THE BURLINGTON PIONEER ZEPHYR FLYS THROUGH CANADA IN 1934.

May 1, 1934 The Streamlined Zephyr is en route to St Thomas terminal., due at 5:00 pm en route to the Century of Progress Exposition, the CB&Q Zephyr three car streamlined train is to make a brief stop at the St Thomas terminal of the Michigan Central. Harry L. Margett, MCR General Superintendent of Detroit and other officials will be on the train with officials of Budd. The Union Pacific three car train passed through a month ago.

May 2, 1934 The Burlington Zephyr was viewed by thousands as it passed through, it created quite a sensation. One thousand were present at the station and over 5000 saw it before it left.

Canadian Railway and Marine World

March, 1934

Streamlined, High Speed, Three-Car Train, of Stainless Steel.

A streamlined, articulated, 3-car train, to be built of stainless steel, was ordered recently by Chicago, Burlington and Quincy Rd., which has its headquarters at Chicago. The train is 196 ft. long and has accommodation for 72 passengers. The leading, or power car, has, at the front, a space for the power plant, the central section is a railway post office and the rear section provides baggage space. The front portion of the second car is for express; at the middle of the car is a buffet, and the rear section of the car has seats for 20 passengers, smoking by passengers being confined to that section. The rear car is entirely for passenger accommodation, the front section being arranged in typically passenger car fashion and the rear section being arranged as a parlor with comfortable chairs at each side. The entire train is carried on four 4-wheel trucks. The total weight of the train is 85 tons and maximum speed is over 100 m.p.h. In an interesting comparison of the train with one of the C.B. and Q. modern steam locomotives in passenger train service, it is pointed out that the steam locomotive and tender weigh 359 tons, compared with 85 tons for the 3-car train complete, and that the locomotive tender has water capacity of 15,000 gall. and coal capacity of 24 tons, while the amount of water required by the 3-car train is negligible and the capacity of its oil fuel tanks is only about 200 gall. The center of gravity of the 3-car train is only 51 in. above the rails, approximately 20% lower than in the typical railway car, which will cause the train to hug the rails more securely than the usual steam train, and also provide better balance and an absence of swaying action in rounding curves.

The power plant includes a 2-cycle 8-cyl. 600 h.p. Diesel engine direct connected to a generator supplying current to the traction motors. The braking system is electro-pneumatic. Roller bearings are applied throughout. All portions of the train interior are air conditioned. In carrying out the streamlining to the fullest extent possible, the windows, of shatterproof glass, are practically flush with the exterior sheathing, and the streamlining is not even impaired by rivet heads, as the shot-welded method of construction has been employed, obviating use of rivets. In exterior design and power development and transmission, the train takes advantage of much research in the aerodynamic

dows, extending around sides and rear, and is provided with luxurious seating accommodation.

On account of the light weight and also because of the greatly decreased wind resistance effected by the streamlining, it is expected that the train will show remarkable economies in operation, a figure of from 30 to 40% of the expense of steam equipment of the same passenger capacity being spoken of.

The train is being built by Edward G. Budd Manufacturing Co., Philadelphia, Pa., and the Diesel engine by Winton Engine Co., a General Motors subsidiary. The roller bearings are of Timken manufacture. The United States Steel Corporation's laboratories and testing facilities have been made use of in connection with the train's design and construction.

The train is expected to be delivered early in March and will be named the Zephyr. It will first be sent on an exhibition tour of the principal cities in the eastern United States, and will then be placed in service between Omaha and Kansas City.

Argentine Transandine By—Services

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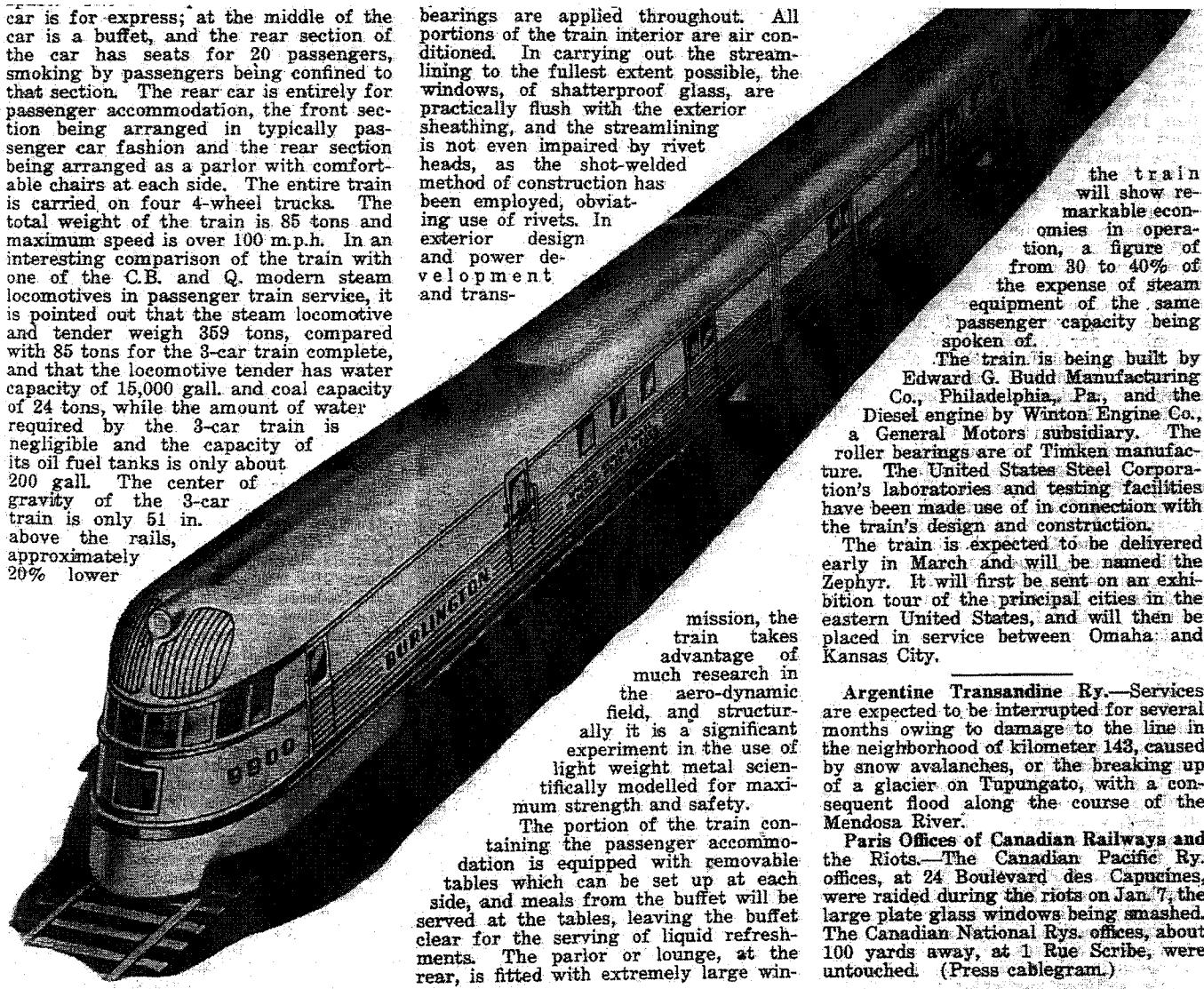

bearings are applied throughout. All portions of the train interior are air conditioned. In carrying out the streamlining to the fullest extent possible, the windows, of shatterproof glass, are practically flush with the exterior sheathing, and the streamlining is not even impaired by rivet heads, as the shot-welded method of construction has been employed, obviating use of rivets. In exterior design and power development and transmission, the train takes advantage of much research in the aero-dynamic field, and structurally it is a significant experiment in the use of light weight metal scientifically modelled for maximum strength and safety.

The portion of the train containing the passenger accommodation is equipped with removable tables which can be set up at each side, and meals from the buffet will be served at the tables, leaving the buffet clear for the serving of liquid refreshments. The parlor or lounge, at the rear, is fitted with extremely large win-

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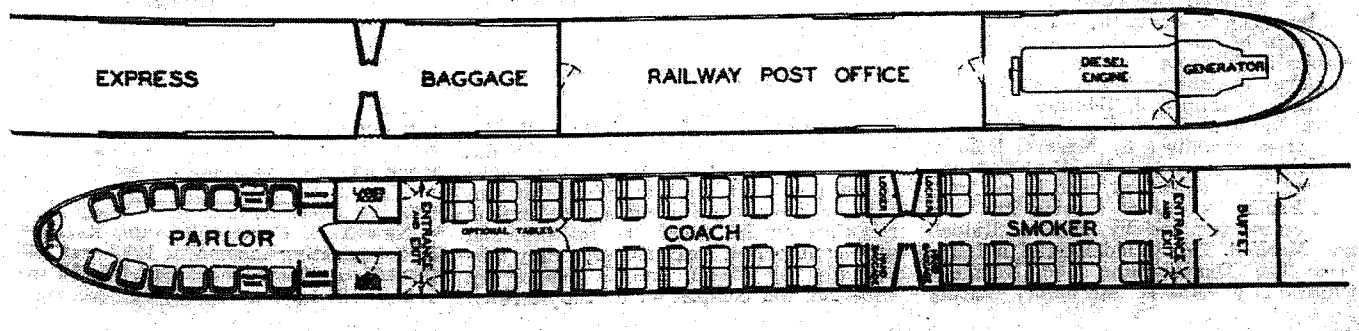
Argentine Transandine Ry.—Services are expected to be interrupted for several months owing to damage to the line in the neighborhood of kilometer 143, caused by snow avalanches, or the breaking up of a glacier on Tupungato, with a consequent flood along the course of the Mendosa River.

Paris Offices of Canadian Railways and the Riots.—The Canadian Pacific Ry. offices, at 24 Boulevard des Capucines, were raided during the riots on Jan. 7, the large plate glass windows being smashed. The Canadian National Rys. offices, about 100 yards away, at 1 Rue Scribe, were untouched. (Press cablegram.)



Streamlined Train, Chicago, Burlington and Quincy Rd.

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The christening ceremonies were broadcast. W. W. Atterbury, President, Pennsylvania Rd., who was unable to attend, spoke from the NBC studio in New York, congratulating Ralph Budd, President of the C.B. and Q., for his vision, courage, initiative and executive ability in making the train possible. During the christening ceremony, Edward G. Budd, President, Edward G. Budd Manufacturing Co., which built the train, paid tribute to those in his and other manufacturers' organizations who had participated in the design and construction of the train, mentioning that President Budd of the C.B. and Q.R. had been interested in the type of equipment represented by it ever since the Budd Company built its first rail car in 1932. A. P. Sloan, President, General Motors Corporation, a subsidiary of which, Winton Engine Co., built the Diesel engine power plant for the train, spoke of the extent to which scientific industrial research had contributed to the train's design and construction. W. Irvin, President, United States Steel Corporation, described the stainless steel used in construction. Mr. Ralph Budd, after thanking those who had made the train possible, said that after its exhibition tour it will operate between Kansas City, Omaha and Lincoln, adding that it was appropriate that it should have been built by the C.B. and Q.R. for use in Mis- [illegible] territory, as Burlington track m.p.h.; Springfield-Ball, 61.1 m.p.h.; St. Thomas-West Lorne, 61.1 m.p.h.; West Lorne-Fargo, 59.7 m.p.h.; Fargo-Tilbury, 47.5 m.p.h.; Tilbury-Essex, 59.2 m.p.h.; Essex-Windsor, 41.1 m.p.h.

The train, consisting of three car bodies carried on four trucks, is 196 ft. long, and weighs about 195,000 lb. The leading car, in addition to carrying the 600 h.p. high compression, 2-cycle, 8-cyl. Winton Diesel engine, has a 30 ft. mail compartment, and a baggage space; the second car has express space, buffet and passenger smoking room; the third car is for passengers exclusively, with a solarium lounge at the rear. The total seating capacity is 72; the baggage and express capacity in the first and second cars is for a maximum of 50,000 lb. The smoking compartment in the second car seats 20 passengers; the main room in the third car seats 40; the solarium lounge has chairs for 12. The Diesel engine cylinders are 8 x 10 in., and the eight cylinders are in line. Engine weight is about 22 lb. per h.p. The crankshaft is a 9-bearing one. The generator, to which the engine is connected, is single-bearing, differentially-wound, placed ahead of the engine, the connection being direct through a flexible steel disc coupling. The generator supplies current to two traction motors, series-wound ones of General Electric manufacture, mounted on the leading car front truck. In addition to the main generator there is a 25 kw. auxiliary one, of 4-pole, direct current, commutating pole type, for air compressors, battery charging, lights, air conditioning equipment, motor for train heating boiler, etc. The trucks, of outside bearing type and with cast steel frames and bolsters, are equipped with roller bearings. The leading truck, on which the traction motors are mounted, has 36 in. wheels; the other trucks have 30 in. wheels. Rubber [illegible]

Railway Freight Traffic Increase Continues.

The Dominion Bureau of Statistics, Transportation and Public Utilities Branch, reports that 4,898,378 tons of revenue freight were loaded at Canadian stations and received from foreign connections, in February, an increase of 1,138,692 tons, or 30% over Feb., 1933. The loadings and receipts from foreign connections were as follows, in tons:—

	Feb., 1934	Feb., 1933	Feb., 1932
Prince Edward Island	14,829	8,884	8,371
Nova Scotia	400,248	264,411	327,134
New Brunswick	211,124	168,240	175,392
Quebec	769,038	505,036	721,960
Ontario	2,206,441	1,610,115	2,152,782
Manitoba	230,123	175,643	222,492
Saskatchewan	326,015	223,972	261,739
Alberta	450,900	613,430	753,873
British Columbia	289,665	189,955	287,870
Total	4,898,378	3,759,686	4,911,613

The products were as follows, in tons:—

Agricultural	1,071,685	881,578	1,128,684
Animal	182,110	157,273	168,408
Mine	1,760,716	1,448,140	1,784,042
Forest	695,586	416,147	616,547
Manufactures and miscellaneous	1,188,281	856,548	1,213,982
Total	4,898,378	3,759,686	4,911,613

There were decreases in traffic in Feb., 1934, compared with Feb., 1933, in only 13 of the 76 commodities listed. There was a decrease in wheat and small decreases in rye, flaxseed and other grains, but there were increases in all other agricultural products, and the total traffic in agricultural products was 190,107 tons, or 21.6%, greater than in Feb., 1933. The increases over Feb., 1933, in the other traffic classifications were:—animal products, 24,837 tons, or 15.8%; mine products, 312,576, or 21.6%; forest products, 279,439, or 67.2%; manufactures and miscellaneous, 331,733, or 38.8%. Comparative loadings at Canadian stations of various important commodities in Feb., 1934, and Feb., 1933, were, in tons, the Feb., 1934, figures being stated first:—ores, other than iron and copper, 124,288-28,181; logs, posts, poles [illegible]

General Motors Corporation, of which, Winton Engine Co., built the Diesel engine power plant for the train, spoke of the extent to which scientific industrial research had contributed to the train's design and construction. W. Irvin, President, United States Steel Corporation, described the stainless steel used in construction. Mr. Ralph Budd, after thanking those who had made the train possible, said that after its exhibition tour it will operate between Kansas City, Omaha and Lincoln, adding that it was appropriate that it should have been built by the C.B. and Q.R. for use in Missouri River territory, as Burlington track had been the first to reach the Missouri River in 1859 in the railway construction race toward the west. G. Swope, President, General Electric Co., spoke over the radio from New York, describing the various ways in which electricity had been instrumental in the train's creation. Following the christening the train proceeded on its maiden trip. At the time of writing it has visited at Baltimore, Washington, Trenton, Newark, New York, Bridgeport, New Haven, Providence, Boston, Worcester, Springfield, Albany, Schenectady, Utica, Syracuse, Rochester, Buffalo, Detroit, Toledo, Cleveland, Pittsburgh, Columbus, Dayton, Cincinnati, Louisville, Indianapolis, Fort Wayne and Chicago.

The run from Buffalo to Detroit was made over the Canada Division, Michigan Central Rd., with stops at Black Rock and Fort Erie for customs examinations, and at St. Thomas to wait for the arrival of a party from Detroit on train 44. It also made an unscheduled stop at the first crossing east of Essex, where it struck an automobile, without any great damage resulting. That crossing is protected by lightning flash signals. The delay caused to the train there was about 15 minutes. Speeds made by the train between various stations were as follows:—Fort Erie-Welland, 39 m.p.h.; Welland-Canfield Jct., 52.2 m.p.h.; Canfield Jct.-Hagersville, 57.8 m.p.h.; Hagersville-La Salette, 50.3 m.p.h.; La Salette-Tillsonburg, 48.2 [illegible] Tillsonburg - Springfield, 56.3

current to two traction motors, wound ones of General Electric manufacture, mounted on the leading car front truck. In addition to the main generator there is a 25 kw. auxiliary one, of 4-pole, direct current, commutating pole type, for air compressors, battery charging, lights, air conditioning equipment, motor for train heating boiler, etc. The trucks, of outside bearing type and with cast steel frames and bolsters, are equipped with roller bearings. The leading truck, on which the traction motors are mounted, has 36 in. wheels; the other trucks have 30 in. wheels. Rubber insulation is used freely to prevent transmission of vibration and sound to the car body. The wheels are of heat-treated wrought steel. The braking system is Westinghouse SME-3, modified for high speed articulated train units, it being a straight air system with emergency feature, and with arrangement for standard automatic operation of brakes in case of handling the train with steam train equipment. The train is steam heated, by a boiler at the rear of the baggage compartment in the second car. Each passenger section is air-conditioned. In the Kansas City-Lincoln service in which the train is to be placed following release from the Exposition at Chicago, it will be scheduled to cover 251 miles in 4 hours, and its entry into the service will make it possible to eliminate two locomotives and six passenger train cars with total weight eight times that of the streamlined train.

Locomotive Shop at Winnipeg.—Canadian Pacific Ry. has given a contract to Thomas Borgford, Winnipeg, to replace the easterly half of the roof of the locomotive shop at Weston, Winnipeg, with a roof of timber construction. The timber part of the roof will be built up of laminated material and covered with C.P.R. standard 5-ply pitch and gravel roofing. While the roofing is being renewed, the skylights will be replaced by a longitudinal monitor.

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Subway Carrying Canadian Pacific Ry. over road in Leaside.—The Board of Railway Commissioners passed order 50,996, May 3, as follows:—Re application of Township of East York and Town of Leaside, Ont., for an order directing City of Toronto, County of York, and York Land Co., to contribute towards repair and maintenance of subway carrying Canadian Pacific Ry. over Millwood Road, in Leaside, which applicants were authorized to construct under order 38443, dated Nov. 22, 1926, as amended by order 38548, dated Dec. 16, 1926, and the cost of future maintenance of which was, by order 49862, dated May 11, 1933, required to be borne and paid by applicants. Upon hearing the application at Toronto, April 14, in the presence of counsel for and representatives of the applicants, City of Toronto, York Land Co., and County of York, and what was alleged, it is ordered that the application is hereby refused.

Air Mail Service between Fort Chipewyan, Alta., and Fond du lac, Sask., will be started about June 12.

Record Non-Stop Run on Chicago, Burlington and Quincy Railroad.

The Chicago, Burlington and Quincy Rd. streamlined, high speed, articulated, three-car train, the Zephyr, which was described and illustrated in Canadian Railway and Marine World for March, pg. 91, and additional information in regard to which was given in the June issue, pg. 238, made a non-stop run on May 26, which far eclipsed all preceding world records for distance travelled non-stop, by railway trains, and for sustained high speed. The train left Denver, Colo., at 5.05 a.m. mountain time, and ran the 1,015.4 miles to Chicago, non-stop, in 13 hr. 5 min., the average speed for the entire distance having been 77.5 m.p.h. The previous record for a long non-stop run, one of 401 miles, held by the London, Midland and Scottish Ry., was exceeded by more than two and one-half times. Owing to the necessity for reducing speed in passing through the larger cities, very high speeds had to be attained at other points to compensate; more than 200 miles was covered at speeds of more than 90 m.p.h. and 19.1 miles was run at 106.2 m.p.h. The highest speed attained was 112.5 m.p.h.

Elaborate precautions were taken to ensure safety and to make certain that the run would be successful. The C. B. and Q. R. engineering department prepared charts showing safe speeds for all sections of track along the route; the division superintendents conferred with municipal and police officials in the cities and towns to be passed through; roadmasters and other railway officials made trips over their divisions on rail motor cars to instruct section forces as to crossing protection, etc.; flagmen were placed [illegible] switches were

rate of speed of which the Zephyr is capable, as well as to determine its all round ability to operate under severe operating conditions. The trip was timed officially by Western Union Telegraph Co. The power plant functioned perfectly throughout the trip, and developed 15 to 20% in excess of its 600 h.p. rated capacity. Fuel data indicated an actual consumption of 384 gall. against an estimate of 550. In connection with arrangements of precautions prior to the run, all vertical and horizontal clearances were checked, the record of curvature and super-elevation was checked and rechecked in the field, and detailed speed charts were prepared to show the permissible rate of speed at every location. Markers indicating limiting speeds were located 3,000 ft. in advance of each curve where special speed restriction was necessary. Train orders for the entire trip were in the hands of train crews and road foremen of each division, these orders having been checked back with each dispatcher and verified before the start of the trip. A road foreman of locomotives was stationed immediately behind the motorman, to note the position or indication of the train order, interlocker and block signals. An engineer of maintenance, seated at the immediate left of the motorman, checked the speed restrictions from schedule superimposed upon a profile and kept the motorman fully informed, sufficiently in advance of the location of such restrictions, so that speed was regulated to meet the requirements of safety. While arrangements were made to avoid necessity for delivering train orders en route, it would not have been considered [illegible] distance of 1,015 miles

Large Increase In Railway Freight Traffic.

The Dominion Bureau of Statistics, Transportation and Public Utilities Branch, reports that 5,786,276 tons of revenue freight were loaded at Canadian stations and received from foreign connections in March, an increase of 1,511,479 tons, or 35.4%, over March, 1933, and of 429,378 tons, or 8%, over March, 1932. The loadings and receipts from foreign connections were as follows, in tons:—

	March, 1934	March, 1933	March, 1932
Prince Edward Island	25,315	13,904	15,975
Nova Scotia	506,736	300,571	374,581
New Brunswick	227,085	179,053	209,571
Quebec	916,085	566,301	756,582
Ontario	2,745,085	1,763,214	2,417,148
Manitoba	261,446	245,212	258,929
Saskatchewan	324,485	389,538	295,165
Alberta	476,709	605,505	689,373
British Columbia	303,380	211,499	339,574
Total	5,786,276	4,274,797	5,356,898

The products were as follows, in tons:—

Agricultural	1,289,630	1,304,061	1,208,581
Animal	199,841	183,480	179,284
Mine	1,904,637	1,247,866	1,846,341
Forest	374,977	486,006	725,449
Manufactures and miscellaneous	1,567,191	1,053,284	1,397,243
Total	5,786,276	4,274,797	5,356,898

Freight loaded at Canadian stations was 912,658 tons, or 30.8%, greater in March, 1934, than in March, 1933; imports increased 244,460 tons, or 36.9%, and in-transit freight, largely from U.S.A. to U.S.A. stations, increased 354,361 tons, or 54.8%. Wheat shipments in March were 241,458 tons, or 8,048,600 bush., lighter than in March, 1933. There were decreases in rye and flax, but increases in all other agricultural products. The increase in animal products was 16,361 tons, or 8.9%, and in mine products 656,771 tons, or 52.6%. There were large increases in coal, that in bitumi- [illegible] tons, or

ensure safety, the ... the run would be successful. The C. B. and Q. R. engineering department prepared charts showing safe speeds for all sections of track along the route; the division superintendents conferred with municipal and police officials in the cities and towns to be passed through; roadmasters and other railway officials made trips over their divisions on rail motor cars to instruct section forces as to crossing protection, etc.; flagmen were placed at all grade crossings; switches were spiked; mail crane arms, water spouts, etc., were wired down; signal department officials made special arrangements for passing the train through interlocking plants, and the superintendent of each division remained in the dispatcher's office while the train passed through their respective territories. The trip attracted a great deal of attention, and the route from Denver to Chicago was lined with spectators. Wherever the track was paralleled by a highway, automobiles were lined up, in two lines in places, to enable their occupants to see the train pass. Among those who accompanied the train were 36 C. B. and Q. R. officers, including Ralph Budd, President; Edward G. Budd, President, Edward G. Budd Manufacturing Co., which built the train; H. L. Hamilton, Chairman of the Board, Winton Engine Corporation, which built the engine for the train; representatives of General Electric Co. and Westinghouse Air Brake Co., and some 20 newspaper representatives. The regular passenger train scheduled time for the run made by the Zephyr is 26 hr. 15 min., or five minutes more than twice as long as the time occupied by the Zephyr. On arrival at Chicago, the train was run to the Century of Progress Exposition grounds, and placed on exhibition.

The experimental trips which the Zephyr had made prior to the Denver-Chicago trip had been comparatively short, although some of them represented longer continuous non-stop performance than is customary with steam locomotives. The non-stop high speed feature of the Denver-Chicago run offered an excellent opportunity to check performance, not only as to maximum speed but also as to the sustained high average ... gineer of maintenance, seated at the immediate left of the motorman, checked the speed restrictions from schedule superimposed upon a profile and kept the motorman fully informed, sufficiently in advance of the location of such restrictions, so that speed was regulated to meet the requirements of safety. While arrangements were made to avoid necessity for delivering train orders en route, it would not have been considered unusual if in a distance of 1,015 miles some unanticipated situation might have arisen which would have necessitated doing so. But no train orders were received en route and all signals showed a clear indication. The trip secured data and experience, valuable from a maintenance and operating standpoint, as to the possibility of high speed over long distances.

Highway Crossing Accidents Involving Automobiles.

The Board of Railway Commissioners has issued a statement showing the number of highway crossing accidents involving automobiles, the number of persons killed, and the number injured, for the years 1928 to 1933, both inclusive, as follows:—

	Accidents	Killed	Injured
1928	313	147	432
1929	330	110	467
1930	292	97	439
1931	280	84	428
1932	212	71	261
1933	189	58	273
Totals	1,616	567	2,300

Air-Rail Operations in Great Britain.—The four large groups of railway companies in Great Britain have, in conjunction with Imperial Airways, Ltd., organized Railway-Air Services, Ltd., to conduct co-ordinated air-rail operations. The company, of which Sir Harold Hartley, Vice President and Director of Scientific Research, London, Midland and Scottish Ry., has been elected Chairman, will operate such air services as the railways install in taking advantage of the powers granted them by Parliament in 1929.

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Estimates, Canadian National Railways, Etc.—A motion by the Minister of Finance, Mr. Rhodes, was passed by the House of Commons, June 1, as follows:—"That the estimates respecting Canadian National Steamships and Maritime Freight Rates Act, presented to the House on April 27, be referred to the select standing committee on railways and shipping, owned, operated and controlled by the government, and that the order referring the same to the committee of supply be discharged."

Train to be Run on Spheres.—A recent Moscow dispatch stated that the Russian Soviet Government had announced it will begin construction, this summer, of a train capable of operating at 120 m.p.h., for operation between Moscow and a suburb 30 miles away, the usual flanged wheels running on rails to be replaced by an arrangement whereby the train will run on spheres travelling in semi-spherical grooves.

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The train, consisting of three car bodies carried on four trucks, is 196 ft. long, and weighs about 195,000 lb. The leading car, in addition to carrying the 600 h.p. high compression, 2-cycle, 8-cyl. Winton Diesel engine, has a 30 ft. mail compartment, and a baggage space; the second car has express space, buffet and passenger smoking room; the third car is for passengers exclusively, with a solarium lounge at the rear. The total seating capacity is 72; the baggage and express capacity in the first and second cars is for a maximum of 50,000 lb. The smoking compartment in the second car seats 20 passengers; the main room in the third car seats 40; the solarium lounge has chairs for 12. The Diesel engine cylinders are 8 x 10 in., and the eight cylinders are in line. Engine weight is about 22 lb. per h.p. The crankshaft is a 9-bearing one. The gen- [illegible] to which the engine is connected,

Cincinnati, Louisville, Indianapolis, Fort Wayne and Chicago.

The run from Buffalo to Detroit was made over the Canada Division, Michigan Central Rd., with stops at Black Rock and Fort Erie for customs examinations, and at St. Thomas to wait for the arrival of a party from Detroit on train 44. It also made an unscheduled stop at the first crossing east of Essex, where it struck an automobile, without any great damage resulting. That crossing is protected by lightning flash signals. The delay caused to the train there was about 15 minutes. Speeds made by the train between various stations were as follows:—Fort Erie-Welland, 39 m.p.h.; Welland-Canfield Jct., 52.2 m.p.h.; Canfield Jct.-Hagersville, 57.8 m.p.h.; Hagersville-La Salette, 50.3 m.p.h.; La Salette-Tillsonburg, 48.2 m.p.h.; Tillsonburg - Springfield, 56.3