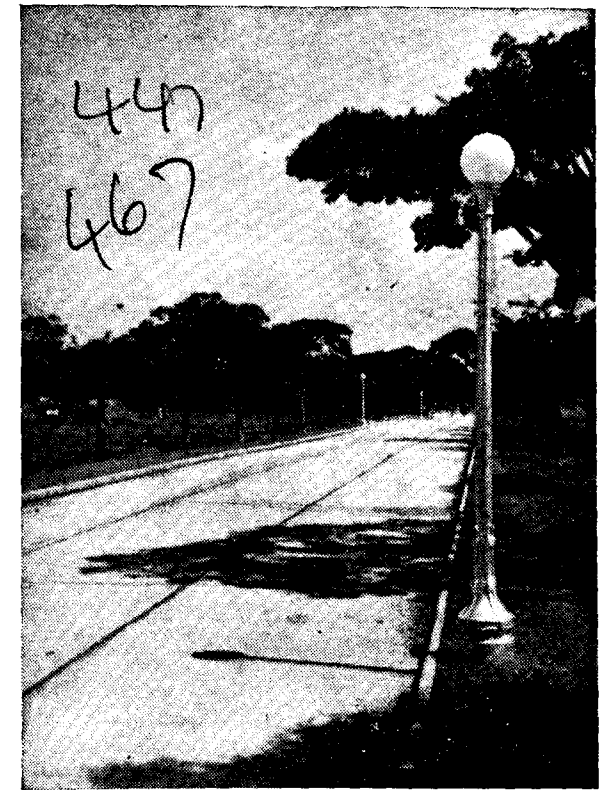


TRANSPORT COMMUNICATION
Monthly Review.
No. 61 May 1952.

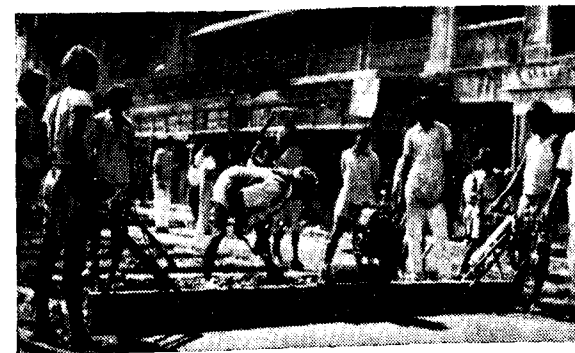
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FOR PERFECT ROADS— —CONCRETE VIBRATION

A 27 ft. concrete road linking the Bangalore-Mysore trunk road and the Mandya Sugar Factory. 1400 tons are carried daily over this road and it was laid with a C. H. Johnson screed vibrator as illustrated.



(By Courtesy of the Indian Concrete Journal)



C. H. Johnson self-propelled screed vibrator.

FOR CONCRETE VIBRATION—

**KILLICK'S
ENGINEERING**

Sole Agents for:—

C. H. JOHNSON (MACHINERY) LTD

Makers of all types of contractors plant.

KILLICK, NIXON & CO. LTD., Killick Building, Home Street, Fort, Bombay I.

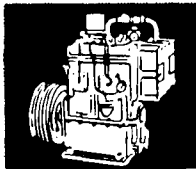
Telegrams: "KILLICK"

Telephone: 30901

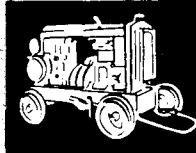
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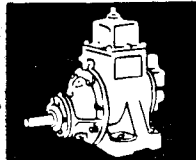
STATIONARY COMPRESSORS
Two Stage. Displacements from 90 c. ft./min. to 638 c. ft./min.



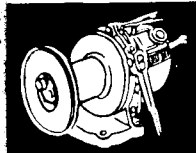
PORTABLE COMPRESSORS
Two Stage. Displacements from 130 c. ft./min. to 360 c. ft./min.



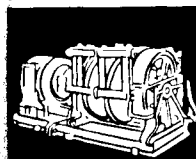
ROTOMOTORS
Vane type air-motors from 1½ b.h.p.



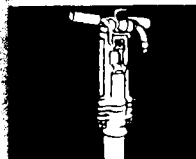
AIRWINCHES
Lifting capacities from 1400 lbs. at 100 ft./min. to 3000 lbs. at 100 ft./min.



SCRAPEHAULERS
Specially designed for scraper loading. Rope pulls from 2200 to 9800 lbs.



HANDRILLS
Hand-held Rock Drills. Weights from 24 lbs. to 84 lbs.



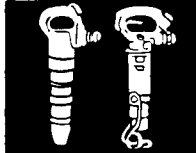
ROTOPUMPS
For water, oil or sludge. Will give 10 g.p.m. with 140 ft. head to 140 g.p.m. with 10 ft. head.



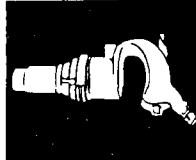
ROAD RIPPERS
Weights from 43 lbs. to 75 lbs.



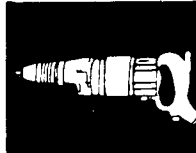
PICKS & SPADERS
Weights from 20 lbs. to 26½ lbs.



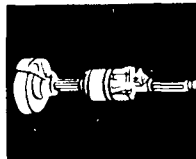
HAMMERS
Weights from 7½ lbs. to 13½ lbs.



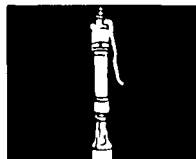
ROTODRILLS
Hand and screw-feed. Capacities to 1½ ins.



ROTOGRINDS
Radial and surface types. Taking 2" to 6" wheels.



RAMMERS
Weights from 9 lbs. to 40 lbs.



CONCRETE COMPACTORS
A new machine for Concrete Compaction.



The machines and tools illustrated here are but an incomplete guide to the range of Holmans activities. Among others not mentioned Holmans Drifters Sinkers and Stopers are world famous. And so in due course will be the latest Holman Development, the HOLBIT, the tungsten carbide tipped rock drill bit.

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BIRD & CO. LIMITED
CALCUTTA . DELHI . KANPUR

SELLING SUB-AGENTS:
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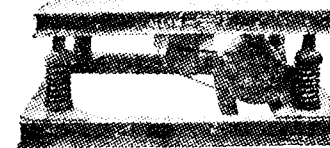
Specialities for Concrete Roads, Structures & Pre-cast Products

E. P. ALLAM & CO., LTD.

London

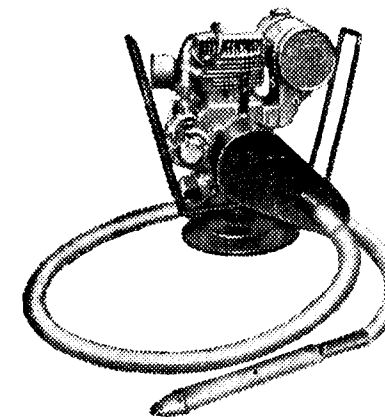
England

VIBRATING TABLES



for Precast Concrete Products, in various sizes, fitted with Variable Amplitude Vibrators and self-contained electric motors or petrol engines.

High frequency Flexible-drive INTERNAL VIBRATORS



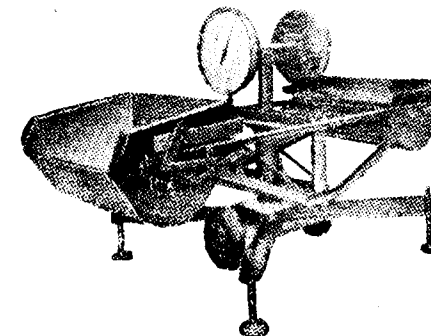
for Building and Civil Engineering Work and also large Precast Concrete Products. Type P. F. powered by small petrol engine and Type E. F. with electric motor. Supplied with 18 ft. or 12 ft. lengths flexible shaft, and three sizes or interchangeable Vibrating Units.

Size R-1½" diameter x 20" long

Size S-2¼" diameter x 17½" long

Size T-3½" diameter x 12½" long

ROAD MACHINES (DRAYTON), LTD. Drayton, England



SWING-WEIGHBATCHER

Designed for use with concrete mixers and isolated mixing units where hand loading is employed. Single-bucket model available for use in confined spaces twin-bucket model ideally suits 10/7 or 14/10 capacity mixers.

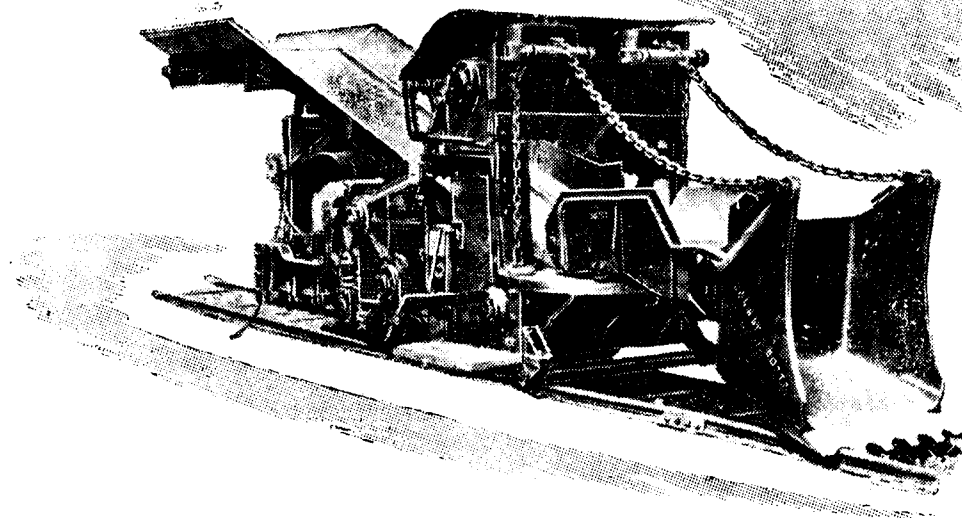
HEATLY & GRESHAM
ESTABLISHED 1892 LIMITED INCORPORATED IN ENGLAND

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L-13, Connaught Circus, NEW DELHI
United India Life Building, Esplanade, MADRAS

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P. O. Box 658, KARACHI
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The British CONWAY LOADER



Fast Loading, rugged strength and great flexibility combine to make the "CONWAY" the premier machine for tunnels, underground loading and removing loose material.

The Loading cycle begins by laying the track as close to the material as possible. The "CONWAY" moves in, first cleaning the track in front of it and then the sides are swept up as the boom is swung to the right and left. In the same manner all the loose material is loaded, leaving the surface clear without the use of any hand shovelling.

Manufacturers
BRITISH CONWAY LOADERS LTD.,
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Agents
GEO. MILLER & CO. LTD.
7, HASTINGS STREET, CALCUTTA 1.
TELEPHONE: CITY 2961 & BANK 3391 • TELEGRAM: "EQUIPMENT".
ALSO AT DHANBAD AND ASANSOL.

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What a R-A-N-G-E BEDFORD offers!

From 10-cwt up to the new
9-ton BIG Bedford

And a Range of Engines too!

Bedford leads the way, offering four types of Engines:—
a 35 b.h.p. engine for 1½ Ton Models;
a 76 b.h.p. engine for 2—3 Ton Models;
a 84 b.h.p. engine for 4—5 Ton Models;
and a 110 b.h.p. engine for 7—9 Ton Models;
all giving greater power, greater economy,
greater smoothness and longer life.

Bedford, the most popular British truck in the world, owes its success to one thing—value for money. For low initial cost, low running cost and sound engineering design, you can't beat a Bedford. And remember that Bedford gives you a wide choice of twelve graded chassis from 86" to 206" wheelbase, from ½-ton to 9-ton capacity.



See the new BIG Bedfords!

Four years of hard testing on rough track and under tropical conditions, and more than half a million miles of road service, have gone into the new BIG Bedfords. Full forward control, with ideal weight distribution, gives equal tyre loading at maximum capacity, and reduces tyre wear for safer, more dependable driving. Other outstanding Bedford features—such as slip-fit cylinder liners, easily replaced when worn—ensure maximum use on the road, least time wasted on repairs. Ask your Bedford dealer for full details today!

Costs less to buy—Costs less to run

GENERAL MOTORS INDIA LIMITED

Fosbery Road, Sewree, Bombay.

Serving India's Transport needs for over 23 years

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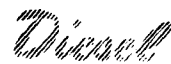
*Make
cheaper,
faster*

ROADS

You need tough equipment for road making and other grading jobs, and you can't "assemble" toughness into a machine. You've got to build it in. 'Caterpillar' Motor Graders are completely built by one manufacturer. That's why 'Caterpillar' Diesel Motor Graders make light work of ditching, levelling and all those tasks where big power is wanted. They are designed to give the maximum performance with the lowest fuel consumption.

Ask your nearest Distributor about 'Caterpillar' Diesel Equipment. He will be glad to give you a demonstration and show you it's the best in the field!

Caterpillar



ENGINES TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

'Caterpillar' Distributors in India

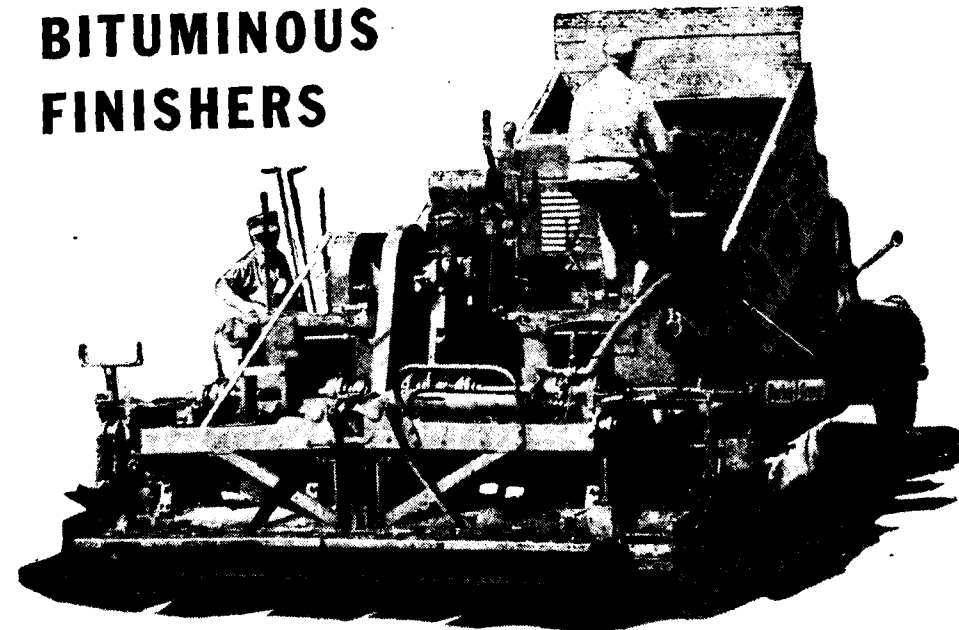
CALCUTTA TRACTORS (INDIA) Limited P. O. Box 323	BOMBAY LARSEN & TOUBRO Limited P. O. Box 278	DELHI WILLCOX (Buckwell-India) Limited P. O. Box 1408
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Sales and Service

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Barber-Greene

BITUMINOUS FINISHERS



B.G. FEATURES

AUTOMATICALLY PRODUCES SMOOTHER ROADS

Here is simple paving efficiency—the Barber-Greene Tamping-Levelling Finisher that places a uniform bituminous surface—*automatically*.

The B-G Finisher tamps, levels, and "strikes-off" simultaneously. It *automatically* adjusts to irregularities in sub-grade... *automatically* measures the correct amount of material... leaves an *automatically* compacted durable surface that remains stable under rolling and traffic.

More miles of roads have been paved by the B-G Finisher than by all other methods combined. A minimum work force will lay a superior surface from 11 to 44 ft. per min. It assures matchless performance on the widest variety of hot or cold-mix bituminous paving jobs—large or small. Send for descriptive literature.

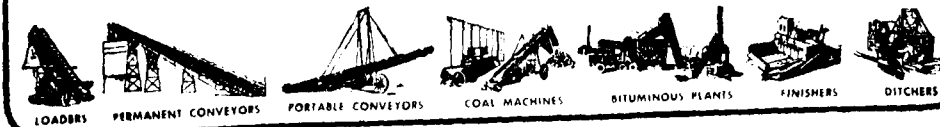
- Maneuverability**
Crawler-traction gives full steering control for following curbs, guide lines or matching adjacent strips... positive tractive power for any paving requirement.
- Variable Widths**
The normal B-G Finisher mat width of 10 ft. can be quickly and easily reduced to 8 ft. wide or increased to 12 ft. wide.
- Large Hopper**
Five-ton hopper receives material direct from trucks... saves delays, allows Finisher to operate between truck loads of mix.
- Dual Control**
The B-G Finisher may be operated from either side—for easier control while matching previous mat. Dual engine, operating and steering controls grouped for ease of operation.
- Wide Range Utility**
For all bituminous paving jobs including sheet asphalt, stabilized mixes, base stone, etc.—the B-G Finisher is economical, efficient. The smoothness you feel in a Barber-Greene road means longer life—less maintenance.



BARBER-GREENE COMPANY, AURORA, ILLINOIS, U.S.A.

BARBER-GREENE OLDING AND COMPANY, LTD.

HATFIELD, HERTS., ENGLAND



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...still further in the lead!
in India — for India



NEW! THE COMMER SUPERPOISE RANGE IS NOW POWERED BY THE
COMMER 6 CYLINDER OHV ENGINE

Ever in the forefront of progress, Automobile Products of India Limited announce important improvements to the COMMER Superpoise Range. COMMER engineers have now provided these sturdy trucks, which have proved their worth under Indian conditions, with an entirely new 6-cylinder **OHV Engine** of immense pulling power giving amazing performance. Other new features include strengthened chassis frames; more powerful hydraulic brakes servo-assisted on heavy duty models together with major suspension improvements.

BUILT IN INDIA BY **APV**

MORE **Power** MORE **Stamina** MORE **Strength** MORE **Safety**

AUTOMOBILE PRODUCTS OF INDIA LTD.
BHANDUP, BOMBAY

AN INDIAN ENTERPRISE ASSOCIATED WITH THE ROOLES GROUP

DISTRIBUTORS:

Bombay—Dadajee Dhackjee & Company Limited

Bareilly—Gopaldas Motors
(Branch at Agra Cantt.).

Calcutta—Walford Transport Ltd
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Indore—Vinod Motors.

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(Branch at Kanpur).

Nagpur—Combine Motors.

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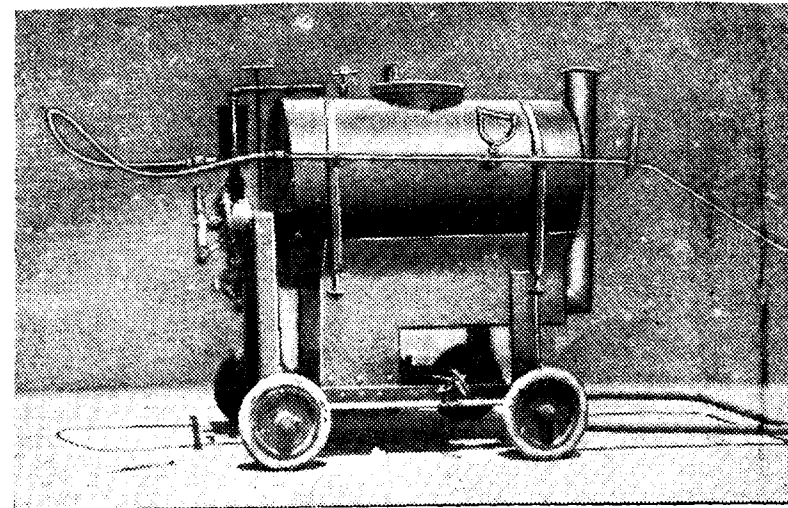
(Branches at Jamnagar & Ahmedabad).

Secunderabad—Patny & Co. Limited.

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SHALIMAR TAR

serves the Road Engineer



THE SHALIMAR TAR SPRAYER

This light, hand operated Sprayer
has been specially designed for
Road work under Indian conditions

It is very efficient, easy to operate
and maintain and is sturdily built for
long service

DETAILS SUPPLIED ON REQUEST

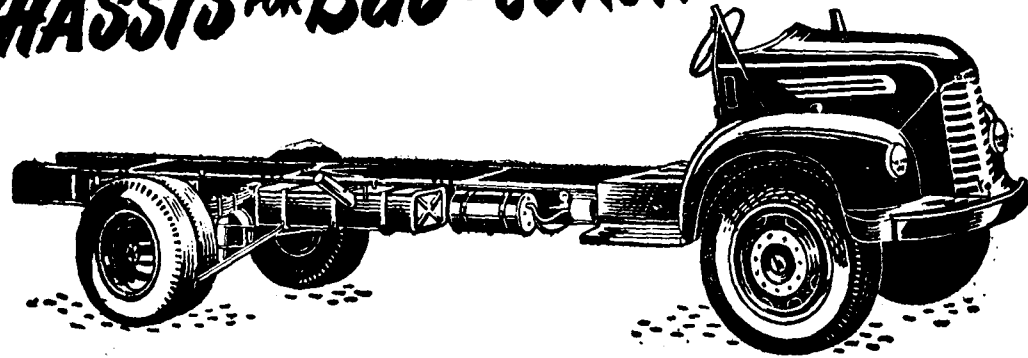
SHALIMAR TAR PRODUCTS (1935) LTD.
AMBALA - BOMBAY - CALCUTTA - DELHI - LUCKNOW

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DODGE ♦ DESOTO ♦ FARGO

**HEAVY DUTY DIESEL
CHASSIS FOR BUS & COACH**

Available in 165" and 190" wheelbase. Smooth riding, long life, sturdy frame, easy to handle, capable of good average road speeds with exceptional fuel economy.

**THE PREMIER AUTOMOBILES LTD.**

Factory: Agra Road, Kurla, Bombay Head Office: Construction House, Ballard Estate, Bombay.

SISTA'S PAL-88

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Editorial**The Hardy Annual Again**

IN our March 1951 issue we published an editorial entitled "A Hardy Annual" in which we discussed the yearly message conveyed by the President of the Indian Roads Congress to the Governments and people of India on the occasion of the annual general session of the Congress.

Some of our contemporaries have complained that the message of the Indian Roads Congress is an old story with yearly variations in the telling, that the message has perhaps as little chance of influencing government as the advice on roads given by others (including the Nagpur planners), and that, from what was known of the government's financial policy, roads would continue to be neglected, as ever. Very kindly one newspaper added, however, that there were some points which would bear constant reiteration.

We do not feel so pessimistic. The Indian Roads Congress was largely responsible for the Nagpur Plan and many of the main principles of that plan have been accepted by the governments of the States and the Centre. The Planning Commission have also greatly helped by endorsing the main policy laid down at Nagpur. Slowly but surely the sound principles set out in the Nagpur Plan are gaining acceptance.

As usual, the Press all over India has this year again echoed, with or without embellishments, the message that the Indian Roads Congress had tried to convey. So it happens every year and then there is silence. Roads are not "news" as the Indian Roads Congress President complained. When they exist they are taken for granted like the air we breathe and when they do not exist, the country pays more for them than it pays for those that do exist. But the newspapers are silent.

Last year we referred to an editorial comment of one newspaper that "The vital importance of good communications for the economic revival of the country is too patent to need special pleading"—or any pleading? The case of roads as far as the newspapers are concerned goes largely by default except for the yearly chorus that echoes the speech at the annual meetings of the Indian Roads Congress.

Can the Press Help?

We do not know to what extent the Press helps to form public opinion in India. Judging by the unanimity of the yearly endorsement it gives to our message (and this can be seen from the extracts from recent newspaper editorials we print in this issue and the similar extracts we print every year), the Press is convinced of the value of roads to the economy of the country. But does it get this message across?

Perhaps it does and perhaps this is not enough. If our people believe in the value of roads, our politicians do not or they think no political capital can be made out of their support for a "more and better roads campaign". America had its "good roads campaign" in the early years of this country but India has only a "Grow more food campaign". Yet, as complained by the I. R. C. President, "who will grow more food when it costs so much to take the product to the market that there is no profit in the business?"

We think the Press can help by constantly placing the case for more and better roads before its readers—in season and out of season—not just once a year after the Indian Roads Congress annual session. Constant dripping wears away the stone and constant complaints about the lack of roads in India may move even the most stony-hearted of politicians. Some day also, perhaps, the common man, who we are convinced knows the value of roads to the country, will take it on himself to say "no roads, no votes". May that day come soon.

DOMESTIC TALKING

Irate Subscriber to Telephone "Complaints". "Will you please see if the line to telephone No. 769828 is in order. I have rung up 7 times during the last half hour and have found the line always engaged."

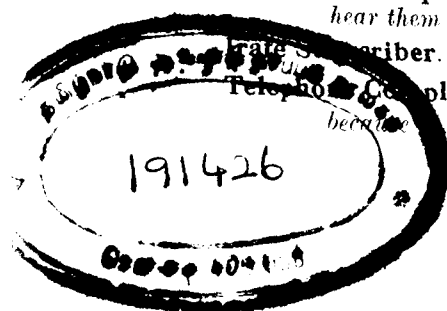
Telephone Complaints. "I shall ring you up in ten minutes or so, Sir."

(Ten Minutes Interval)

Telephone Complaints. "Line No. 769828 is in order, Sir, I can hear them talking."

Irate Subscriber. "But....."

Telephone Complaints. "Yes, Sir, he must be talking to his wife because he has not said a word during the last ten minutes."



ROADS IN BELGIUM

[On the occasion of the Lisbon Congress, the Permanent International Association of Road Congresses issued three bulletins which gave details of the highway system of the various countries of Europe—their history, development, financing, administration, present position, and future programmes.

An abstract of the information relating to Belgium is given in this article and it is proposed to give from time to time similar abstracts for some other countries. Those interested should study the articles in original which contain much information of value. Members of the Indian Roads Congress can obtain the Bulletins on loan by application to the Secretary.....Ed.]

Classification and Administration

THE roads network of Belgium was classified in 1830 and is composed of two systems: Primary system and Secondary system.

The primary system includes State highways and Provincial highways.

The Secondary system consists of feeder roads, local rural roads and the city arteries and streets.

The classification of the highways into systems is merely a result of a government's decision and is often arbitrary. As the State lacked funds to maintain roads some of these were put in charge of the Provinces.

The State highways are in charge of the Ministry of Public Works; the Provincial highways are in charge of the Provinces under State protection. The local roads and the feeder roads are in charge of villages under Provincial control.

Revenue sources

Maintenance works are paid for through ordinary budgets out of ordinary revenues from the responsible authorities, i.e., taxes and imposts. Improvements or new constructions are paid for through extraordinary budgets out of extraordinary revenues from the same authorities, i.e., "bond-issues."

In Belgium, as in many other countries, adaptation of the road system to the needs of traffic has been delayed: a day-to-day policy has been followed and

future economic needs are often sacrificed for the sake of immediate demands.

Owing to the constitutional principle which forbids any earmarking of revenues, there is no link between the maintenance and improvement expenditures and the revenues produced either directly or indirectly.

Non-Lapsing funds

On two occasions, however, the Belgian Government, well aware of the importance of the problem, took the necessary steps for recovery from critical conditions by instituting special funds.

In 1928 the first "Special Roads Fund" was instituted with a grant of £4 million to be used from 1928 to 1933 for the rehabilitation of the highways damaged during the 1914-18 war. In 1933 a second fund was endowed with £5.3 million to complete the work of the first fund.

These special funds were similar to extraordinary budgets but they had the advantage of binding the Government to a programme to be carried out during several years, **without any interference of the annual budgets and their traditionally late approval by Parliament.**

World War II broke up the restoration of the highway system while motorisation of the armies brought about a new development of automobile traffic. The disparity between traffic needs and highway facilities was thus inevitably increased and the restoration of the road network involved considerable effort and resources to adapt it to the future needs.

An important programme of modernisation, which was adopted in 1949, is now being carried out.

Programme of improvement and Construction

Thanks to the Marshall aid, an important programme of improvement could be started in 1949. The general plan includes a programme of measures of pressing necessity for the years 1950 to 1954 and a programme based on accepted principles for the next 10 years.

At the present time the Government is trying to finance these programmes which involve an expenditure of £ 130 million in the first 5 years, and £ 160 million in the next 10 years.

Traffic Surveys

Traffic surveys were made in 1933, 1938, and 1949; a smaller scale survey was made in 1948. Two types of counters were used: a portable type for occasional counts and a fixed type (electric) for permanent counts. The 1949 survey was conducted on 7,000 miles of highways.

The survey was supplemented by distributing post-card questionnaires to drivers of motor vehicles. Information called for included: capacity of vehicle, weight and nature of the load carried, itinerary followed during the day, and mileage travelled. No fewer than 368,000 cards were distributed; 44,500 were received back and gave 40,000 answers of value (the original article gives details).

Statistical Information

The existing mileage of roads is :—

Primary System

- I. State highways ... 5,700 miles
- II. Provincial Highways 1,000 miles

Secondary System

- Feeder roads ... 7,500 miles
- Local roads ... 15,500 miles
- Urban roads ... 9,400 miles

Annual expenditures on roads are as follows :—

Annual Expenditure (Converted to £ sterling approx. at \$3 = £1)

Years	State highways		Provincial highway	
	Total ('000,000) £	Per mile £	Total ('000,000) £	Per mile £
1947	4.2	727	0.7	693
1948	3.7	653	1.0	1,027
1949	8.5	1,480	1.2	1,193
1950	8.0	1,407	—	—

After the completion of the 15-year programme of development, the highway system will be composed as follows :—

- (a) 550 miles of freeways ("auto routes");
- (b) 1250 miles of main highways (Primary System I);
- (c) 2500 miles trunk roads (Primary System II), and
- (d) 8000 miles regional roads (Secondary system).

Design standards have been fixed for these 12,300 miles of highways, after taking into account the nature of the terrain.

The design standards are given in the following Tables :

TABLE I

Category of highway	No. of lanes	Width of lane ft. in.	Standards*		
			Level terrain	Moderately rolling terrain	Very rolling terrain
Freeways	4*	12 6	A*	B*	C*
Primary system I	3 or 4	11 8	B	C	D
Primary system II	2	11 8 or 10 ft.	C	D	E
Secondary system	2	10 0	D	E	E

* See table 2 on page 31

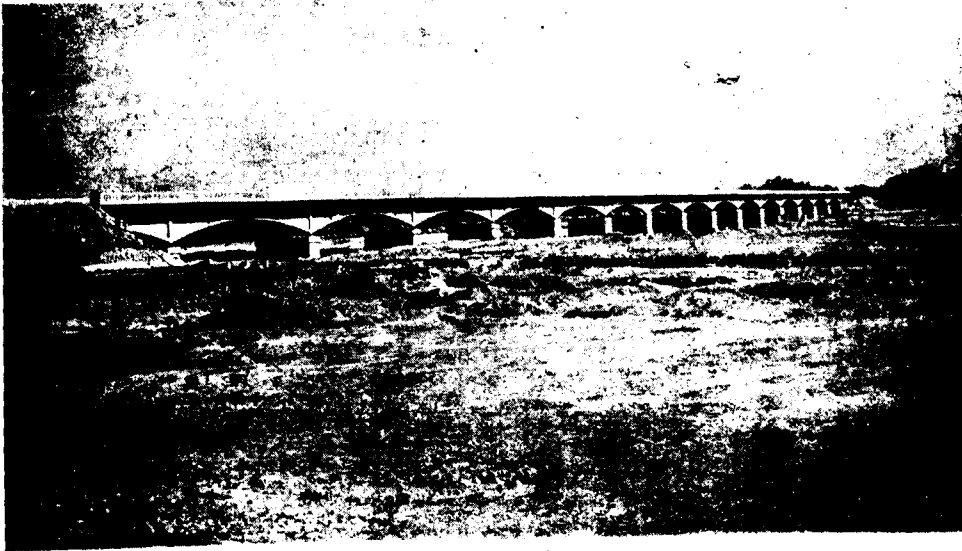
Continued on page No. 31

BRIDGING INDIA'S RIVERS THE KUAKHAI BRIDGE

The road bridge over the Kuakhai river is one of the four projected major bridges intended to develop the Mahanadi delta. It is also one of the numerous bridges which will have ultimately to be built on National Highway No. 5 between Calcutta and Madras. It achieved "top priority" for local reasons, viz., the development of the new capital city of Orissa at Bhubaneswar and the need for connecting it with the old capital, Cuttack, by means of an all-weather road. Further details of the history of this project were given in the article in this series in our March issue on the Kathjuri Bridge*.

active. On comparing surveys and other records dating back to 1847 with the surveys made in 1896-97, railway engineers of those days came to the conclusion that "the whole tendency of the river appears to be to convert the Kuakhai into the main channel....." The observed recorded discharge of the Kuakhai was 3,40,000 cusecs in 1896. As if to falsify these prophets, the highest recorded discharge after 1897 was only 2,53,000 cusecs in 1937.

The bed of the Kuakhai has now tended to rise at its mouth and was in 1947 as



A view of the Completed Bridge.

A Variable River

The Kuakhai is one of the deltaic branches of the Mahanadi and discharge passing down these branches varies from year to year. Sometimes only one branch takes the main discharge and a few years later this branch gets sluggish and tends to silt up while another branch becomes

much as 17 ft. higher at that place than that of the Kathjuri at its corresponding point of take-off from the Mahanadi.

These changes in the regime of the river aggravated considerably the normal uncertainties of the situation and made the selection of a suitable bridge site difficult.

* For Technical details of the Kathjuri Bridge, see I.R.C. Journal Vols. XIV-2 & XIV-4. For those of the Kuakhai Bridge, see I.R.C. Journal Vols. XV-3 & XV-4.



The start of the work.

Various experts favoured the construction of the bridge at different locations on the river spread over a range of about 15 miles. At each of these locations there was further divergence of opinion about the most suitable exact site. A joint inspection by experts in March 1947 followed by model experiments at the testing station at Poona solved this thorny problem and the present bridge site near Baliaanta was finally settled.*

Like the Kathjuri bridge, the Kuakhai bridge was built as a reinforced concrete balanced cantilever structure with suspended spans in alternate bays. The span was, however, much smaller on this bridge.

Dimensions

The main dimensions of the bridge are :—

Overall length face to face of abutments, 1696 ft; 15 spans, 106 ft each, and 2 end spans, 53 ft each; height of pier shaft from plinth level to level of bearing seat, 18.5 ft; thickness of pier shaft at plinth level, 8 ft; batter in piers, 1 in 16.

Carriageway, 24 ft; 2 footpaths, 6 ft each; depth of girders, 13 ft 6 ins. at the

supports, and 6 ft at the centre; web thickness, 9 inches.

Live load, I.R.C. Class AA on the carriageway; live load on the footpath, according to Clause 207 of the I. R. C., Bridge Code.

Maximum pressure intensity on foundations under piers, 7 tons per sq. ft.

Temperature variation, ± 30 deg. F.

Average velocity of water under the bridge, 5 ft

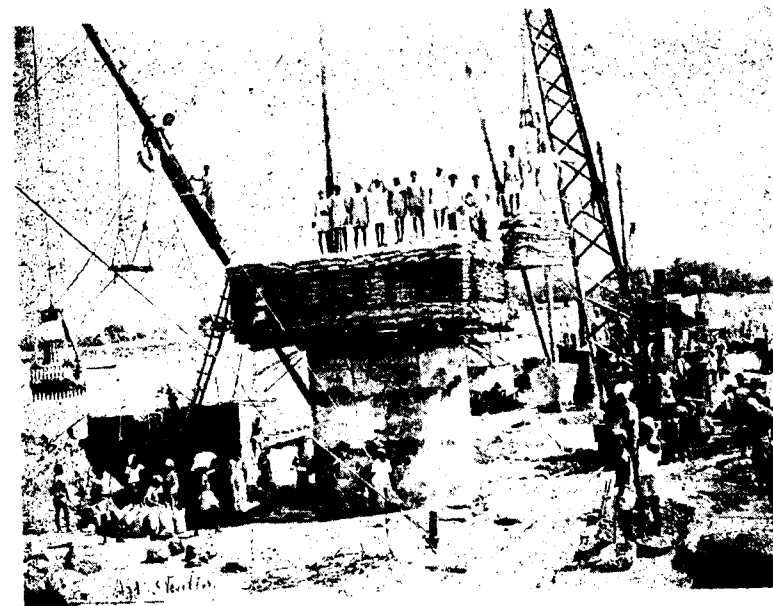
per second; discharge, 2,60,000 cusecs. (This calculated maximum discharge takes account of the dam across the Mahanadi under construction at Hirakud some 200 miles upstream of the Kuakhai bridge site.)

Well Foundations

One of the main differences between the Kathjuri and Kuakhai bridges was that in the latter two separate circular wells were used under each pier instead of a twin well as at the Kathjuri. This made sinking easier in the much stiffer clay existing at the Kuakhai site.

Of the 32 wells forming the foundations of this bridge, only 7 sank absolutely straight. The shift and tilt in the remaining 25 wells varied from $\frac{1}{4}$ in. to $1\frac{1}{2}$ in. in the worst cases. This was considered within the range of permissible tolerance and the piers were built in the designed positions.

The wells were 13 ft 6 in. in diameter (outer) with a 2 ft 6 in. thick steining. After sinking and plugging they were



Sinking devices: Kentledge loading on one well and dredging in progress in another.

closed between the line connecting the uppermost points of the superstructure and the line containing the lowest parts of the foundation) Rs 136/-. Considering the depth to which the wells were sunk, the cost of the work may be looked upon as normal or even below normal.

Tests

Before the superstructure was taken in hand, test cubes were made to ascertain the strength of concrete from different

connected at the top with 3 ft thick vibrated reinforced concrete well caps.

The piers were built of lightly reinforced 1 : 3 : 6 cement concrete with plums. The abutments were designed as reinforced concrete retaining walls for earth pressure and traffic loads on the fill behind but not for taking any load from the bridge.

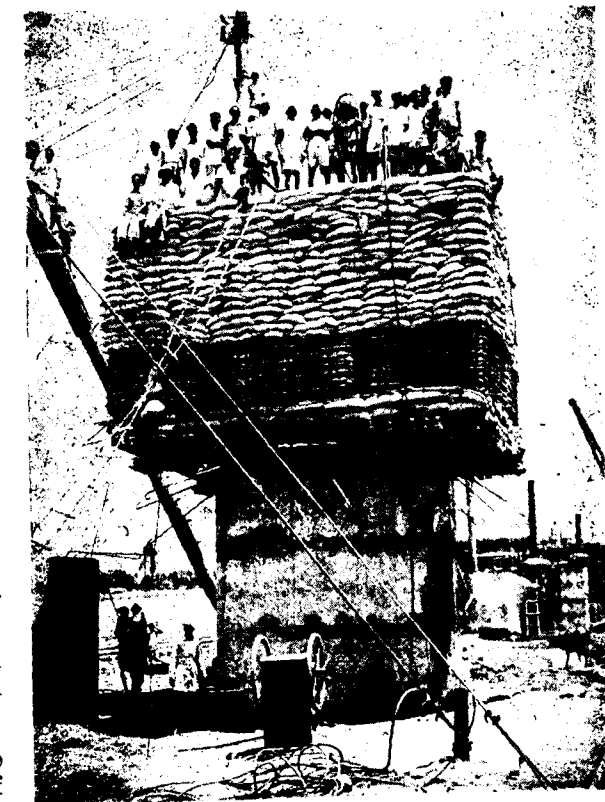
The joints in the main reinforcement in the beams were welded.

The roller and rocker bearings were designed for a load of 240 tons (400 tons on the Kathjuri bridge).

Costs

The bridge has cost the Central Government a total amount of Rs 23,21,000. Of this, the foundations cost Rs 8,12,000; piers and abutments, Rs 13,04,000; and superstructure, Rs 9,69,000.

Cost per running foot of the bridge, Rs 1,768; per sq. foot of carriageway, Rs 57; per sq. foot of roadway, Rs 38/7; per sq. foot of entire elevation (i.e. the area en-



A well loaded with kentledge.

* For plan please see page 6 of our issue for March 1962.

sources. Hard granite stone metal and gravel were found suitable. Selected, broken gravel was, however, also allowed in the superstructure mixed with 50 to 60 per cent of broken granite.

During the actual construction, 2 to 3 test specimens were taken every day from the mix used in the work and later tested to see whether the ultimate strength conformed to specifications. The strength of 1 : 2 : 4 cement concrete at 28 days ranged from 3,257 lb to 5,413 lb per square inch.*

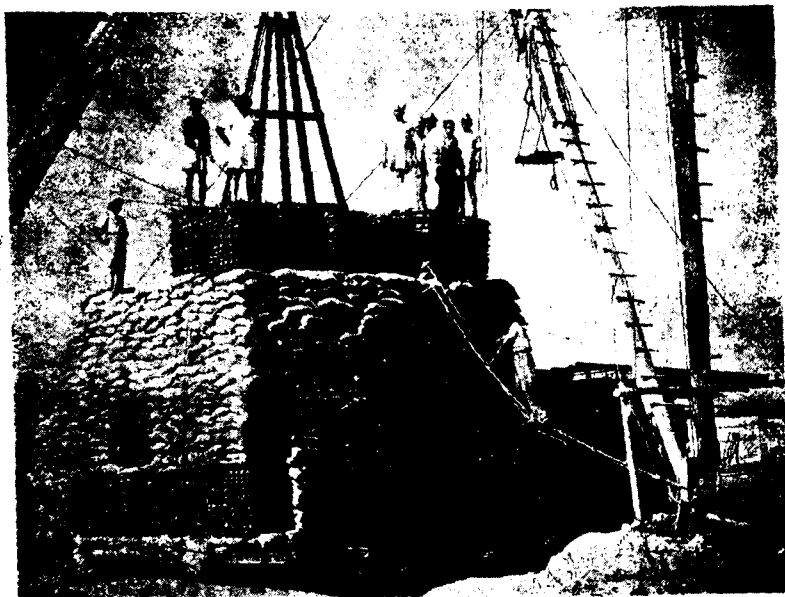
Sand was tested for bulking every day of concreting. Figures for percentage reduction ranged from 22 per cent to

27 per cent and an adequate proportion of sand was used to compensate for this bulking.

The metal used in the roller and rocker bearings was tested both physically and chemically.*

The bridge was load-tested after completion under dead loads calculated to give rise to stresses the bridge had been designed for. The test was successful and the spans subjected to the test recovered completely when the load was removed.

Work on the bridge began in November 1947 and it was thrown open to traffic in January 1951.



Well No. 3—Upstream. When found excessively difficult to sink even with sufficient Kentledge, special chisel cutter was used.

A LONG LIFE

Pat. I wish I knew the place I was going to die in.
 Friend. What good would that do you, Pat?
 Pat. Sure, I'd never go there.

*Details of the tests are given in the Paper in I.R.C. Journal Vol. XV-3.

PRESS COMMENTS ON THE SIXTEENTH SESSION OF THE INDIAN ROADS CONGRESS

“Hindu” Madras, April 29.

SINCE the formulation of the Nagpur Plan, India has not lacked a plan for road development. What is lacking is determination on the part of the Governments at the Centre and in the States to put this Plan into execution. In his stimulating address to the Indian Roads Congress at Simla, Mr. G. M. McKelvie, Road Development Adviser to the Government of India, spoke many plain truths about the inadequacies of our present road policy.

Despite the fact that the Royal Commission on Agriculture pointed out as long ago as 1927 that this country was suffering from the evils of unbalanced development of roads, little has been done to promote balanced development. The Royal Commission urged that more money should be spent on district and village roads and the Nagpur Plan recommended that about a fifth of the total expenditure should be on national highways while at least half the expenditure should be on district roads and village roads. But most States continue to spend large sums on National and State Highways, while district and village roads continue to be neglected.

State Governments are yet to pay heed to the principles laid down by Mr. McKelvie that all classes of roads should be regarded as of importance for the national welfare and no one class should progress at the expense of another. There should be balanced development in a planned sequence.

Mr. McKelvie rightly warned that roads should not be developed ahead of the requirements of the traffic they carry or may be expected to carry. In other words, the nature of the surface should be determined by the circumstances of each case and not by the category into which a stretch of road falls. One suspects that failure to observe this principle has involved the construction in the past of roads either much above or much below the standards warranted by the needs of the area. In either case it is false economy.

The demand that road development should be placed on a statutory basis and financed from a special fund which is not subject to the vicissitudes of annual budgetary fluctuations has been there for a long time. Whether such a course would be possible or desirable in respect of one field of State activity alone is a debatable point. But there can be no two opinions on the need for allotting more funds for road development and placing road financing on something like a long-term basis. A greater part of the heavy duty on petrol and the various duties on motor vehicles and spare parts ought to be legitimately utilised for providing better roads.

Addressing a conference of engineers, Mr. McKelvie naturally raised questions about the recruitment to the profession and the revival of an All-India Engineer Service. There is perfect justice in his complaint that the administrative officer is over-rated and the engineer gets a back seat in the present set-up.

No wonder that the engineering service is not attracting the best talent and recruitment of Class I Engineers has been far short of what is required to maintain the efficiency of the department. In view of the many big projects that have been taken up in recent years and the large-scale road and other public works programmes that will have to be carried out in the coming years, the creation of an All-India Service of Civil Engineers, as urged by Mr. McKelvie, is a matter that calls for immediate consideration.

There is, as it is, a grievous shortage of experienced first rate engineers at the top and unless this deficiency is made good by attracting the best engineering talent to the public services the Government will find themselves gravely handicapped in the efficient and economic execution of their projects.

"Tribune" Ambala, April 29.

The presidential address delivered by Mr. G. M. McKelvie at the 16th session of the Indian Roads Congress which opened at Simla on Sunday is full of sound observations on questions relating to road policy, road finance, and other aspects of road development.

In spite of considerable progress made during recent years in the construction of roads, India lags behind all advanced countries in respect of road mileage. The deficiency of roads in India may be judged from the fact that while in the United States road mileage per one lakh population is 2,500, in Britain 392 and in France 934, the corresponding figure for this country is only 89. The Nagpur Plan of road development aimed at a high target for the 10-year period after the war. Financial limitations have, however, made such an ambitious programme difficult to implement. But lack of financial resources alone does not explain the inadequacy of roads. There has also been lack of full appreciation of the vital part which means of transport play in a country's economy. There has particularly been a lamentable neglect of roads in the countryside.

Mr. McKelvie has rightly stressed in his presidential address that road development should not be subject to the changes in political philosophy and that regular funds should be set aside for road maintenance and development. In all progressive states the accepted fundamental principle underlying road finance is that all road users must contribute to the funds for the maintenance and development of roads. Funds should be allocated out of the general revenues for road development and taxes collected from vehicle users should be earmarked for maintaining roads in good condition and expanding them.

Like railways, road development programme ought to be financed partly by loans and partly through taxes on road users. Now that many States are nationalising road transport services and are hoping to make large profits from them, it is sound investment for them to open up new areas through loans. Road develop-

ment can be very much facilitated if we treat it on the same basis as the development of railways.

Unfortunately, while the railroad system has been built up by large-scale capital investment, the roads have developed only through contributions from general revenues. This policy must definitely change.

"Statesman," New Delhi, April 29.

Road users in India—passengers and carriers alike—get little consideration. Public commissions and private associations have repeatedly championed their needs, but with little visible result. On Sunday, Mr. G. M. McKelvie, President of the Indian Roads Congress, reiterated what he thought should be the basic principles of a national road policy, with perhaps as little chance of influencing Governments as other advocates (the Nagpur planners included) before him. He also spoke of haphazard, disconnected building, of waste and the neglect of rural roads, of division of authority and the need for corrective legislation, of muddled, inadequate finance and crushing taxation.

This is an old story and variation in the telling is difficult, as comparison of speeches made every year shows. Some points, however, bear constant reiteration. The average vehicle owner in India is much more heavily taxed than his British, French, and American counterpart; the motor vehicle, for purposes of taxation, is still classed as a luxury in India. The roads by which it travels are, however, in another category. According to one authority only 5 per cent have modern surfaces, and of the rest two-thirds are unmetalled. They add Rs 10 crores a year to the cost of operating motor transport.

Nevertheless, along these inadequate, rutted highways move great quantities of goods. In 1949-50, it has been calculated, the figure for railways was 25,460 million ton-miles; that for bullock-carts 12,000 million and for lorries 16,500 million ton-miles. During the same year people paid Rs 951 crores to travel by

bus, taxi and private cars. Such tenacity in the face of adversity clearly deserves reward—except, seemingly, in the eyes of Governments. A new deal for the road user is still remote.

The Nagpur Plan once raised hopes. But against its 10 year expenditure target of Rs 611 crores (for roads other than national highways) only Rs 27.11 crores (less than 5 per cent) was spent in three years. The Planning Commission has now laid down a new schedule of "steady, balanced and continuous" development. But it is a far cry from the Nagpur Plan, and there is no assurance that inadequate funds will not be pruned still further. The Commission avoided the proposal of an independent Road Board, recommended by the Nagpur planners. It ignored the Motor Vehicles Taxation Committee's recommendations for taxation reform and more intelligent use of proceeds.

Mr. McKelvie reiterated the M.V.T.E. Committee's suggestion that a road plan should be statutory with funds set aside by statute. Official hostility to this proposal is deep-rooted and the value of the Bills to which Mr. McKelvie referred remains to be seen. The Model Highway Bill, for example, was drafted five years ago and has not yet reached Parliament.

In sum, there is nothing to suggest that roads will not continue as neglected as ever. This is regrettable, for, as the taxation inquiry committee pointed out, fiscal problems similar to India's have occurred in other countries and been met and largely solved. If, as the Planning Commission has said, "roads are a service for all forms of development whether of agriculture, trade or industry," Governments here cannot much longer shirk their responsibilities.

"Hindustan Standard," Calcutta, April 30.

The time was when roads were considered to be a competitor to the railways and when the prospect of a reduction in railway earnings through increased facilities of road travel held up the extension of motorable road mileage. That ill-concei-

ved opposition is now happily dead. Further, with the acceptance in principle of the scheme of nationalisation of road transport and the enormous growth of goods and passenger traffic the railways would feel relieved if some of their burden were to be transferred to the roads.

But then the roads have to be capable of taking this traffic for which heavy vehicles must be used with much greater frequency and in greater numbers. From this point of view the present position is very unsatisfactory.

Moreover, a number of arterial roads, including what are termed National Highways and State Highways, are significant from the viewpoint of military defence as well and as such should receive high priority. The development and maintenance of these roads should, therefore, be also the concern of the Defence Department and a high proportion of the cost thereof should be borne by that Department.

That the Government has turned a blind eye on these prime requirements is not so deplorable as that in all these years not much more than one per cent of the target fixed under the Nagpur Plan of 1943 adopted as the basis of free India's road plan, has been realised.

Members of the Roads Congress have, in view of this seeming waste of their long and hard labours, every reason to feel frustrated, particularly when they see huge sums dissipated on worthless counts at the same time as this matter of urgent national importance is held up for alleged paucity of funds.

All that Mr. McKelvie said in the course of his presidential address about the necessity of securing efficiency in engineering administration and about the creation of an All-India Service of Civil Engineers deserves serious consideration.

But more urgent is the adoption, urged by him, of a common road policy by the Central and the State Governments. His stress on an integrated road plan for the whole of India in which all classes of roads should be allowed balanced development and in which maintenance of roads to proper standards should have priority

over the construction of new roads is rational and well-timed.

"Anand Bazar Patrika," Calcutta,
April, 30.

If Government want to find an excuse (for not fully implementing the Nagpur Plan), they can easily make use of the fact that funds have been in short supply and it has not been possible for them to find the necessary amount which explains why the decisions of the Nagpur Plan could not be worked out in toto. Such explanation may perhaps be acceptable in the matter of certain other development schemes, but there is every reason to term it as an unrealistic approach when efforts to develop roads are slowed down just on the ground of shortage of funds.

The "Neglected Queen"

A tone of such a complaint is implied in the Presidential Address of Mr. McKelvie in the 16th Session of Roads Congress at Simla. Even today Indian roads are greatly neglected at the hands of the Government development experts and planners. At least it is more apparent when compared with the Railways. It is, however, an established fact that in the Indian economic life the roads earn much more than the railways. But in the estimation of Government the roads have never been given the same amount of importance or weight as the railways.

The fields of income and expenditure on railways have also been kept apart from the public income and expenditure. Earnings from the railways strike one very distinctly and it becomes difficult to turn down the claims of the railways for development, keeping the earnings in view. But no separate account is kept of the earnings and expenditure on roads. So somewhat like the proverbial "Duorani" (the neglected queen), the road while contributing a tremendous sum towards the economy of the country, itself remains uncared for. An insignificant amount of the earnings from the road is being spent for its development.

That a reasonable share of the earnings from the road should be spent for its

development, is not only a just claim, but is a logical claim. For, repairs, development, construction and extension of road are really one of the chief means of effecting improvement in the economy of the country. It can be easily and naturally comprehended, that be it agricultural produce or any other industrial production, unless there exist proper means of transport, such produce becomes dear and scarce and this creates difficulties in the public economy. The development of industry or agriculture will not be feasible unless a large number of suitable roads which can bear the load of the necessary transport are constructed or extended all over the country.

It is desirable that the age-old tradition and custom of Government to spend the money earned from the roads on other development projects should change. Further, the few and undeveloped Indian roads which carry the vehicles of the traders and earn money in the shape of taxes can claim at least a share of such earnings. So it is not right to offer the plea of want of funds against the development of roads which open up such a vast field of income.

"Indian Express", Madras, April 29.

The principles laid down by Mr. McKelvie for the Indian Roads Congress are beyond reproach. He has formulated new rules for our administrators and advised that local feeder roads are as vital for the economy as national highways while integrated development requires analysis of traffic, potential and actual. Tolls in special cases are not deprecated. When costly bridges are built, it is permissible to collect a fee from the users. A new point made is that maintenance is as important as construction of new roads.

"Bombay Chronicle," Bombay,
April 30.

The basic principles of a road policy were reduced into six concise and precise points by Mr. G. M. McKelvie, Road Development Adviser and Joint Secretary to the Government of India, in his presidential address to the Congress.

These principles as enunciated by him are: (1) the road network of each State should be an integral part of the road network of India; (2) all classes of roads should be regarded as of importance for the national welfare and their development should be balanced; (3) roads should not be developed ahead of the traffic they carry or will carry in the immediate future; (4) roads should be free to all, with no toll barriers; (5) road maintenance should have priority over new construction; and (6) the road plan should be statutory, with regular funds set aside by statute for maintenance and development.

Mr. McKelvie revealed that the points he made have already been incorporated into a series of bills, which were expected to be brought up before Parliament. In view of the many pressing matters awaiting consideration of the new Parliament, it is doubtful if these bills can come up for consideration early. But there cannot be much difficulty in going ahead in so far as present legislation permits. Considering that the same political party is in power at the Centre as well as in most of the States, co-ordination must be comparatively easy.

"Times of India," New Delhi, May, 1.

The annual reminder to Governments—both at the Centre and in the States—that roads are a vital sector of the national economy has been given by the Indian Roads Congress which held its sixteenth session at Simla during the week-end. The simple truth that communications are all essential means to prosperity is acknowledged by Government but unfortunately this country continues to suffer from one of the lowest road mileages.

The Government's excuse of financial stringency is not valid because its appropriation of road taxes to general revenues and the consequent denial of necessary funds for roads is an unwarranted fiscal practice. It is time the Government acted on the Motor Vehicles Taxation Inquiry Committee's report so that the road user is relieved of many of his present burdens and roads are assured of non-lapsable funds.

The Planning Commission has recognised that road development should be

steady, balanced and continuous. It has allocated for five years a total expenditure of approximately Rs 94 crores, which is but a fraction of the outlay envisaged in the Nagpur Plan. Even so, the nation's economy will gain much if the funds are properly utilised. **A special Roads Department in each State is required to ensure that the funds are spent and a cadre of specialised road engineers is built up.**

"Hitavada," Nagpur, April, 30.

The crux of the matter may be summed up in one sentence: no road should be considered by itself, but as part of a network. This was the theme of Mr. McKelvie's sound and timely address to the Indian Roads Congress.

"Searchlight," Patna, May, 4.

The heart of India resides in villages, which can be ignored only at the greatest peril of national prosperity and well-being. Minor district roads serve as life-line to teeming millions who otherwise have to live in isolated islands of village hamlets, far from crowded towns and enjoying little benefit of scientific developments of the modern age. Being strangers to it, they care little for modern amenities. But they do care for and feel the high expenses incurred in transporting their produce to the markets. The rotten condition of roads coupled with ante-diluvian means of transport lead them to incur a heavy expenditure on transport and as such the margin of their profits is greatly reduced.

"Who will grow more food when it costs so much to take crops to the markets?" asks Mr. McKelvie. He is right. His statement is a pointer to one of the basic causes of food scarcity which is a major problem for our Government to tackle. The committee appointed by the Government of India to enquire into the failure of the grow-more-food campaign is said to have reached the last lap of its work. It will be profitable and desirable if the committee takes notice of the road aspect of the question.

The State Government in their reports to the committee are reported to have suggested the appointment of suitable young men with proper training in a group of villages to enthruse the farmers to grow more food. But no enthusiasm will be forthcoming if their very life line is left neglected by the State Governments. State budgets show that no adequate provision is made for village and minor district roads. Rather, as Mr. McKelvie says, the demand is to spend more and more on the national and state highways.

According to the Nagpur Plan, on the whole, not more than about one-fifth of the total road expenditure should be on national highways and half should go on major and minor district and village roads. The Planning Commission has adopted this ratio in its programme for road development. The programme, if implemented, will no doubt, usher in a new life for villagers.

"The Mail," Madras, April, 30.

Mr. McKelvie called attention to high cost of transport of agricultural produce

to where it is needed owing to the bad condition of the roads the carts carrying it have to travel. We, in South India, have heard how farmers have refused to transport produce to markets because it was unprofitable to do so, the cost of transport being too high.

"Who will 'grow more food' when it costs so much to take a crop to market that there is no profit in the business?" asked Mr. McKelvie. He pleaded, as we have done repeatedly, for the allocation of a larger percentage of the revenue derived from taxes, direct and indirect, on transport to the making, improvement, and maintenance of roads. It is doubtful if his recommendation will, in these days, when the excuse of "financial stringency" is ever on the lips of Union and State Ministers, receive a sympathetic hearing.

But one thing is certain that until what he recommends happens, India cannot have the roads she needs, or keep those she has in serviceable condition.

AWAKENING

"During the last month and more, I have visited many villages in my constituency in the Tanjore District and in most places the only request made to me was for roads."

"This has also been my experience in other parts of the country whenever I had occasion to go into the interior."

[His Excellency K. Santhanam in his speech at the opening ceremony of the Cauvery Bridge at Pugalur—23-12-51.]

THE SIXTEENTH SESSION

THE Sixteenth Session of the Indian Roads Congress held in Simla at the invitation of the Government of the Punjab was inaugurated on the 27th April 1952 in the Davico's Ballroom by His

Brick Metal in Tar Carpets" by Shri K. C. De, were highly commended.

Technical Papers

In all five Papers, on Standards for Vertical Curves for Roads, Construction of the Shillong-Silchar Road, Grouted Concrete Roads, Design of Road Beds, and the Importance of Organization, were discussed at the Session. The last named Paper criticised the internal organization of our highway engineering departments and contained some valuable suggestions for their improvement. The discussions will appear in the next issue of the Journal of the Congress.

Meetings

The outgoing and incoming Councils held their meetings on the 26th and the



His Excellency Shri Chandu Lal Trivedi inaugurating the Session.

Excellency Shri Chandu Lal Trivedi, the Governor of the State. About 200 delegates from all over India attended the Session. Shri G. M. McKelvie, Road Development Adviser & Joint Secretary to the Government of India, Ministry of Transport, delivered the Presidential Address. Messages of goodwill received from Dr. B. V. Keskar, Deputy Minister, Ministry of Transport, His Excellency Shri K. Santhanam, Lt. Governor, Vindhya Pradesh, and others were read out to the Congress.



Mr. G. M. McKelvie delivering the Presidential address.

"The Indian Roads Congress Medal" was awarded to Shri B. V. Vagh for a series of Papers on the "Design of Bullock-cart Wheels". Papers entitled "Organization of Building Activities" by Shri G. R. Nangea and "Behaviour of

30th April 1952 respectively.

The various Committees and Sub-committees of the Congress met during the Session and discussed the Codes for prestressed concrete and steel bridges;



The Audience listened to the Presidential address with rapt attention.

design of round-abouts; siting of petrol pumps, erection of roadside advertisement hoardings; maintenance of earth roads; classification of Indian soils; and many other important matters. Other important points that came up for discussion were improvement of the existing layout of footpaths at crossings in urban areas, adequate provision for bus stops on city roads, difficulties experienced by the Indian manufacturers of tar and bitumen boilers, asphalt mixers, sprayers, and concrete mixers.

The programme for the next series of tests at the Alipore Test Track was drawn up.

Local Inspections.

While in Simla, delegates not busy on committees visited the Rashtrapati Niwas and Kufri, a pleasure resort on the Hindustan Tibet road, eight miles beyond Simla. A demonstration near the Victory Tunnel on the Circular Road of a few black-topping specifications was also

arranged by M/s. Shalimar Tar Products Ltd., for the benefit of the delegates.

Important Works Visited.

The last two days of the Session were devoted to mofussil visits. On the 1st May 1952 the delegates motored down to Kalka and visited the Cement Factory at



Relaxing after a hard day's work.

Surajpur and the new State Capital under construction at Chandigarh. This was

followed by a visit to the Bhakra and Nangal Dams and their ancillary works on the 2nd May. The Journey from Kalka to Nangal and back to Delhi was made in a special train.

Six Government Departments and eighteen firms participated in the exhibition.

Full details of the exhibition are given elsewhere in this issue.

Exhibition.

As usual a technical exhibition was organized but on this occasion on a more modest scale than usual. This was done in spite of the handicaps imposed by the Kalka-Simla hill road on the transport of road-making machinery and other bulky exhibits for display. The exhibition was nevertheless quite impressive and attracted a large number of citizens in addition to the delegates.



It is not only a bridge site that merits careful selection!

Entertainments.

The natural beauty, fresh mountain air, and the calm atmosphere of Simla left nothing to be desired for refreshing the minds of the delegates after each day's busy programme. Technical films and a variety concert organized by a group of local educational institutions made the evenings all the more lively. On one evening His Excellency the Governor of the Punjab was "At Home" to the delegates at the Raj Bhavan.

The outgoing President was "At Home" to his Council on the 29th April.

NOT FUNNY

The prisoner was in the dock awaiting his sentence. The Judge turned towards him and solemnly announced a sentence of five years' hard labour. To his surprise the prisoner let out a howl of laughter. When he had finished laughing the Judge said sternly, "I see nothing particularly funny in a five-year term of hard labour." The prisoner wiped his eye, looked at the Judge, and said, "Well, you see, the joke's on you; I saw my doctor last month and I've only got six months to live."

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

By

MR. G. M. McKELVIE.

Simla, April the 27th, 1952.

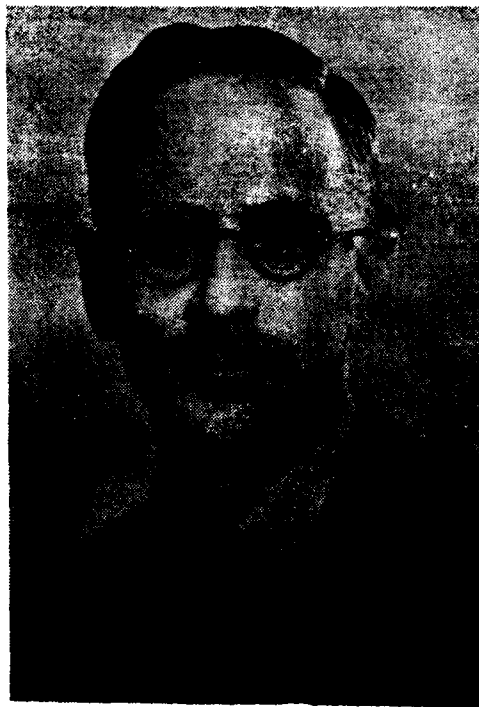
YOUR EXCELLENCY, LADIES, AND GENTLEMEN,

The Indian Roads Congress is most grateful to your Excellency for having spared the time to come hear today to open this, the sixteenth, session of our Congress. We are also grateful to our honoured guests for having graced this occasion with their presence.

Since this Congress was founded in 1934 we have met at many places in India, from Delhi in the North to Trivandrum in the South, from Bombay in the West to Calcutta in the East. This is, however, the first occasion that we have had the privilege of meeting in the Punjab although, during our first session in 1934, we toured through the Punjab and inspected some of your excellent roads. On that occasion we were entertained to lunch by your Minister for Agriculture of those days, the Hon'ble Sir Jogendra Singh. How long ago it all seems although it is only eighteen years.

This time by courtesy of the State Government we meet in Simla the beautiful, the present capital of the State and a place of thriving activity. From here we can see the mighty Himalayan ranges of which many of us have so far only heard. Here we can breathe fresh mountain air and exercise our leg muscles.

Punjab is famous not only in India but in the world for its engineering works. The old traditions are being maintained and during this session we are going to see work in progress on the New Capital construction at Chandigarh and on the Bhakra and Nangal dams. We have already seen when coming up this hill something of those



MR. G. M. McKELVIE, C.I.E., I.S.E.

fine engineering achievements, the road and the railway from Kalka to Simla.

The road (as usual) came first and only road engineers can appreciate the difficulties that were overcome and the problems that were solved during its construction. Appropriately, we shall be discussing a Paper on hill roads during this Simla Session.

The mountain railway is itself with its 103 tunnels totalling five miles in length, its long viaducts and lofty bridges, an example of engineering

skill of no small magnitude. We are too apt to take roads and railways for granted as we take mountains and rivers and the air we breathe but what would Simla be without its road and railway.

But we do not need to preach on the value of roads to the people of the Punjab and the neighbouring State of Himachal Pradesh. What they have done in the past, are doing now, and propose to do in future, is an indication of the value they place on roads.

THE INDIAN ROADS CONGRESS

It is customary for the President on the occasion of our annual Sessions to say a few words on our Society, what we have done in the past, and what we are trying to do. We started in 1934 with 73 members and now we have nearly 1300. We exist "to promote and encourage the science and practice of the building and maintenance of roads".

Our Society gives opportunities to its members to pool their collective experience and ideas on all matters concerning roads, by discussion at our annual meetings and by service on committees and on the Council. We interest ourselves in road research, education of the highway engineer, standards, specifications, and highway finance. Among our objects we include the suggestion of legislation for the development and improvement of roads and we lay special emphasis on the dissemination of information and knowledge that may be of use to our members and the profession generally.

Our journal now finds its way to most countries in the world and recently, through our monthly publication, the Transport-Communications Monthly Review, we have been making an effort to explain our standards, designs, and specifications to overseers and other road officials who are not members of our Society.

On the purely technical side, our Bridge Code, unfortunately still incomplete, is perhaps our best effort and one that has earned high praise from abroad. The Nagpur Plan (described recently in a well known Indian journal as "of hallowed memory") was inspired by this Society and owes much to our deliberations.

Incidentally, the Plan is not dead but is still the basis of all road planning in India. The Planning Commission have embodied the Nagpur Plan principles in their own first five-year plan and have quoted the saying often repeated by us:

"A country pays for its roads whether it has them or not—and it pays more for those it does not have."

During this session we are going to discuss some interesting Papers. One of these criticises the internal organization of our highway-engineering departments and contains some valuable suggestions. We shall also probably find time to discuss a very interesting and instructive account of bridge development and design in Canada recorded by the bridge engineer of the Roads Organization of the Ministry of Transport who visited Canada last year (and, incidentally, won somewhat of a name for himself there).

Then, many of our members will be spending all the time they can snatch from the discussions on Papers to work from morning till evening on our technical committees. Our junior members will have an opportunity to "listen in" at these discussions and we expect discussions and arguments on technical matters will go on far into the night between groups of enthusiasts.

We have provided a small exhibition—nothing like the very extensive display we had last year at Calcutta because of the difficulty of bringing much machinery to Simla, but a good and interesting exhibition for all that—and we shall show interesting films on road construction and listen to lectures given by experts.

ROAD POLICY

Having said something about the technical work we shall be doing during this session, I turn to what can be called wider issues. It is indeed customary every year for the President of our Society to voice from this platform the collective view of our members on such matters as road policy, road finance, and road administration.

Several years ago the founder of this Society, Sir Kenneth Mitchell, said that since we had among our members nearly every road engineer in India we could claim with some justification that we knew more about roads, their possibilities, and what was wrong with them, than any other body of men in the country. We were, therefore, entitled to say what we thought both on the technical and the non-technical aspects of road development.

As a Society we have often in the past given the Central and State Governments advice on policy questions and it is a matter of gratification that our advice and recommendations have so often been accepted and acted on. It was at our Gwalior Session in October 1943 that our Council first passed a Resolution urging the Central Government to designate a system of roads as "National Highways" but long before that we had been pressing Government to consider the same suggestion although we had then spoken of "Federal Trunk Roads".

In 1945 we suggested that Government should invite an engineer—administrator from abroad to advise on our Nagpur Plan and "methods of organization, planning, construction and research". The President of the United States of America himself in response to the request of the Government of India sent his two most experienced officers, General Fleming and Mr. Thos. H. MacDonald. The latter officer had at that time been in charge of the Federal Roads Administration in the United States of America for a period of no less than 27 years. Our members know how valuable was the advice given us by those officers. We discussed our problems with them endlessly and we have based much of our policy on their advice.

We also advised on sending road engineers abroad for practical training and no fewer than 59 were sent in subsequent years much to the benefit of Indian roads. Coming nearer home, we advised on the setting up of a committee to study motor vehicle taxation and road-rail relations in India and we followed this up with advice on the co-ordination of all forms of transport-communications (a recommendation that was strongly endorsed by the Governor of the United Provinces), on village road improvement and village road co-operative schemes, on road finance and administration and on many such matters.

BASIC PRINCIPLES OF ROAD POLICY

The principles we recommend for inclusion in the common road policy to be adopted by the Central and State Governments are as follows:

- (1) The road net-work of each State should be an integral part of the road net-work of India.
- (2) All classes of roads should be regarded as of importance for the national welfare; one class should not progress at the expense of another; development should be balanced as between classes and should proceed in a planned sequence.
- (3) Roads should **NOT** be developed ahead of the requirements of the traffic they carry or will carry in the immediate future. A national highway can have an earth surface and a village road, a concrete surface if the traffic in each case requires these surfaces.

- (4) Roads should be free to all: there should be no toll barriers except in special cases to finance loans taken to construct large bridges and important road works. The tolls should cease as soon as the loans are repaid.
- (5) Road maintenance to proper standards should (with hardly an exception) have priority over the construction of new roads.
- (6) Roads are a service to nearly all forms of development and road development should form part of almost all development schemes.
- (7) The road plan should be statutory with regular funds set aside by Statute for road maintenance and development. Road development is a long-term measure and should not be subject to the vicissitudes of temporary changes in political philosophy.
- (8) Statutory provision, essentially common throughout India, should be made for regulation of traffic, control of ribbon development, the levy of betterment taxes on roadside lands, and removal of encroachments.

Stated like this, the road policy we recommend for adoption in India may appear simple and obvious. Yet, in every day practice, departures are being made from even the most fundamental concepts of this policy. A road does not exist by itself, it is fed by and feeds other means of transport-communications. Yet concrete roads have been built in the past, isolated from connecting roads, railways, etc., and today those expensive roads carry hardly any traffic at all—the traffic cannot get on to them.

Every one agrees that, since roads are fed by and feed other roads, there should be balanced development as between the various classes of roads, yet how many States' budgets show that adequate provision has been made for village and minor district roads? Rather the demand is to spend more and more money on the National and State highways.

The Royal Commission on Agriculture commented in 1925 on the evils of the then existing unbalanced development of roads in India and its remarks were endorsed by the Indian Road Development Committee (the Jayakar Committee) of 1928 but the position is not very different now, a quarter of a century later. The Nagpur Plan suggested that, on the whole, not more than about one-fifth of the total road expenditure should be on national highways and half should be on major and minor district roads and village roads.

The ratio to be adopted in individual States will, of course, depend on local conditions but we are glad to note that the Planning Commission have adopted the Nagpur ratios in drawing up in broad outline their all-India five-year plan for road development.

BALANCED DEVELOPMENT

I have mentioned that the money provided for roads in the States does not always allow for balanced development. The difficulty is partly organisational or administrative. The national highways are now the responsibility of the Centre, the principal State roads, of the State Governments, while district and village roads are mainly the responsibility of local authorities. How is there to be a common road policy when there are so many different authorities responsible for roads?

"An Act is Necessary"

This division of responsibility exists in most advanced countries. The problem has been solved by them and it can be solved by India. The American

experts told us that they had learnt by painful and costly experience that the road plan should be statutory. This is what they said—

“An Act is necessary. In such a form the Plan becomes a Charter for action by a large number of agencies and makes possible, what is not otherwise possible, a uniform understanding of the Plan.

“Also in this form the Plan becomes less subject to the vicissitudes of changing political philosophy.....The attainment of an adequate system of highways to serve all the requirements of so large a country as India is a time-consuming process.”

On this advice and as a result of our own studies, our Society has worked out in outline what the statutory road plan should be. Most of our recommendations have been embodied in three Bills, the (Model) Highway Bill, the Motor Vehicle (Principles of) Taxation Bill (required by Entry 35 in List III of the Seventh Schedule of the Constitution of India) and the Central-Aid Roads Bill. The first bill was circulated to the States some three years ago and the other two were considered last year, first by a Committee of our Council (the Chief Engineers of Part A & B States) and later, by the Transport Advisory Council. The recent elections have delayed progress on these three Bills but we may hope for some advancement in their consideration in the near future.

ROAD FINANCE

It will be evident that the Bills deal mainly with financial matters but finance is the crux of the whole problem. Here our critics will say that we engineers are treading on sacred ground and that we should stick to our own subject, engineering. Our answer is that it was not until the engineers of other countries interested themselves in road finance that the road problem of those countries was solved.

By their training and experience engineers are accustomed to think along practical lines, they deal with facts. We are sometimes inclined to think that our financial pundits regard finance as something mysterious, something not to be talked about. For example, the terms of reference given in 1943 to the Nagpur Conference of Chief Engineers enjoined them to plan “undeterred by financial considerations”.

The Chief Engineers of those days, being practical men with long administrative experience to their credit, ignored this direction and added chapters on administration and finance to their report. They said that they had during their deliberations been cognisant throughout of the obvious limitations of finance and that their plan was based on India's capacity to pay for roads having regard to the direct and indirect revenue receipts that would follow from a development of the road-communications system of the country.

Recently, the whole question of road finance was ably analysed by the Motor Vehicle Taxation Enquiry Committee. What they said in effect was that the Central tax on the road transport industry should be divided into two parts—

- (1) a tax levied on the same basis as that applicable to any other industry, *plus*
- (2) a “user” tax or fee, in other words, a road rent, the proceeds of which should be spent on roads.

They added as an illustration that the taxes alone paid per ton-mile by the ordinary goods lorry were already more than twice as much as the total cost, including taxes, of carrying goods by rail. Only a fraction of the taxes collected from the road user was spent on roads.

For the States they recommended that all the proceeds from the taxation of the road user should be spent on roads. They said this was being done in most of the advanced countries.

If we consider the taxes at present levied on the motor vehicle user we find that petrol is taxed in India at a higher rate *ad valorem* than gold, than diamonds, than beer or whisky, than golf balls—it is taxed as though it were a luxury of luxuries. But other countries are also taxing petrol heavily. The difference is that in our case the tax is almost entirely a revenue tax while in many other countries the “luxury element”, i.e., that part of the tax which exceeds the level of taxes on non-luxury articles, is regarded in their case as a toll or fee or as “road rent” and the proceeds go to the roads. In some countries the whole of the tax is regarded as road rent and the proceeds are spent on roads.

The same remarks apply to the tax on the motor vehicle itself and on its spare parts, a tax that goes as high as 96 per cent *ad valorem*. The Motor Vehicle Taxation Enquiry Committee recommended this tax should be reduced and that in any case the proceeds from the “luxury element” of the tax should be spent on the upkeep of roads.

When you buy a railway ticket you pay for the train, the engine, the station Master, and the permanent way. When all these have been paid for, what is left goes to general revenues. But when you buy a bus ticket, you pay for the bus and its driver and hardly anything directly for the roads on which the bus runs. The roads must get what they can from general revenues.

A Fundamental Principle

The fundamental principle underlying road finance in most advanced countries is that those who benefit from roads must pay for the roads. We have tried to embody that principle in the draft Bills I told you about. In our discussions on this question we were much heartened by the observations of the Planning Commission.

“A certain continuity in the supply of funds (for roads) is essential if wasteful expenditure is to be avoided and programmes, however modestly they may be drawn up, are to be pursued without interruption,

and again

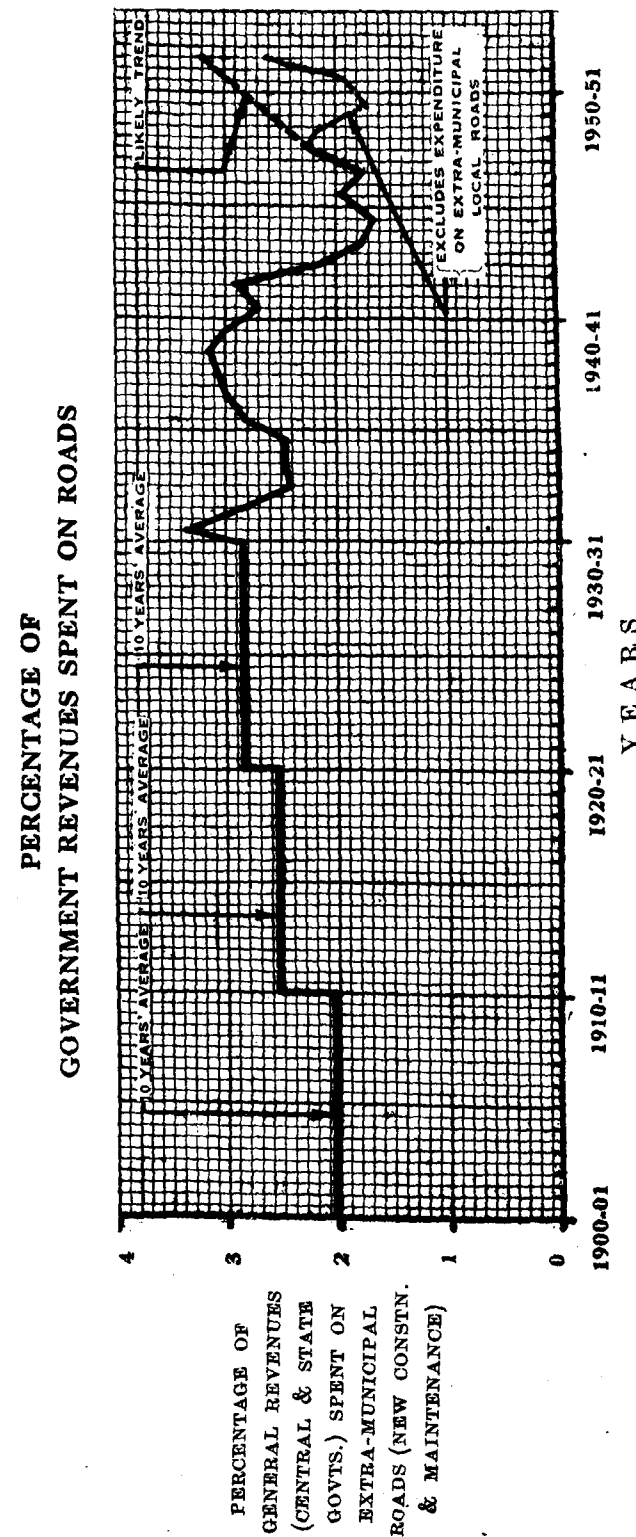
“..... it is important that it (progress in road development) should be steady, balanced, and continuous.”

WHY ROADS ARE LACKING IN INDIA

What we are concerned with is the upkeep and development of Indian roads and for this we must have assured funds. We have much leeway to make up. You may not know that India has fewer roads per square mile of area, fewer per million of population, fewer per million of rupees of national income, fewer per million of rupees of national expenditure, than perhaps any other advanced country.

Look at the budgets of other countries and then look at ours. We seem to provide a lower percentage of our resources for roads than most countries. Why is that? Do we want road less than they do? The answer is that we probably have a greater need for roads.

I had a graph drawn by a statistician to indicate what percentage of Indian revenues had been spent on roads, other than town roads, during the last 50 years or so. The graph has been printed. You will see that before the days of the motor vehicle, we spent from 2 to 2½ per cent of our total revenues on roads. Then the percentage rose to nearly 3 except during the depression years in the nineteen thirties. The Statistician could not tell me whether we were back to 3 per cent now as the figures relating to expenditure by local bodies were not available. Perhaps we are spending more than



3 per cent and, if we add capital expenditure, more than 4 per cent. But contrast that with 6 to 9 per cent spent by some of the Commonwealth countries.

Let us examine a little further. How have the other countries managed to spend a greater percentage of their revenues on roads than we have done? Is it because they are richer than we are - or is it the other way about, are they richer because they have paid more attention to roads and have not wasted so much of their resources on uneconomic transport? How many of us have seen, here in India, a bullock cart struggling through the mud with the poor bullocks straining at the yoke and half a dozen men pushing at the wheels and shouting at and belabouring the bullocks—and when we looked at the cart, have we not seen that it is only half loaded? This is our economy.

Who will "grow more food" when it costs so much to take a crop to the market that there is no profit in the business?

WHY WE MUST HAVE ROAD

Roads serve not only railways, waterways, and airways, they serve nearly every form of development. If there is to be agricultural development, there must be roads to carry the agricultural products to the distributing centres; if industrial development, again roads help to bring the raw products to the industries and take the manufactured products to the consumer; if public health is to be improved or literacy increased, again there must be roads, and so on.

It is not necessary for me to elaborate on this to you who have shown by coming here what value you place on roads. We all, I think, agree with what the late Lord Wavell said—

"Among the social services, I put communications first since I do not see how it is possible to effect any great improvement in health and education in the villages of India until they can be reached surely and quickly at all times."

It seems to me that everyone agrees with this, all the newspapers, all public speakers, everybody. But when it comes to action there are difficulties. Roads are not spectacular, they are not "news". Much money is required to build or improve a road and, when it is built, we take it for granted and do not even notice it. There is no kudos or limelight attached to road building and those that want to be in the limelight spend their energies on something more personally rewarding. You have only to look at your daily newspaper to realize this.

APPRECIATION

But the common man, the villager, does appreciate roads. For a century there was a jingle repeated in Highland villages in Scotland—

"If you had seen these roads before they were made,

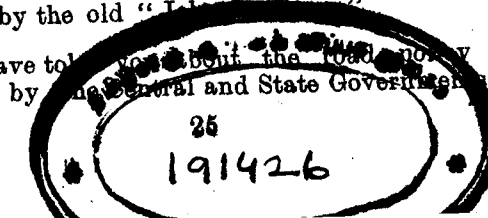
"You would lift up your hands and bless General

"Wade"."

Here, in Simla, the villagers still call the India-Tibet road "Kengree (Kennedy) Sahib ki Sarrak" although the road, (really a mule-track for most of its length) was constructed almost exactly 100 years ago. I also remember in my early service frequent reference by villagers, and reference, mark you, in a tone of warm approval, to "Kampani ki Sarrak" when they referred to one or other of the roads built more than a century previously by the old "Company".

Let me repeat. I have told you about the road and how this Congress has recommended for adoption by the Central and State Governments and this led me to

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touch on some legislative measures we have suggested. I have spoken on why we must have roads if India is to develop at all and why roads are lacking in India. This in turn led to some remarks on our suggestions regarding road finance. We have made our suggestions and now it is for others to consider them and act on them.

ORGANISATION

But we still have a big part to play. Certainly we must do everything in our power to develop our technical knowledge. The Papers we read at these annual sessions, the Standards and Codes of practice we are working out, the research and model-testing work we are controlling with Government's encouragement, are all efforts in this direction. Perhaps our most important work in this sphere is done through our Committees and I would urge those Members who have some contribution to make to join the Committees and to do Committee work not only now, at the annual session, but throughout the year.

There is, however, much more that we should do. I would suggest that we now take up another question, a very important question, how we should re-organize our engineer agencies to carry out efficiently and economically the programme of work we are urging the Centre and State Governments to undertake.

Let us suppose we are given all the money for roads that we ask for, and let us suppose our funds are assured and we become like our opposite numbers in America and Australia and elsewhere who do not have seriously to consider such silly things as "lapses of grants" and the very wasteful "rush of expenditure at the end of the financial year" which comes right in the middle of our busy working season, let us suppose that all we have recommended is accepted and then let us ask ourselves whether we are sufficiently organised as engineering administrations to handle efficiently and economically all the work we shall be given.

FRUSTRATION

You will say, perhaps, that the reorganization that is necessary is not in our power. But if we make up our minds about what should be done, and if what we say is reasonable, I am sure we shall get what we want.

During the last two or three years I have been reading the speeches made by senior engineers all over India on the occasion of the annual meetings of our Institution of Engineers and its branches and of other Engineering Societies. Nearly all these speeches give vent to a feeling of frustration. They talk of "a positive deterioration of efficiency", "technical talent not being put into full gear", conditions that militate against the development in our officers of "self-confidence, original thinking, initiative, and the habit of taking decisions".

What is the reason for this feeling of uneasiness, this malaise among us? The reasons are many and each speaker has dealt with one or more reasons and has suggested cures. Ultimately, however, it seems to me that the underlying reason for all our troubles is the low value at present placed in India on the engineer. Even our engineers themselves do not always appreciate the dignity of labour and have turned themselves into clerks instead of spending their time on works.

Engineers in other Countries

I mentioned that our Society has for years been recommending that selected engineers should be sent abroad for short periods of practical training and to broaden their outlook. Fifty-nine road engineers have now had a chance to see a bit of the world. They have found in other countries that engineers are controlling affairs, they

are the administrators, the people in charge, the people to whom their Governments turn for advice, and to whom they entrust the management of affairs. I do not think India will advance and hold her right place in the world unless her engineers take their right place in the national economy.

Recently I was told of two young men who were in school and college together. One was brilliant, always first in everything, and the other was quite good. The first went on for further study to an engineering college and did brilliantly there. He is now an Assistant Engineer on Rs 440 a month. The other, who had a much poorer record in all respects, was ultimately selected for the new Indian Administrative Service and he is now drawing, I am told, Rs 600 a month and will soon perhaps be in charge of an engineering department and be giving orders to a Chief Engineer nearly twice his age. Is this all that India thinks of her engineers?

India needs good engineers very badly and should encourage the pick of her young men to enter the profession. But she must value her engineers at least as highly as the advanced countries value theirs. Let us ask ourselves whether the best of our youngmen are attracted to engineering or whether the fine talent that really exists in the country is being driven to seek other employment.

An All-India Engineer Service

Before 1931 there was very keen competition for posts in the Indian Service of Engineers and many candidates had the distinction of having been first in their University and then first in their Engineering College.

In that year the Service was abolished and nothing was done to replace a source of employment that had originally an annual intake of 15 to 20 officers. The recruitment of Class I Engineer Officers throughout India from 1931 onwards (I am quoting from Sir Arthur Dean's Report on the Staff Position of the Public Works Departments, 1945) was—

1931,	2;	1932, Nil;	1933, 4;	1935, 6;
1936,	1;	1937, 4;	1938, 9;	1939, 17;
1940,	45;	1941, 21;	1943, 13;	& 1944, 33.

There has not been such keen competition since the Indian Service of Engineers was abolished. But, much worse, in the period 1931 to 1938 only 26 officers were recruited in the Class I Service instead of at least 90. It is just this very class of officers, a class containing picked men with from 15 to 20 years of experience behind them, that we are in such great need of now. This backbone of selected trained men is lacking with us today. I do not know what vast loss India has suffered from the absence of this talent.

I think the first thing we should press for is the creation of an All-India Engineering Service of Civil Engineers. Let us make sure, however, that it will be worth the while of the best candidates to compete for entry into this service. The pay must be reasonable but, much more essential, the conditions of Service must be reasonable. The Service will be a *Corps-d'elite* and the officers should be given powers and responsibilities accordingly. It was said long ago that no business concern would give its highly paid officials so little real power as Government does. We must press for an improvement in this respect also.

In the meantime there is much we can do to set our own house in order. Many suggestions have been given in a Paper we are going to discuss this Session. We may also consider the following:

- (1) Let us always think of economy in the execution of our works. An engineer is a man who can do for one rupee what any fool can do for two. Let us be engineers.

- (2) Let us tighten up discipline and abolish slackness.
- (3) Let us treat Audit as our friends and not as nuisances. They can show us where things are going wrong in our management of control and we can look into their "objections" and put things right.
- (4) And, above all, let us take a pride in our profession and think of what good we can do to our fellow man by honest, hard work. Let us resolve to do our duty with all our soul and heart and might.

If we can do all this it will soon be found that our young-men will be prouder than ever of being engineers. We shall attract the best talent to our Services, greatly to the benefit of India.

There are many details we shall have to discuss in Committee, our freedom to exercise our responsibilities (this is fast disappearing), the relation of power to responsibility, the present-day increase in paper work at the expense of real work, the ever-growing forest of rules and regulations that hampers progress and stifles initiative—in fact we shall have to discuss why we are ceasing to be engineers and becoming glued to our office chairs. Ultimately we will perhaps be able to say what strength our cadres should have and how our work should be administered.

I hope you have not found too tedious what I have tried to say. Engineers are trained to act rather than to speak but there are times when it is our duty to speak. If you will bear with me a little longer I shall go over very briefly what I have just said and then I'll have done.

I have commented on the useful work done by this Congress in the matter of developing our knowledge of engineering science and techniques and in disseminating the results of our studies. I have also spoken of our studies on road policy and road finance and have expressed our gratification that Government have so often acted on our advice in administrative and financial matters. I have stated in some detail the principles that we consider should govern the road policy of the Central and State Governments. These principles have now been embodied in three draft Bills and I have expressed the hope that these Bills will soon be considered by Government and our legislators. In tendering advice as we have done we have followed the example of a sister association, the American Association of State Highway Officials, who have been instrumental in suggesting much of the American Government's highway policy.

Lastly I have taken full advantage of the privilege accorded to the President of this Society to throw out suggestions for the consideration of our Council and Members. I have suggested that we should now press for the creation of an all-India Service of Civil Engineers and that in the meantime we should redouble our efforts to cut the mesh of red tape, a hundred times worse than it ever was before, that is strangling us and preventing us from doing our work properly. I have also done a little preaching suggesting that "work is worship" and that the best way we can serve God and India is to work hard and honestly.

And now I must thank you for giving me a patient hearing. By your presence here you have encouraged us in our work of developing India's roads. For this too I must thank you on behalf of our Society.

Speech by His Excellency Shri Chandulal Trivedi I. C. S.,

Governor of Punjab (I),

at the 16th Session of the Indian Roads Congress, held

AT SIMLA ON SUNDAY,

the 27th April, 1952.

Mr. President, Ladies and Gentlemen,

May I, at the outset, express my grateful thanks to the Indian Roads Congress for the honour it has done me by inviting me to inaugurate its sixteenth session? May I also, both on behalf of the Punjab Government and my own behalf, extend a most cordial welcome to the delegates and visitors to the Congress, who have come here to-day from all over India? We, in the Punjab, greatly appreciate the compliment you have paid us by the selection of our Capital as the venue of the present session of the Congress. I am sure you will find the fine climate and lovely surroundings of this hill-station an inestimable aid in your arduous deliberations. I hope also that you will carry back with you pleasant memories of your stay amongst us.

In you, Mr. President, I hail an old friend and comrade. Both you and I spent the major part of our service in Madhya Pradesh, known as the Central Provinces and Berar in our time. There we had our early roots; there we learnt our work and were trained and thus grew and developed, each in our respective sphere. Both of us owe a great deal to the Madhya Pradesh, its Government, its system of training and administration and, above all, to its good and kindly people. I have permitted myself to be reminiscent, partly because I am delighted to see you, Sir, in the Presidential chair and largely because I wish in this way to emphasize the very great importance of the proper and systematic training of our young officers and the inculcation in them of the spirit of selfless service, steadfast devotion to duty, a continuously progressive outlook and the highest standards of Public conduct. By and large, good engineers and good administrators are made, and not born, and it is training, study, zeal, energy and hard and conscientious work which make them.

All of us have listened with great interest to your address which, if I may venture to say so, was most instructive. You have covered a very wide ground. Of all the States in India the Punjab in the past took, perhaps, the greatest interest in the development of roads. It is, therefore, not surprising that Sir Kenneth Mitchell, a Punjab engineer, was the founder of the Indian Roads Congress in 1934. Since then, the Congress has grown from strength to strength. You have done well to remind us all of the great and lasting contribution of the Congress to all aspects of road development, for example, road policy, road finance, the Bridge Code, the Nagpur Plan and the evolution of the concept of National Highways, not to mention other matters. Moreover, the advice which the Congress has given from time to time to the Central and State Governments has been most valuable. These are achievements which the Congress has every reason to be proud of, and today our gratitude goes out to all those, whether in official or non-official walks of life, who have given their best to make the Congress what it is to-day. Your Congress is at present a great and beneficent force, making its weight felt in everything which pertains to the development of communications, with particular reference to roads.

I need hardly stress the great importance of roads in this road-minded gathering. To Napoleon is attributed the saying that an army marches on its stomach. It would be, perhaps, equally true to say that in war a nation marches to victory, and in peace to progress, mainly on its communications, of which roads are a very important

element. Some of us may rightly feel that the 5-Year Plan does not provide sufficient funds for the development of roads. In particular, I know that my friends in the Punjab feel sore that the amount allotted to roads in the Punjab plan is only Rs. 75 lakhs out of a total estimated outlay of a little over Rs 15 crores. I hope it may be possible to augment this provision. On the other hand, the primary aim of the Five Year Plan is to increase production both in the spheres of agriculture and industry, and the Punjab has special problems arising out of partition and the mass migration of populations, the solution of which cannot brook delay. Priorities have had, therefore, to be assessed with great care. We in the Punjab however, realise that transport facilities must keep pace with increase in production, and I may disclose that we propose to make a provision, of Rs. 2 crores in the Bhakhra-Nangal Project for the development of roads in the areas which will receive irrigation, and in which the road communications, particularly those originating from villages, are either non-existent or not at all good. The establishment of new mandis or markets is also a part of the Project. I would, therefore, ask you, my friends the engineers, not to feel disappointed, much less frustrated, on what may seemingly look like an inadequate appreciation of the vital role of roads in any co-ordinated scheme of development.

You have referred to questions of remuneration of engineers and also relations between them and lay administrators. Though I am one with you in regarding these questions as important, may I venture to say that these matters should not give rise to despondency. A feeling of frustration is not healthy at any time, and more so now when great engineering works like Bhakra Nangal and Chandigarh Capital Project, are under construction in the Punjab, and other large engineering works are under way elsewhere in India. The great tasks, which the engineers are called upon to undertake at present, are their opportunity, and should, I suggest, fill them with glow and zest. Knowing the engineers as I do it is hardly necessary for me to say this, for usually they are not given to gloom, but I thought it might be just as well to say it. The truth is that never was the engineer, be he engaged on constructing a road or an irrigation system, more important than he is in India of to-day.

With your permission I would now like to underline some of the points which you have made in your illuminating address. Speaking purely personally, I entirely agree with you in your suggestion for an All-India Engineers Service. So far as I am aware, the constitution of an All-India Service for Irrigation and Electricity is already under contemplation. If this comes through, the next step might well be the establishment of an All-India Service for Buildings & Roads. Belonging as I do to an All-India Service, I may be pre-possessed in favour of such Services, but I believe it will be generally recognised that All-India Services have done a great deal, in the past, to break down provincial barriers to promote unity in administrative and other spheres and generally in maintaining at a very high level standards of work and conduct. I am glad that you have stressed the importance of economy. Economy is vital at all times, and particularly at present when costs are very high, and I express the fervent hope that none of my friends, the engineers, will ever forget the indispensable necessity of the greatest possible economy both in design and construction. You have observed, Sir, that an engineer is a man who can do for one rupee what any fool can do for two. Let this be the constant ideal of every engineer. Might I, in this connection voice the feeling that I have come across that an engineer is sometimes, if not often, a man who can do for one rupee and eight annas what an ordinary man with common sense can do for himself for one rupee!

Lastly, you have rightly stressed the place of village and minor district roads in any programme of road development. Many of us are not tired of emphasising the importance of such roads, but when it comes to framing a programme, these humble but very necessary roads are forgotten. I hope that what you have said will stimulate greater interest in rural roads. Perhaps, your Congress can do valuable service by concentrating on devising and developing specifications for constructing cheap and reasonably durable village roads. If we are to make progress worth the name in this

direction, it is essential to enlist the voluntary help of rural people in the construction of such roads, and, as you all know, the Planning Commission has very rightly emphasised this aspect.

I would like here to refer to one matter which does not find a place in your address. I am under the impression that the road engineers, if not your Congress have been at work for a long time on devising wheels for the bullock-cart, which will cause less wear and tear to the roads than the wheels in use in bullock-carts at present. I trust that by this time your researches and experiments have resulted in something concrete.

Once again, I thank the Congress for asking me to inaugurate this Session. I have great pleasure in inaugurating it, and wish its deliberations in the cool air of Simla a complete success.

Thank you Mr. President, ladies and gentlemen.

(Continued from page No. 4)

TABLE II

Standards	Ground plan	Longitudinal section			Minimum visibility ft.	Safe speed m.p.h.
		Concave radius min. ft.	Convex radius min. ft.	Grade max. per cent		
A	3,330	66,600	33,000	4	1,330	94
B	1,660	26,600	13,300	5	830	80
C	830	10,000	5,000	6	500	62
D	330	3,300	1,660	8	250	44
E	165	660	660	10	100	31

The category of a road is related to the volume of traffic as follows :—

Category	Future daily traffic volume (vehicles)
Freeways	Above 7,200
Primary system No. I	4,800 to 7,200
Primary system No. II	1,600 to 4,800
Secondary system	Below 1,600

The estimate of future traffic volume is based upon a ratio of one vehicle per 14 inhabitants which is 250 per cent of the 1938 figure and 150 per cent of the 1950 figure and is considered to be a moderate estimate.

CONCLUSIVE

School Examiner.

How do you know the world is round like a ball?

Pupil.

Teacher says so, the book says so, and father says so.

(Many of our engineers give similar answers when they are asked why they make certain provisions in their designs.....Ed.)

MESSAGE FROM
THE HON'BLE DR. B. V. KESKAR,
Deputy Minister for Transport & Railways, Government of India

to
the 16th Session of
THE INDIAN ROADS CONGRESS

at Simla on the 27th April, 1952

IT is a pleasure to note that the Indian Roads Congress is developing and has made substantial progress during the last few years. The 16th session of the Congress, which is meeting now, will be having before it the very important task of helping in the implementation of the Five Year Plan, which means so much for the future stability and prosperity of the country. On the eve of the beginning of the Five Year Plan it is evident that the realisation of the plan depends to a great extent on the co-operation of engineers and technicians.

The engineers of the Indian Roads Congress are a specialised people and they can contribute substantially in the carrying out of this great task of national importance by helping the implementation of that part of the 5-Year Plan which pertains to roads and bridges. No plan will be complete without these two. The ingenuity and skill of the Road Technicians will lie in making the best use of the resources at our disposal and make them last as long as possible.

I am glad to note that we have passed the corner as far as the acute financial crisis that threatened us is concerned. Our position is not so critical; in fact it is slightly easier, and let us hope that it will permit us to devote more funds for the development of our roads. There also the engineers can help in trying to do the largest amount of work at the cheapest rates possible. This will also give an impetus to the ambitious plan that we had envisaged for the road network of India.

I hope the Congress will carry on more intensive research work and find new materials and ways of road treatment and bridge building, which will permit us to utilise our local material and the cheapest available material too. This will go a long way in helping us in the implementation of the Five Year Plan.

MESSAGE FROM HIS EXCELLENCY SHRI K. SANTHANAM,
Lieutenant Governor, Vindhya Pradesh.

I regret that I shall not be able to attend the Session, but I have great pleasure in sending my good wishes for its success. I have great interest in the Indian Roads Congress. It is helping to produce a tradition of experiment, research and knowledge regarding the problems of construction and maintenance of roads, which is of the greatest importance for the development of this country.

Please convey my cordial greetings to all the engineers attending the Session.

Greetings and Good wishes for the success of the Session were also received from England, Australia and America.

EXHIBITION

THE technical exhibition which has come to stay as a regular feature of the Annual Sessions of the Indian Roads Congress was organized on the open space at the Ridge which is one of the busiest spots in Simla.

The exhibition was declared open on the 27th April by the Hon'ble Choudhri Lehri Singh, Minister for Public Works, Punjab. The Minister was later conducted round the stalls.

Speaking on the occasion the Minister observed that it was gratifying to note that the Indian Roads Congress had not confined itself only to the theoretical aspects of its activities viz., discussion of Papers, meetings of the committees and subcommittees, etc., but had also organized this technical exhibition which brought home to the layman what road construction and maintenance meant and what status roads had in the economy of the country. Continuing, the Minister



The Hon'ble Ch. Lehri Singh, P. W. D. Minister, Punjab, opening the I. R. C. Exhibition at Simla.



The Exhibition by night.

said that such an exhibition would enable the general public to appreciate what the road engineers were doing to improve roads which were a *sine qua non* of any form of development in the country.

The citizens of Simla and the delegates showed a keen interest in the exhibits which included models, photographs, and explanatory charts of roads and bridges; and machinery and materials used for the construction of the modern roads.

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

1. Government of India Roads Organization :

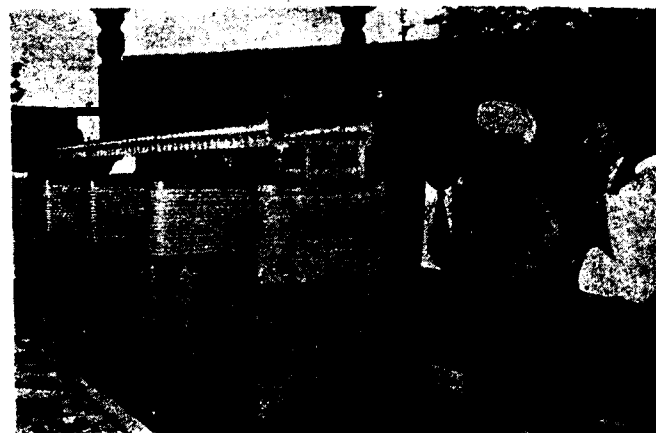
- (1) **Statistical.**—Statistical and Graphical presentation of data of road accidents, etc. Chart showing the Organization of the Ministry of Transport.
- (2) **Standards.**—Standards for Vertical and Horizontal Curves; Improvements to road junctions.
- (3) **General.**—Charts entitled "Roads for Tomorrow" as programmed in the Nagpur Plan; Sample copies of periodicals received in the library of the Roads Organization.

2. Punjab

The Buildings and Roads Research Laboratory, Karnal, exhibited :—

- (1) Charts illustrating properties of soils;
- (2) Samples of Indian soils;
- (3) Models of stabilized soil base courses and wearing courses, surfaced and unsurfaced;
- (4) Soil testing apparatus;
- (5) Samples of stones etc. as found and used for the construction of roads in the Punjab.

3. Madras



Madras showed some good road & bridge models. This photo shows a model of the Pugalur Bridge described in our April issue.

Cross Sections of

- (1) a stabilized road constructed in a sandy tract;
- (2) a stabilized Major District Road constructed in a Black Cotton Soil area;

Models

- (1) a model of the prestressed concrete bridge across the River Palar (N.H. No. 45);
- (2) a model of a precast and prestressed concrete beam;
- (3) a model of the continuous T-beam bridge across the River Cauvery at Pugalur (N.H. No. 7);
- (4) a model of a Mobile Laboratory for testing cement concrete.

Plant, Machinery & Apparatus

Soil testing apparatus manufactured by the Madras Highways Department was also exhibited.

4. West Bengal

- (1) A model of the road test track, Alipore, Calcutta.
- (2) A model of the tractor with test carts (mobile test carts).
- (3) Models of 1950-51 test specimens.
- (4) An album of photos showing 1950-51 tests.
- (5) Explanatory photographs (selected and enlarged) showing the 1950-51 tests.
- (6) Charts and diagrams depicting the results and conclusions of tests carried out in the past.

- (7) A photograph showing a bird's eye view of the Test Track.

- (8) Road Development plans of West Bengal.

5. Himachal Pradesh

Road Development plans.
Photographs of bridges, etc.

6. State Transport, Bombay

Spare parts for motor vehicles manufactured by them.

Models of structures;
Literature & Photographs.
Layout of Workshops, Depots, Bus Stations, etc.

FIRMS

- M/s. Armco (India), Ltd., Calcutta.
M/s. B. K. Khanna & Co. Ltd., New Delhi.
M/s. Bengal Chemical & Pharmaceutical Works Limited, Calcutta.
M/s. Burmah Shell Oil Storage & Distributing Co. of India Ltd., New Delhi.
M/s. Concrete Association of India, Ltd.
M/s. Graves Cotton & Co., Ltd., Bombay.
M/s. Hindustan Construction Co., New Delhi.
M/s. Kailash Brothers, Delhi.
M/s. Killick Nixon & Co. Ltd., Bombay.
M/s. Larsen & Toubro Limited, Bombay.
M/s. Millar's Timber & Trading Co., Ltd., Bombay.
M/s. Mousell & Co. Ltd., Bombay.
M/s. Shalimar Tar Products Ltd., Calcutta.
M/s. Tata Iron & Steel Co. Ltd., Jamshedpur.
M/s. Tractor & Equipment Corporation Ltd., Delhi.
M/s. Tractor (India), Limited, Calcutta.
M/s. Wilcox (Buckwell-India) Ltd., Delhi.
M/s. William Jacks & Co. Ltd., Calcutta.

Displayed Catalogues, Charts, Photos Models. In some cases actual machinery for the construction of drainage, latest type of surveying and mathematical instruments; testing machines, etc., etc.

Lectures, Panel Discussions & Technical Films.

Lectures :

An interesting talk on "Causeways or Submersible Bridges" was given by Dr. S.P. Raju, Director, Engineering Research Laboratories, Hyderabad (Deccan) on the 27th April, 1952. The talk was later followed by a film.

Another interesting talk on the "New Punjab Capital at Chandigarh" was given by Shri P. L. Verma and Miss Jane Drew on the 29th April 1952.

Panel Discussions :

In order to exchange views on the practice adopted in India for the construction of cement concrete pavements and to take stock of the experience of various members, a panel discussion was arranged on the 29th April 1952. Earlier, a brief questionnaire to form a basis for the discussion was circulated. It is intended to make such panel discussions a regular feature at the Sessions of the Indian Roads Congress.

Technical Films

In the evenings technical films connected with highway engineering were shown.

A beadle in a Scotch church, who had carried on his duties many years beyond the allotted span, having seen the coming and going of several ministers, was one day asked by a visitor which one he liked best. Scratching his head thoughtfully, he answered, "Weel, they were a' guid men, but I liked Mr. Chambers the best." "And what was your reason for that?" "Mon, his claes (clothes) fitted me tae perfection."

DISCUSSION ON PAPERS

THE Congress discussed five technical under which the engineering profession has to work and the difficulties first Paper on "Vertical Curves for Highways" contributed by the Specifications and Standards Committee of the I.R.C. was discussed on the 27th April 1952. The Paper dealt with the necessity for properly designed and laid out vertical curves to secure adequate visibility and recommended standards for adoption throughout India. The Paper fulfilled a long felt need and evoked lively discussion.

The second Paper on "Grouted Concrete Roads" (discussed on the 28th April) described a method of cons-



Paper Discussion.



Paper Discussion.

tructing concrete pavements which the Author claimed would be cheaper without affecting their life and service value. The third Paper entitled "The Importance of Organization" described the handicaps

result of the political partition of India in 1947. The last Paper was entitled "Design of Road Beds" and suggested a method of designing the various component parts of the road structure.

experienced during execution of works at present. The paper made some valuable suggestions to improve the existing conditions. The discussion was very lively and instructive. The number of speakers on this Paper was so large that time had to be strictly "rationed".

On the 29th April, the remaining two Papers were discussed. One related to the "Construction of the Shillong-Silchar Road". It described in detail the alignment, survey, and construction of this strategic hill road which had to be built as a

HERE AND THERE

1. IS THE DECK OF A BRIDGE A HIGHWAY?

BALTIMORE, Aug. 25.—Bridges are part of highways, Maryland's Attorney General has ruled, and that opinion may cost the owner of a truck more than 1,000 dollars.

Magistrate J. Milton Dick of Cumberland had before him a charge that a truck weighing 37,300 pounds crossed the Potomac River bridge into Maryland from Wylie Ford, W. Va.

The 37,300 pounds was under the general limit for trucks on highways but still violated the bridge capacity, which was 20,000 pounds. So Magistrate Dick asked the Attorney General whether a bridge was part of a highway.

The answer could mean plenty—in dollars—to trucking firms accused of operating overweight vehicles.

For instance, there could be a 100 dollar penalty if you exceeded the weight limit of a certain bridge in Western Maryland. But if a bridge was classed as part of a highway, then the penalty could run into hundreds of dollars.

Attorney General Hall Hammond ruled it was.

The fine for exceeding bridge limits previously was 25 dollars to 100 dollars. But under Mr. Hammond's ruling, which made the offence a highway load violation, the Elliott Motor Lines of Winchester, Va., could be fined six cents for each of the 17,300 pounds over the 20,000-pound bridge limit—or a total of 1,038 dollars.

(Extracted from 'American Highways'—October 1951).

2. MECHANIZATION OF ROAD CONSTRUCTION

Portuguese Policy

THE Portuguese highway engineers who decide the general policy in road construction and maintenance have endeavoured to maintain a reasonable balance between the introduction of modern economic methods involving the intensive use of machinery and the retaining of traditional methods on which many workers are dependent for their livelihood. The most modern methods

have been adopted for main roads of great economic importance, whilst on secondary roads and the less important urban thoroughfares those traditional methods are retained that give employment to a large number of Portuguese workers and are bound up with important interests.

(Extracted from 'Contractors Record and P. W. Engineer'—December 1951).

3. PER CAPITA ROAD EXPENDITURE

The British Road Federation recently issued a statement to the Press giving details of the expenditure on roads, per head of the population, in seven different countries viz., U.S.A. (£10-2-0); Portugal (£4-8-0); Sweden (£2-12-0); Norway (£2-11-0); Great Britain (£1-9-0); Italy (£0-12-0); Turkey (£0-8-6).

(Extracted from 'World Highway Report of the I.R.F.'—February 1952.)

(In India the expenditure is less than one rupee per head of population, this is less than one sixth even of the expenditure of a small undeveloped country like Turkey. —Ed.)

4. ROADS AND TEMPLES

SHRI C. Rajagopalachari, who declared the (Pugalur) bridge open, recalled the ancient way of unification of the country by people visiting temples all over the country, and added that, though there was some difference of opinion in this matter at present, the national highways served a

similar object in the unification of people all over the country.

[Shri C. Rajagopalachari in his speech at the opening ceremony of the Cauvery bridge at Pugalur on 23-12-51.]

5. TESTING A BRIDGE

COMPOSITE action of steel and concrete is definitely shown in the results of tests on the San Leandro Creek Bridge, south of Oakland. The bridge has been the subject of an extensive series of tests aimed at determining actual stresses in the structure.

Strain gauges at more than 200 points on the bridge structure were utilized in taking measurements under both static and dynamic loadings. Dynamic loads were provided by 70,000 and 85,000 vehicles run over different parts of the bridge at speeds varying from 3 to 25 m.p.h. Some 20,000 feet of oscillographic strain recordings were obtained.

An interim report will be issued this fall; analysis to date, however, has definitely indicated the composite action of the concrete deck and the steel girders. This holds forth the possibility of designs which might result in considerable savings in steel.

(From 'Highway Research Abstracts'—October, 1951)

(Research requires very careful and patient work before arriving at conclusions. We have noticed a tendency among some Indian workers to jump to conclusions on one or two results only—Ed.)

6. INFANT POSTMASTERS

IN the early 1700's the cities took the administration of the letter delivery into their own hands. As long as the profits remained relatively modest, the postmaster were left in charge, with a small part of the profit going to the city. But as revenues increased by leaps and bounds, the postmastership became the favourite objective for nepotism. Postmasterships were presented to relatives or friends who never set foot inside a dispatch office, while the actual management was carried

out by ill-paid employees. Amsterdam has had women, little girls and even infants as postmaster. In 1730, a mayor of Amsterdam gave the postmastership to his infant son as a baptismal present, thus insuring the child of an annual income of 12,000 guilders, a very large sum for those days. Later, postmastership were divided into halves, quarters and eighths, each part going to a relative or, for the proper remuneration, to a "friend."

7. "A" AND "THE"

DIFFICULTY is experienced by some of our contributors in assigning the correct article to the nouns they use. Let them remember that there is a world of difference between

"a sack" and "the sack."

"The sack" makes one think of "sack cloth and ashes" while "a sack" is just sack cloth.

The following rules may help:—

- (1) A noun prefixed by the article "a" means any of that kind. "A box" means any box.
- (2) A noun prefixed by the article "the" means the particular object of that kind. "The box" means the particular box the writer is thinking of. Generally the writer would have to add an explanatory clause after using the article "the". "The box which was sent to me."
- (3) Usually no article is required for

- (a) Indefinite plurals
- (b) A very particular object, and
- (c) Something very generic.

Samples

- (a) "His room was full of boxes."

(b) "Send it to Secretary" (meaning the Secretary, the only one, of the Ministry).

(c) "He went through a line of boxes with box to the right of him and box to the left of him."

(4) Definite plurals require "the." "The boxes in this room are heavy."

(5) Superlatives require "the" because the biggest is a definite quality. The biggest box is the one and only box of that kind.

(6) A good rule is, "Always use 'a' ('an' before vowels except those with a 'y' or 'w' sound, 'a unit', 'a one') or 'the' for singular nouns in the first place and cut out the article only when rule (3) above applies." In this way, most of the mistakes generally committed by our contributors will be eliminated.

LEARNING BY CAPILLARITY

"From time to time even the foundations of important structures are still designed without taking advantage of what the best informed local engineers have known for many years. Similar incongruities may be encountered in almost every part of the world. They are due to the fact that it takes time for newly acquired knowledge to percolate from the points of origin within the engineering communities to the outlying districts and to rise, by capillarity, to the peaks of administration."

—Karl Terzaghi—'The Influence of Modern Soil Studies on Design and Construction of Foundations'—

Building Research Congress 1951.

TECHNICAL INFORMATION

PUMPING CONCRETE—FACTORS INFLUENCING POWER REQUIRED

On the inspection tour to the BHAKRA Dam Site the delegates to the Simla Session of the Indian Roads Congress saw concrete being pumped over long lengths in the diversion tunnels. We give here an informative article on the "pumpability" of concrete. We hope our readers will find it interesting.

AN investigation of the power required for pumping concrete having different slumps, through different lengths of piping, is described in the December, 1949, issue of Magazine of Concrete Research. The author, O. Dawson, B.Sc., states that the pumping of concrete is a growing practice—horizontal lengths of up to 1,000 ft are common and lengths up to 2,000 ft have been used. When the concrete is pumped against a vertical head the length of pipeline is considerably reduced, a rough relationship between horizontal and vertical pipe being 10 : 1. Cement contents leaner than 1 : 6 cement-aggregate ratio are difficult to pump.

It is often found, however, that the concrete prepared on one contract will pump easily while on another a series of pipe blockages and breakdowns will make the contractor abandon the method. "Pumpability" is affected by the following eight factors:—

- (1) Velocity of concrete in the pipe.
- (2) Cement content of concrete.
- (3) Grading of sand.
- (4) Grading of stone.
- (5) Shape of sand and stone particles.
- (6) Water/cement ratio.
- (7) Type of cement.
- (8) Improvement in the cement-water mixture by the addition of a surface tension reducing agent.

Success depends on the selection and control of these eight variables.

The pump used in the tests was designated PC3 and was made by the Concrete Pump Co. It was fed by a 1 cu. yd. mixer, part of a central mixing Plant, and was driven by a 50 h.p. motor. The tests showed that the most important factor in the pumping of concrete is the lubrication of the pipe by the very fine particles of wet cement. Increasing the cement content appears to give easier working at the pump. But it was found that if the cement-aggregate ratio was increased to a very high figure the pump failed to work on long pipelines over 1,000 ft. This curious effect may be due to over-lubrication of the concrete which then tended to squeeze back past the closed valves of the pump. However, no records were taken.

No facilities were available for tests to investigate the addition of agents to reduce the surface tension. However, the author states that when such agents have been tried the results have not been very successful, owing to over-lubrication of the concrete.

The tests show that pumping concrete through a 6 in. dia. steel pipe the load on the motor increased in accordance with a straight line graph from 32 amps. for 100 ft to 48 amps. for 800 ft.

(Extracted from 'Commonwealth Engineer'—Jan. 1, 1951.)

BUDGETS AND ADMINISTRATION REPORTS

(i) MADHYA PRADESH CIVIL WORKS BUDGET 1951-52.

The following extracts pertaining to Civil Works Budget have been taken from the Madhya Pradesh Budget for the year 1951-52.

	(In Lakhs of Rs)		
	Actuals 1949-50	Revised Estimates 1950-51	Budget Estimates 1951-52
I. Revenue (Civil Works).			
1. Rents of Buildings and furniture	5.67	5.23	5.25
2. Ferry Receipts	2.94	2.83	3.00
3. Tolls on roads	1.88	2.00	2.00
4. Recoveries of expenditure	.69	.44	.50
5. Miscellaneous	3.76	1.46	1.27
6. Transfer from the Central Road Fund.	1.03	2.00	16.90
7. Deduct - Refunds	— .29	— .03	— .02
Total	15.68	13.93	28.90
II. Expenditure (Civil Works).			
1. Original Works	48.57	48.10	68.92
2. Repairs	64.07	63.48	112.97
3. Reserve with Govt.	—	—	1.50
4. Suspense	+ .15	.35	.35
5. Grants-in-Aid	.08	.30	.45
6. Post-war Development Scheme	64.14	66.42	72.00
Total	178.01	178.65	256.19
III Expenditure (Communications only).			
1. Original Works - Ordinary	22.13	28.06	43.28
2. Original Works - Post-War Scheme	27.26	24.55	23.33
3. Repairs	n.a.	48.24	92.80
Total		100.85	159.41
IV. Revenue from Roads.			
Receipts from Tolls & Ferries	4.82	4.83	5.00
Receipts under Motor Vehicles Act	37.44	39.13	39.28
Sales tax on Motor Spirit and Lubricants	18.99	24.00	24.00
Total	61.25	67.96	68.28

A BRIEF REVIEW OF THE MADHYA PRADESH BUDGET 1951-52

(With special reference to civil works)

THE total revenue receipts of Hyderabad for 1951-52 are estimated at Rs 20,44.50 lakhs and revenue expenditure at Rs 20,30.60 lakhs leaving a small surplus of Rs 13.90 lakhs. The revised estimates for 1950-51 indicate a bigger surplus of Rs 149.98 lakhs with the revenue receipts amounting to Rs 19,04.24 lakhs and revenue expenditure to Rs 17,54.26 lakhs. The estimates of revenue and expenditure for 1951-52 are higher than the revised estimates for 1950-51.

Revenue expenditure on civil works for

1951-52 estimated at Rs 256.19 lakhs forms 12.6% of the total State expenditure in the year, the corresponding percentage for the previous year being slightly less i.e. 10.2%. Revenue expenditure on communications (original works and repairs) in 1951-52 is estimated at Rs 159.41 lakhs out of which about Rs 23 lakhs is earmarked under post-war schemes. As a proportion of the total State expenditure, the expenditure on communications in the two years 1951-52 (estimates) and 1950-51 (revised) forms 7.8% and 5.7% respectively.

(ii) JAMMU & KASHMIR PUBLIC WORKS
BUDGET 1951-52.

The following extracts relating to Public Works (Roads and Buildings) Budget have been taken from the Jammu and Kashmir Budget for the years S. 2008 (1951-52).

	(In Lakhs of Rs)	
	Revised Estimates S. 2007 (1950-51)	Estimates S. 2008 (1951-52)
I. Revenue (Roads & Buildings)		
(1) Dak Bungalows	.01	.01
(2) Rent of Buildings	.88	.89
(3) Other Receipts	.39	.32
(4) Road Toll	22.00	20.00
Total	23.28	21.22
II. Expenditure (Roads & Buildings)		
(1) Original Works Buildings	11.13	17.54
(2) Original Works—Roads and Bridges	0.34	4.46
(3) Surveys & Miscellaneous	11.94	0.05
(4) Maintenance & Repairs (Buildings and Roads)	18.55	21.00
(5) Tools and Plant	1.17	1.64
(6) Establishment Charges	5.98	6.27
Total	55.11	50.96

A BRIEF REVIEW OF THE KASHMIR BUDGET

(With special reference to Civil Works)

THE total revenue receipts of Jammu and Kashmir State for the year S. 2008 (1951-52) are estimated at Rs 457.56 lakhs and revenue expenditure at Rs 470.70 lakhs with a consequent deficit of Rs 13.14 lakhs. The revised estimates for the previous year show a deficit of Rs 5.53 lakhs with the revenue receipts amounting to Rs 444.72 lakhs and expenditure to Rs 450.25 lakhs.

Revenue expenditure on Civil Works for 1951-52 estimated at Rs 50.96 lakhs

forms 10.8% of the total state expenditure in the year, the corresponding percentage for the previous year being 12.2. Revenue expenditure on roads and bridges—original works in 1951-52 is estimated at Rs 4.46 lakhs against Rs 6.36 lakhs provided in the previous year.

The estimated expenditure on civil works from Capital A/c (outside the revenue a/c) amounts to Rs 8.47 lakhs of which Rs 3.70 lakhs are earmarked for roads and bridges.

List of Approved Works on National Highways

S. No.	Job-No.	Name of work	Amount approved. Rs	Remarks.
BOMBAY				
1.	571 BM 8	Improvements to the Baroda-Vasad section (miles 0/0 to 11/6) of the Bombay-Ahmedabad National Highway.	5,53,500/-	
2.	573 BM 4	Improvements to miles 12/6 to 30/0 of the Poona-Bangalore Road (length about 17 miles 2 furlongs).	6,86,000/-	
3.	577 BM 8	Construction of Kathor-Pardi section of the Bombay-Ahmedabad National Highway.	3,01,300/-	
WEST BENGAL				
4.	581 BG 31	Widening the metalled crust and easing bad bends and making up earth flanks of Siliguri-Sevoke Section of National Highway No. 31.	1,95,000/-	
5.	583 BG 2	Land acquisition and earth work for easing sharp curves and straightening zigzag curves in 54th and 55th miles of the Grand Trunk Road.	24,200/-	

(Continued)

S. No.	Job No.	Name of Work	Amount approved. Rs.	Remarks.
UTTAR PRADESH				
6.	580 UP 28	Painting Miles 135-148 of N. H. No. 28 (Lucknow-Gorakhpur Road)	5,44,900/-	
7.	582 UP 28	Painting miles 191-195 of Gorakhpur-Kasia Road.	2,31,700/-	
MADHYA PRADESH				
8.	567 CP 7	Construction of a road from Karanji to Pohna up to Yeotmal District border, N. H. No. 7 (length 14 Miles).	9,98,300/-	
9.	568 CP 6	Improvement and widening of Akola-Khamgaon section of National Highway No. 6 (length 6 7/8 miles).	1,36,000/-	
10.	569 CP 6	Resectioning and surface treatment of Akola-Khamgaon Section of National Highway No. 6 (length 20 5/8 miles).	1,38,000/-	
11.	574 CP 7	Construction of a road from Dhoki to Nizam border in the Yeotmal District.	76,051/-	
PUNJAB				
12.	570 PBI-A	Providing a bye-pass at Tanda on National Highway No. 1-A	2,76,700/-	
13.	575 PBI-A	Providing roadway decking on the Beas and Chakki rivers on Mukerian-Pathankot Section of National Highway No. 1-A	7,40,645/-	
14.	576 PBI-A	Extension of guide bunds of the Beas Bridge by 125Ft. required in connection with the construction of a separate road bridge on the Mukerian-Pathankot Section of National Highway No. 1-A	2,31,374/-	
ORISSA				
15.	572 RS 6	Construction of approach roads to the rail-cum-road bridge over the Mahanadi river at Sambalpur.	24,79,000/-	
ASSAM				
16.	579 AS 37	Construction of a bridge over the Kullong River on mile 75 of the Assam Trunk Road and approaches thereto.	6,55,800/-	

List of Books added to the Roads Organization Library during March 1952

Manager of Publications, Delhi, 1952.

1. Indian Railway Standards Code of Practice for Design and Construction of Earthquake Resistant Buildings and Structures — Adopted 1951.
2. Report of the Delhi Improvement Trust Enquiry Committee 1951—Vol. I.
3. Report of the Delhi Improvement Trust Enquiry Committee 1951—Vol. II.
4. Directory of Economic and Statistical Projects, No. 1, January 1948. (Department of Economic Affairs, United Nations, Lake Success, New York.)

The Bureau of Economics and Statistics Secretariat, Bombay.

5. Statistical Atlas of Bombay State (Provincial Part) 1950 — (Revised edition).
6. Estimates of Areas Under Crops in Bombay State 1948-49 (Supplement to the Statistical Atlas of Bombay State (P. Part, 1950).
7. Manual of Road and Canal Side Arboriculture (Bombay State) 1950. (Govt of Bombay)

Country Roads Board of Victoria, Exhibition Building, Carlton, N. 3., Victoria, Australia.

8. Design of Concrete Mixes—Graphical Method—Technical Bulletin No. 5. (U. D. C. No. 666. 972. 1) dt. 14-9-49.
9. Plant—Tungsten Carbide Tipped Rock Drill Bits—Eng. Note No. 19. dt. 30-8-1949.
10. Hints on Sampling for Pavement Design—Engineering Note No. 20 dt. 21-9-49.
11. Earthworks—Consolidation and Use of good material in Upper

Layers of Banks — Engineering Note No. 21.

12. Road Planning Width of Road Reserves—Engineering Note No. 22.
13. Vibrating Roller 28-J-I — Engineering Note No. 23 — dt. 18-1-1950
14. Notes on Rock Drilling — Engineering Note No. 24, dt. 18-1-50.
15. Plant-Motor Vehicles — Engineering Note No. 25, dt. 25-2-1950.
16. Removal of Traffic Lines — Engineering Note No. 26, dt. 11-5-1950.
17. Tractor Operation — Engineering Note No. 27. dt. 20-6-1950.
18. Geometric Design — P a v e m e n t Widths — Engineering Note No. 28. dt. 21-6-1950.
19. Theory of Structures (New impression, April, 1950) by Arthur Morley (Longmans Green and Co., London, 1950).
20. Oil Economy — getting the best out of engine oil and engines. (Defence Research Laboratory, Deptt. of Supply and Development Commonwealth of Australia, 1949.)
21. C.A.I. Structural Information Series Nos. 1-8, 12-19, 21-22 and 24-27. (The Concrete Association of India, Queensway, New Delhi.)
- Publication Division, Ministry of I & B. Govt. of India.
22. Kandla Project
23. Kandla Port Project.
24. Foreign Trade Zone.
25. Gandhidham. (The Sindhu Resettlement Corporation Ltd., Bombay, 1952).
26. Salt Industries in Kutch with Special reference to history and progress made by Kandla Salt Works.

27. First report on the National Income Committee — April, 1951. Ministry of Finance, Govt. of India)
28. How to write Technical Books by John Gloag (George Allen & unwin Ltd., Museum Street, London).
29. Engineering Soil Survey of New Jersey—Report No. 1, Bulletin No. 15—Dec., 1950. (Rutgers university, New Brunswick, New Jersey, 1950)
30. The Statesman's Year-Book, 1951. (Edited by S. H. Steinberg) (Macmillan & Co. Ltd., St. Martins Street, London, 1951.)
31. Examination of Quarry Sites for Road Metals in Certain parts of the Dharwar District (cyclostyled.) by B. F. Mehta. Geological Survey of India).
- Department of Scientific and Industrial Research Road, Research Laboratory, U. K.
32. The Design of building for Warm climates — Library Bibliography No. 142.
33. The measurement of short time intervals by A. Falton.
34. Improvements in Photoelastic Technique obtained by the use of a photometric Method by A. F. C. Brown & Others.
- His Majesty's Stationery Office, London.
35. Swelling Streets in Gets—Special Report No. 6 (Revised 1950)
36. Plumbing in America—National Building Studies Special Report No. 2.
37. Demp-proof Courses in Parapet walls Building Research Station Digest No. 11.
38. The Weathering Preservation and Maintenance of Natural Stone Masonary (Part II) B. R. S. Digest No. 2, August, 1950.
39. Filling and Sealing Materials for joints in concrete roads, Road Note No. 7 by R. S. M. rd.
40. Lightweight Building materials (Reprint from the Builder, October, 1948).
41. Building on Made—up Ground or Filling — B. R. S. Digest No. 9.
42. Concrete Kerbs Causes and prevention of failures—Road Research Tech. Paper No. 18.
43. The effect of the Soil foundation on the road Surface — An outline of existing Knowledge.
44. Sources of Road Aggregate in Great Britain.
45. Soil Thermodynamics applied to the movement of moisture in Road Foundations by D. Croney & J. D. Coleman.
46. Load-bearing Reinforced Concrete Walls and their use in the construction of multi-storey domestic buildings (Reprint from the Reinforced Concrete Review 1949, Vol. 1, No. 11) by A. F. Seddon
47. Magazine of Concrete Research No. 3. — December, 1949, containing an article "The vibration of concrete slabs." (Cement and Concrete Association, 52, Grosvenor Gardens London, S. W. I.)
48. The Solution by relaxation methods of ordinary differential equations. (Extracted from the proceedings of the Cambridge philosophical Society, Vol. 45 — Part I), by L. Fox.
- Mathematical Division, National Physical Laboratory, Teddington, Middlesex.
49. The Analysis of Fresh Concrete — (Reprint from Concrete & Constructional Engineering, February, 1949. by R.H.H. Kirkham
50. Uber den Zusatz von Bitumen Zu Stra Benteer by Dr. Ing. No. EWers, Jena and Dr. W. Riedel Dresden. (Straben—Und Tiefbau Verlagsgesellschaft, m.b.H., Berlin).
51. Aslib Proceedings — Annual Conference, 1948—Vol.—I. No. 2, August, 1949. (Aslib, 52 Bloomsbury, Street, London, W.C.I.)



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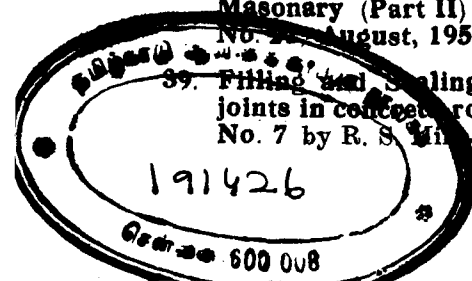
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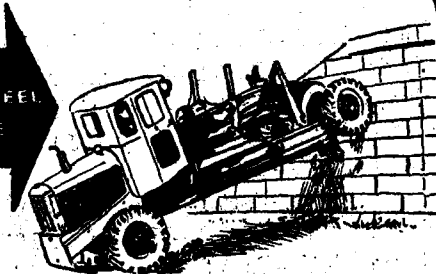
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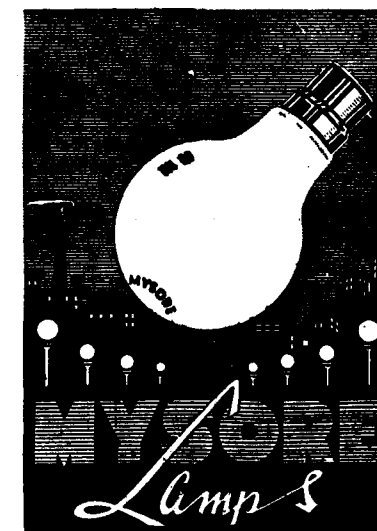
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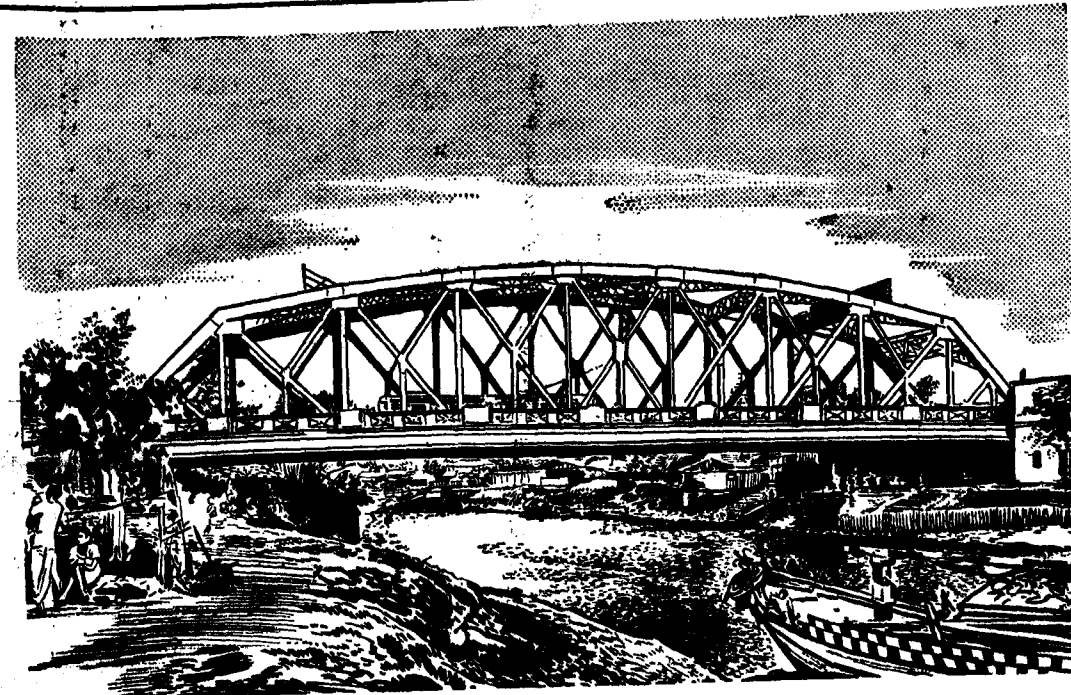
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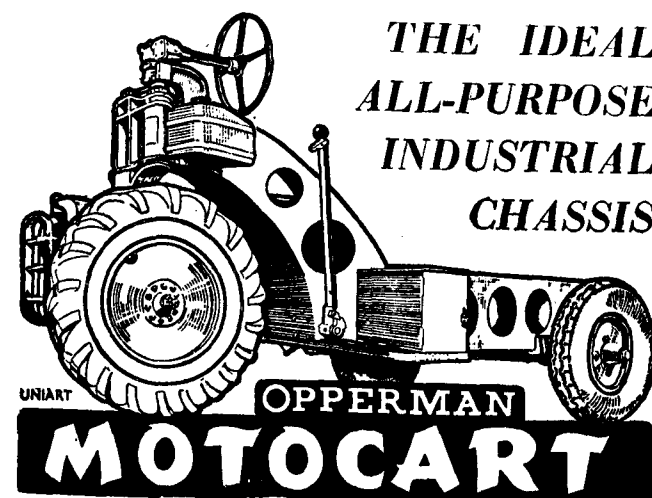
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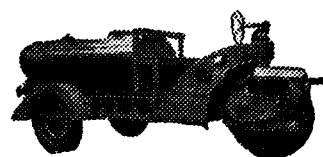
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