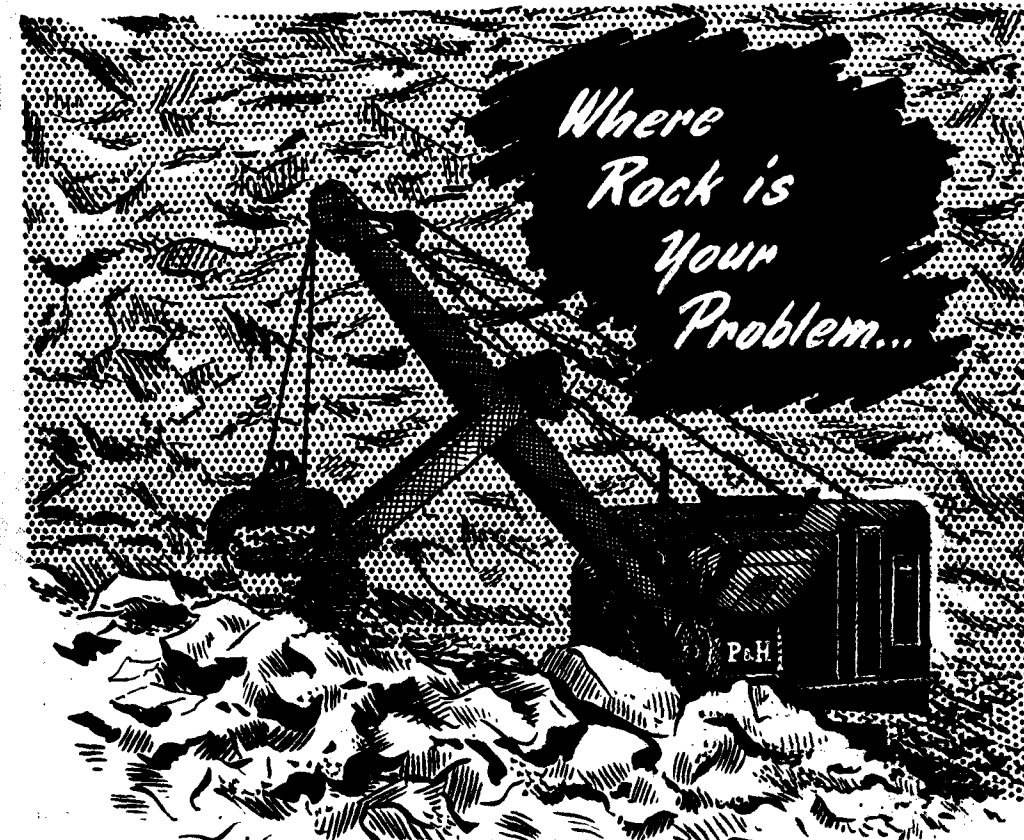


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Fine equipment, expert technicians can help solve your roadmaking problems in the Standard - Vacuum test laboratories—maintained for your convenience. Please write or telephone for assistance or advice you may need — there is absolutely no cost or obligation.



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P&H is your Answer!

All over the World, where heavy metal, rock or earth is required to be excavated cheaply and quickly, P & H excavators have invariably been chosen because they point the way to cheaper costs.

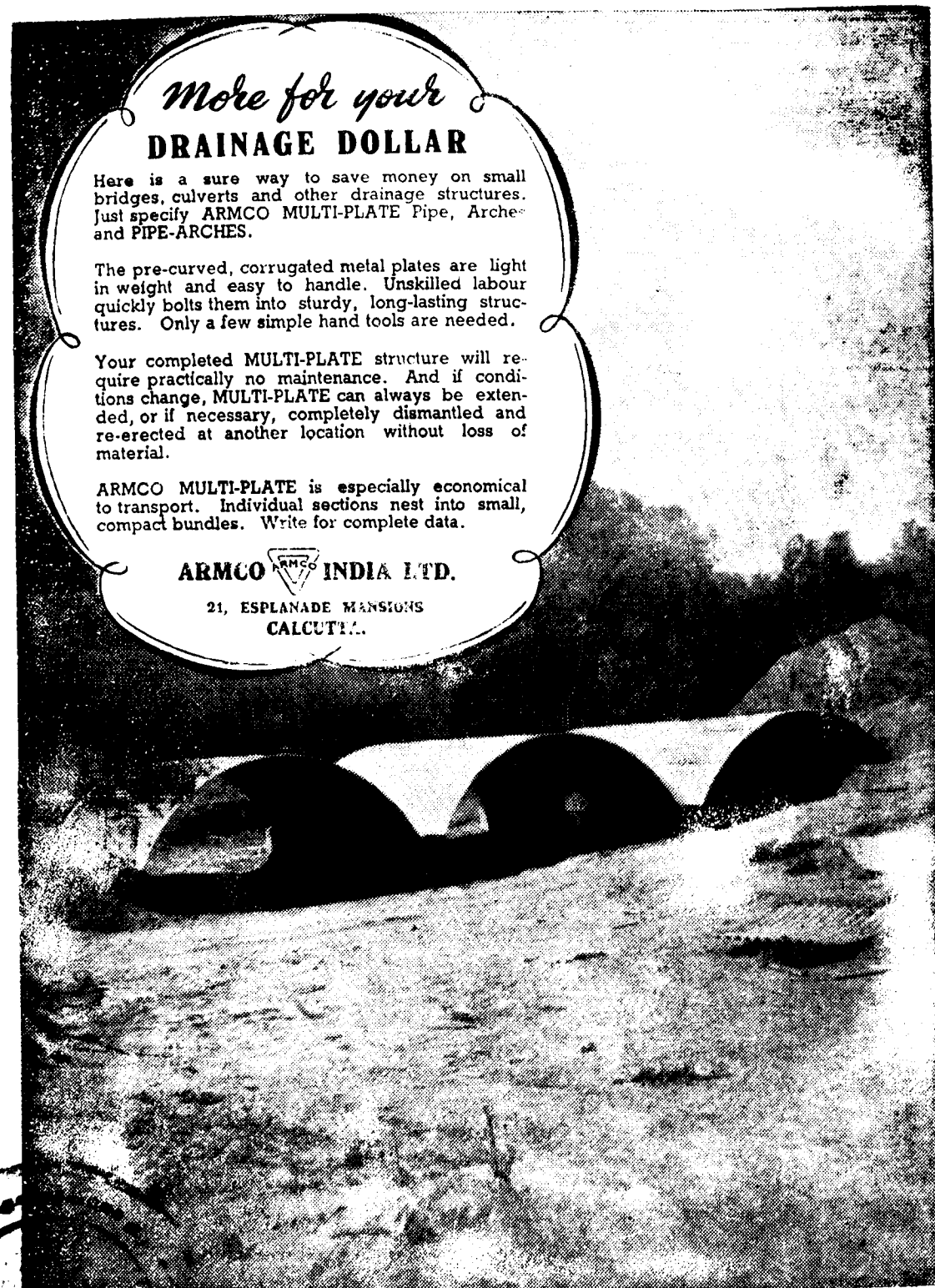
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Excavators * Shovels * Draglines

PASHABHAI PATEL & CO., LTD.

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DRAINAGE DOLLAR

Here is a sure way to save money on small bridges, culverts and other drainage structures. Just specify ARMCO MULTI-PLATE Pipe, Arches and PIPE-ARCHES.

The pre-curved, corrugated metal plates are light in weight and easy to handle. Unskilled labour quickly bolts them into sturdy, long-lasting structures. Only a few simple hand tools are needed.

Your completed MULTI-PLATE structure will require practically no maintenance. And if conditions change, MULTI-PLATE can always be extended, or if necessary, completely dismantled and re-erected at another location without loss of material.

ARMCO MULTI-PLATE is especially economical to transport. Individual sections nest into small, compact bundles. Write for complete data.

ARMCO  INDIA LTD.
21, ESPLANADE MANSIONS
CALCUTTA.

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The Easy way

BY THE

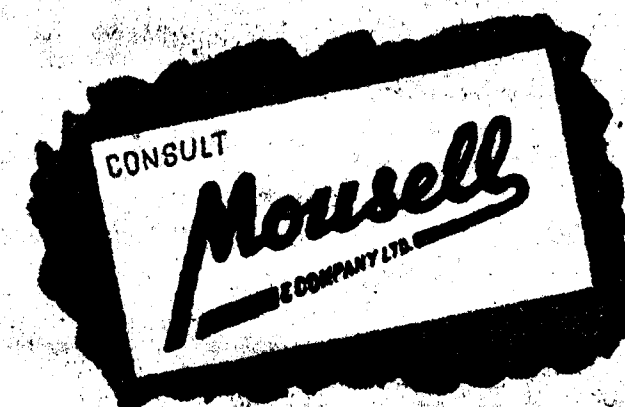
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(REG. TRADE MARK)

Grouting Process

(PATENTED)

FOR ROADS, FLOORS, RUNWAYS ETC.



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