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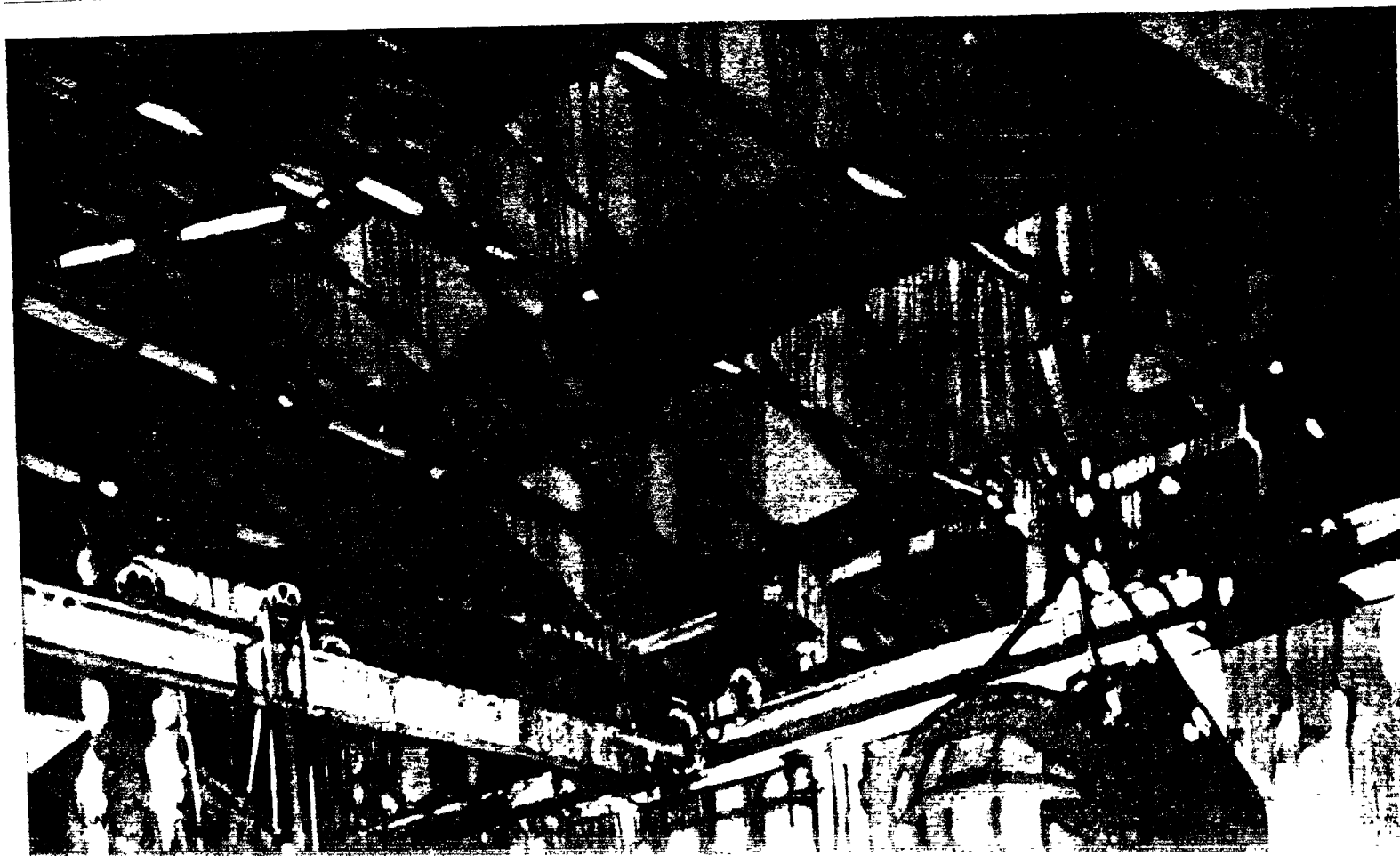
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Railway and Road Matters.

It is announced that the National Wages Board will start its review of railwaymen's pay and conditions of service on Monday, January 19th.

WHEN, as related in this column on January 2nd, Sir Herbert Walker was speaking at a dinner of the staff of the Southern Railway general manager's and secretary's offices, he also said that the cost of the electrification to Brighton would be about £3,000,000, and, with luck, there would be an electrical service to Brighton by the summer of 1932.

IN view of the growth of road motor traffic, it would seem that the lamps on level crossing gates should have their visibility improved so as to guard against the gates being run into and damaged by road vehicles, accompanied possibly by an obstruction on the railway. This remark is prompted by two recent accidents—a fatal one at Retford and a remarkable escape at Coppull in Lancashire—which was due to the road being slippery owing to frost.

FROM time to time we mention the inquiries of the Assistant Inspecting Officers of Railways into the more serious accidents to railway servants. Colonel Mount's annual report for 1929 shows that those officers and the sub-inspecting officers held 460 such inquiries during the year. In only 215 of these cases was it thought necessary to make any recommendation; in 167 instances the recommendation was accepted and in 36 it was declined. The remaining 12 cases were still under consideration.

AS far as we can see, no name associated with British railways appears in the list of New Year Honours, and the only officer of note among those overseas is Mr. Percy Rothera, the agent of the South India Railway, who receives a Knighthood in the Indian list. Mr. Herbert Morrison, the Minister of Transport, becomes a Privy Counsellor, and Mr. Charles Campbell, one of the Sub-inspecting officers of the Railway Department of the Ministry, is made a Member of the Order of the British Empire.

OUR contemporary, the *Railway Review*—the organ of the National Union of Railwaymen—in its issue of January 9th, drew attention to the fact that during 1929 the four grouped companies paid more than £539,000 in connection with merchandise carried by goods train and over £66,500 for consignments by passenger train which had been lost or damaged in transit. It is then remarked that "We feel confident that it is only necessary to once again draw attention of railwaymen to this important matter in order that the figures mentioned above may be substantially reduced during the coming year."

THE fatal accident to three trainmen at Northumberland Park Station, Tottenham, on January 7th, recorded, along with the Carlisle accident, in our Seven-day Journal on January 9th, was of a very unusual character. We may say that, besides the coroner's inquest, the circumstances will be inquired into by Colonel Anderson on behalf of the Ministry of Transport. We have reason to believe that, although there are special operating regulations for gunpowder trains, that the train was not properly secured.

Notes and Memoranda.

THE number of operatives employed in the cotton mills of Bombay during last year was 232,087, which shows an increase of 13,000 over 1929.

THE average daily production of motor tires in France was 14,100 pieces during the past year. The annual consumption was about 2,900,000 tires.

THE Pacific Gas and Electric Company is adopting a pressure of 1200 lb. per square inch for the boilers of its new station at San Francisco. The three boilers will have a total evaporative capacity of 500,000 lb. per hour.

IT is said that the cost of hardening and tempering rock drills by means of the electrically heated salt bath is, on the Rand, less than one farthing per drill. This amount includes power, maintenance, depreciation, labour and supervision.

IT is claimed that the tank which is being made by Braithwaite and Co. for the Murree waterworks in the Punjab, will be the largest pressed steel tank in the world. It will be 204ft. by 160ft. by 16ft. deep and will have a capacity of some 3,250,000 gallons.

IN a lecture given to the Royal Society of Arts, Professor C. R. Darling said that theoretically, 20,000 cubic feet of air, which represent the contents of a house of moderate size, may be raised in temperature from freezing point—32 deg. Fah.—to 64 deg. Fah. by the heat produced from the combustion of 1 lb. of coke, and when the air is once heated only losses due to cooling by conduction through exposed walls and windows and the entry of fresh air from without have to be made good by the furnace. He also pointed out that, at present prices in South London, the relative amounts of heat obtained from one pennyworth of fuel are as follows:—Gas coke, 60,000 units; household coal, 57,000; semi-coke, 45,000; anthracite, 40,000; oil, 11,400; coal gas, 11,100; electricity, 3415 units.

WRITING in the *Canadian Engineer*, Mr. P. H. Wood, of the Converse Bridge and Steel Company, suggests the use of several colours in the painting of bridges. "I will admit," he says, "that unless it was done under artistic supervision the effect might be terrible. Also, the span would have to be of graceful outline to start with. During the war the French painted a number of their railway bridges in a similar fashion to the way ships were camouflaged. A number of colours were used and the effect was certainly startling. From even a short distance away they looked like anything but a bridge. The same ingenuity by artists on steel highway bridges would achieve pleasing results, particularly if the design of the span was aesthetically satisfactory. A variation in effect might be achieved by applying stainless steel, or possibly aluminium alloy sheets to some of the principal members."

AT a recent meeting of the French Académie des Sciences in Paris, Mr. A. d'Arsonval described a new Röntgen-ray tube capable of working at 400,000 volts. It was in 1913 that Mr. W. D. Coolidge invented the type of tube in

Miscellanea.

THE new free port at Piræus, Athens, is to be opened in April.

AN aerodrome is to be constructed in Andorra by a Barcelona firm.

THE cost of extending the piers in New York Harbour, to accommodate 1000ft. liners, is estimated at £15,000,000.

THE annual carnival dance of the Imperial College is to be held at the Union, South Kensington, on February 20th, at 9.30 p.m. Tickets may be obtained from Mr. D. M. Tombs.

ACCORDING to an analysis by the *Engineering News-Record of America*, the state of Vermont expends most on the maintenance of roads, with an amount of 37·80 dollars *per capita*.

THE Department of Overseas Trade has just issued a booklet of "Hints for Commercial Visitors to Turkey," which has been prepared by the Commercial Secretary to H.M. Embassy at Istanbul.

IT appears, from statistics recently issued in America, that, on the average, each locomotive of the Pennsylvania Company consumes nearly 2500 tons of coal per annum. The company owns 6100 engines.

THE recent extended fog in the Manchester district is said to have resulted in a record in electricity generation. On January 6th the local power stations produced 2,113,000 units, which is at the rate of 770 millions a year.

IT is proposed to construct an embankment 12 miles long, with an average height of 20ft., at Sangywa, Rangoon, with the object of forming an artificial lake to provide potable water for the city. It is estimated that the lake would give a supply of 47½ million gallons of water a day.

THE City Council of Edmonton, Alberta, has decided to expend 450,000 dollars on the extension of the boilers in its power plant, and will probably order further plant to the amount of 1,445,000 dollars during 1932-33. This second programme will include a 15,000-kilowatt generator.

THE announcement is made that the New England Power Association, a subsidiary of the International Hydro-electric System, has a construction programme involving an expenditure of upwards of 5½ millions sterling. On completion of the programme, which includes the construction of the fourth largest hydro-electric plant in the U.S.A., the Association will have a total hydro-electric capacity of 467,300 H.P., in addition to steam-driven plant of approximately the same horse-power.

THE laboratory for carrying out large-scale experiments on hydrogenation of coal established at Duisburg by the A.G. für Steinkohleverflüssigung und Veredelung has, says the *Iron and Coal Trades Review*, been closed. This step has been found necessary, due to the fact that owing to the want of suitable materials for the parts of the plant exposed to very high pressures these were very quickly worn out. The same trouble has prompted the I.G. Farbenindustrie to curtail considerably its activity in the

will be inquired into by Colonel Anderson on behalf of the Ministry of Transport. We have reason to believe that, although there are special operating regulations for gun-powder vans, there are none for petrol tanks. We would have it remembered, too, that on September 19th, 1927, a passenger train ran broadside into a train of thirty petrol tank wagons—fortunately empty—at Plaistow.

THE Underground authorities always have deserved credit for the attractive design of their posters, and four recent examples deserve special mention, in that they bring home to the passenger some of the special features provided for the safety of the trains. These respectively show the "dead man's handle," whereby, should the motorman accidentally release his control whilst running, current is cut off automatically and the brakes applied; the tunnel telephone that enables a motorman to "plug in" at any point on the line and to communicate with the sub-station; the automatic train stop, which "trips" the motor should a signal be overrun; the escalator safety gear for stopping it in an emergency. An inset shows the particular apparatus in a larger scale.

It is well known that the Metropolitan Railway is considerably handicapped in its train service to and from the City lines by the bottle-neck of only two lines of way between Baker-street and Finchley-road. In order to find some relief, powers were obtained in 1926 to make a tube railway between Edgware-road and Willesden Green, but the line has not been proceeded with. A letter in *The Times* of January 10th makes what, if the companies concerned would agree to it, would, in our opinion, provide an excellent remedy against this congestion. The former Midland main line and the Metropolitan come within 100 yards of each other at West Hampstead, and the proposal is to lay in a junction at that point which would allow for Metropolitan trains from the City to run over its own widened lines up to King's Cross and thence over the old Midland Railway *via* St. Paul's-road Junction to West Hampstead. We would add, as corroboration of the nearness of the two lines at that point, that there used to be, and probably still are, sidings at West Hampstead for exchanging traffic between the two companies.

THE Board of Trade export tables for November show that the value of the railway material sent overseas during the first eleven months of the present year was as follows; the corresponding figures for 1929 and 1928 are added in brackets: — Locomotives, £3,576,879 (£2,971,833, £3,203,733); rails, £2,044,648 (£2,534,812, £3,238,964); carriages, £1,725,535 (£2,218,259, £2,357,899); wagons, £3,004,890 (£2,270,735, £2,947,243); wheels and axles, £362,573 (£397,580, £696,215); tires and axles, £612,436 (£569,086, £547,515); chairs and metal sleepers, £597,737 (£479,072, £827,089); miscellaneous permanent way, £806,892 (£952,854, £1,227,485); total permanent way, £4,524,813 (£5,074,813, £6,658,944). The weight of the rails exported was 235,998 tons (301,138 tons, 371,836 tons), and of the chairs and metal sleepers, 62,603 tons (48,000 tons, 83,697 tons). During the month of November last locomotives of the value of £56,647 were shipped overseas, which included the Argentine, £240,264; India, £195,754; South Africa, £44,940. During the same month rails of the value of £64,292 were exported, which included the Argentine, £21,173; Portuguese East Africa, £13,130; British South Africa, £3816; Straits Settlements, £3080; Australia, £2310; and India, £2075.

At a recent meeting of the French Académie des Sciences in Paris, Mr. A. d'Arsonval described a new Röntgen-ray tube capable of working at 400,000 volts. It was in 1913 that Mr. W. D. Coolidge invented the type of tube in which the electronic current is produced by emission from an incandescent cathode. Up to 1928 it was considered, says the *Electrical Review*, that 200,000 volts was the maximum which such a tube could withstand, although Coolidge had already produced a tube working at up to 350,000 volts and two and three-stage tubes for from 600,000 to 900,000 volts, while later experimental tubes for pressures up to 1 million volts in fifteen stages had been produced. Mr. d'Arsonval pointed out that all those advances had, however, been confined to research laboratories, and that so far there was no systematic production of tubes for 400,000 volts. The new d'Arsonval incandescent-cathode tube is a sealed single-stage bulb, which, at a constant voltage of 400,000 volts, carries 2 milliampères, while with a pulsating voltage of 400,000 volts it will carry an average of 2.5 milliampères. This has been achieved by mounting the cathode filament within a round metallic component, the air in which is, by extending the exhausting action, entirely withdrawn. The new tube is being manufactured by the Gaiffe-Gallot and Pilon Company, of Paris, and is made in lengths up to 43.5 in., with bulb diameters of from 190 mm. to 200 mm. The distance between the anode and cathode is 40 mm., and the diameter of the metallic sleeve 25 mm.

THE temperature of solids may be estimated by the eye or accurately measured by means of a thermometer, thermo-couple, or optical pyrometer. Flames, particularly non-luminous flames, present a more difficult problem. A flame may, according to the American Bureau of Mines, be hot enough to melt platinum and yet look fairly cool to the eye. Conversely, there are certain luminous cool flames which will not burn the hand. This is because the radiation from flames does not follow the laws which apply to solids; for example, much of the radiation from the ordinary Bunsen type of flame is in the invisible infra-red region of the spectrum. In a method for measuring flame temperature being employed at the Pittsburgh Experiment Station of the Bureau, the flame is coloured yellow with sodium vapour and the intensity of this light compared in a spectroscope with the light from a heated solid at known temperature. The work is being carried out as one phase of a study of the physics and chemistry of gaseous combustion and explosion. Values have been obtained for statutory flames of different mixtures of air with methane, ethane, propane, butane, iso-butane, ethylene, propylene and butylene. Maximum flame temperatures vary from 1880 deg. Cent. for methane to 1975 deg. Cent. for ethylene. The mixture of gas and air which gives maximum temperature does not correspond to that which gives maximum flame speed, except for methane and Pittsburgh natural gas. For all other hydrocarbons tested, the mixtures which produced the highest flame temperature contain less combustible gas than those which give the highest speed of flame. The percentage of combustible gas in air which gives maximum flame temperature is slightly on the rich side of that required for exact combustion to carbon dioxide and water. Maximum calculated temperatures are 40 deg. to 70 deg. Cent. higher for the saturated hydrocarbons and about 100 deg. Cent. higher for the unsaturated hydrocarbons than the experimental values. Radiation losses account for the lower measured temperatures.

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THE official returns rendered to the Electricity Commissioners show that 1150 million units of electricity were generated by authorised undertakers in Great Britain during the month of December, 1930, as compared with 1049 million units in the corresponding month of 1929, or an increase of 9.6 per cent. During the year ending December 31st, 1930, the total amount of electricity generated by authorised undertakers was 10,869 million units, as compared with 10,294 million units for the year ending December 31st, 1929, representing an increase of about 5.6 per cent.

THE Commercial Secretary to the British Embassy at Istanbul, Turkey, reports that a revised draft Bill designed to introduce the metric system of weights and measures has been submitted to the Budget Commission of the Grand National Assembly. The Bill prohibits the use of other measures in all contracts, agreements, invoices, commercial books, notices, documents, &c. A translation of the Bill may be seen at the Department of Overseas Trade, 35, Old Queen-street, London, S.W. 1 (reference 22583/26). It will be recalled that a similar Bill was introduced in 1926, and again in 1928, without becoming law.

At a recent meeting of the 1820 Settlers' Association at Cape Town, the organising secretary, Captain Edwards, explained the circumstances in which 29 Scottish riveters who were brought out from the Clyde to work on the Northern Rhodesia copper mines returned to Scotland after ten weeks. He said, according to the *S.A. Mining and Engineering Journal*, these men had come out on a contract of 25s. a day, and had refused to carry it out because certain casual workmen were getting 28s. 6d. a day. They complained that on their arrival at the mines they found that though their earnings with overtime amounted to £55 a month, casual workers from Johannesburg engaged on the spot earned, with overtime, as much as £60 a month. The men, who had not come out under the auspices of the Association, which had merely been asked to befriend them, said they preferred the dole in England to £55 a month in Rhodesia as long as there were men worth less earning more.

THE Home Secretary gives notice that in pursuance of his powers under Sec. 47 of the Workmen's Compensation Act, 1925, as extended by the Workmen's Compensation (Silicosis and Asbestosis) Act, 1930, he proposes to make a scheme to provide for the appointment of a medical board to give the necessary certificates in all cases where compensation is claimed for silicosis or asbestosis, and to carry out periodic medical examinations of workers employed in certain specified processes involving exposure to silica or asbestos dust. He further gives notice that he proposes at the same time to amend the Metal Grinding Industries (Silicosis) Scheme, 1927, and the Various Industries (Silicosis) Scheme, 1928, with a view (1) to provide for the certification by the medical board of cases arising under these schemes, and (2) to extend the right to compensation to workmen. He further proposes to make a scheme—to be cited as the Asbestos Industry (Asbestosis) Scheme, 1931—to provide for the payment of compensation by employers of workmen employed in certain processes involving exposure to asbestos dust.