Statutory Grain Rates

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Scope and Purpose

The problem of statutory grain rates has come before the Commission as a logical element in its consideration of "(a) inequities in the freight rate structure . . .; (b) the obligations and limitations imposed upon the railways by law . . .; and (c) such other related matters as the Commissioners consider pertinent . . .".[1]

This research report is designed to provide an economic assessment of

1. the alleged burden to the railways in carrying statutory grain traffic;
2. the historical and present place of statutory rates in the Prairie farm economy, the Prairie economy, and the national economy; and
3. the probable impact on the Prairies and their farm economy of any changes in the statutory rates.

Historical Review and Analysis

National Policy and Transportation Policy

The statutory grain rates had their origin in an era when a most prominent element in Canada's national policy was the peopling of the West. The intention was that the land and settlers should be organized to farm and produce mainly grain for export and that the various economic activities that flowed from this should be a benefit to all the other people on the Prairies and the people and areas in other parts of Canada handling the western product or producing and shipping food and supplies to the West.

Clearly this national policy called for abundant and moderately-priced transportation. The Canadian Pacific Railway Company itself in its initial building stage, 1881 to 1886, illustrated this, and the Crowsnest Pass Agreement was a further development of national transportation policy at the core of national policy. In the case of both, the original charter and the

[1] Order in Council P.C. 1959-577, setting out the Terms of Reference of this Commission.

1897 arrangements, federal assistance was of a capital nature and the Company undertook to build its lines and give some degree of rate protection. The idea was that when the lines commenced operation the railway would try to build its business as much as it could to serve its purposes and in doing so would be serving also the public's purposes.

A national policy does not necessarily mean the loss of money by anybody, or the subsidization of anybody, or lack of reliance on free enterprise or competitive forces. The implementation of a subsidy may be justified as a means of either giving greater horizon to free enterprise by overcoming a capital shortage or surmounting an inherent geographic disadvantage.

Today's statutory grain rates, which are a practical extension of the Crowsnest Pass Agreement rates, are those applying on carload shipments of grain and grain products, including flour, from Prairie points: (1) to Fort William, Port Arthur and Armstrong, Ontario; (2) to Pacific Coast terminals (Vancouver, New Westminster, Victoria and Prince Rupert) *for export;* and (3) to Churchill *for export.*

The Crowsnest Pass Agreement

In the 1897 Crowsnest Pass Agreement the Canadian Pacific obtained a subsidy of $3,404,720 from the Government of Canada to build a line from Lethbridge through the Crowsnest Pass into the Kootenay area of British Columbia where coal and other mineral discoveries had been made. In exchange the railway undertook to reduce freight rates on:

1. a number of articles important to settlers and farmers, on their movement from Central Canada to the Prairies;[1] and
2. grain and flour from its lines on the Prairies to Fort William and Port Arthur by three cents per 100 pounds. This provided rates to Fort William, for example, as follows:

Winnipeg,	420 miles,	14 cents per 100 lbs.
Regina,	776 miles,	20 cents per 100 lbs.
Calgary,	1,242 miles,	26 cents per 100 lbs.

As part of the Agreement the railway undertook "that no higher rates than such reduced rates or tolls shall be hereafter charged by the Company between the points aforesaid".[2] These are the phrases which have (quite logically) been taken by the Prairie people as an undertaking in perpetuity.

[1] Green and fresh fruits, 33⅓ per cent reduction; coal oil, 20 per cent; and cordage and binder twine, agricultural implements, iron, wire, window glass, paper for building and roofing purposes, roofing felt, points, livestock, wooden ware and household furniture, 10 per cent.

[2] Statutes of Canada, 1897, 60-61 Victoria, Ch. 5, Sec. 1 (*d*) and 1 (*e*).

Fowke has summarized the objectives of the contracting parties as follows:[1]

Government of Canada

"(1) the more rapid development of the highly promising mining area of southern British Columbia,

(2) the effective integration of this area into the Canadian economy in defiance of geographic facts and despite American designs,

(3) the enlargement of the prairie and inter-mountain markets for eastern manufacturers through the provision of lower freight rates on the western movement of certain important products,

(4) the stimulation of agricultural settlement and general economic expansion in the prairie provinces by means of the statutory assurance of lower rates on grain and on the inward movement of capital equipment, and

(5) the acceptance by the Canadian Pacific Railway Company of the principle of governmental rate control in the national interest."

Canadian Pacific Railway Company

"(1) the subsidy, more substantial than that considered by the previous government, would pay, according to the Company's own recorded estimates, upwards of one-half of the cost of the Crow's Nest line,

(2) construction of this line would entitle the Company to a large land subsidy indirectly from the Province of British Columbia,

(3) the line would provide an all-rail link between the Company's main line and the Kootenay region, and

(4) it would thus be possible to forestall American economic occupation of that wealthy area and to secure for the Canadian Pacific Railway Company first claim upon the traffic benefits to be derived from economic development in the southern Canadian Cordillera."

History of Agreement Rates

The importance of the Agreement is not placed in doubt by recapitulating the history of grain rates from the Prairies to the Lakehead to show that, between the effective date of full reduction, September 1, 1899, and the 1925 statute, the rates were precisely in effect for only seven and a fraction of the twenty-six years.

[1] Evidence tendered by Dr. Vernon C. Fowke on behalf of the Respondents (Western and Maritime Provinces) on Jan. 12, 1953, before the Board of Transport Commissioners in Rate Base-Rate of Return case, Ottawa, Vol. 912, p. 780-781.

Another agreement between the Government of Manitoba and the Canadian Northern Railway, made for competitive purposes, brought effective rates 3 cents lower in Manitoba and 2 cents lower in Saskatchewan and Alberta between 1903 and 1918. After staying at Crowsnest levels for a few months in the latter year, special action in the face of post World War I inflation led to considerable temporary increases until July 1922, when Crowsnest levels were restored. Rates as much as 14.5 cents (Calgary) above Agreement rates had briefly prevailed in 1920.

When, in 1922, Agreement levels were restored on the eastbound movement of grain, the suspension of the Agreement rates on westbound movement of settlers' goods and farm equipment was not lifted, and in the 1925 compromise both these decisions were embodied in the Railway Act. The grain rates were, by action of the Board of Railway Commissioners in application of the legislation, applied on a uniform mileage basis to all lines in the grain area and to export shipments to Pacific Coast terminals.

Westbound Commodities in the Agreement

Not as much has been written about the cancelled westbound rates on materials as on Crowsnest grain rates. The history of the rate on agricultural implements since shortly after the Agreement has been tabulated. This is one of the most important categories in the list of commodities reduced for westbound movement in the Agreement.

It may be observed that the 1904 rate on farm implements was 98 cents per 100 pounds. This was presumably the rate called for in the Agreement and therefore replacing an 1897 rate of $1.09. Also in 1904 the otherwise applicable 6th class rate was $1.01, 3 cents higher. This was presumably not affected by the Agreement, but it must have been reduced from 1897 through other influences or it would have been the applicable rate for implements from which 10 per cent would on January 1, 1898, be removed. By 1908 the commodity rate had subsided to 87 cents and use of the class rate allowed an 86 cents rate for a time after 1914. Post-war increases were wiped out in 1924, when 97 cents briefly became the rate, in line with the Agreement (although a 1 cent discrepancy appears). The large increase to $1.28 in late 1924—in consequence of the Board of Transport Commissioners' order disallowing Crowsnest rates published for 1897, stations only on the ground of discrimination against other stations—was wiped out in January 1925, by an Order in Council of the previous month. There was an appeal to the Supreme Court, whose finding was for the Crowsnest Pass Agreement literally as 1897 conditions—stations and lines—indicated in 1925. The Railway Act amendment (Sec. 328: (6) and (7)) of that year followed, and westbound rates on implements and other agreement commodities were henceforth not bound but subject to regulation by the Board.

TABLE I—CARLOAD RATES ON AGRICULTURAL IMPLEMENTS
(in cents per 100 pounds)
(TORONTO TO REGINA)

Effective date	*Commodity rates*	*6th class rates*	
		Normal	*Bridge*[a]
Aug. 1, 1904	98	101	
Apr. 4, 1905	98	101	
Dec. 23, 1907	97	97	
Mar. 10, 1908	87	97	
Apr. 1, 1912	87	89	
Aug. 1, 1912	—	89	
Sept. 1, 1914	—	86	
Sept. 1, 1917	—	87	
Apr. 1, 1918	97	98½	
Aug. 20, 1918	—	112½	
Sept. 1, 1919	102½	112½	
Sept. 23, 1920	140	154	
Jan. 1, 1921	138½	148½	
Dec. 1, 1921	128	137	
July 7, 1924	97	137	
Oct. 27, 1924	128	137	
Jan. 9, 1925	97	137	
July 23, 1925	128	137	
Apr. 8, 1948	155	166	
Dec. 27, 1948	—	166	
Jan. 11, 1949	155	166	
Oct. 11, 1949	167	179	
Mar. 23, 1950	180	193	
June 16, 1950	186	199	
July 24, 1950	—	199	
July 26, 1951	—	223	
Feb. 11, 1952	—	233	
May 1, 1952		233	221
Jan. 1, 1953		254	242
Mar. 16, 1953		272	259
May 1, 1953		272	253
Mar. 1, 1955		262	243
Nov. 1, 1955		262	236
Mar. 1, 1956		262	243
July 3, 1956		280	261
Jan. 1, 1957		291	271
Mar. 1, 1957		291	273
Aug. 1, 1958		290	272
Dec. 1, 1958		339	320
Mar. 1, 1959		339	317
Aug. 1, 1959[b]		319	297
Dec. 1, 1959		319	289
May 6, 1960[b]		313	283

[a] Rate reflects "bridge" subsidy reduction under Section 468 of the Railway Act.
[b] Roll-back was to 110 per cent instead of 117 per cent Aug. 1, 1959, and to 108 per cent instead of 117 per cent May 6, 1960.

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The rate of $1.28, which had been effective from 1921 to 1924 and which was 32 per cent above the Agreement level, was established and this prevailed until the first post-war general increase of 21 per cent took place in 1948. This rate was 9 cents (7 per cent) less than the otherwise applicable 6th class rate. The commodity rate seems to have lapsed for two weeks at December 27, 1948. Upon being restored, the commodity rate took the subsequent 20 per cent increase in the regular three stages in 1949 to 1950, but final cancellation of the commodity rate came on July 24, 1950, causing an immediate 13 cents jump in the effective rate (the same 7 per cent as mentioned for 1948).

This 6th class became class 40 on March 1, 1955, with the changes in designations accompanying equalization, and the rate fell from $2.72 (normal) to $2.62 (normal).[1] Meanwhile, on May 1, 1952, the "bridge" subsidy had reduced the rate for the shipper but had no effect on carrier revenue. The same comment would apply to the roll-back of August 1, 1959.

So from the railway revenue point of view, changes in this rate after 1955 consisted only in general increases on July 3, 1956, January 1, 1957, and December 1, 1958.

The crucial changes from the Crowsnest level in this long series of rate changes over 56 years were as follows:

1. 1908 to 1918: Competitive depression prior to close of World War I;
2. 1925: Adoption of $1.28 level when 1897 Agreement cancelled in respect of westbound movement;
3. 1950: Cancellation of commodity rate for implements.

All other changes were formula actions for rates generally or for the class rate scale or general to eligible "bridge" traffic.

The final result, in May 1960, is a rate to the railways of $3.39 and to shippers of $2.83, being respectively 250 per cent and 192 per cent above the level provided in the Crowsnest Agreement.

Other Westbound Commodities

Exhibit 49A[2] throws some further light on the lapsed westbound provisions of the Crowsnest Agreement. For most of the articles in the list are shown:

1. the rate provided for in the Agreement (September 1899),
2. the crest of the post World War I increases (September 1920), and
3. the rate on April 25, 1960.

[1] Normal here means "bridge" reduction not made.
[2] Appendix A.

Increases today (shippers' rates) over Agreement levels are: binder twine 300 per cent; settlers' effects 218 per cent; iron bars 68 per cent; lubricating oil 31 per cent; paints 129 per cent. In the case of some other items inscribed "No movement", the applicable rates have been ascertained to indicate the following increases today of shippers' rates over Agreement levels: furniture 162 per cent to 222 per cent; apples 174 per cent; window glass 239 per cent; cattle 183 per cent; wire 138 per cent.

In further indication of the significance of the westbound provisions of the Crowsnest Agreement which lapsed permanently in 1925, the movements in recent years of the named commodities as related in the Waybill Analyses[1] have been examined. Nine of the ten years from 1949 to 1958 were analysed and published.

Agricultural implements and parts moved in the biggest volume and were recorded in each of the nine years. The average movement was 42 cars, which, on the 1 per cent sample basis, would suggest an annual movement of 4,200 cars. Some $30,000 annual average freight revenue (sample basis) was recorded. The indication of the historical table of rates on this commodity is that current rates are about three times the Crowsnest level. Thus, of the estimated annual freight bill of $3 million, only $1 million would be paid if, like grain, implement rates westward through Fort William were still covered by the Agreement. Conversely, the extra $2 million actually collected by the railways is indicative of the scale of their concern in deriving low and statutorily limited revenue from the carriage of grain.

Other westbound commodities, the movement of which may be noted in the Waybill Analyses with their annual average movement of 1 per cent or so are: cordage and binder twine 1 car, $833 revenue; window glass 2 cars, $2,520 revenue; fresh fruit 4 cars, $2,042 revenue; paper for roofing purposes 3 cars, $3,070 revenue; paints 2 cars, $1,930 revenue; livestock less than a car, $186 revenue; furniture (not necessarily all "household") 47 cars, $32,500 revenue. There are no items of "iron", as such articles in the Analyses are "iron and steel". Such possible items show 14 cars average per year, $20,300 revenue.

The revenue significance, if the rates could be traced, would probably be between double (as indicated by the railways' contention for grain requirement) to three times or a little more as reported for implements. As much as $6,300,000 of annual revenue on Agreement articles other than implements is suggested, but a conservative estimate (considering the lack of precise correspondence between some categories in the Waybill Analyses and the Crowsnest Pass Agreement) is perhaps no more than half that amount. Thus the foregone benefit since 1925 would be about as much again as that estimated for implements.

[1] Prepared by the Board of Transport Commissioners of Canada.

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It is necessary, concerning the foregoing conjecture on the westbound portion of the Crowsnest Pass Agreement, to *caution* that only the CPR was party to that Agreement whereas the CNR may carry half the applicable traffic recorded from the Waybill Analyses.

Surviving and Cancelled Benefits of Agreement

The contrast for the grain is, of course, that since the post World War I rise and fall, the rate (14 cents Winnipeg to Fort William, 20 cents Regina to Fort William, etc.) has remained at 1899 levels. There are non-statutory grain rates, an example of which is that from Fort William to Toronto-Montreal. This rate was 25 cents per 100 pounds for twenty-five or more years before 1948, making a ton-mile revenue of .505 cents, very close to the Crowsnest level. The eastern rate is now 66 cents to the shipper, 71 cents (without the roll-back) to the railway, some 164 per cent and 184 per cent above the 25 cents level, whilst the western statutory rate is unchanged.

Thus a contrast of two important parts of the 1897 Crowsnest Pass Agreement.

Statutory Rates and the Railways

The accepted theory of ratemaking indicates that total revenue from the differentiated rate structure must be sufficient to cover railway operating costs and overhead, while the rate on each particular article or shipment must cover out-of-pocket costs for the shipment and make some contribution to fixed or overhead costs; and that the particular rates above the indicated floor must be such as to move the traffic. This last stipulation can be in the sense of meeting the competition of another carrier or more generally permitting a movement that would otherwise not take place or only in small volume.

There is thus a lack of precision in ratemaking. The rate structure as a whole, in relation to composition of traffic at a stage in time, may barely return variable and fixed costs and some surplus for development or it may generously do so. In inflationary periods, as since World War II, the situation has been and is likely to be a struggle to have revenues keep up to increasing costs of operation. Fast developing competitors affect blocks of traffic and particular rates to compound this chronic unsolution of railways' problems.

Similarly, any particular rate may just return variable costs and a bit more, or may readily cover total costs and then some. The freight classification is supposed to arrange articles of freight through this spectrum

from ample return to barely remunerative but, perhaps, large volume movements. But competition has made the intent of the classification in respect of freight revenue difficult to preserve.

Since 1897, more particularly in the second and third quarters of the twentieth century, railway rating and volume of business have been affected not only by the competition of other carriers but also by creeping inflation. The latter, making for the chronic cost-price squeeze confronting railways, was not characteristic of the gold standard[1] era, which terminated many years after the Crowsnest Pass Agreement was signed. During the generation following 1897, railways had problems of volume of business, but there was stability in the rate structure contributed to by a somewhat steady dollar and a quasi-monopoly situation.

In any case, any particular rate could be varied within a narrow range and fulfil the loose stipulations of good ratemaking. Thus, to reduce grain rates 3 cents per 100 pounds in two years was not necessarily to depress unduly those rates nor to distort the rate structure in any violent way.

Our review of the history of Crowsnest rates suggests that the applicable rates in the absence of that Agreement may not have been much different from 1902 to 1922. There is further room to speculate that voluntary or normally set rates on grain would have been similar until 1939 and therefore until 1945 or 1946, considering wartime controls were accepted on all sides. This view is contributed to by the existence of grain rates in the East very similar in ton-mile return to statutory rates until 1948. Even today "At and East" rates on grain are in some cases as low as will be elucidated later.

Railways' Submissions

The railways' representations before this Commission on costs of handling statutorily rated grain traffic and their contentions for a just and reasonable rate today of double the Crowsnest level, convey the impression that the carriers have lost large sums of money each year for many years under the statutory rates situation. The analysis they have submitted concerns mainly 1958 and for some purposes 1956 to 1958, and this analysis is being tested elsewhere in this volume.[2] Thus, evidence as to how much longer than three recent years such traffic has been a "losing" traffic will be indirect rather than derived from railway cost evidence already before the Commission.

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[1] Against its virtues the gold standard had even greater faults, including the possibility of deflation.

[2] See Hay, D. H., *The Problem of Grain Costing.*

Royal Commission on Transportation

The immediately preceding reference to the history of Crowsnest rates and of the general rate level and their divergence suggests that the traffic was remunerative until 1946 and that the shift to unremunerativeness came, if at all, during only the last ten years or so.

"Solely Related Lines"

Extended commentary on the details of the several cost submissions of the railways is not given here. The "solely related lines" concept of the cost submissions is examined, however.

This was introduced by the railways primarily as an element in their cost calculations; the accounts for certain lines could be taken directly into statutorily rated traffic costs without statistical inference if the lines could be shown to be solely related to the study traffic. The presentation infers that such lines would be abandoned if relief on statutory traffic should not be forthcoming and remaining lines would constitute a workable railway system.

The analysis here is not primarily on the justification or otherwise of the criterion for cost purposes but rather on the geography of the matter and to some degree the consequences of abandonment pursued according to "solely related lines".

TABLE II—LINES IN THE PRAIRIE PROVINCES "SOLELY RELATED" TO THE HANDLING OF GRAIN, AS DESIGNATED, 1959, BY CANADIAN PACIFIC RAILWAY AND CANADIAN NATIONAL RAILWAYS

	Alberta	*Saskatchewan*	*Manitoba*	*Total three provinces*
CANADIAN PACIFIC RAILWAY				
Track miles, Dec. 31, 1958	2,643[a]	4,311	1,761	8,715
"Solely Related Lines"	381	1,773	474	2,628
Remaining track miles	2,262	2,538	1,287	6,087
"Solely Related" as per cent of total	14.4	41.1	26.9	30.4
CANADIAN NATIONAL RAILWAYS				
Track miles, Dec. 31, 1958	2,141[a]	4,410	3,146	9,697
"Solely Related Lines"	335	1,873	748	2,956
Remaining track miles	1,806	2,537	2,398	6,741
"Solely Related" as per cent of total	15.6	42.5	23.8	30.4

[a] Less 13 miles in each case for 26 miles of joint track—to eliminate double count.

Canadian Pacific Railway's "solely related lines" are in the following localities:

MANITOBA: 474 of the total 1,761 miles in the Province (26.9 per cent) are involved. Most of these are in the southwest and centre west, also part of a line north of Winnipeg into the Interlake area and two stubs in the centre south.

Besides the main line, two secondary east-west through lines would stay, if "solely related lines" were abandoned. Lines straight north and south of Winnipeg (along the Red River and Lake Winnipeg) would stay.

SASKATCHEWAN: 1,773 of 4,311 miles in the Province (41.1 per cent) are involved. These include most stub lines and some tertiary main or through lines, especially in the south.

ALBERTA: 381 of 2,643 miles in the Province (14.4 per cent) are involved. These consist of stub lines and alternate through lines between small centres. The through line southeast from Lethbridge to southern Saskatchewan (as far as Shaunavon) is included in "solely related".

Canadian National Railways' "solely related lines" are in the following localities:

MANITOBA: 748 of 3,146 miles in the Province (23.8 per cent) are involved. If abandoned, all lines in the south of the Province would go except: (1) the line south from Winnipeg to the United States border and lines east of it, and (2) the main line west and the secondary main line to Brandon and Regina (part west of Portage la Prairie 52 miles to near Brandon would go). Of two very close main lines (1 or 2 miles apart) Winnipeg to Portage, the more northerly would go. In the west of the Province (1) a stub line west from Hallboro 74 miles to Beulah would go, as well as (2) a somewhat duplicate line north 38 miles from Neepawa, and (3) a tertiary line west from Neepawa through Russell and to and beyond Yorkton, Sask.

SASKATCHEWAN: 1,873 of 4,410 miles in the Province (42.5 per cent) are involved.

If "solely related" lines were abandoned, the main line system, including (1) Melville, Saskatoon, Biggar, (2) Humboldt, North Battleford, Lloydminster, (3) from Brandon to Regina, Saskatoon, Prince Albert, (4) Regina, Melville, Hudson Bay to The Pas, (5) Saskatoon, Kindersley to Calgary, would be preserved.

Most of the lines and stub lines on the fringe of the railway's southwestern system in the Province would go. Also most lines south of Prince Albert and west of that city and north of North Battleford would disappear.

ALBERTA: 335 of 2,141 miles in the Province (15.6 per cent are involved). These are lines southeast of Edmonton including the one through Stettler forking to Drumheller and Hanna. To these are added two stub lines on the east connecting into the Saskatchewan system.

Abandonment in Relation to "Solely Relatedness"

"Solely related lines" have been worked out by each railway without regard to the other, it would appear.

Thus, there is no effect such as "you abandon in this area and I will abandon in that, so as to leave *some* service for each locality". On the contrary, the basis of the designation of "solely related lines" is that the line pass through an area mainly committed to grain and that the line not be a through route for long-distance traffic of a general nature.

There is some cumulative effect, therefore, when a policy of abandonment of "solely related lines" is postulated independently by each railway. This may be generalized as follows:

Southwestern Manitoba would be hit, with only two main lines of each railway remaining.

The effect in Saskatchewan is somewhat of a general thinning out. The cumulative effect is seen in the northwest and southeast.

The indicated abandonment in Alberta is only about half the extent of that in Manitoba (in respect of proportion of mileage affected) and only a little more than a third of the proportion in Saskatchewan. The overlap is slight as between the railways, partly because the zoning of the Province into a "CP south" and a "CN north" is more pronounced here than in the other two Provinces.

We have no indication of "solely related lines" of Northern Alberta Railways. Thus such CP and CN lines are even less than 14 or 15 per cent of all lines in that Province.

If railway rationalization be proposed for the systems in the Prairie Provinces, it should be worked out on a basis much wider than merely the "solely related" formula of the Railway submissions.

"At and East" Rates

These eastern rates are suspected of being in some cases as low as or lower than statutory rates and to be carrying traffic steadily. They are export rates. Their history and status can be elucidated in summary.

R. A. C. Henry stated: "On Grain received ex Bay, Lake or River ports, (export) rates have been published, for many years, in relation to

those in effect from Buffalo to Philadelphia and New York, and have necessarily reflected changes made in those rates from time to time".[1]

Apparently the intent is that it is Montreal and St. Lawrence ports which are made equal to Philadelphia and New York. Mileages from Buffalo to Philadelphia and Buffalo to New York are about 400. Port Colborne is the lake port most obviously competitive with Buffalo, being only 20 miles across the corner of Lake Erie; it is 424 miles by the Canadian route from Montreal. Nearly all other Lake and Bay ports are greater distances from Montreal, up to 563 miles for Walkerville. Toronto, Kingston and Prescott are, of course, shorter distances, and shorter than Buffalo-New York.

Apparently Boston and Portland are rated higher—about 1 cent per 100 pounds—than New York. Our Maritime ports, Saint John and Halifax, have been equated with Boston and Portland, though distances are much greater.

Buffalo	— Boston	494 miles	(approx.)
Buffalo	— Portland	588 miles	"
Port Colborne	— Saint John	894 miles	"
Port Colborne	— Halifax	1,191 miles	"

The "At and East" rate for shipments to these four ports is 24.75 cents per 100 pounds for wheat and soya beans, slightly more for other grains up to 29.69 cents[2] for barley and buckwheat. On the basis of wheat, ton-mile revenues are as follows:

		cents
Buffalo	— Boston	1.01
Buffalo	— Portland	0.83
Port Colborne	— Saint John	0.56
Port Colborne	— Halifax	0.41
Sarnia	— Halifax (1,278 mi.)	0.39
Goderich	— Saint John (948 mi.)	0.52

Crowsnest rates give ton-mile revenue of as little as .42 cents from Calgary to Fort William; .45 cents from Maple Creek easterly and .52 cents from Maple Creek to Vancouver; and about .50 cents on the average. Thus most "At and East" rates to Halifax are lower than Crowsnest rates, and the longest "At and East" CP haul—Goderich to Saint John—is about the same level (comparable with Edmonton to Vancouver and Qu'Appelle to Fort William).

Ton-mile revenues for the United States routes that provide the competition are about 1 cent or a little more.

[1] Henry, R. A. C., and Associates, *Railway Freight Rates in Canada*, a study prepared for the Royal Commission on Dominion-Provincial Relations, Ottawa, 1939, p. 136.

[2] The rate for flaxseed, at 47.28 cents, provides ton-mile revenue of almost 1 cent, well above Crowsnest levels.

Royal Commission on Transportation

The CPR in Part I of its submission to the Turgeon Commission, 1949,[1] dealt with this subject in part. CPR examples of cars of wheat shipped from Port McNicoll to Montreal and to West Saint John, N.B., showed net earnings per car-mile of 34.4 cents to Montreal and 19.9 cents to West Saint John. Net earnings per ton-mile were respectively .66 cents and .38 cents. The comment was: "The net earnings per car mile from Port McNicoll to Montreal are approximately at the 1948 system average of all traffic. The net earnings per car mile from Port McNicoll to West Saint John are substantially less than the average, namely 19.9 cents as compared with the 1948 average of all traffic of 35.0 cents per car mile. In view of both the car mile and ton mile and ton mile earnings it would appear that the rate from Port McNicoll to Montreal returns at least out-of-pocket costs but the rate to West Saint John does not provide sufficient revenue to meet out-of-pocket costs and is carried at an operating loss".[2]

The table of the CP submission is herewith brought up to date in Table III for average loads, freight rates, elevation and switching charges.

TABLE III—WHEAT, IN BULK, FROM PORT MCNICOLL, ONT., TO MONTREAL, QUE., AND WEST SAINT JOHN, N.B., FOR EXPORT, RATES AND EARNINGS, 1960

	From Port McNicoll	
	To Montreal	*To West Saint John*
1. Miles	448	915
2. Average bushels per car	1,815	1,815
3. Average weight per car—lbs.	109,000	109,000
4. Gross rate per 100 lbs. (cents)	23.92[a]	24.75[a]
5. Earnings per car (dollars)	260.73	269.78
6. Less elevation charge at Port McNicoll—per car 1¼ cents/bu. (dollars)	22.70	22.70
7. Less elevation charge (¾ cents/bu.) at Montreal—dollars per car	13.60	—
8. Less switching at Montreal—dollars per car	9.00	—
9. Net earnings per car (dollars)	215.43	247.08
10. Net earnings per car-mile (cents)	48.00	27.00
11. Net earnings per ton-mile (cents)	.88	.495
12. Earnings per ton-mile based on line 5. above (cents)	1.07	.54

[a] "At and East" rate which includes cost of elevation at Port McNicoll and Montreal.

[1] Submission of the Canadian Pacific Railway Co. to the Royal Commission on Transportation, Part I, October 1949, p. 77-80.

[2] *Ibid.*

It may now be seen that the net earnings per car-mile to Montreal are 48 cents, or 7 cents less than the average for all traffic in the 1958 Waybill Analysis. The net earnings per ton-mile for termination at Montreal are .88 cents and at West Saint John .495 cents, a level slightly lower than most Crowsnest rates. It would appear that the CPR's recognition that these rates were insufficient to meet out-of-pocket costs, at least to West Saint John, would be even more emphatic today.

The volume of exports of wheat, oats, barley and rye from Saint John and Halifax has aggregated 26.5 million bushels on the average during the last ten years. A very high proportion of this may be assumed to have arrived at those ports on "At and East" rates.

Service Aspects

The railways have told the Commission that in 1958 some 8 per cent of the carloads of freight they originated was statutorily rated grain traffic; that such traffic comprised 10 to 15 per cent of their loaded car-miles, 19 to 26 per cent of their revenue ton-miles, and 6 to 9 per cent of their freight revenue.[1] All these percentages are more than doubled when statutory traffic is set against only that originating in Western Canada.

The railways state that the ratio of empty to loaded car-miles for statutory traffic in 1958 was between 57 per cent (CN) and 58 per cent (CP), and this compares with ratios of 52.5 per cent for the CN system and 51.5 per cent for the CP system.

This traffic is entirely loaded and unloaded by shippers and consignees, and the railway just moves the car along its track from loading point on industrial siding to similarly situated unloading point. However, such arrangements are characteristic of all carload traffic.

Western grain traffic was long considered highly seasonal, with the requirement of a big build-up by the railways of available cars in the West preparatory to each harvest season. Then the big rush and movement occurred until the close of the Lakehead harbours. The Wheat Board marketing system, and more particularly the congestion in all storages characteristic of many recent years, has resulted in the rail movement being much more even and presumably more normal and less costly for the carriers.

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[1] Ranges of percentages are from CN (lower) to CP (higher). See Joint Submission of CNR and CPR to the Royal Commission on Transportation—*Statutory and Related Rates on Grain and Grain Products in Western Canada,* October 12, 1959, p. 21.

The Bracken Report presents an indication of this in the following table:[1]

TABLE IV—AVERAGE MONTHLY MARKETINGS OF THE FIVE MAJOR GRAINS IN THE PRAIRIE PROVINCES, "CONGESTED" PERIOD, CROP YEARS 1952-53 TO 1956-57 AND "FREE FLOW" PERIOD, 1945-46 TO 1949-50

	Crop Years			
	Average monthly marketings 1945-46 to 1949-50		*Average monthly marketings 1952-53 to 1956-57*	
	(millions of bushels)			
August	32.1		29.7	
September	126.6	58.2 per cent of total	57.5	29.8 per cent of total
October	94.4		71.5	
November	45.2		57.3	
December	27.2		58.1	
January	20.5		39.0	
February	9.7		28.5	
March	15.0		29.6	
April	11.3		29.9	
May	20.1		43.2	
June	27.3		68.8	28.9 per cent of total
July	27.1		112.1[a]	

[a] July average is probably inflated above the movement in that month, and part of this high figure more properly appertains to August. There was some leniency at the end of years when the initial price was due to fall (4 of the 5 years).
Report on *The Inquiry into the Distribution of Railway Box Cars*, by John Bracken, p. 99.

It may be noted that in the "free flow" period 58.2 per cent of marketings took place in the September-November quarter, and all other months had below average volumes; the low month, February, had marketings only 25.5 per cent of the average monthly volume of 38.0 million bushels; the high month September showed marketings 334 per cent of the average.

In the "congested" period, however, as many months were above average as below average, the low month, February, was 54.7 per cent of the average (52.1 million bushels); the high month, July, was 215 per cent of the average. The "congested" period averaged an annual volume one-third larger than the "free flow" period, but the range of monthly volumes of the former was only 83.6 million bushels as against 116.9 million bushels in the "free flow" period.

Rail receipts of grain at export position terminals are a more direct indication of the seasonality of the railways' task in moving western grain, most of which is at statutory rates.

[1] Table D-2-d, p. 99, Report on *The Inquiry into the Distribution of Railway Box Cars*, by John Bracken. Data in this table was provided by The Board of Grain Commissioners, except for the insert percentage marketed in the months noted.

The Bracken Commission of 1958 inquired into "the distribution of railway box cars for the movement of grain amongst country elevators at individual shipping points in Western Canada". It indicated that its problem arose from the very heavy crops since 1950 which, together with the Wheat Board's inability to sell all the wheat, oats and barley that were annually produced for interprovincial and export trade, led to the large pile-up of grain of recent years.[1]

In respect of the problem of congestion at terminals, the Commission found as follows:

> "A. That the railways have the task of providing the box cars necessary to permit the Wheat Board, as owner of the grain, to carry out its shipping programme from country points as outlined from time to time.
>
> "B. That they are not legally required to deliver box cars to shipping points in any particular order, or in any specific number at any particular time; that the law against discrimination and the desire to give good service and earn the goodwill of the public are the final determiners of railway practice in this connection.
>
> "C. That the railways are guided by (but not ordered by) the Wheat Board in the placement of cars at the different shipping points, by weekly statements issued by the Board showing the quota situation at each shipping point and the number of cars required at each to complete deliveries under the different quotas in effect.
>
> "D. That the railways co-operate to the utmost extent in meeting the Wheat Board's wishes but are their own final arbiters in regard to order and time of placing cars at the different shipping points.
>
> "E. That they do not have the legal responsibility for determining the distribution of box cars amongst competing elevators at a shipping point.
>
> "F. That they manifest concern lest any new regulations interfere with their efficiency and thereby increase their costs of transportation.
>
> "G. That they protest strongly against the undue delays that occur from time to time in unloading cars after arrival at the terminal points.

"It is our view that the congestion of unloaded grain cars at certain terminals from time to time arises from lack of co-ordination amongst the elevator companies, the railways, the terminals and the Wheat Board itself; that each of these interests in the exercise of its legal rights contributes unwittingly to this condition; that legal regulation might improve the situation, but that voluntary co-operation within the present legal structure would seem to offer more hope of rational procedure."[2]

The Commission recommended "that co-ordination among the elevator companies, the railways and the terminals be invited by the Wheat Board with a view to achieving by co-operation what has failed to be accom-

[1] *Op. cit.*, p. 57.
[2] *Op. cit.*, p. 61-62.

plished in the exercise of their legal rights by their individual efforts, namely, the mitigation of the wasteful and unnecessary pile-up of unloaded cars from time to time at the terminals or elsewhere."[1]

The Commission further observed on this point:

"A. That the Wheat Board has power to see that no more cars are loaded than can be unloaded without undue delay;

"B. That both the railways and the Wheat Board have the power to divert cars to different terminals;

"C. That the railways have the power in their own hands of placing no more cars for loading than they can see reasonable prospects of unloading."[2]

Comparative Grain Handling Methods - United States

The grain crop of the United States is larger and more varied than that of Canada and the proportion of it which is disposed of domestically is much larger. Getting it to export position is not the crucial task that it is in Canada. There are 175 million humans in the United States and they require much of the country's grain directly as flour, breakfast foods, beverages, etc., and indirectly as animal feeds. The average total haul is probably shorter than in Canada.

Along with this more heterogeneous pattern of grain production in the United States go higher railway rates for its movement, at least in relation to Crowsnest rates. This was the case 20 years ago when Crowsnest rates were probably not a burden and the more so now.

The basic United States grain rate structure has exemplified such fundamentals as:

1. rate equalization over various routings to broad market areas;
2. application of a single rate to all grains and to products;
3. such rate covering various privileges such as circuity of routing, diversion, stopping, storage, and mixing in transit.[3]

The basic United States grain rate structure can be illustrated by movement eastward from Great Plains states. Recognized terminal markets include Duluth, Minneapolis, Sioux City, Omaha and Kansas City. Somewhat farther east are other terminal cities such as Chicago, Peoria, St. Louis, Cincinnati, Toledo and others. Buffalo is a lake unloading point, and export ports are Baltimore, Philadelphia, New York and Boston.

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[1] *Ibid.*, p. 62.
[2] *Ibid.*, p. 62.
[3] These principles have, for the most part, their counterpart in Canada.

Initial rail shipment is at *local* rates, returning between 1.6 cents per ton-mile for over 1,000 miles to 2.25 cents for 400 or so miles. Further movement from terminals is at *proportional* rates about 70 per cent of the level of local rates, and intended to make a combination charge about equal to the appropriate through rate from loading point through and beyond initial terminal point to lake or ocean port or consumption point. The effect is much like in-transit privileges calling for payment of balance of through rate from transit point. Proportionals are the average of transit balances, and they may be assessed by any railroad, not just the inbound carrier.

From lake and other terminals there are *ex-lake* rates, both domestic and export, to Atlantic Coast ports and the latter are only slightly more than half the former. Similarly from terminals other than lake ports there are *proportional* domestic and export rates, in about the same relationship to each other (e.g., 100:55) as ex-lake rates. Such export rates return about 1.0 cent per ton-mile to carriers and domestic rates in the same territory nearly twice as much.

The competition of other carriers—trucks, barges and lake vessels—has begun to affect United States grain rates here and there in the basic scheme just sketched. "Here and there" means that competitive rates are instituted very selectively by railroads. This, indeed, is the nature of that category of railway rates, that they meet competition that is real or imminent.

Trucks have moved strongly into the initial movement from country elevator to terminal or distant feeding area. This trend is still under way. Of the principal reasons for this, among the stated advantages of trucks, *lower rates* are the most important. Other factors are easier L.C.L. movement, speed, flexibility and less damage. Truck movement involves passing up transit privileges, the importance of which may be small in particular situations.

Haldeman states:[1] "There is some room for rail rate reductions on grain before they reach fully distributed costs, and a considerable area for reductions before rail rates as a whole decline to out-of-pocket costs. . . . Barge rates and lake vessel rates on grain (are) well above computed costs. Truck rates usually cover out-of-pocket costs and a little more, since so much trucked grain moves as back-haul. . .

"Barge and lake vessels move grain for three to five mills per short ton-mile . . . They move grain beyond terminal or subterminal markets . . . For the rail movement of grain from Minot, N.D., to Baltimore, ton-mile earnings range from 12.5 mills to 22.5 mills per short ton-mile . . . Truck

[1] *Carrier Competition for Grain Traffic*, a paper presented at the 1960 Annual Meeting, National Association of Chief Grain Inspectors, Toledo, Ohio, May 11, 1960, by Robert C. Haldeman, Transportation and Facilities Research Division, Agricultural Marketing Service, U.S. Department of Agriculture.

charges vary but often are around 17 mills per ton-mile. From Baltimore to Europe, ocean vessel charges are well under one mill per ton-mile . . ."

Haldeman summarizes competitive rail rate reductions in the United States for 1958 and following years:

1. Eastern line export grain reductions from most grain origins north of the Ohio River and east of the Mississippi River to North Atlantic ports, all in reaction to Seaway competition.
2. Proportional export rates from Missouri River markets—Kansas City, Omaha, Sioux City—to ports on Lakes Superior and Michigan, reduced five to six cents.
3. Earlier, coarse grain rates, domestic and export, had been reduced to lake ports from selected areas of Iowa, Minnesota and South Dakota.
4. Local rates within 100 miles of Toledo reduced to meet truck competition to that terminal.
5. Local rates from specified markets in northern Minnesota, northeastern South Dakota and eastern North Dakota to Minneapolis and Duluth were reduced from 8.5 cents to 13.5 cents per 100 pounds, a substantial proportion of the total rate.

In most of these cases lessened transit privileges, restricted routing and higher minimum carload weights accompanied the reductions.

Parallel Canadian developments include numerous agreed charges for movement of grain from Bay ports to interior Ontario feed mill points and Ontario grain within the Province. This suggests trucks are in this movement and trucks are also moving grain grown in western Ontario to points east and north. The Canadian Waybill Analysis, 1958, shows eastern region grain movements average between 1.6 cents (wheat) and 3.9 cents (rye) per ton-mile revenue to carriers. This would include a mixture of local, ex-lake and export rates. The railway agreed charges related to competition with trucks for 50 to 150 miles from Bay ports average 3 cents per ton-mile.

The higher rail freight rates on grain in the Western United States in contrast to the Crowsnest scale in Western Canada should be considered against the higher prices available to grain growers in the United States.[1] These United States prices are related to the parity policy in that country and they involve subsidies from the Federal Treasury in most recent years. Prices of western Canadian grain are unsubsidized except as one might reason that some degree of subsidy is available from the Crowsnest scheme of rates. The recognition until now of grain growers in the national policy of the two countries has been different but positive in each case.

[1] Mid-July 1960 quotations, No. 1 Northern and equivalent $2.16 in Minneapolis and $1.67 in Fort William, Canadian currency in both cases.

Burden of Statutory Rates

The railway estimate of the burden of statutory rates may be noted in their detailed submissions on the subject. They have revenues of .48 to .50 cents per ton-mile and ask that they might get as much again. This is backed by an indication of variable costs averaging about .75 cents and total costs averaging 1.0 cent or a little more.

The burden, on this evidence, is at least .25 cents per ton-mile and perhaps more (on total cost considerations) up to somewhat more than .50 cents. Per annum, it is the equal of between half and all of the indicated deficit of some $70 million for the two railways. In the preliminary organizational meeting of the Commission in September, Mr. Sinclair for Canadian Pacific said, at page 101, that the statutory rate inequity "means something in the region of $35 million to $40 million in revenues as a minimum, and possibly more under today's conditions, year after year".

Such a conclusion assumes that the volume of grain offered for shipment would be insensitive to changes in the level of freight rates. So stated, this is questioned here. But perhaps it assumes more especially that relief to the railways could and would be given as a subsidy from the Public Treasury as proposed by the railways, and that therefore grain shippers' costs per bushel, per 100 pounds or per car, would not be increased and their propensity to ship grain would be unchanged as far as freight cost might influence it.

In any case, it is desirable to consider at least two points:

1. Would the volume of western grain traffic be stable in the face of higher (double or more) *public* rates if adjustment were made directly without subsidy?
2. Have Crowsnest and statutory rates always been a burden throughout 61 years, or need one consider only quite recent years to find when any burden may have developed?

To consider the first proposition—elasticity of demand for *rail* transport for western grain—we have cited a United States reference that truck rates for grain there "usually cover out-of-pocket costs and little more", and "truck charges vary but often are around 17 mills per ton-mile".[1] A direct application of this indicates that a rail cost of 1.0 cent per ton-mile would be lower than likely truck rates (based on cost) by .7 cents per ton-mile, and that traffic would therefore not be lost to competitors by a doubling of Crowsnest grain rates. There is the necessary caution that "so much trucked grain moves as backhaul", which might indicate occasional

[1] Haldeman, *op. cit.*

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lower than out-of-pocket charges by trucks for carrying grain, as backhaul cannot usually be avoided.

Would such higher rail rates affect the volume of production of each grain on the Prairies? If, as it is widely accepted, the incidence of freight rates is on the grain shipper, i.e., the farmer, and if such producers react rationally to costs, then the total effect of higher rates should be reduced production and therefore reduced volume of shipping. If this prediction is sound, then the railway cost-price position for western grain handling should be improved per unit as they anticipate, but the aggregate extra gross revenue they would derive in a year would be less than the doubling of current statutory rate revenue apparently expected by them. It might take more than one year for such a result and there might be improvements (or deteriorations) in world grain markets to obscure the effect.

Turning to the second question, when, if there is a burden, did this burden develop? If the railways have nowhere stated firmly that western grain rates were a burden for them from 1899, there are places where such a suggestion is presented. It is a contention which on indirect evidence, at least, is invalid. We have already indicated that a 3 cents reduction in 1898 to 1899 was probably done within the limits of good conventional ratemaking, as facilitating the movement of traffic is one of the objectives. The further reduction for the Manitoba agreement during the period before World War I must also be approved in conventional terms, which allow competition to be met as long as rates remain compensatory.

After 1922, Crowsnest rates were matched by several significant eastern grain rates *which moved traffic,* were voluntarily published by the carriers and should have been and probably were compensatory.[1]

During this same period we have the evidence of line extension in Western Canada, largely in territories that provided grain traffic or nothing. First main track in the three Prairie Provinces aggregated as follows:

		Gain
1906	5,966 miles	
1909	7,157	1,191 miles (4 yrs.)
1914	11,709	4,552
1919	14,688	2,979
1924	16,280	1,592
1929	17,571	1,291
1934	18,523	952
1939	19,389	866
1944	19,300	—89
1958	19,401	101

[1] Compensatory is here defined as returning direct costs and at least an appreciable proportion of overhead costs to the carrier.

By the beginning of World War II railway mileage in the agricultural part of the Prairies was stabilized. But almost annually until then lines were extended. This was a voluntary process on the part of the railways. They were looking for grain and associated traffic and building toward farms more distant and toward newly settled land. They were competitive with each other but they felt they could make money handling grain and associated commodities and they were in all likelihood correct.

There are those, however, who regard the current railway pattern on the Prairies as redundant to some degree and even some who think that the feverish building in the 1920's and 1930's led immediately to redundancy.

Any current situation of redundant lines does not, however, mean that the pattern was redundant in the twenties and thirties. New factors since then, besides increased costs of railway operation alongside fixed grain rates, include improved roads, improved and more numerous trucks, improved grain growing methods, changed grain markets and grain prices. Any study of rationalization of railway plant and of grain handling plant and methods should begin now with due consideration of likely future needs. There are several parties to the problem of rationalization and these include, besides the railways, communities along the line, elevator companies, producer controlled and private, the Wheat Board, provincial authorities responsible for roads, farmers and possibly truckers.

Statutory Rates in the Prairie Economy

Historical — The Grain Production Industry

The growth of the grain production industry over a period of many years can be illustrated by data for trends in wheat acreage, production and value.

Acreage has increased to more than three times the amount early in the century. The greatest acreage was planted in the two years 1949 and 1950—more than 26 million in each case. Since then there has been a decline to less than 21 million in 1957 and 1958, with a small increase in 1959. Crops have scarcely declined, however, as yields per acre have increased. The first half of the 1950's had crops of one-half billion bushels or more in all but one year and since then one-third billion bushels have been more typical, a decline in volume attributable to a slight decline in acreage and a larger decline in yield.

The acreage of today is comparable with that of the 1920's and of the period of World War II. In other periods, such as the 1930's and the first

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decade after the war, acreage was higher. However, the 1930's were characterized by drought and crops were smaller than those on less acreage currently.

TABLE V—WHEAT AVERAGE ACREAGE, PRODUCTION, FARM PRICE AND VALUE, PRAIRIE PROVINCES, 1908-61

	Seeded acreage	*Average yield*	*Production*	*Average farm price*	*Total farm value*
	'000,000 ac.	bu.	'000,000 bu.	$/bu.	$'000,000
1908–10 (3)	6.8	17.1	116	0.80	93
1911–15	10.6	21.2	225	0.75	169
1916–20	15.7	15.5	244	1.48	361
1921–25	21.0	16.3	342	0.91	313
1926–30	22.9	18.0	411	0.85	351
1931–35	24.7	12.3	303	0.46	140
1936–40	25.6	13.3	341	0.64	220
1941–45	20.4	17.4	356	1.04	370
1946–50	24.5	15.1	370	1.60	590
1951–55	24.4	21.6	523	1.42	747
1956	22.1	25.0	551	1.24	682
1957	20.4	17.8	364	1.28	465
1958	20.2	17.1	346	1.32	456
1959	22.6	17.7	399	1.19	474
1960	22.6	20.8	470	1.14	537
1961	23.2	10.4	240		

The Income Position of the Prairie Farmer

The farm income situation as it developed during the last 35 years may be shown for the three Prairie Provinces:

In the tables below farm income from those grains qualified for statutory grain rates is shown by annual averages for five-year periods since 1925. All other farm income is similarly shown and the proportion of each to total farm income is indicated. This is almost "crops versus livestock" income, but such minor Prairie crops as potatoes, vegetables, sugar-beets, grass seed, rapeseed, etc., are grouped with livestock and products.

It may be observed that at the beginning of the period three-quarters of farm income in the three provinces was from grains—wheat accounts for more than half of grain income throughout the period. During 20 years this proportion declined to two-thirds, and then just over one-half, as the effects of drought and wartime production programmes were evident. Post-war conditions led to a resurgence of the relative importance of the grains up to 70 per cent for a year or so, but they declined once again to only

TABLE VI—AVERAGE CASH INCOME FROM THE SALE OF FARM PRODUCTS, PRAIRIE PROVINCES, 1926-60

	Income from five principal grains[a]	*Income from other crops, livestock and products*	*Total cash income from sales*
	$'000,000	$'000,000	$'000,000
1926–30	379	111	490
1931–35	132	71	203
1936–40	188	114	302
1941–45	374	315	689
1946–50	631	416	1,047
1951–55	794	470	1,264
1956–59 (4)	665	573	1,238
1956	753	489	1,242
1957	638	537	1,175
1958	626	515	1,141
1959	652	644	1,296
1960	628	693	1,321

PERCENTAGE OF TOTAL PRAIRIE CASH FARM INCOME

	Per cent	*Per cent*	*Per cent*
1926–30	77	23	100
1931–35	65	35	100
1936–40	62	38	100
1941–45	54	46	100
1946–50	60	40	100
1951–55	63	37	100
1956–59	54	46	100
1956	61	39	100
1957	54	46	100
1958	55	45	100
1959	50	50	100
1960	48	52	100

[a] Wheat, oats, barley, rye and flax.

slightly more than one-half in the last two or three years. This shift has been contributed to by increases in livestock income and decreases in grain income. The reasons have included (1) grain marketing quotas; (2) declining world grain prices; (3) increasing population and demand for livestock products in Canada.

One is tempted to predict that the relative de-emphasis of grain in the western provinces' agriculture will continue or intensify, for reasons similar to those cited for the trend to date. However, crop conditions and market conditions influencing price could make a sudden alteration or delay in the trend for any one year in the near future.

On the market side, the export of wheat has long dominated disposal of the crop; some 60 to 65 per cent of the annual disposition is in exports and has been steadily so through the 1950's.

TABLE VII—CANADIAN WHEAT DISPOSITION, 1936–61

	Total	*Domestic*	*Export*	*Export as per cent of total*
	(millions of bushels)			
1936–40	294	116	178	61
1941–45	458	165	293	64
1946–50	370	143	227	61
1951–55	470	158	312	66
1956–57	419	155	264	63
1957–58	479	159	320	67
1958–59	462	168	294	64
1959–60	425	148	277	65
1960–61	504	150	354	70

What are prospects in wheat marketing? A recent study[1] indicates they will be as follows:

"(a) In the short run assuming competition in reducing surplus stocks:

Exports ..... 220-250 million bushels.
Domestic requirement .... 150-165 million bushels.
Total requirement ..... 370-415 million bushels.

(b) Long-term demand (1980):

Exports ..... 255-300 million bushels.
Domestic requirement .... 180 million bushels.
Total requirement ..... 435-480 million bushels."

It estimates 20 to 25 million acres as being required for such crops.

Recent production (1957, 1958 and 1959) has been below the estimates, so that, on the wheat indicator, absolute decline in Prairie grain

[1] *Progress and Prospects of Canadian Agriculture*, by W. M. Drummond and W. MacKenzie, a study for the Royal Commission on Canada's Economic Prospects, 1957, p. 53.

production may not be in prospect. The likelihood of increase in livestock production and that of non-grain crops, responding to growing Canadian population, is very real, however.

Thus grain production for cash sale has become and is likely further to become less important in the agricultural sector of the Prairie economy. At the same time, the agricultural sector itself is becoming a smaller proportion of all economic activity in the three provinces. On the gauge of net value of production of the principal industries, the trend over 35 years has been as follows:

TABLE VIII—AVERAGE NET VALUE OF PRODUCTION, AGRICULTURE AND TOTAL, PRAIRIE PROVINCES, 1926–59

	Agriculture	*Total (with 7 other industries)*[a]	*Agriculture as per cent of total*
	$'000,000	$'000,000	Per cent
1926–30	549	787	70
1931–35	216	371	58
1936–40	350	586	60
1941–45	648	1,014	64
1946–50	896	1,549	58
1951–55	1,132	2,512	45
1956	1,188	3,229	37
1957	742	2,877	26
1958	787	3,065	26
1959	891	3,174	28

[a] Also forestry, fisheries, trapping, mining, electric power (all primary); and manufacturing and construction (secondary).

In the early part of the period studied, agriculture was the main industry on the Prairies—to the extent of over 70 per cent of the total. The 1930's ranged in the 50 and 60 per cent range (on reduced or deflated values). The war period saw a resurgence of agricultural values and their proportion in total activity. The steady decline in agriculture's share since 1954, indicated by five-year averages, actually commenced after 1948, when the high of recent years, 61 per cent, was recorded. Alberta oil was discovered then, and industrial developments flowing from that had a large share in the increase of segments other than agriculture since then.

The drop below 50 per cent for the agricultural sector occurred in the late 1930's for Manitoba, in 1950 for Alberta and in 1957 for Saskatchewan. The agricultural weight in Manitoba and Alberta now appears to be less than 25 per cent.

The same indication of declining relative importance of agriculture in the Prairie economy can be given by examination of employment (including self-employment) in agriculture and the economy at large (Table IX). In the short period during which the labour force has been systematically surveyed, since 1945, persons with jobs in agriculture have declined from a proportion of almost half in the total of persons with jobs to only 29 per cent in 1958. This has been a steady trend. It is notable that absolute numbers of persons with jobs in agriculture have likewise declined, as mechanization and consolidation of farms have proceeded. The trend seems to be still under way.

TABLE IX—PERSONS WITH JOBS IN AGRICULTURE AND TOTAL PERSONS WITH JOBS, PRAIRIE PROVINCES, 1946–60

	Agriculture	*Total*	*Agriculture as per cent of total*
1946–50	439	944	46
1951–55	358	931	38
1956	323	975	33
1957	305	988	31
1958	296	1,004	29
1959	284	1,036	27
1960	279	1,053	26

SOURCE: *The Labour Force, November 1945—July 1958*, Reference Paper No. 58, Dominion Bureau of Statistics, p. 156–159.

It follows from examining Tables VIII and IX together that per capita income of persons with jobs in agriculture is going up on the average. Whether or not this is sufficiently rapid to offset a rising price level would require more intricate analysis than has been made here. Crops and prices being what they are, it would vary from year to year.

Grain Growers' Divided Interest

The stake of western grain producers in statutory rates is offset by certain disadvantages. These disadvantages do not necessarily offset the advantage, generally taken to be substantial. And the disadvantages only apply if, as appears to be so, statutory rates are too low in relation to railway costs.

The disadvantages can be enumerated as follows:

1. Any net gain to the western farmer from his grain being shipped at less than remunerative rates is reduced by his inevitable sharing of such benefit with grain buyers, many of whom are outside Canada. He is not benefiting to the extent that he is generally considered to be.
2. Western farmers pay freight on materials they buy for business and domestic purposes and these are higher than they would be if grain rates were not statutory and were treated as other rail freight rates, i.e., held to fair and reasonable levels by the carriers regulated by the Board of Transport Commissioners. Reference to Exhibit 52[1] (estimated result for CPR of a general freight rate increase of 19 per cent, compiled in 1958) suggests that, if traffic now moving at statutory rates obtained double statutory revenue, rates on coal and coke and on non-competitive class and commodity traffic could be reduced 31 per cent and still return the same aggregate freight revenue to the railway.[2] Using the 1958 Waybill Analysis, a doubling of statutory revenue would permit a 21 per cent lowering of class and non-competitive commodity rates and still return the same total freight revenue to the railways covered in that Analysis.[3] Both these approaches

[1] Appendix B.

[2] See following tabulation:

	Estimated revenue	*Estimated increase*	*Previous revenue*
	$ million	$ million	$ million
3. Coal and coke	19.1	1.4	17.7
6. All other	152.6	23.2	129.4
Total			147.1
1. Statutory (doubling)			44.7
Balance			102.4
$102.4 million is 69 per cent of 147.1 million			

[3] 1958 revenue from class rates ..... $ 580 thousand
1958 revenue from non-competitive commodity rates $2,132

Total $2,712
Statutory (doubling) 567

Balance $2,145

$2,145,000 is 79 per cent of $2,712,000

(Waybill Analysis and Exhibit 52) disregard competitive rates and agreed charges on the assumption that their level is compelled by circumstances in the transportation industry rather than by any statutory rates. This is probably an oversimplification inasmuch as the growth of the competitive segment of railway traffic has been affected by the "normal" rate level, which has probably been affected by statutory rates, and that the competitive sector would therefore have been different, i.e., smaller, in the absence of statutory rates.

3. Railway service may leave something to be desired. If the carriers may anticipate a fair return from other traffic and only a loss from Crowsnest traffic, their effort may well go into serving the other traffic. There are statutory requirements that grain traffic be well handled. Any suggestion that it is not cannot be readily substantiated. It is a subtle thing at best. The Bracken Inquiry into the Distribution of Box Cars (1958) was appointed in part to investigate this matter, but it found the problems of grain shipping just complicated enough, and the number of vital parties in the process just numerous enough that it did not assign blame to only one agency or even primarily to one.

4. If any subsidy from the Federal Treasury were to be instituted related to statutory rates, western farmers as taxpayers would have a fourth disadvantage.

Incidence of Freight Rates on Grain

A review of the theory and measurements of demand elasticity, supply elasticity and incidence (of a tax or a freight rate increase or a subsidy, etc.) and their applicability to marketing western Canadian wheat at current or increased rail freight rates, leads to the conclusion that the burden of increased rail freight rates on grain would not be wholly borne by grain producers if demand and supply elasticities at the farm are lower than unity, as is found to be the case by every competent investigator. This means that overseas customers, for example, will partly bear this burden, as will also suppliers of some factors of production.

A further conclusion, harmonious with the above and just as inevitable if the elasticities are low, is that any benefit of current Crowsnest rates—which benefit would derive from the rates being, as claimed, below the cost of performing the service—must now be shared by western Canadian producers with their customers (overseas and domestic) and perhaps with their

suppliers. These relationships and incidences must be so if the elasticities of demand and supply have been correctly gauged as "low".[1]

St. Lawrence Seaway Savings

Early in 1959 when it was known that the 27-foot St. Lawrence Seaway would replace the old 14-foot system, the Canadian Wheat Board increased its asking prices for wheat in store Fort William-Port Arthur by 5⅜ cents per bushel. In its 1958-59 report[2] the Board stated that it "felt that the saving in forwarding costs for wheat resulting from the Seaway should accrue to the advantage of the western wheat producer . . . The increase in Board asking prices for wheat in store the Lakehead, being in effect a saving in forwarding costs within Canada, did not affect Board asking prices for wheat, c.i.f. St. Lawrence ports, and as a result did not increase the cost of wheat moving via the Seaway to the overseas buyer . . ."

The obvious comment on this action, using the same concepts and logic as in assessing impact of possibly increased rail freight rates, is that, with demand elasticity for wheat being low even at Lakehead and seaboard, the policy was correct; less proceeds for a lower priced offer would have accrued than by holding the seaboard price steady.

Shipping Costs, Rigid and Flexible

The accompanying Table X shows Crowsnest freight charges along with other transportation costs of moving wheat from the Canadian Prairies to overseas markets for a period of 27 years. The tendency of most of the items to increase over time is apparent, as is the fixed level of the rail freight cost, Prairie point to Fort William. Relative to 1933-38 and 1946-50 the 1959 charges are up by the following percentages:

	1933–38 base	*1946–50 base*
	(per cent)	(per cent)
Interior handling	56	50
Lakehead fobbing	75	31
Lake transportation freight	180	19
Ocean transportation	64	(−45)
Estimated total forwarding costs	50	(−16)
Crowsnest freight	nil	nil
Lakehead price	79	(− 3)

[1] Conventionally, elasticities below 1.0 are "low".
[2] Page 9.

TABLE X—ESTIMATED AVERAGE COSTS OF MOVING CANADIAN NO. 1 NORTHERN WHEAT FROM A MID-PRAIRIE POINT[a] TO THE UNITED KINGDOM, SEASON OF NAVIGATION, 1933–60

	1933–38	*1939–45*	*1946–50*	*1951*	*1952*	*1953*	*1954*	*1955*	*1956*	*1957*	*1958*	*1959*	*1960*
						(cents per bushel)							
Interior handling costs..... (Country elevation, inward weighing and registration, and selling charges)	2.887	3.000	3.500	4.500	4.500	4.500	4.500	4.500	4.500	4.500	4.500	4.500	4.500
Rail freight to Lakehead.....	13.800	13.800	13.800	13.800	13.800	13.800	13.800	13.800	13.800	13.800	13.800	13.800	13.800
Lakehead fobbing..... (Elevation, outward inspection and weighing, warehouse receipt cancellation, and lake shippers' charges)	1.484	1.484	1.974	2.469	2.469	2.469	2.469	2.469	2.469	2.469	2.594	2.594	2.594
Lake transportation charges													
Freight.....	4.734	7.304	11.170	16.000	16.000	16.000	14.403	13.500	16.000	16.000	16.000	13.288	13.000
Other (Brokerage, insurance and bank charges).....	.532	.624	.849	.861	.814	.776	.739	.735	.646	.636	.624	.645	.650
Seaboard fobbing..... (Wharfage, superintendence, broker, agent's commission)	.720	.720	.720	.738	.738	.988	.988	.988	.988	.989	.989	.989	1.016
Ocean transportation charges..... (Mainly freight, but also insurance, bank and interest charges)	9.444	32.308	28.276	43.965	22.011	19.947	21.573	29.513	34.388	22.296	16.046	16.076	17.049
Estimated average forwarding costs....	33.601	59.240	60.289	82.333	60.332	58.480	58.472	65.505	72.791	60.690	54.553	51.892	52.609
Price in store Fort William.....	90.458	90.268	166.575	192.250	188.250	185.750	186.250	173.000	174.000	168.125	162.375	166.250	165.875

[a] Scott, Sask.

SOURCE: Based on Board of Grain Commissioners for Canada, *Canadian Grain Exports* (Annuals), 1954-55 to 1960-61.

Thus lake transportation is the item which has increased most over time and ocean transportation is the most variable and, for the most part, the largest element (Table X). Lake rates are regulated as to maxima by the Board of Grain Commissioners. Ocean freight is not regulated by any government, nor even by a steamship conference, because tramp vessels, for which there is a market from day to day, do most of the carrying. Tramps are characteristically very scarce or very plentiful. It will be noted that World War II, Korean War and Suez periods saw high ocean rates, about double the levels in non-emergency periods.

Whether one should ask why rail rates should be so immutable when water rates are both free and variable, or suggest that, with water rates such an unstable element in marketing costs, it is just as well that a more stable—statutorily fixed—element is available as an offset, depends upon point of view. There can be stability without fixity.

Furthermore, despite the fixity of Crowsnest rates, total shipping costs of wheat from a mid-Prairie station to Liverpool since World War II show a range of variation between 50½ cents and 82½ cents per bushel, the higher figure being 63 per cent greater than the lower. And although the high freight cost is associated in the same year with a high price at Fort William, it must be assumed that some of the burden of extra freight costs falls on producers, to provide less proceeds per bushel at the farm than would have been available with none or less freight increase. Against this, however, would be the probability that the same emergency situation making for inflation buoyed both the price and the shipping cost.

Public Policy Issues

The statutory grain rates, in their original form of contract rates to which the Dominion Government was party, have always been and remain matters of public policy. They have frequently been termed a charter of Prairie agriculture. The rates started in association with further encouragement to the Canadian Pacific Railway and provisions to ensure benefits from it to users of railway services. The vision was one of a western economy based on agriculture of a kind surrounding production of the export product wheat. This particular export trade was deemed to be and long remained a prominent element in the whole national economy.

It promises to continue important in trade. However, looking ahead through several years, grain production and sale may take a less prominent place proportionally in the West and more generally. Many farmers will be less committed in the future than in the past to the "wheat economy" only.

We have examined the likely effect of higher (say doubled) western grain freight rates. Whilst an increase would be felt in the ordinary course

of events by the grain grower, nevertheless his customer and perhaps some of his suppliers would perforce share the burden to some extent.

From one point of view the burden of statutory rates as they are is less than ever; that is in terms of constant dollars, be they those of 1899, 1925, 1948 or other years. But constant dollars are gauged by the general price level, and the wheat grower is primarily sensitive to the wheat dollar, that is to the price per bushel he can obtain for wheat. This has, unfortunately, been declining since about 1950, with however some tendency to a new lower stability. At the same time many costs (other than western rail freight rates) have increased on a per unit basis through the ten years or more under consideration. The main offset to this, and indeed inspired by it, has been more and more mechanization of farming procedures to achieve lower unit costs. It has presumably been a somewhat losing battle in the balance.

The railways have proposed a subsidization—of the grain grower—to the extent of the statutory rate freight bill to give the carriers a doubling of the revenue for carrying the traffic, and a return to them of their bare costs. They would get one cent per ton-mile against only one half cent available from existing rates. When queried as to method of payment of this subsidy, the railways suggest that it would be impractical to pay it other than through the carriers; they may be willing to take their chances of retaining the traffic if the subsidy went direct to shippers and rates were raised. At one cent per ton-mile, it is not clear that they need be anxious, but at 1.5 or 1.75 cents truckers might offer their services.

The railways intimate that other freight-payers would benefit from their augmented revenue situation following introduction of a subsidy, and that such freight-payers are paying unduly now to offset statutory rate losses.

It might be appropriate to recognize:

1. that returns on statutory traffic are indeed grossly (if not uniquely) low,
2. that grain shippers have in effect a bargain in western rail freight charges greater than in earlier years when Crowsnest rates were rather "normal" and
3. that the "wheat economy" does not and will not typify the Prairie Provinces as it did for two generations, because the production of special crops and livestock is increasing in the region, as is the output of industries other than agriculture.

The reasons for Crowsnest rates and in due course statutory rates are different or at least of a different degree of intensity in 1960 than in 1897 and 1925. The provisions of those eras are up for re-examination, and the presumption and indication are that the policy should be altered, in the direction of less rigidity and less disregard for changing values and diminishing purchasing power of the dollar.

CANADIAN PACIFIC RAILWAY

COMMODITY RATES ON SPECIFIED ARTICLES FROM SPECIFIC POINTS IN EASTERN CANADA TO SPECIFIC POINTS IN WESTERN CANADA AT VARIOUS PERIODS[1]

Commodity	——	*Sept. 1 1899*	*Sept. 13, 1920*	*Present Rate*	*Remarks*
Furniture.....	From Woodstock, Ont. To Regina, Sask.	$1.25	—	No movement	Commodity rate discontinued 1917 and never re-established.
Binder Twine.....	From Hamilton, Ont. To Winnipeg, Man.	.715	.74	2.85	Negotiations for Agreed Charge now in progress to meet truck competition.
Apples.....	From Toronto, Ont. To Moose Jaw, Sask.	.85	1.065	No movement	
Window Glass.....	From London, Ont. To Portage la Prairie, Man.	.785	.845	No movement	Window glass now moves from a number of points in Eastern Canada (London is not a shipping point for window glass) to distribution points in Western Canada under an Agreed Charge. Glass also moves to Western Canadian points from Vancouver. Glass can also be imported via Churchill.
Household Goods (Settlers' Effects)	From Brockville, Ont. To Brandon, Man.	.39	.52	1.24	Questionable as to whether movement in any volume.
Iron Bars.....	From Hamilton, Ont. To Calgary, Alta.	1.37	1.395	—	Traffic moves under Agreed Charge No. 428 at $2.30 per 100.

COMMODITY RATES ON SPECIFIED ARTICLES FROM SPECIFIC POINTS IN EASTERN CANADA TO SPECIFIC POINTS IN WESTERN CANADA AT VARIOUS PERIODS[1]—*Conc.*

Commodity	——	*Sept. 1 1899*	*Sept. 13, 1920*	*Present Rate*	*Remarks*
Cattle	From Ingersoll, Ont. To Weyburn, Sask.	.81	.92	No movement	
Lubricating Oil	From Montreal, Que. To Edmonton, Alta.	1.72	1.55	—	Traffic moves under Agreed Charge No. 152 at $2.25 per 100.
Paints	From Windsor, Ont. To Regina, Sask.	1.07	1.115	—	Traffic moves under Agreed Charge No. 135 at $2.65 minimum 24,000 lbs.; $2.45 minimum 40,000 lbs.
Wire	From London, Ont. To Saskatoon, Sask.	1.325	1.17	No movement	
Woodenware	From Woodstock, Ont. To Winnipeg, Man.	.715	.74	No movement	

[1] As requested by Mr. A. V. Mauro, Transcript of evidence, *Hearings*, December 7, 1959, Vol. 12, p. 1636–1638.

CANADIAN PACIFIC RAILWAY

ESTIMATED RESULT OF A GENERAL FREIGHT RATE INCREASE OF 19%
(25¢ per ton on Coal and Coke)

(1) *Type of Traffic*	(2) *Estimated Revenue November 1, 1958 to December 31, 1959*	(3) *Percentage of Total*	(4) *Amount of Increase*	(5) *Estimated Revenue Yield in Dollars November 1, 1958 to December 31, 1959*	(6) *Percentage of Total*
	(Millions)				
1 Grain and Grain Products at Statutory and Related Rates	$ 44.7	9.38	No Increase	$ —	—
2 International, Overhead, Import-Export and Other Related Rates	141.1	29.62	U.S. Increases Applied	—	—
3 Coal and Coke	19.1	4.0	25 cents per ton	1,425,000	4.52
4 Competitive Rates	58.7	12.32	19%	5,576,000	17.67
5 Agreed Charges	56.0	11.75	See Note	553,000	1.75
6 All Other Freight Traffic	152.6	32.03	19%	23,195,000	73.53
7 All Freight Traffic	472.2			30,749,000	
8 Miscellaneous Traffic subject to Freight Rate Increases	4.2	.90	19%	798,000	2.53
9 GRAND TOTAL	$476.4	100.00		$31,547,000	100.00

NOTE: Estimated Revenue Yield is calculated by applying 19% increase to Agreed Charges containing Escalator Clause.

Review of Federal Transportation Statistics

by

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Review of Federal Transportation Statistics

Recommendations

Conceptual Basis

1. Transportation is a significant phase of the production processes of Canadian industry. Accurate and consistent information should be given promptly to the public to permit analysis of the efficiency of transportation services and their role in our economic life. The 1960's will be a decade of increasing competition in world markets, and Canadian industry will require efficient, low-cost transport in its drive to retain and expand exports. The 1960's will also be a decade of increasing competition and continuing technological change within the transportation industry itself. Therefore, the Government of Canada should devise a programme to meet the statistical needs of a foreseeable future in which public attention will centre on competition in transport and competition in world markets.

2. In this environment, the public will require more information about transport services which are most likely to grow in significance—trucking, air-cargo and mixed-media traffic. Also, the public will need more information on the relative efficiency of the different means of transport and the extent to which governments subsidize them. Greater emphasis must be placed on provision of comparable, internally consistent, historically continuous statistics of traffic by road, rail, pipeline, water and air.

Canadian Industrial Freight Traffic Survey

3. A Canadian Industrial Freight Traffic Survey, similar to that which forms part of the Census of Transportation now awaiting provision of funds by the United States Congress, would help to meet these needs. The Survey would be taken from documents retained by shippers of freight. Appropriate techniques for sampling the required information could be developed by the Dominion Bureau of Statistics, initially for important industries with a manageably small number of respondents, and later for all mining, processing and manufacturing industries. From the Survey, statistics of the volume of traffic moving by each carrier could be developed, with a breakdown according to commodity, region of origin and destination of shipments, and revenue collected per ton-mile. A full survey could be taken every ten

years and linked into the decennial Census of Industry so that total shipments by industries could be obtained. Such information would assist in preparation of annual statistics based on sample surveys in intercensal years. If improved interpolations proved to be necessary, a full survey could be conducted every five years instead of every ten.

New information provided by the Survey would make possible greatly improved analysis of traffic handled by competing carriers, and of the potential economies from through routing of traffic. For the first time traffic statistics would be available with commodity information uniform for all carriers and comparable with other statistical series, such as the international trade statistics, which are prepared according to the Standard Commodity Classification of the Dominion Bureau of Statistics. A Canadian Industrial Freight Survey would provide the statistical material required for further analysis of the role of transport services in the location of industry and in production processes. Statistics from the Survey would improve forecasts of traffic in important commodities, and estimates of carriers' future costs and appropriate rates.

Passenger Traffic Survey

4. In the interest of more efficient handling of passengers, a Passenger Traffic Survey should be devised to provide statistics of passenger flow between various regions by each means of transport. The Survey, to be conducted every five or ten years, would be based on reports from carriers, hotels and motels, and from the passengers themselves. Resulting information on passenger traffic patterns would be useful to the carriers and to industries depending on travel and tourists. Also, statistics from the Survey, in conjunction with improved statistics of commercial truck traffic, would make it easier to decide on the proper allocation of costs of highway construction and maintenance to private and to commercial users.

Index of Freight Rates

5. The pricing of transport services is so significant in competition among carriers, in public regulation of the industry, and in the costs of important manufacturing and primary industries, that an Index of Freight Rates should be designed to fill a gaping hole in our present statistics. Separate indexes should be published for rates charged by each type of carrier—rail, truck, airlines and shipping companies—with appropriate sub-indexes for regional movements and for important commodity groups. For rail traffic, an Index for the years 1954 to 1960 could be prepared from the annual *Waybill Analysis* of the Board of Transport Commissioners. Subsequently, most of

the information needed for constructing an accurate Index of Freight Rates for all media of transport would be available from a Canadian Industrial Freight Traffic Survey.

Improvements to Existing Statistics

6. Existing statistical publications relating to transport should be re-examined from a conceptual standpoint by the Dominion Bureau of Statistics. If new information on traffic becomes available through an Industrial Freight Traffic Survey, it may be used to improve some existing statistics and to supersede others. Each statistical series published should fill a need in the over-all programme. Unless re-examined periodically, statistical publications tend to immortality. A re-appraisal could eliminate redundant statistics, such as some of the tabulations published so late in *Railway Transport,* or result in the overhaul of a meaningless publication like *Water Transportation* which lacks a positive conceptual definition of what constitutes the Canadian shipping industry.

The overhaul of existing statistical publications would be greatly facilitated by establishment of a Committee on Transportation statistics under the chairmanship of the Dominion Statistician or his nominee. Representatives of the Dominion Bureau of Statistics should be assisted on this committee by representatives of the carriers, or the federal and provincial regulatory authorities, and of important industrial users of transport statistics.

7. Most of the existing statistical series dealing with traffic should, however, be continued in basically the same form. Traffic statistics prepared according to the commodity classification of the Association of American Railroads will still be useful in comparisons among railways. *The Waybill Analysis*: *All-Rail Carload Traffic,* published annually by the Board of Transport Commissioners, is sufficiently accurate to be of value to a number of users of statistics in its present form. The size of sample in the Waybill Analysis should only be increased if this proves necessary in order to construct annual statistics for the proposed Canadian Industrial Freight Traffic Survey. Although the method of preparing the Waybill Analysis publication need not be changed, responsibility for its publication should be shifted to the Dominion Bureau of Statistics.

Speed of Service

8. Speed and frequency of service provided by different carriers is an important aspect of transport output. The need for speed explains the growth in air cargo, for instance. Yet no statistics exist which give any useful

information on speed and frequency of service. Sampling techniques should provide a means of developing useful statistics on the time element in transport service.

Integrate Passenger Statistics

9. Statistics of passenger traffic now scattered through a number of periodicals should be integrated in one publication. In this publication should be incorporated the results of the Passenger Traffic Survey.

Equipment Inventories

10. Inventories of plant and equipment of railways, truckers, airlines and shipping companies should be related to the investment or expenditure involved. The cost of the dieselization programme, for example, should be shown against the quantities of diesel equipment and plant acquired by each major railway. The investment in aeroplanes and other equipment by major airlines should also be published.

Technological Change

11. Some statistical series, such as locomotive-miles, become outdated with technological change. Horsepower-miles would more accurately provide a homogeneous measure of work done when the character of a locomotive is changing. There are many different measures of output and efficiency in the transport industry and such statistics are easily misused. An explanation of the uses and limitations of statistics of output and of technical and economic efficiency could usefully be included in the text of statistical periodicals containing such data.

Labour in a Time of Technological Change

12. Continuous and detailed statistics of employment, hours, and wages in the transportation industry are particularly important when labour is affected by technological change and automation. Historical continuity in statistics of railway employees' earnings and hours was destroyed by a change in the occupational classes and in the method of reporting earnings and hours at the end of 1955. An "hours worked" basis was substituted for "hours paid for". The railways should make available to the Dominion Bureau of Statistics for publication information on hours paid for and average compensation per hour paid for on a basis permitting comparisons of earnings and hours in each occupational category with data published prior to the end of 1955. Also data should be available in this form to permit comparison

with other statistics of hours and earnings published by Dominion Bureau of Statistics for other industries. Comparable statistical series of employment, hours, and earnings should also be published for other carriers—trucks, airlines, shipping and urban transit. Statistics of unemployment of transport workers would also be useful.

Carriers' Costs

13. There is some demand for publication of the cost to carriers of handling freight and passengers between specific points. Statistics of the cost of particular transport operations are usually subject to the difficult problem of allocating sizeable joint costs. A formula could be devised by the Board of Transport Commissioners for making an arbitrary allocation of expenses to passenger and to freight service, or to intercity and suburban passenger traffic. Certainly it is important that the carriers themselves and the Board of Transport Commissioners have as accurate information as possible on the specific costs of moving passengers and freight in particular cases. It is not, however, advisable to give shippers of freight a weapon for completely undermining the "value of service" principle in railway ratemaking. If shippers knew exactly the costs of the carriers, they could use the information in raising objections to all rates above the "cost of service". Therefore, while improvements in cost determination by the carriers and the regulatory authorities should be encouraged, it is not in the public interest to publish estimates of "out-of-pocket" or variable costs of carriers handling particular types of traffic. The same objections do not, however, apply to the *prices* of transport services, for which more statistics are needed.

Specialized Industries

14. Certain specialized types of transport are likely to become increasingly important, and they could well be treated as distinct industries meriting publication of special statistics. Trucking of milk, automobiles, and livestock, tanker fleets, furniture moving, and freight forwarders, all fall into their own distinct categories, and it would be useful to begin publication of some statistics on the operations of each of these groups. In the warehousing and storage of goods, there are also some distinct categories which merit separate treatment, one example being customs sufferance warehouses.

Subsidies to Transport

15. While considerable information is now available on subsidies to railways, statistics of direct and indirect subsidies by governments to other forms of transport should be published. Sufficient information should be

developed on traffic flows of commercial trucks and private motor vehicles and passengers to permit better studies of the extent to which different forms of highway traffic either are subsidized or pay their share of road costs through taxes and fees to governments. Also, it would be valuable to develop statistics showing the extent to which services utilized by airlines are subsidized. A subsidized carrier has an advantage in competition with other carriers. There is a cost in terms of efficiency in encouraging traffic by subsidies to move through channels it would not otherwise use. In view of the importance of handling traffic wherever possible by the most efficient means, the public should know the extent of subsidies to different media of transport and to specific companies.

Accidents

16. In addition to the existing accident statistics for each means of transport, it would be useful to include the cost of damage to persons and property and also the expenditures by governments and other organizations for prevention of specific types of accidents.

Time-Lags

17. The Dominion Bureau of Statistics should study the time lags in the production of annual publications dealing with transport. The average delay in publication of annual transport publications after the close of a year is more than six months. Long delays in publication reduce the usefulness of the information published, and any speeding of publication enhances the value of the statistics. Introduction of improved data processing equipment is not the only answer to long delays in publication, because the delays happen anyway. Problems of securing prompt publication should be attacked vigorously whether they arise from slow reporting by respondents to the Dominion Bureau of Statistics or from conditions within the Bureau (notably a chronic shortage of staff).

Cost of Programme

18. The cost of this Programme of Transportation Statistics is extremely difficult to determine—impossible, in fact, until the new and improved statistical series are designed and methods worked out. The exact design of the programme is a matter for statistical experts in sampling and statistical methods in the Dominion Bureau of Statistics. The cost of the programme will also depend upon whether changes are introduced all at once or over a period of time.

Responsibility for Publication

19. Responsibility for the publication of statistics by the Government of Canada belongs primarily to the Dominion Bureau of Statistics. If a well co-ordinated statistical programme is to be administered by the Government, it should in all important respects be carried out by this statistical agency of government. It is true that individual government departments and boards must prepare statistics for their own internal use tailored to their specification. This is true also of business firms in regard to transport statistics. The published statistics are never quite adequate for every use, and so private statistics for internal use become necessary. The danger is that the statistics produced by a board or department will supersede those of the Dominion Bureau of Statistics. A board or department may argue that it has greater technical ability at its disposal than the Bureau. This may be true, but the statistics produced for public use by another body apart from the Dominion Bureau of Statistics may be less satisfactory from the standpoint of statistical validity and from the standpoint of comparability with other series. It is recommended, therefore, that Dominion Bureau of Statistics publish all of the transport statistics issued by the Federal Government in the form of periodicals. The annual *Waybill Analysis* now published by the Board of Transport Commissioners may be processed in its present manner, but the Dominion Bureau of Statistics should take responsibility for publication of this and all other regular statistical series.

Chapter 1

Uses of Transportation Statistics

To what extent do the transportation statistics published by the Government of Canada serve the uses which they might be expected to serve? This volume attempts to answer that question. The first necessary step in the accomplishment of this aim is to describe the uses of transport statistics, and the second is to describe what the existing statistical series contain. It should then be possible to match the present with the ideal situation and to speculate on what statistical feats are necessary to bring the two closer together. In matching ideal with actual situations, it is usually realistic to take a long view. In the case of transportation statistics a long view (of 20 years or so) provides the particular advantage of allowing time for full blossoming of advanced techniques for collection and processing of data with the use of high-speed electronic computers and related devices. The applications of this technology by the carriers and the statistical agencies of government are now only in bud, not in full bloom.

Transport as Part of the Production Process

The uses made of transportation statistics relate to a great variety of needs, but we can sum them up by saying that statistics are needed for an understanding of the transportation industry in itself and, almost more important, to clarify relationships between the transport component and other components of the economic process of production and sale of goods. Transportation has no separate life of its own. Transport carriers are instantly affected by any improvement or decline in the fortunes of every other industry. The close mutual dependence of other industry upon transport and of transport upon other industry creates a use for statistics which reflect the significance of transportation in the total production process of an industry. And also this dependence creates a need for industrial statistics which can be related to carriers' traffic and pricing of service. Existing statistics will be found to err on the side of treating transportation as an independent entity unrelated to other industrial processes.

Therefore, there is no harm in stating emphatically the importance of transport costs in relation to total production costs (especially in a country of vast distances), of transport charges in relation to costs and pricing policies of business firms, and the effect of transport costs on industrial location relative to markets and sources of supply. Published transportation statistics should be applicable to studies of such relationships.

Also, transport statistics should be (and are) available to relate transportation in a general way to total production of the economy and gross national product. Statistics of traffic or activity in the transport industry should appear in forms which permit their use as barometers of economic activity in particular industries and regions. And for all of these purposes it is important that comparable statistics of transportation "output" should be available for the different modes of transport.

At this point it is necessary to be more specific. Uses of transport statistics must be spelled out, both in regard to statistics of the transportation industry itself and statistics tying transportation in with other sectors of the economy.

Pricing of Transport Services

One of the significant aspects of transportation service for which published statistics should be available is pricing. The price of transportation service is of vital importance to industry and consumers who must bear the cost. The price obtained by the carrier for transportation service significantly affects the revenue position and financial welfare of the carrier. Furthermore, the price of transport service is to a large extent regulated by the Government for good economic reasons such as the prevention of ruinous competition

among firms with a heavy investment in fixed plant, and the prevention of unjust discrimination where the public might be at the mercy of a monopolistic carrier. Therefore, the pricing of transport service is something in which a remarkably large number of people have an important interest—almost all business firms, the consuming public, the regulatory agencies of government, and the carriers themselves whether they be truckers, railways, shipping companies, pipeline companies or airlines. The price of transport services is of key importance in the affairs of the transportation industry itself and in its relations with the rest of the economy.

As a result of this, one might expect that there would be considerable information in the published statistics dealing with freight rates and the average revenue per ton-mile (or some other measure of transportation output) collected by the carriers. One would anticipate that some statistical measures would be available for comparing, for instance, the post-war increase in freight rates charged by trucks or railways for moving automobiles from plant to market and the increase in market prices of automobiles. As we shall see in the next chapter, there is no means of making such a comparison with present statistics. Also, statistics dealing directly with freight rates relate almost exclusively to grain. And there are extremely serious gaps in the statistics dealing with revenue collected per unit of railway output. The great importance of the pricing of transport services is so far not reflected in published statistics.

Price is one of the focal points in competition among carriers. Price is one of the means by which an efficient carrier with low handling costs can divert traffic to himself. Consequently it would be useful to have a substantial amount of information on the price of freight service and passenger service offered by different carriers. It would be useful to have an index of the price of various transport services which could be related to the many other wholesale and consumer price indexes published by the Federal Government. And it would be useful to have information on freight charges for specific products moving between specific regions so that transport costs could be related to other processing costs.

Economic Efficiency of Transport Services

Another need which should be met by an ideal programme of transportation statistics is the need to measure efficiency of transportation services. There are two aspects of efficiency for which statistics should be provided—technical efficiency and economic efficiency. Technical efficiency relates to the performance of trains, trucks, terminals, and the many mechanical operations involved in provision of transport service. Economic efficiency brings in the dollar sign; it implies the provision of optimum service at minimum cost. Improvements in technical efficiency are bound to improve economic efficiency

through a more economical use of resources. The measurement of economic efficiency involves the relationship between output of service and inputs of labour, materials, plant and equipment, expressed in terms of dollars. Cost per ton-mile, for example, is one of the statistics which may be used to measure economic efficiency, provided that the nature of the service rendered and the location of the movement of freight are properly specified.

Economic efficiency is not a simple thing to measure. For example, the goal of economic efficiency cannot be established simply as minimum total transport costs over a given period of time, or a minimum proportion of gross national expenditure for transportation. A larger outlay might provide a much improved service which would tend to increase the gross national product. More freight might under some circumstances be sent by air, for instance; even though the transport cost per ton-mile would be much greater, the speed of service might be so great as to enlarge greatly the market for a perishable product. Nor can economic efficiency properly be judged by the condition of a carrier's income statement. Under some circumstances the provision of non-remunerative services by carriers may stimulate output of manufacturing or primary industries in an advantageous way.

The proper measurement of economic efficiency may require a considerable array of statistics which delineates costs of service, amounts of service or output (and its location), and also some yardsticks of what efficient performance is. The possibility of making valid comparisons between carriers' costs of providing similar services is necessary for the analysis of efficiency.

Many of the statistics needed for the measurement of economic efficiency are already published. There are statistics of output in terms of railway gross ton-miles, net ton-miles and tons of freight. Comparable statistics are published for railway passenger service. For other carriers, there is generally less detail and more gaps. For instance, tons of freight shipped by water are available, but not ton-*miles*. Some of the output measures, especially for railways, are expressed also as averages per dollar of freight revenue (per ton of revenue freight, and so forth). The form in which carriers' *costs* are published though renders it almost impossible to relate the appropriate costs to output. The approach to publication of expense data is financial, not functional. This limitation is a severe one when it comes to appraising economic efficiency or performance relative to cost.

The trouble stems partly from the difficulty of getting any single measure of a carrier's performance or output. Transportation service consists of more than movement of a ton of freight so many miles. Another dimension of freight service in addition to distance and volume is time. Speed of service often counts, or no freight traffic would move by air. Loss and damage, which occasion delay and inconvenience, are another aspect of transport service, and the danger or lack of danger of such occurrences may influence the

shipper's choice of carrier. Special services performed by the carrier—refrigeration, assistance in loading and unloading, notification of arrival, delivery to the door, and the privilege of diverting shipments in transit—all are aspects of transport service or output. They enter into the carrier's costs. They are part of performance, a job well done or botched.

Because there is no single measure of transport service, even for one given mode of transport like railways, it is necessary to specify a considerable range of statistics for the measurement of carriers' output. We need statistics of volume of freight (tons, for example), of distance, of speed, and of special services. Some combinations of different aspects of output are possible, such as "ton-miles" which measure both volume and distance. But there is no single unit of output which can be devised to cover every aspect of output. There is no way of getting around the complex variety of statistics needed for proper measurement of output, and existing statistics probably do not go far enough in providing the variety needed. At the same time, current statistical publications might be improved by more explanation of what is represented in figures of tons and ton-miles and some of the more sophisticated concepts like "gross ton-miles per train-hour". The layman sometimes does not know whether he can use a particular concept for his purpose or not, and the risk of misuse is considerable. More interpretive text in the Government statistical publications would provide some chart through difficult seas like measurement of railways' output.

Then there is the added difficulty of measuring carriers' costs in relation to output or services. There are difficult problems of allocating joint costs. An arbitrary formula could be devised by the Board of Transport Commissioners for separation of freight and passenger costs, or for separation of intercity from commuter passenger costs. The resulting figures of cost would still be arbitrary, however wise the designer of the formula. Still, *trends* in the allocated costs might provide useful indications of whether passenger expenses, for example, are increasing more rapidly than freight expenses. Progress is not impossible, but the statistical results will always require the most educated and intelligent interpretation. The answer to what traffic is remunerative and what traffic is not will not be revealed with crystal clarity.

The problem of proper interpretation raises the question of what information should be published and what should be available only to the carriers themselves or the regulatory authorities. The misuse of published statistics can be mischievous. And some statistics easily lend themselves to improper interpretation. It is clearly in the interest of the Board of Transport Commissioners, for instance, to have all statistics of cost and output which may throw light on the efficiency of different carriers. This does not mean that the information must be published. Also, it is in the interest of competing carriers to know each others' costs. A knowledge of other carriers' costs

provides a useful yardstick for a railway or a trucker's own operations and pricing policy. From this standpoint, if some carriers' costs are published in meaningful form, then it is only fair that they should *all* be published—for trucks, ships, airlines, and pipelines as well as for railways. The error in this case could be in *partial* publication which could be to the advantage of the carriers who were allowed to keep their costs secret. Finally, it is clearly in the interest of shippers and business firms generally to know what the carriers' costs are for handling traffic between specific points. If this information is available, shippers have a weapon to beat down the freight rates on products for which rates are higher than the carriers' cost of service.

Publication of carriers' costs of providing specific services would assist shippers in undermining the "value of service" principle in ratemaking as regards the products they ship. It is in the public interest that transport service be provided at low cost to shippers, but is does not follow that the elimination of the value of service principle is in the public interest. Some rates in excess of carriers' average total costs are useful in compensating carriers for non-remunerative or low competitive rates which cover only variable or "out-of-pocket" expenses. Non-remunerative rates may be beneficial where the output of consumers of freight service is very sensitive to transport cost. Under some conditions imports may be displaced or additional production and employment generated by non-remunerative rates. In extreme instances where rates do not even cover variable cost, the benefits may be sufficient to warrant either a subsidy by the Government to this traffic or compensatory rates on other traffic less sensitive to transport charges. If the value of service principle is undermined sufficiently, the only alternative will be a government subsidy.

Accordingly, it seems wise to make available a considerable amount of information about costs and carrier output to the regulatory authorities, but to withhold the information from shippers. In practice the larger carriers can probably estimate each other's costs readily enough.

For regular publication, adequate information on *prices* of various transport services is sufficient. The statistics for measurement of various aspects of service or output should be available, but carriers' revenues from providing the services should be published in preference to the costs. The revenues are clearly defined, but the costs are difficult to define and often difficult to allocate. Moreover, the publication of revenue data makes possible comparisons of carriers' charges for similar services, without providing shippers with a weapon for securing reductions in freight rates. It is not expected, of course, that everyone will agree with this judgement about the wisdom of publishing carriers' costs. It is a controversial subject.

In conclusion, there is a need for statistics which measure and promote economic efficiency in the transportation industry. Comparable statistics of

the varied services or outputs of different modes of transport should be publicly available. Although a business machine may be packaged differently and so weigh differently when sent by air or by water, a ton or a ton-mile of freight is roughly comparable for different carriers. Gaps in such statistics should be filled.

Secondly, cost information which can be related to functions or services should be available to the regulatory authorities so as to promote realistic ratemaking and efficient transport. The carriers themselves seem to be increasingly cost-conscious in today's competitive environment and this development tends to improve efficiency in transportation. Actual publication of carriers' costs for specific services, however, is a different matter. Publication of such information may damage the carriers financially through increasing pressures for rate reduction.

The third recommendation in regard to statistics relating to economic efficiency is that a substantial amount of information be publicly available on revenues collected or prices charged by the carriers for their services. The information should not be entombed in a book of rates, but should appear in regular statistical publications in tables showing movements of freight (volume, distance, region and commodity) against revenue collected, and also in tables relating to revenues from special services.

Finally, some interpretation of the uses and limitations of data relating to carriers' output may increase the usefulness of the published statistics.

Technical Efficiency

The variety of technical operations in movement of freight and passengers through and between terminals results in a corresponding variety of statistics of carriers' performance. Appropriate statistics must be designed in the case of railways for utilization of motive power, loading of freight and passenger trains, adherence to schedules, terminal handling, car allocation, consumption of fuel and materials, and utilization of manpower. For air operations, the statistics should relate to airports and aeroplanes and the special equipment and problems of the airlines. For water shipments, harbours and canals enter the picture. Each means of transport has its own special equipment and character, and accordingly its own statistical requirements.

Many of the statistics relating to technical efficiency are used for internal supervision of performance. These are not necessarily the statistics which the public requires. Analysts of the transportation industry will, however, derive useful information from statistics of performance. Measures of output, such as gross ton-miles, measures of utilization of equipment, such as the percentage of serviceable locomotive days to total locomotive days, and

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other measures of capacity and "inputs" will be useful not only to the carriers themselves but also to outsiders who wish to study the transportation industry.

Forecasting Traffic

Statistics of carriers' output do not derive all their significance from the need to measure economic efficiency or technical efficiency. Detailed information about traffic, by commodities and areas, is of considerable use in market research. Forecasts based on traffic statistics can detect developing trends in industry, and assist firms in predicting business conditions and potential sales.

Also, forecasts of traffic are useful in estimating future costs of carriers. Costs of transport are related to volume and location of traffic. Forecasts of demand for transportation service can assist carriers and regulatory authorities in realistic pricing of transportation services. New trends in transport service and the degree of public acceptance of such services as piggyback, fishyback and containerized freight shipment can be studied if proper statistics are available. Both carriers and shippers will plan more effectively if data are available for forecasting and for appraising trends.

Although freight traffic has particular significance for the economy, the usefulness of studies of passenger traffic patterns should not be overlooked. Forecasts of passenger traffic trends are of value not only to airlines, railways, shipping companies and bus companies, but also to the tourist and hotel industries. Published statistics of passenger traffic in adequate detail serve an important purpose.

Subsidies to Carriers

Pricing policies of carriers, traffic volume and composition, and carrier efficiency are all related to the financial condition of firms in the transportation industry. In practice, the financial position of many Canadian firms engaged in providing transport services has been improved through the payment of subsidies by the Government.

Because the public must pay both the freight charges and the subsidies, they have an interest in the publication of financial statements by the carriers. Financial statements, the next chapter will show, are already available in considerable detail for rail and air carriers, but much less information is available for truck and water carriers. Also, the public has an interest in the amount and form of subsidies to transport firms. The most adequate information on subsidies is now available for rail carriers. Serious gaps exist in public information on subsidies to highway traffic, airlines and pipelines.

In some cases, the reason is that the element of subsidy is disguised or difficult to determine. In regard to highway traffic, there is a lively controversy on this continent concerning the extent to which commercial trucking pays through licence fees and other taxes its fair share of the cost of building and maintaining highways. A clear answer to this question depends upon an analysis of the composition of traffic on particular highways. In Canada there is insufficient solid statistical fact to make possible an analysis of commercial trucking and other traffic in relation to highway costs.

Where direct subsidies are paid to the transportation industry, such information merits inclusion in the published statistics. Sometimes, as in the provision of airport, harbour and canal facilities, owned by the Government, the element of subsidy is uncertain or difficult to determine. Where subsidies are indirect, it is in the public interest to provide statistics which make possible estimates of these subsidies.

Accident Statistics

Another area of public concern is accidents related to transport. Highway accidents are of particular importance in view of their frequency and seriousness. Airline and rail accidents also arouse public concern. Therefore, it is useful to publish statistics of accidents in the transportation industry, with appropriate detail concerning location and cause, and also statistics showing the cost of accidents. Present accident statistics are quite detailed, but give little information on the cost in terms of damage to persons and property. Another important part of the accident picture is the extent of government spending for the prevention of accidents and for safety measures.

Labour Conditions

Public interest also focuses frequently on labour conditions in industry. The transportation industry is no exception. It is desirable to have detailed statistics of hours, wages, employment and unemployment in the transportation industry.

Statistics of hours and wages, with information concerning paid holidays and overtime, should be published regularly for each region and means of transport. Furthermore, such information should be comparable with similar statistics for other industries, so that inter-industry comparisons will be possible. Such information should also be available historically over a substantial period of time.

In a time of rapid technological change in the transport industry, information regarding the effects of such change on employment (and unemployment) in particular occupations is useful public information.

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Urban Economics

So far, the transportation industry may appear to be considered an inter-urban rather than an urban industry. There is, however, no intention to omit accidents on city streets or labour conditions in urban transit companies from the category of useful transportation statistics. In addition, urban transportation is not only a significant industry in itself, but also is in some cases hardly separable from inter-urban transportation. Railways provide commuter services in large metropolitan areas, and so do inter-urban bus companies. Local cartage companies provide not only urban transport but also services which are tied in with inter-urban movements of rail freight. Taxicabs offer mainly an urban service, but will also carry passengers between cities as well. For a complete picture of the transportation industry it is necessary to have statistics of urban transport as well as of inter-urban transport.

In addition, statistics should be available to permit studies of the role of transportation in the economy of the large municipality. Traffic problems grow in seriousness with the growth in large agglomerations of population. Solutions to problems of urban congestion can be found only through a thorough understanding of the economics of urban transportation. Alternatives to expensive road construction programmes may be found in improved railway and bus commuter services, or subsidized extensions of mass transit facilities. Analysis of such problems and alternative courses of action depends upon the availability of adequate statistics of urban transportation. The kinds of statistics needed relate both to traffic patterns of public and private vehicles, costs and revenues of urban transit companies, and public expenditures on roads.

National Defence

Up to this point, only peacetime uses of transportation statistics have been considered. In wartime, comprehensive planning of transport movements to take account of war priorities demands adequate statistics of traffic and equipment for each means of transport. In a future war or defence emergency, electronic data processing might well secure a more efficient utilization of the nation's transportation capacity. Past statistics of inputs (plant, labour and materials) could be related to output detail so as to calculate production functions for the transport industry. Resulting input-output tables could be of great assistance in programming traffic for maximum results in an emergency. The necessary statistical base cannot be worked up in an instant. Extension of our peacetime statistics, further analysis of traffic patterns and costs, and applications of new data-processing techniques to

secure fast results will all improve our chances of effective mobilization of transport resources in a sudden national emergency.

Timeliness and Historical Continuity

In all statistics for whatever use, an important consideration is timeliness of the information when it is published. If statistics of transportation covering 1960 are not available until 1962, much of their usefulness may be destroyed. On the other hand, a rush to publish statistics without time for checking accuracy or securing delinquent reports may result in inaccurate information. Or fast publication may be secured at excessive cost. The importance of fast availability of statistics varies according to the use made of them. For forecasting traffic or economic trends, prompt availability of information is of considerable importance. For analysis of situations which change slowly, immediate accessibility to data has less importance. The statistics should be timed so as to meet the important needs within a reasonable time. Sometimes the provision of monthly or weekly data in less detail improves the timeliness. In other cases, detailed annual data may be significant even if not available promptly at the end of the year, whereas general data published monthly may not meet a real need. Through inquiries for information and comments on existing publications, the Dominion Bureau of Statistics gathers an impression of the importance of timeliness in publication of particular statistical series.

A further important dimension in statistical services is the element of historical continuity. For some purposes, availability of a historical series is not important. In other cases, the absence of a continuous time series renders fruitful analysis impossible. Historical analysis of statistics of traffic, finances of carriers, labour employed, and price of services is likely to be sufficiently common and important to warrant an effort to preserve continuous time series.

Sometimes it is difficult to preserve genuine continuity in a statistical series over a long period of time. A locomotive today is not the same as a locomotive ten years ago either in appearance, consumption of fuel, or performance. Accordingly, a locomotive-mile or even a train-mile today is not quite the same thing as it was in 1950. A long historical series of train-mile statistics may look homogeneous, but it is not. Technological change has interfered. Likewise, commodities change as time goes on, and today's automobile is not quite the same product as an automobile was in 1940. Also completely new products are added. New types of equipment and plant can introduce hidden discontinuities into statistical series. A huge investment in hump yards or diesel locomotives can result in a sharp decline in labour cost of yard switching or hauling a ton of freight, and the historical series of labour cost is misleading unless related to depreciation costs of yards and

locomotives over the same period of time. For all these reasons, historical continuity cannot be guaranteed.

At the same time, if the basis of a statistical series is changed to make it more accurate or useful in a modern context, it is usually possible to preserve historical continuity through continuing the series for a while on the old basis. Discrepancies then show up. Difficulties arise when the basis of a statistical series is shifted, but no bridge is provided between the old and new series.

Usefulness of statistical information is therefore dependent frequently upon the speed with which it becomes available and upon the possibility of comparisons with past years. This aspect of present transportation statistics will be considered in the appraisal of existing statistics in the next chapter.

Appraising the Usefulness of Statistics

Many of the uses of transportation statistics have been described in this chapter. Other uses exist, undoubtedly, which have not found a place in this description. Not all uses which statistics come to serve can be easily foreseen either. Sufficient has been said, however, about the needs which transport statistics serve to provide some criteria for judging existing statistics.

How do we decide then whether a given statistical series (present or proposed) is useful or not? Is not usefulness largely a matter of opinion? It is certainly true that there are difficulties in deciding when a statistical series meets a real need. Some experienced statisticians have found that the best way to get an answer is to quietly stop publication of a series. If no one complains, the statistics are useless and can safely be discontinued. If there are loud complaints, the statistician simply resumes publication and apologizes for the delay!

The method suggested is a little crude. It yields no information about the reason for a statistical series not being needed. It tells nothing about whether the statistics arrived too late to be useful, or whether they were too complicated, or poorly presented, or simply irrelevant to any need.

Logic will carry us only part way in deciding whether a given statistical series meets a need. Some statistics may be so inaccurate as to appear useless, but even so there are situations in which businessmen make accurate decisions using imperfect information. The statistics may appear inadequate and yet be better than nothing. Then there are many border-line cases where a series might be useful, but where nothing is really known about its actual use. The number of paid subscriptions to a statistical publication is some indication of usefulness, but some organizations and libraries subscribe to all government publications in the interest of having complete files. The publications may not all be actually used. Then too, a small number of subscribers may actually make highly significant use of a publication. A trade

association may use one copy of a government publication as a basis for a valuable piece of analysis distributed to 1000 members. Or a university professor may use some obscure statistical series in writing a useful book.

The next chapter begins with an appraisal of present transportation statistics using another method—a questionnaire to a sample of industrial firms which may be expected to have a use for transportation statistics.

Up to this point, we have described a number of needs for transportation statistics and have outlined kinds of information which could usefully be published. Among the uses for such statistics is the integration of transport cost and traffic data with information about other steps in the production of goods and services. Information on the pricing of transport services was also found to serve a presumed need. Statistical measures of output, of economic efficiency and technical efficiency should also be of value. Financial reports of carriers and statements of government subsidy should be published. Finally, the special needs of defence planning should be taken into account through development of advanced statistics of transportation inputs and outputs. In most instances, there is a need for comparable information for all the many different modes of transport. This is a complex industry affecting every region of the country, and therefore an almost bewildering variety and detail of transport statistics appear to be needed. In terms of the outline of uses here developed, we shall now analyse the existing published statistics with particular attention to important gaps and ways of filling them.

Chapter 2

Assessment of Existing Statistics of Transportation

Questionnaire to Traffic Officials

In July 1960 a questionnaire went to 25 traffic officers employed mainly by large manufacturing firms to ask them "How useful are the Federal Government's transport statistics to you?" The questionnaire is reproduced and the 23 replies are summarized in Table 1.[1] Questions in this questionnaire asked about the usefulness of existing statistics of transportation and also about the value of several suggestions for new statistical series.

[1] Replies were received from the following organizations: Aluminum Company of Canada, Limited; Bathurst Power & Paper Company Limited; The British American Oil Company Limited; Canada Cement Company, Limited; Canadian Canners Limited; Canadian Gypsum Co., Ltd.; Canadian Industrial Traffic League; Canadian Industries Limited; Crown Zellerbach Canada Limited; Duplate Canada Limited; DuPont of Canada Limited; Federated Co-operatives Limited; The Glidden Company Limited; Hiram Walker & Sons Limited; Husky Oil & Refining Ltd.; Kraft Foods Limited; Lever Brothers Limited; Manitoba Transportation Commission; Northern Electric Company Limited; Robin Hood Flour Mills Limited; Standard Brands Limited; Swift Canadian Co., Limited; Union Carbide Canada Limited.

Replies indicated a greater demand for statistics published by the Dominion Bureau of Statistics on rail and truck transportation than for those dealing with other means of transport. Eight replies classed rail statistics as "very useful" and seven replies placed truck statistics in the same category. Only one respondent classed pipeline or urban transit statistics as "very useful" and four considered them of no use. Of course, it might be anticipated that industrial traffic officials would have less reason to use urban transit statistics than statistics of intercity transport. One question dealt specifically

TABLE 1—QUESTIONNAIRE WITH SUMMARY OF REPLIES FROM 23 ORGANIZATIONS

How useful are the Federal Government's transport statistics to you?

1. Do you subscribe to any of the transportation statistics published by DBS? No: 6 replies.

	Very useful	*Occasional use*	*No use*
Truck	[7]	[4]	[2]
Rail	[8]	[3]	[2]
Air	[3]	[4]	[3]
Water	[3]	[4]	[2]
Canal	[3]	[5]	[2]
Pipeline	[1]	[5]	[4]
Urban transit	[1]	[2]	[4]

2. Do you use the annual rail Carload Waybill Analysis published by the Board of Transport Commissioners? If so, is it:
   Not used: 5 replies.
   Useful in detail [6]; Useful in its totals [4]; Little use [6]

3. Do you subscribe to all publications of the Dominion Bureau of Statistics in all fields? Yes 3 ; No 19 .

4. How many of your employees are engaged in reporting information to the Dominion Bureau of Statistics? None: 6 replies.
   Full time 1 ; Part time 56 . (Totals reported by all respondents.)

5. Do you develop from your own company records traffic and transport statistics for your own use? Yes 16 ; No 5 .
   Please give details:

6. Would any of the following statistical services (if made available by the Federal Government) meet a need in your company? None: 5 replies.
   (a) Truck carloading figures similar to rail carloadings already published [8]
   (b) Volume of traffic by main commodity and origin and destination for:
   Rail [11]; Truck [11]; Air [4]; Water [9]
   (c) Cost to carriers of handling shipments between specific points by:
   Rail [16]; Truck [17]; Air [6]; Water [14]; Pipeline [8]

(d) Index of freight rates:
Rail [13]; Truck [13]; Air [7]; Water [11]; Pipeline [6]

(e) Piggyback and fishyback traffic analysis [10]

(f) Containerized traffic analysis [12]

(g) Statistics by teletype [1]

(h) Present statistics published sooner [9]

with the annual *Waybill Analysis: Carload All-Rail Traffic,* a publication of the Board of Transport Commissioners containing statistics of tons, ton-miles, average haul and revenues classed according to commodity and type of freight rate (*see* App. p. 506). Six of the 23 respondents found the detail in this publication useful, although it is based on a small sample (1%) of domestic carload traffic. Four found the more general or total statistics useful, six considered the publication of little use, and five did not use it at all. Two other respondents did not answer this question. Broadly speaking, the replies to questions concerning existing statistics indicated that truck and rail statistics (including the *Waybill Analysis*) are very useful and that at least a quarter of the traffic officials polled make "occasional" or more frequent use of the statistics in all categories of intercity transport.

A large majority of the firms sampled also prepare their own internal statistics of transportation. The nature of internal statistics varies from firm to firm. A number of companies prepare detailed statistics of freight loaded and unloaded, or shipped by each mode of transport. Tonnages shipped to warehouses and distribution points are commonly recorded. Some firms record loss and damage claims or demurrage charges or cost of local cartage services utilized. The need for internal statistics of these types could never be met by published statistics which are not intended to reveal the operations of individual industrial firms.

None of the respondents actually complained about the burden of reporting information to the Dominion Bureau of Statistics. Provided the replies are comprehensive, a total of one full-time employee and 56 part-time employees were engaged in reporting statistics for 23 firms. These numbers do not appear excessive—fewer than three per firm.

A large proportion of the traffic officials replying supported a need for additional statistical services. Greatest demand was for "cost to carriers of handling shipments between specific points" truck (17 replies), rail (16), and water (14). There was also a substantial demand for information on pricing of transport service; 13 replies indicated a need for an index of rail freight rates, 13 for an index of trucking rates, and 11 for a water rates index. Nearly half of the respondents wanted statistics on volume of rail and truck traffic by main commodities and by origin and destination. Also there was support for more data on some of the new developments in freight traffic—

containerized traffic (12 replies) and piggyback and fishyback (10). More than one-third of the replies showed a desire for earlier publication of present statistics.

All of these precise questions about needed statistics cover information not now published—gaps in the existing statistics. There is clearly a demand for information to fill these gaps in pricing of transport service, cost to carriers of providing service, details of traffic by commodity and by origin and destination, and detail of new types of freight movement. Amongst traffic officials, as indicated by this sample, there seems to be a fair degree of acceptance of present statistics, but also a demand for some new series.

Traffic officials are not the only users of transportation statistics by any means. A wider group of potential users—market analysts, government officials and economic consultants—could also be approached with the same questions. The traffic officials were questioned because they are a specialized industrial group working in transportation. Their interest in transport statistics, and therefore their probable response to the questionnaire, was judged to be greater than that of a more diverse group.

Coverage of Transport Periodicals

Several types of government publications may contain information on transportation. Some periodicals specialize in transport statistics. Such publications may be annual, like *Railway Freight Traffic,* or monthly, or even more frequent, like *Carloadings,* which the Dominion Bureau of Statistics issues four times a month. Most of the government periodicals dealing entirely or chiefly with transportation are produced by the Dominion Bureau of Statistics, but one notable exception is the annual *Waybill Analysis: Carload All-Rail Traffic* issued by the Board of Transport Commissioners. The specialized statistical publications almost always deal with a single mode of transport and few with more than one, except, for example, where truck operations of major railways are included in rail reports. Two exceptions, publications dealing with several modes of transport, are the periodicals *Travel between Canada and the United States* (monthly) and *Travel between Canada and Other Countries* (annual). Apart from these few examples there are no publications which successfully tie together the various means of transport. Existing statistics do not integrate the parts of the whole transportation industry in large measure, because statistical series published for the different means of transport are not comparable.

Included among the special publications on transportation for our purpose are periodicals dealing with warehousing and storage, and with production of transportation equipment. Warehousing and storage are closely linked to transport in actual practice. There is also a close relation between

industrial inventories and transportation service. And production of transport equipment—whether railway rolling stock or boats or bicycles—is important in the relationships between transport and the rest of the economy.

In addition to publications dealing specifically with transportation, there are many which deal only incidentally with transport. For example, the annual *Grain Trade of Canada* prepared by the Dominion Bureau of Statistics contains information on water and rail freight rates, on movements by water, rail and truck to grain elevators, and on quantities of grain stored in elevators. So much information relating to transportation and particularly storage is contained in the periodicals which deal chiefly with grain that these are listed in this study among publications in the Warehouse and Storage category.

The statistical content of all the publications dealing mainly or substantially with transportation is summarized in the Appendix, and exhibits representing exact reproductions of tables in these periodicals illustrate the form of presentation.

Annual Reports of Government Agencies

Also annual reports of some government departments contain statistics of transport in the form of distinctive series—not just a rehash of the ordinary statistical publications. An important example of this is the *Annual Report of the National Harbours Board* containing important statistics of traffic inbound and outbound from ports under the Board's jurisdiction. The *Annual Report of Board of Transport Commissioners for Canada* contains very detailed information on expenditures for protection at highway crossings and also detail of grade separations approved and contributions from the Railway Grade Crossing fund for automatic protection and improvements to view. For this and certain other information the Board's annual report is a source of detailed statistics not found in the regular periodicals of the Dominion Bureau of Statistics.

Another important report is the *Annual Report of the Canadian Maritime Commission,* containing material on ships in the Canadian merchant fleet, and charter rates. Statistics of Canadian-flag participation in carriage of Canada's overseas trade are included and also information on operations of Canadian shipyards.

The Board of Grain Commissioners also publishes a number of statistical tables based on reports received from all elevators licensed under the Canada Grain Act. Useful information on transport may appear incidentally in other reports of government agencies—such as details of subventions on coal paid under the Maritime Freight Rates Act, published in the *Annual Report of the Dominion Coal Board.* Then too, there are included in annual reports of government agencies financial statements of government bodies

dealing with transportation—The Department of Transport, the Board of Transport Commissioners, the St. Lawrence Seaway Authority, and the National Harbours Board. Amongst government agencies we may include the Canadian National Railways. Actually the Canadian National and Canadian Pacific both include statistical sections as well as financial data (balance sheets and income statements) in their annual reports. Annual and historical statistics of rail-line operations include much material found also in the Dominion Bureau of Statistics publications on traffic and revenues and expenses. A few statistics such as average speed of freight trains appear only in the annual reports of the two major railways.

The annual reports of government agencies are for the most part though only an incidental source of information on Canadian transportation. Main reliance must be placed on the specialized statistical series published regularly by the statistical agencies of the Government, chiefly the Dominion Bureau of Statistics. Accordingly, this report does not make any recommendation about the statistical content of annual reports of government agencies. It is considered that all important data should be provided in the regular statistical periodicals, whether or not there is some duplication with the departmental reports. For example, the *Annual Report of the National Harbours Board* contains material on ports which also appears in the *Shipping Report* published by Dominion Bureau of Statistics. Some of the information on charter rates found in the report of the Canadian Maritime Commisison might, however, usefully make its way into regular specialized transport publications.

Relation of Transport to the Rest of the Economy

In addition to the specialized reports on transport and the annual reports of government agencies which serve more than just a statistical purpose, there is considerable useful information on transportation in Dominion Bureau of Statistics and other government publications which deal either generally with the whole economy, or mainly with some other subject—with only incidental reference to transportation. These publications are significant in that they relate transportation to the rest of the economy.

One example is Taxation Statistics, published annually by the Department of National Revenue. Not primarily concerned with transportation, this publication shows financial data on taxable companies in the categories of railways, urban transportation and taxicabs, bus and other transportation, grain elevators, and storage and warehouse. The airlines may not like being lumped in with "Bus and other transportation", but on the whole the information in the publication is useful in relating taxable transport companies with corporations in other industries.

A number of publications dealing with employment contain incidental references to transportation, or some transportation category in the tables of statistics. A monthly employment index for transportation and for each of the important modes of transport appears in a monthly publication of the Dominion Bureau of Statistics, *Employment and Payrolls*. The same publication also states the average weekly wages and salaries and the number of employees reported in each of these categories. The information is provided in regional detail as well—by provinces and selected urban areas.

Information on average weekly hours, average hourly earnings, and average weekly wages appears in the Dominion Bureau of Statistics monthly and annual periodicals, *Man-Hours and Hourly Earnings*. Employees in "transportation equipment" and "electric and motor transportation" are covered here. Hirings and separations in transportation, storage, and the transportation equipment industries are reported in the semi-annual publication, *Hiring and Separation Rates in Certain Industries*. This is not a comprehensive list of transport data in publications dealing chiefly with labour and employment. Most of the Dominion Bureau of Statistics' publications on labour and employment contain a transport category. There are some gaps though. It is recommended that in the *Man-Hours* publication railways, trucks and shipping be included. Employees in each of these categories should be shown separately, along with employees in transportation equipment and electric and motor transportation, who are already covered.

Statistical publications dealing with prices contain monthly consumer price indexes for: transportation; automobile operation; new passenger cars; gasoline; local transportation; and street car and bus fares. Price indexes for freight rates are a noteworthy omission from the *Prices & Price Indexes* publication.

Also the annual *National Accounts* publication includes information on transport subsidies by the Federal Government, provincial taxes on gasoline and motor vehicles, and on the contribution of transportation and storage to the Gross Domestic Product at factor cost, to corporation profits, and to other national aggregates.

Transportation is also included—in the categories "transportation, storage, and trade" and "transportation equipment" in the input-output table in the Dominion Bureau of Statistics' study of the inter-industry flow of goods and services, 1949. It would be worthwhile to include specific information eventually on transport alone and even individual modes of transport in such input-output studies of the whole economy.

Finally, transportation data are included in a number of publications used by people who are not specialists in transportation at all. General users of statistical information, or specialists in fields other than transport, may often find the degree of detail in the chapter on transportation in the *Canada*

Year Book, 1959, sufficient for their purpose. Material on transport in these publications and in the monthly *Canadian Statistical Review* is usually similar to that available in greater detail and sooner in the specialized transport publications. On the other hand, information in the Dominion Bureau of Statistics *Daily Bulletin* may draw the attention of any user of this service to a specialized publication on transport which has just been issued that day, and give him a summary of the statistics as well. Also, in the May 17, 1960 issue, Dominion Bureau of Statistics published for the first time estimates of intercity ton-miles by each mode of transport, as well as a percentage distribution, with separate series for the years 1938 to 1958 for rail, road, water, air and oil pipeline. While not a specialized publication, the *Daily Bulletin* may from time to time prove useful to any user of transport statistics.

Summary of Coverage in Specialized Transport Periodicals

Enough has been said to indicate the great volume of statistical data published with reference to transportation in a variety of publications. At this point it is desirable to say more about the exact nature of the transport statistics now being published. It will then be possible to work toward more precise recommendations for improvement once the gaps and weaknesses in present statistics are more clearly defined. We will deal specifically only with the specialized publications on transport. That is where improvement must start.

A broad summary of the coverage of the specialized publications on transport (including all the publications described in the Appendix) is presented in Chart 1. Classification of statistical data for use in Chart 1 is (1) by mode of transport and (2) by subject or function with which statistics may deal.[1] The chart shows the extent of coverage—considerable detail; incomplete coverage; smattering of data; or no data at all. Areas in which statistical material is now concentrated become apparent from the chart and it is then possible to appraise the significance of the gaps.

The subjects in the left-hand column of Chart 1 relate to aspects of transport operations and financing concerning which there might be a need for public information. The analysis in Chapter 1 demonstrated a need for statistics dealing with pricing of carriers' outputs—freight rates, passenger fares and storage charges. Replies to questionnaires supported a need for an index of freight rates. Also there was a demand for statistics dealing with the amount of output (traffic) of carriers. The replies to questionnaires

[1] Judgements concerning the extent of coverage in each square in the chart were based on a detailed description of the statistical material available under each subject for each means of transport. This detailed material is not reproduced in this report, but is included in the working papers in the files of the Royal Commission on Transportation.

SUMMARY OF COVERAGE IN TRANSPORTATION PERIODICALS

Subject or Function \ Mode of Transport	RAIL				ROAD			URBAN	WATER			Air	Pipe-Line	Ware-house & Storage
	Rail-ways	Bridges Tunnels Ferries	Ex-press	Commu-nica-tion	Truck-ing	Inter City & Rural Bus	Motor Vehicle	TRANSIT	Ship-ping	Canals; St. Lawrence Swy.	Har-bours			
TRAFFIC (OUTPUT): 1. Total Volume & Distance	■	▨	▨	▨	■	■	▨	▨	■	■	▨	■	■	▨
2. Volume & Distance by Commodities	■		N.A.	N.A.	▨	N.A.	N.A.	N.A.	■	■	▨		■	▨
3. Frequency & Speed of Service	▨						N.A.							
PRICING OF OUTPUT: 1. Freight Rates	▨		N.A.	N.A.	▨			N.A.	▨					
2. Passenger Rates 2. Storage Charges	▨			N.A.		▨	N.A.	▨	▨					
INPUTS (and pricing of Inputs): 1. Plant & Equipment Inventor	■	▨	▨	▨	■	■	■	▨	■	■		▨	■	■
2. Materials and Fuel Consumption	▨				▨	▨	▨	▨	▨			▨	▨	
3. Labour & Wages	■	▨	▨	▨	■	▨	N.A.	▨	▨			▨	▨	▨
FINANCES OF CARRIERS 1. Balance Sheet & Income Statement	■	▨	▨	▨	■	▨	N.A.	▨	▨	▨	▨	■	■	■
2. Taxation	■	▨	▨	▨	■	■	■	▨	▨			▨	▨	▨
3. Government Aid & Subsidy	■				▨	▨	▨	▨						
Government Regulations					■	■	■		▨					
ACCIDENTS: 1. Number & Cost 2. Safety Measures & Expense for Prevention	■	▨	▨		■	▨	▨	■	▨			▨		

KEY

■ CONSIDERABLE DETAIL

▨ INCOMPLETE OR PARTIAL COVERAGE

▩ SMATTERING OF DATA

□ NO DATA

N.A. NOT APPLICABLE

CHART 1

supported a need for statistics of traffic by commodity and by origin and destination. Statistics measuring economic efficiency in Chart 1 usually fall under the heading of traffic—total volume—because they combine certain cost information (or sometimes carriers' revenue) with measures of output, for example "freight train revenue per train mile". Statistics relating to technical efficiency are not classed separately, but are included in the output or "total volume and distance" category. The classification in Chart 1 is not related explicitly to use but rather to the nature of the subject matter of the statistics. Uses may not always be ascertainable objectively, whereas subject matter of a statistical series is more precisely definable. So the classification emphasizes certain aspects of transport. One aspect is output or traffic (volume, distance, speed) and the commodity data necessary for integrating these with data for other industries. One distinct subject is the pricing of outputs (rates). Another aspect is inputs—the inventory of plant and equipment, materials and fuel, and labour necessary for producing transportation service. Then there is the financial aspect. It may sometimes be difficult to integrate the financial data with input and output data, but they form part of a single piece—the fabric of transport service in Canada. Government regulations and accidents are additional aspects of transport service. Regulations may entail cost, and so may safety measures, and in this way these features of transport service tie into the same piece of material. So the subject classes are broadly related to different uses that may be made of statistics, but subjects and uses, while reconcilable, are not identical. It is not necessary that all of the classes fit together. Each class of statistical material has distinct uses of its own regardless of any need for bringing all series together. A good programme of statistics is concerned with maximum usefulness of the statistics in each class as well as an adequate coverage and co-ordination of all classes of published transport data. The classes in Chart 1 do not cover every subject, nor relate to every use. But they do serve to categorize the statistical series available, and an appraisal of their usefulness readily follows.

We can see from Chart 1 that more detailed statistics are available for rail and truck than for other means of transport. Particularly great detail is provided for rail transport. Even for rail, though, there are gaps. One is the complete absence of information on government regulations though there is much detail on this subject for trucks. A smattering of data is published on frequency and speed of rail service (none on frequency actually). And existing information on freight rates and passenger fares and on materials and fuel consumption is judged to be incomplete or to cover the subject only partially. On trucking, information on traffic by commodities provides only partial coverage, and there is nothing on storage charges of commercial trucking firms or on frequency and speed of service.

Urban transit is only partially covered by current statistics, except where accidents are concerned. Statistical reporting on the minor carriers, live express or ferries and bridges or canals, is spotty. The most noticeable gaps are: (1) nothing on air traffic by commodities; (2) very little on volume of goods stored—most of it is on grain; (3) nothing on air, pipeline, or warehouse rates, while water rate information is confined to grain; (4) nothing at all on government subsidies to water, air, pipeline, warehousing, and only a smattering on subsidies to urban transit; (5) coverage of airline statistics is only partial on a number of subjects—inputs of plant and equipment inventory, materials and fuel consumption, and labour. Gaps in bridges, tunnels and ferries, in express and in railway communications are possibly not of great importance. More data on harbours and canals, however, might be useful.

Judgement of these matters however, must await a more detailed consideration of the contents of the statistical series represented by the squares in Chart 1. The content of each statistical periodical is described separately in a catalogue in the Appendix, illustrated by exhibits. The publications appear in this catalogue according to the type of transport to which they refer—rail, road, urban transit, water, air, pipeline, warehouse and storage, or transportation equipment. In the text of the report, however, we shall follow the order implied in Chart 1. The statistical series, without much detailed reference to the periodical in which they are found, will be classed according to carrier and subject, and the adequacy of statistics in each of these classes will be appraised.

Traffic: Volume, Speed and Distance

The large amount of data published on total volume of traffic for each of the major carriers is indicated by Chart 1. Such statistics relate to volume, distance, and speed or frequency of service. "Tons" and "carloads" measure volume, "average haul" measures distance, "ton-miles" or "car-miles" combine measures of volume and distance. Statistics regarding frequency of service seem to be non-existent, and there are no data at all on the speed of service, except in terms of average speed of railway freight trains (in miles per hour) and "on-time performance" of passenger trains. Since terminal handling can be a time-consuming factor in freight movement, it might be advisable to sample the time between actual loading of freight at origin and actual unloading and destination, or alternatively between making out bill of lading and notification of arrival of freight at destination. Volume, speed and distance are the main aspects of transport output—but special services such as refrigeration, milling-in-transit, assistance in loading and unloading are also part of the transport service. The special service features vary

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markedly from carrier to carrier, and there is little indication of the extent of such services in the published statistics of traffic. Traffic statistics serve a wide variety of uses in measurement of economic efficiency of transport, in forecasting traffic, sales business conditions and in calculating carriers' costs.

Another important feature of traffic statistics is the possibility of analysis by commodity and by region. Without this type of breakdown, it is difficult to relate the data to specific industries or areas of the country. In some ways, each region of the country has its own distinct economic problems which entitle it to be treated as an economic entity. Analysis of many questions of regional economic policy—Dominion-Provincial relations, for example,—demand availability of regional data. And transport is frequently an important issue in regional economic analysis. Significant regional data are available through statistics of traffic, and where there are important omissions in this respect, they will be noted. Gaps in commodity data are of sufficient importance, however, to warrant a separate line for "Traffic by Commodities" in Chart 1. For all major intercity transport, statistics of volume of output are published in considerable detail.

Information on railway carloadings is available four times monthly (*see* App. p. 498-499) with a breakdown for 47 commodities and less than carload traffic. The regional breakdown is very broad—eastern and western divisions of the country—and therefore not particularly useful. There is no corresponding information on truckloadings. Such statistics would be of value because the two together would provide a useful economic barometer, available in print, one would hope, shortly after the close of each period. On a monthly basis, more detail of traffic is available for all carriers, and the greatest detail of all is available annually, though often many months after the close of the year.

For rail traffic, tons of freight appear in the monthly issue of *Railway Freight Traffic,* published by the Dominion Bureau of Statistics. The commodity classification used is that of the Association of American Railroads, and so does not coincide with that used by the Dominion Bureau of Statistics for other statistical series, such as international trade. The same information is available also in the annual issue. Tons originated and terminated are shown (*see* App. p. 499), but there is no link between origin of a shipment and its destination, which greatly limits the usefulness of the series. Additional limitations are the fact that imports by water are not separated from rail shipments originating at Canadian stations, and that exports by water are included with other traffic terminating at Canadian stations. No clear separation of domestic and international shipments is possible. These same limitations apply in the annual publication, *Railway Transport,* Part V: *Freight Carried by Principal Commodity Classes,* which gives similar information for each of 22 Canadian railways.

The annual *Waybill Analysis, Carload All-Rail Traffic,* published by the Board of Transport Commissioners, also utilizes the commodity classification of the Association of American Railroads. But there are more data included than merely tons of freight. Number of carloads, revenue tons, ton-miles, car-miles and average haul are all measures of railway output recorded by commodity in this publication. These data are supplemented by statistics of average revenue per ton-mile, a rough measure of pricing of output, and by information on type of rates (*see* App. p. 506). The regional breakdown is quite broad. Traffic originating and terminating in eastern, western, and maritime regions is shown separately, but again statistical tables suffer from the weakness of no link between origin and destination of shipments. Furthermore, the fact that the basis of the data is a 1 per cent sample of carload waybills renders the data unreliable, particularly in details. The degree of accuracy was, however, sufficient apparently to warrant 6 of 23 respondents to the questionnaire (Table 1) reporting that the publication was useful to them "in detail".

Other limitations of the Waybill Analysis include the omission of traffic over the American border and the omission of less than carload traffic (attempted only once by the Board and then dropped because of the labour involved). Also, the publication gives no indication of mixed-media traffic, such as combined lake and rail movements. It would be particularly helpful to have traffic data which could be related to exports and imports. And availability of mixed-media traffic data (lack of which is one important general criticism of present transport statistics) would assist in the promotion of through routing and co-ordination among all modes of transportation. Appropriate combinations of media can promote economic efficiency in transport.[1]

Nowhere in present traffic statistics is there an analysis of piggyback traffic, (now stated in total without commodity breakdown), fishyback traffic or containerized freight. Statistics relating to joint movements by rail and truck, or rail and water, and specifically relating to these new developments in freight service, would be quite advantageous, as is indicated by the replies to the questionnaire.

In addition to the published tonnage and ton-mile statistics by commodity, there is a variety of other information on rail traffic for which there is no commodity breakdown. Gross ton-miles, car-miles, train-miles, locomotive-miles, passenger-miles, are published in various forms annually and monthly in *Railway Operating Statistics.* Also, the publication contains a variety of averages—measures of revenue per unit of traffic (per freight train-mile or per ton-mile, for example), and measures of operating perform-

[1] A study of American transportation policy by the U.S. Department of Commerce, *Federal Transportation Policy and Program* (March 1960), recommends encouragement of through routes and joint rates between several forms of transport, p. 8.

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ance such as average ton-miles per loaded car-mile. Such information is shown separately for the Canadian National Railways, Canadian Pacific Railway, and the total of 22 Canadian railways (*see* App. p. 504). Similar information for each of the 22 railways appears in *Railway Transport,* Parts I and IV (*see* App. p. 499-501 and 502-503). Properly used, many of these averages are indicators of technical efficiency or economic efficiency of railways. Yet the statistics of this type require considerable intelligent interpretation before they can be used for that purpose. More interpretation of the limitations and uses of these statistics might be profitably included in the text at the front of these publications.

Measures of output of other phases of rail operation are contained in separate publications which deal respectively with express, communications, and also with bridges, tunnels and ferries. The express publication tells nothing of importance about the quantity of express traffic—only the value of financial paper issued (*see* App. p. 506-507). Express car-miles in freight and passenger service by type of motive power, and in work train service appear in *Railway Transport,* Part IV (*see* App. p. 502-503), but not in the publication *Express Statistics.* This latter publication could be made more comprehensive by the addition of statistics of volume of express traffic. The statistics of output of telegraph and cable companies are more adequate, containing detail of telegrams sent and received, cablegrams sent and received, and money transfers. Traffic over bridges, through tunnels, and on ferries, with totals for each category is counted in terms of passengers, trucks, buses, motorcycles, and so on.

Traffic by Commodities

The main gap in statistics of truck traffic is the paucity of commodity data. Commodity data are limited to six broad categories—agricultural; animal; mine; forest products; manufactures and miscellaneous; and NOS general freight.

No commodity breakdown is provided for urban trucks. Commodity totals are given by province of registration (Atlantic provinces grouped together), separately for international and interprovincial class, and intra-provincial intercity class of traffic (*see* App. p. 509-511). A much more detailed commodity classification, preferably the Standard Commodity Classification used by the Dominion Bureau of Statistics, would greatly improve the value of the data. The inclusion of a breakdown by commodities for urban truck movements would also be useful. Also traffic flows of each commodity by origin and destination would be valuable information.

The most useful material on truck traffic is included in the annual publication *Motor Transport Traffic,* with seven separate volumes for national

estimates and for provincial (*see* App. p. 509-512). No data are published monthly on truck traffic at all. The other main source of trucking information is an older series, *Motor Carriers—Freight* (*see* App. p. 508-509), which contains financial, traffic, equipment, and other statistics for each of four classes of carrier, depending upon size, with least detail for the smallest firms. The trucking statistics all somehow give an impression of unnecessary complexity. The inclusion of different amounts of data for different classes does not make for quick comprehension of the statistics. In the *Motor Transport Traffic* publication, the numerous classifications of truck according to interprovincial and international, intra-provincial, intercity, private, for-hire, farm trucks, urban trucks, and vehicle weight groups make each publication a maze to the uninitiated. The fault may be in the presentation, but in any event the statistics are frighteningly complicated at first glance.

Just as the truck statistics are deficient in commodity breakdown, so the air cargo (freight and express) statistics would benefit from an extension in this direction. There are no commodity data at all for air cargo, which is an area of great potential in North America in years to come. A study of air cargo by Boeing Airplane Company predicted that domestic air cargo traffic in the United States would rise from about 470 million ton-miles in 1957 to 2 billion ton-miles in 1965 and over 5 billion in 1970. The trend in world air cargo traffic is similar. Between 1946 and 1957, world air cargo traffic expanded over 20 per cent annually.[1] The time to begin gathering statistical series is not after a marked growth has occurred, but before it occurs. Statistics of air cargo by commodity and origin and destination would be of growing use. Such statistics would be a useful addition to the Dominion Bureau of Statistics publication, *Civil Aviation.*

In regard to water traffic, tons by commodity are now available but not ton-miles. In fact, aggregate estimates of ton-miles by water have only recently become available. The monthly publication, *Shipping Statistics,* shows some commodity tonnages for coastwise shipping and foreign shipping, and the annual *Shipping Report* contains such data in considerable detail (*see* App. p. 522-524). Weaknesses of these data are (1) the fact that in coastwise shipping the amount loaded frequently does not correspond with the amount unloaded; (2) absence of ton-miles, or data linking origin and destination; and (3) the large size of the "general cargo" category. In coastwise traffic, statistics of cargo tons by commodities are contained in the *Traffic Report of the St. Lawrence Seaway,* published annually by Seaway Authority, not Dominion Bureau of Statistics (*see* App. p. 527-529). But the data are only partial in coverage in the sense that only Seaway traffic is included.

[1] Boeing Airplane Company, *Forecast of Free World Passenger and Cargo Air Traffic (1965-70-75),* p. 18-23 (published 1959).

Except for a great amount of data on grain in storage in elevators, as reported by weekly, monthly, quarterly and annual publications by the Dominion Bureau of Statistics dealing with the grain trade, there is nothing on storage and warehouse by commodities. The *Grain Trade of Canada,* published annually by the Dominion Bureau of Statistics, contains a wealth of detail on movements of the various grains.

Grain products are not the only ones of importance insofar as storage is concerned. The Dominion Bureau of Statistics should take a comprehensive conceptual look at the storage statistics. One result might be separation of particular types of storage, or a linking of storage with particular special industries engaged as well in transportation such as the furniture moving industry. Recently the *Globe and Mail*[1] published an article entitled "Staff moves are becoming costly factor in business". Such an article would gain from the availability of specific data on furniture moving and storage industry.

Passenger Traffic

Up to this point we have been mainly concerned with freight. Gaps also exist in the passenger statistics which are scattered through many different publications. In the rail traffic statistics, much detail is provided on passengers, passenger-miles, passenger train-miles and passenger revenue per passenger train-mile, for each individual railway. In the Dominion Bureau of Statistics publication, *Passenger Bus Statistics,* there are statistics of passengers, miles run by buses and revenue vehicle miles for Group 1, 2 and 3 motor carriers. The traffic is classed according to chartered and regular routes (intercity and rural; urban and suburban). Separate data are published for each province. But in addition to this, data on buses are included in five other Dominion Bureau of Statistics publications.[2] For water passengers, traffic statistics appear in *Canal Statistics* annually and *Summary of Canal Statistics* monthly, as well as in the Traffic Report of the St. Lawrence Seaway (published by the Seaway Authority). *Civil Aviation* contains great detail on travel by air. The Air Transport Board in a publication which is not for general distribution, *Origin and Destination Statistics: Mainline Scheduled Traffic of Revenue Passengers, 1955-1959,* published for September and

[1] August 30, 1960.

[2] *Railway Transport,* Part IV contains motor bus-miles for each of 22 railways; *Motor Carriers—Freight* contains detail of passengers and miles run by buses; *Motor Transport Traffic* contains detail of mileage per bus, average journey, passengers, passenger miles, capacity seat-miles, and so on; *Urban Transit* contains information on revenue passengers carried for urban transit operations of intercity and rural passenger carriers; *Travel Between Canada and the United States* monthly and *Travel Between Canada and Other Countries* annually carry information about travellers crossing the Canadian-American border by bus. Private automobile traffic and trans-border air and rail also are included in two publications dealing with trans-border travel.

March in each of five years the number of passengers by origin and destination between Canadian stations and also between Canadian stations and of terminal points of Trans-Canada Air Lines in the United States (*see* App. p. 533-534).

The passenger statistics create a spotty impression. There is no uniformity in them and the data are sandwiched in a variety of publications. It would be useful to have a more methodical survey by origin and destination of passenger travel by all modes of transportation. Passenger travel is one area in which the failure to co-ordinate statistics by different media of transport is particularly striking.

Recommendations for Traffic Statistics

Not every statistical series or publication relating to transport has been covered up to this stage, though the Appendix is quite comprehensive. Nevertheless, the discussion has gone far enough to indicate some structural weaknesses in the present array of transport statistics. The following are the chief weaknesses, with recommendations pointing the direction of improvement:

1. A general need is for comparable data relating traffic handled by different modes of transport. This need is specially great in a time of keen competition among carriers. Also, where data are deficient for certain modes of transportation, existing statistics should be extended to fill gaps. Railway traffic data are needed on a basis comparable with other carriers on the same commodity classification. This necessitates conversion of present statistics or more likely introduction of a new series using the Standard Commodity Classification rather than the classification of the Association of American Railroads. In the case of trucking, commodity statistics are non-existent for urban trucking, and the commodity classification is not detailed enough for private and "for-hire" interurban trucking. Air commodity statistics do not exist. Water statistics by commodities exist for tons, but not ton-miles. Accuracy of the coastwise statistics for a number of ports is questionable and the canal and St. Lawrence Seaway statistics do not cover all the traffic. These deficiencies should be remedied. One method of doing so is suggested in Chapter 4, "A Canadian Industrial Freight Traffic Survey".

2. In regard to traffic statistics, another need is to link origins and destinations to show as far as possible actual movements of traffic. Care in designing such statistics would be necessary so as to avoid going too far in revealing operations of any particular company

to its competitors. In the water statistics, tonnage data are given by ports but the loadings and unloadings are not sufficiently closely related to each other. Sometimes freight is unloaded in coastal trade which, so far as the statistics show, has never been loaded. Rail traffic reports do not distinguish domestic and foreign goods originating at or destined for Canadian stations. Truck statistics are shown only by province of registry of truck. For all carriers we need proper origin and destination statistics.

3. The small size of sample in the rail carload *Waybill Analysis* is often criticized. But replies to questionnaires do not indicate the small sample really is useless on this account. It is possible to be more critical of some of the omissions: less than carload traffic; mixed-media; piggyback; containerized traffic and trans-border. These omissions should be remedied in the interest of promoting efficient transport by through-routing, and in order to promote comparability of transport with other industrial statistics. Also, better analysis of competition among the different media of transport would be possible with a more comprehensive coverage of traffic. Moreover, the commodity classification used in the *Waybill Analysis* is a railway classification, not comparable with other carriers. Further discussion of the *Waybill Analysis* and traffic statistics follows in Chapter 4.

4. Another omission from present traffic statistics is details of volume of traffic benefiting from special services like refrigeration, carrier assistance in loading and unloading, milling in transit, and so on. Such information might usefully be published on a comparable basis for all carriers.

5. There is a general need to improve traffic analysis through provision of data on traffic, by commodities origin and destination. Statistics of tons, ton-miles, average haul per ton, revenue per ton-mile should be published on this basis. A proposal along these lines is set forth in Chapter 4.

6. Also, in part, because of its potential usefulness as a general economic indicator, it would be worthwhile to supplement the existing rail *Carloadings* report, published four times a month, with a similar report on truck loadings.

7. Data on speed of service are almost entirely missing from government statistics. Train-hours in freight service is about the only time measure appearing in all the government statistics. This information appears in Parts I and IV of *Railway Transport* (*see* App. p. 499-503). There are no statistics at all on frequency of service by any carrier. There is a definite need to develop series of statistics

comparable for different carriers on this subject. Even sample data indicating speed and frequency might well be sufficient.

8. *Express Statistics* should contain measures of express output, so as to make the data comprehensive in this special subject.

9. The categories or the presentation of trucking statistics should be simplified.

10. An explanation of the uses of railway output data and degree to which economic and technical efficiency are measurable by each of them should be included in each issue of the appropriate periodicals.

11. Commodity statistics for storage and warehousing of goods other than grain should be provided.

12. There are many freight traffic publications relating to rail transport. The publication *Railway Transport* appears only after a sizeable delay. The various volumes appeared 8 to 14 months after close of the year 1958. Also it largely duplicates earlier series. Some volumes of it probably could be omitted.

Actual rail freight rate information is confined to data for grain, published in *Grain Trade of Canada* annually. There is nothing published on truck rates, or urban cartage charges, or air rates. Water freight rates on grain from Fort William and Port Arthur to various points on Great Lakes are shown in *Canal Statistics* (*see* App. p. 525-527), and also in *Grain Trade of Canada*. Nothing is published on pipeline rates or warehouse and storage rates.

For road and truck, however, there are statistics of average revenue per ton-mile. Usually revenue per ton-mile is an average of several rates, except where the commodity designation coincides exactly with that used for ratemaking purposes.

In regard to rail, the 1 per cent sample of carload traffic in the Board of Transport Commissioners' *Waybill Analysis* provides a close approximation to rate information because average revenue per ton-mile is published for individual commodities. Revenues per car-mile is also stated, which is a less useful indication of price of service or rate. The information in the *Waybill Analysis* is particularly useful because information about traffic moving on different types of rate is given—class rates, commodity rates, statutory rates, agreed charges, and so on (*see* App. p. 506). Less useful is the average revenue per ton-mile of freight for all traffic for separate railways published in several other publications.[1]

[1] This information appears in monthly and annual issues of *Railway Operating Statistics*, in *Railway Transport*, Parts I and II, in *Canadian National Railways, 1923-1958*, and in *Canadian Pacific Railway Company, 1923-1958*.

For trucking, average revenue per ton-mile appears for "for-hire" trucks only (since private truckers do not levy charges on their own freight). Information is given only for six broad commodity groups and for intercity movements. Also published is information on revenue per truck and revenue per mile travelled. Such statistics are presented in the national and provincial issues of the annual *Motor Transport Traffic* publication.

Existing published information on pricing, even of railway services, is insufficient for production of an index of freight rates. Such an index would be useful for comparison with other price indexes. Also, it would be worthwhile to publish more information on prices charged for specific movements of freight and for rates on traffic by length of haul (by mileage blocks). Pricing information is important in analysis of the transport industry and competition among carriers, and also in relating transport to other phases of industrial processing. A proposal for an index of freight rates, for each carrier, and also for specific commodities is examined in Chapter 3—"An Index of Freight Rates". Chapters 3 and 4 will demonstrate that the provision of more explicit pricing information could be joined with a proposal for more detailed statistics of flows of traffic, by commodity with origin and destination related. Also it would be useful to have some information on storage charges, now non-existent.

Passenger Fares

Urban Transit contains details of passenger fares charged for each of 13 major transit systems. This is the only information relating directly to passenger fares in all the government statistics. There is nothing at all on taxicab fares.

Rail average revenue per passenger mile appears in monthly and annual issues of *Railway Operating Statistics* for each of the Canadian National and the Canadian Pacific and total of 22 Canadian railways (*see* App. p. 504). Also these statistics appear in *Railway Transport,* Part II. The same type of information and also data on average revenue per passenger (as well as per passenger-mile) are published in *Railway Transport,* Part I, and in the publications *Canadian National Railways, 1923-1958,* and *Canadian Pacific Railway Company, 1923-1958.*

For bus traffic, the only figures on average passenger revenues are included in *Motor Transport Traffic.* Revenue per mile, revenue per bus, and revenue per passenger-mile are recorded there for the various provinces, but nothing of this sort is published in *Passenger Bus Statistics.*

A certain amount of additional information can be found in the monthly Dominion Bureau of Statistics publication, *Prices & Price Indexes,*

where there are consumer price index series for transportation as a whole, for automobile operation, new passenger cars, gasoline, local transportation, and street car and bus fares. The pricing of passenger service is not as significant for the economy as freight rates. Nevertheless, it might be useful to bring together material on traffic and pricing of passenger services into one publication where it can be more readily used.

Inventory of Plant and Equipment

So far we have considered the output side of transport service and will now deal with the inputs—plant and equipment, fuel and materials, and labour. Publication of statistics on inputs facilitates analysis of technological changes in transport, and their effect on demand by carriers for products from other industries. Also, information on employment makes it possible to appraise the effects of technological changes and investment in new capital equipment on employment in transport. Data on wages and hours may prove useful in wage negotiations and in outside studies of wage demands.

A substantial amount of detail on plant and equipment is available for road, rail, pipeline, and water carriers, and on warehouse and storage capacity. In regard to plant and equipment, there is not the same possibility or need for standardization among carriers. Each means of transport has its own peculiar items in an inventory of plant and equipment.

In the rail statistics, substantial amounts of detail are published regarding mileage of track, car equipment, motive power, rail and ties, and so on. Capacity and type of equipment are recorded. The main sources of such information are *Railway Transport,* Part III, which deals exclusively with equipment, track, and fuel statistics, and Part I of the same publication which contains "Comparative Summary Statistics" (*see* App. p. 499-501). Part III for the year 1958 appeared (as Table 2 later in the chapter shows) nine months after the close of the year, and Part I, 14 months after the end of 1958. The delay is not as serious a matter as a similar delay in traffic statistics would be, as there is not generally the same need for analysis close after the event.

One apparent weakness in these statistics relates to the need that they should reflect clearly changes in technology. For instance, with dieselization the nature of motive power has changed considerably, and a locomotive now is very different in its capacity to do work. With technical improvements in diesel locomotives, the change could continue. It would be useful, therefore, to publish information about horsepower of diesel units in service. Locomotive-miles, for example, become meaningless if a locomotive is not a standard piece of equipment. It is desirable to search out some factor common to all locomotives (horsepower, for example) and to express capacity and

work done in those terms. Some advances could be made here. Also, it would be useful to have in these publications related material on dollar investment in plant and equipment, for instance in the dieselization programmes of major railways.

Statistics of plant and equipment for bridges, tunnels and ferries consist of a smattering of information on two companies—the Van Buren Bridge Company and the International Bridge and Terminal Company in *Railway Transport,* Part III. If bridges, tunnels and ferries are of any separate significance, it might be useful to have a more adequate description of their plant and equipment in the publication dealing with that subject—*International Bridge, Tunnel and Ferry Companies.* For communications, existing statistics of wire and cable mileage, channel and circuit mileage, and pole line mileage probably suffice. In the publication *Express Statistics* the number of express offices is stated, and details of route mileage are published according to type of carrier—rail, water, air, motor, and miscellaneous (*see* App. p. 506-507). It is useful to have comparable information for the express routes of different modes of transport. Availability of express traffic information on a similar basis would round out the publication. As it is, the publication seems incomplete.

Most of the information on truck equipment, stated by capacity, type, and kind of fuel, is found in *Motor Carriers—Freight* (see App. p. 508-509) with additional information on the truck population by gross vehicle weight group in *Motor Transport Traffic.* Also there is a great deal of information on registrations of taxicabs, buses, trucks and other motor vehicles in the annual publication, *The Motor Vehicle* (*see* App. p. 512). The statistics are given for provinces and for municipalities. *Passenger Bus Statistics* contains detail of bus equipment by region, model year, and seating capacity. *Urban Transit* also contains information on revenue equipment classed by seating capacity (*see* App. p. 520-521). Detail of highway and rural road mileage and of urban street mileage appear in *Road and Street Mileage and Expenditure.* Trucks associated with firms offering public warehousing and storage are reported in the annual publication, *Warehousing.* Related material is scattered through a number of publications, and yet this may be inevitable since each of the publications relates to some distinct aspect of road transport.

For oil pipelines, information is available for each of 32 companies on pipeline mileage separately for gathering and trunk lines, and by pipe diameter. Also there is information on pumping stations on trunk lines by rated horsepower. The statistics are published in the annual issue of *Oil Pipe Line Transport* (*see* App. p. 535-536). No comparable data are available yet for gas pipelines, but the publication *Gas Pipe Line Transport* (monthly only) is of very recent origin and an annual publication is planned which should improve the range of information provided.

Storage capacity is stated in detail for grain elevators, according to the kind of licence, in *Grain Trade of Canada.* For other types of storage, information on net occupiable space in cubic feet according to the kind of storage appears in *Warehousing.*

A very large amount of statistical material appears on the number and registered net tonnage of vessels arriving at and departing from Canadian ports. In the annual *Shipping Report,* such information in great detail is published separately for international seaborne shipping and coastwise shipping. Details of country of registration are also provided (*see* App. p. 522). Some of the same material for ships arriving at and departing from National Harbours Board ports is published in the Board's annual report (*see* App. p. 529-530). Also there are useful statistics in that publication on cargo tonnage inward and outward by foreign ships and by Canadian ships. Such data are useful in analysis of government policy toward the Canadian merchant marine and foreign shipping. From this standpoint, in addition to what is now available, it would also be valuable to have statistics relating specifically to Canadian shipping operators giving the number of ships by type and size which these operators own and the number that they charter.[1]

The publication which is supposed to deal with the Canadian merchant marine is not of much use—*Water Transportation.* Experts in shipping matters declare it is not worth the paper it is written on. The publication contains information on vessels owned or chartered by Canadian marine operators according to type of vessel and location. Foreign carriers are deliberately excluded since the report is designed to measure the Canadian shipping industry only. Yet not all Canadian carriers are included, and the value of this publication is hampered by the lack of an acceptable definition of what comprises the Canadian water transportation industry. Accordingly, it is not possible to use the statistics in this publication to obtain a clear picture of the water transportation industry. The report needs a thorough overhauling and examination from a conceptual standpoint.

Finally, in regard to the plant and equipment of air carriers, information is published in the monthly, preliminary annual, and annual issues of *Civil Aviation* on the average number of aircraft owned and leased by airlines. Data on airport licences in force and on aircraft registered by type appear in the annual issue only. Information on the investment in different types of aircraft might usefully be related to the types of equipment operated by the various carriers. The statistics on plant and equipment of airlines are not as detailed or comprehensive as those published for railway, road or water transport.

[1] Specifically in regard to type of vessels operating through canals and the St. Lawrence Seaway, there is considerable information published in monthly and annual issues of *Canal Statistics.*

Recommendations for Plant and Equipment Statistics

1. Especially in rail statistics it is important to design statistics of plant and equipment in such a way that technological changes will be evident in the statistics. Capacity of locomotive should be stated in terms of horsepower, and locomotive-miles in the more homogeneous unit of horsepower-miles.

2. In regard to all important carriers—rail, truck, air and shipping—it would be useful to relate equipment inventory explicitly to the dollar investment in it. This type of information would be useful both in analysis of technological change in the industry and of competition among carriers.

3. There should be a more adequate description of the plant and equipment of bridge, tunnel and ferry companies, and it should appear in the publication, *International Bridge, Tunnel and Ferry Companies.*

4. Statistics of pipeline mileage and pumping station capacity should be published for gas pipelines similar to that now available for oil pipelines.

5. To facilitate analysis of problems of the Canadian merchant marine, it would be useful to have statistics of shipping owned and chartered (according to type and size) by all Canadian operators. Provision of such statistics should form part of a conceptual re-examination of the publication, *Water Transportation.*

Materials and Fuel

In the regular periodicals dealing with each mode of transport, there is a considerable amount of information on fuel used by the carriers. Other materials used in operations of carriers are hardly considered at all. Unless there is a demand for such information, however, it does not appear worthwhile to undertake any costly extension of statistics in this direction.

Labour

Earlier in this chapter, reference was made to information on wages, hours, and employees in publications of the Dominion Bureau of Statistics dealing chiefly with labour throughout all industries. Information on average weekly wages and salaries, employment (an index), and number of employees is provided for transportation as a whole, for railways according to such broad categories as maintenance of equipment and maintenance of way, for water transportation, and for truck transportation. Similar data are provided for employment in the production of transportation equipment. This informa-

tion is comparable with that provided for other industries outside the field of transportation. These data on employment in transportation, however, do not relate to individual occupations.

Employees by type of occupation are included, however, in the statistical coverage of the specialized publications dealing with each mode of transport. The number of employees man-hours worked, and earnings by category of employee are reported in the annual oil pipeline periodical. Number of employees and earnings also appear in the annual issue of *Civil Aviation* for airlines, in *Water Transportation* for employees of some Canadian ship operators, and in *Urban Transit* for each of 13 major urban transit systems. Regular and casual employees of warehouse and storage firms are covered in *Warehousing.*

Bus company employees are reported by category of job in *Passenger Bus Statistics* and truck employees in *Motor Carriers—Freight.* General officers, office clerks, drivers, mechanics, working proprietors, and others are separately classified according to the size class of the trucking firm. Information on number of employees and the salaries is published, but not on the total hours worked. Railway employees engaged in highway transport and cartage operations are reported in the sixth volume of *Railway Transport* which deals solely with employment statistics. The number of employees, time on duty, total compensation, and average per hour and per year are recorded—more detail than is published on other employees engaged in trucking.

The amount of material on employment in rail transport is considerably greater and is published mainly in *Railway Transport,* Part VI (*see* App. p. 503-504). For each of 79 categories of employee, information is presented on number of employees, time on duty in hours, average hours worked, total compensation, and average wages and salaries.

Up to the end of 1955, the railways reported to the Dominion Bureau of Statistics details of employment by various groups and the hours *paid for.* Now the railways report the hours *actually worked,* making no allowance for overtime, holidays and vacations. The result is that the wages per hour appear higher than they did on the old basis. As a result, the average wage per hour in this publication for railway employees is not comparable with similar figures in other government publications relating to other industries. Nor can any comparison be made with statistics of average wage per hour for railway workers prior to the end of 1955. Historical continuity has been destroyed. No provision was made for linking the new and old series so that statistics prior to the end of 1955 could be compared with more recent figures. Moreover, the railways also changed the occupational grouping so that historical continuity is completely broken.

Recommendations for Labour Statistics

1. It is recommended that the railways be required to furnish statistics of hours paid for and average compensation per hour paid for on a basis which will permit comparison of present earnings in each occupational category with those prior to the end of 1955. The statistics of earnings of railway employees would then be on a basis comparable with earnings per man-hour in other industries. If it should prove impracticable to revert to the old basis of reporting, the railways should be at least required to provide statistics for a single year (1960 or 1961) on the old as well as the new basis so that historical continuity can be re-established.

2. For truck, water, air and gas pipeline employees, statistics of man-hours paid for should be published, together with averages of earnings per man-hour.

Finances of Carriers

Financial statistics give a picture of the profit or loss position of companies in an industry or branch of industry. Over time, changes in items in an income statement or balance sheet indicate growth, stagnation or decline. Any properly constructed accounting statements will show up whether an industry or a company is doing well or not. Financial information in varying degrees of detail and completeness are published for rail transport, trucks and buses, urban transit, Canadian shipping companies, airlines, pipelines and warehouses.

In amount of detail, the railways are most favoured. *Railway Transport,* Part II, contains only financial statistics, balance sheets, income statements, and statements of capital stock and funded debt for each of about 30 companies. The report for 1958 appeared 13 months after the close of the year. Other publications presented railway financial statements to the public some months earlier but in less detail. Operating revenues and expenses, broken down into main categories, and also net rail operating income appear in the monthly issue of *Railway Operating Statistics* and later in the annual issue. Statements of income and capital accounts for the Canadian National and Canadian Pacific are published in the two publications of the Dominion Bureau of Statistics respectively bearing the names of those railways. In addition, *Railway Transport,* Part I, the summary volume issued more than a year after the close of the period 1958, included information on disposal of net income, investment in road and equipment property, railway capital, and the depreciation and reserves of railways in total (*see* App. p. 499-501).

In spite of the very large amount of financial information published, all of it in accordance with the "Uniform Classification of Accounts for Class I Common Carriers", it is quite difficult to relate the financial picture

to the information on carrier inputs and outputs in any specific way. The financial statistics are prepared according to an accounting classification which is not related to functions or inputs or outputs. Revenues may be classed according to broad categories like "freight" and "passenger", but expenditures are not classed the same way, and could be only through an arbitrary splitting of joint expenses. Even where operations are fairly distinct, like storage, wharves, elevators, telegraph and telephone, the revenue categories for such items frequently do not seem to be comparable with the expenditure categories. And often it is difficult to distinguish what non-rail operations may be included or excluded from a given statement. Also, there does not seem to be anything about hotels at all, though these should be a fairly distinct category both as regards revenues and expenses. It would be hazardous to judge railways' efficiency from the financial statements. It would be absolutely impossible to examine any very specific aspect or location of rail operations using the published financial statistics. Another weakness of the railway financial statistics is the inclusion of obscure and relatively meaningless companies who rate first-class accommodation in these periodicals, like the Napierville Junction Railway Company.

The periodicals which contain information about railways also contain financial data on express and communications—operating revenues and expenses, with varying degrees of breakdown by companies. Bridge, tunnel and ferry companies are included too. *Railway Transport,* Part II, contains the income and total operating expenses of each of three Pullman, tunnel and bridge companies, the capital stock of two bridge companies, and the current assets and liabilities of one bridge company. It is not immediately apparent why some items are omitted for some companies but not for others. Data on capital, investments, taxes, and interest are provided for total ferry companies and for total bridge and tunnel companies in the periodical *International Bridge, Tunnel and Ferry Companies.*

The financial statistics of all carriers, voluminous as they are, are probably more impressive to an accountant than they are to a traffic executive or an economist. The questionnaire to users of statistics (Table 1) indicated a demand for information on "cost to carriers of handling shipments between specific points". Such a demand could not be met at all through the present accounting data on expenditures. This is one of the severe limitations of all of the published financial statistics. They do not carry one very far in analyzing efficiency or any aspect of specific operations.

Trucking company financial statistics, subject to exactly the same limitations as the rail statistics, are published mainly in *Motor Carriers—Freight.* Statements of property account and income are published for each size group of trucking firms. Separate statements are given for the Atlantic region and for each of the other provinces (*see* App. p. 508-509). Similar

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information for buses appears in *Passenger Bus Statistics.* The periodical *Motor Transport Traffic* contains only totals of revenue from different truck movements and gross vehicle weight groups. There is nothing on expenses in this publication at all.

Balance sheets and income statements for 13 major urban transit systems are published in the annual issue of *Urban Transit* and total revenues of Class I carriers are reported in the monthly issue (*see* App. p. 520-521).

Financial statements of certain Canadian shipping operators are shown in total in *Water Transportation,* but the statistics are of little use because they relate neither to the entire Canadian shipping industry nor to the operations of any single company. Apart from these statistics, the only financial data relating to water operations are toll revenues of the St. Lawrence Seaway (published in the Seaway Authority's *Traffic Report of the St. Lawrence Seaway*), also information about the revenues and expenses of railways in their water operations (in *Railway Transport,* Part I), and finally some statistics on capital expended by the Canadian National and Canadian Pacific Railways for steamships—in the two publications relating respectively to these railways.

For airlines, detailed statement of property account, balance sheet, and revenues and expenditures are published annually in *Civil Aviation.* The monthly and preliminary annual editions of this periodical contain statements of revenues and expenses only. Separate statements for each of six or seven major airlines appear in the various *Civil Aviation* publications (*see* App. p. 530-532).

Considerable detail of the financial position of each of 32 oil pipeline companies is set forth in *Oil Pipe Line Transport* each year. In the monthly issues, however, only quarterly operating revenues for each of five companies are published. In the relatively new monthly publication, *Gas Pipe Line Transport,* total operating revenues are stated for each of 16 natural gas transmission companies. When the proposed annual issue of this publication is produced, more extensive detail of the financial situation of natural gas pipeline companies can be expected.

The main source of financial data for warehousing and storage is the annual publication, *Warehousing.* Unlike the rail, air and pipeline statistics, however, the warehousing statistics do not provide statements for any individual company's operations. Details of property account, operating revenue and operating expense are given for the total of 213 firms which offer public warehousing and storage with a breakdown for firms in each province.

Some additional financial information concerning warehousing and storage appears incidentally in other publications. For example, the balance sheets and statements of income and expense of the Port Colborne and Prescott grain elevators appear in the *Annual Report of the National Harbours*

Board. In *Railway Transport,* Part I, operating revenues of the total of all railways, from wharves, grain elevators, rents of buildings, storage of freight, and storage of parcels and baggage, are published. In Part II of the same publication, operating revenues for approximately the same storage items are published for each of 31 railway companies or subsidiary companies. On the expense side, however, operating expenses are reported for the Canadian National and Canadian Pacific only, and for only coal and ore wharves and grain elevators. Since the expenses and revenues do not relate to the same items, it is difficult to draw any conclusions about the relative magnitude of revenues and expenses of storage items. Maybe this situation is inevitable in accounts of minor operations of the railways, but it is still difficult to see what purpose is served by the publication of some of this detail.

Because railway statistics are prepared according to an accounting classification which ensures comparability with the accounts of American railways, the existing published reports are useful in their present form. Also, comparisons among Canadian railways can be drawn from these financial statements. Even so, a lot of needs are not fulfilled by the present financial statements, but tinkering with the present accounting classification would not likely help very much. The elimination of separate accounting statements for some of the smaller railway companies like the St. Lawrence and Adirondack and Roberval and Saguenay would be no great loss, but no great economy either. And only a very complete overhaul of the method of reporting expenditures data would permit analysis of costs of specific rail operations in specific localities. Shippers want to have information about the cost to carriers of handling freight between specific points, and the financial statements yield nothing of this sort. A functional approach rather than a financial approach to accounting would be necessary to obtain this type of material. The basic data would be obtainable from the costing departments of the railways rather than from the accounting departments.

From the standpoint of economic analysis, there are great limitations in the usefulness of the financial reports concerning all of the different modes of transport. The present classifications of accounts do not lend themselves readily to measuring the cost or profitability of particular operations or do not lend themselves readily to the requirements of controlling efficiency of operation. They are intended to reveal the financial position of enterprises and are valuable in that sense. The needs of the transport economist and the industrial traffic officer must be met in another way, not through balance sheets and income statements prepared by accounting departments.

Recommendations for Financial Statistics

1. Publication of railway financial statistics on a basis permitting comparisons with American railways should continue.

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2. The need for statistics to measure carriers' costs of specific operations cannot be met through the means of company financial statements.

3. Financial statements of some of the small subsidiary railway companies do not seem to have much potential use. Yet the statements have to be prepared anyway and the cost of publishing them is likely quite small. While the railway statistics seem to include extremely insignificant companies, the statistics for other carriers sometimes omit significant companies. The grouping together of a substantial number of firms in the shipping and warehousing reports limits the usefulness of the financial statements for these industries. This same criticism applies to the *Water Transportation* report which does not include all of the Canadian operators and so does not present a comprehensive picture of the industry. The warehousing firms might usefully be classified according to their type of operation. Also, the addition of more companies in the *Urban Transit* report would help to give a more comprehensive picture of the financial situation of the urban transit industry.

Taxes, Subsidies and Government Regulations

Competition among carriers is bound to raise the question of how much each means of transport (and each company) is subsidized by the various levels of government. Where a given means of transport is subsidized while others are not, the operations of the subsidized carriers tend to expand to a greater extent than they would under a *laissez-faire* policy of government toward the industry. If the subsidized carrier receives some form of capital subsidy, it can expand its investment and lower its depreciation costs. It will then be in a more favourable position than it otherwise would be to attract traffic from its competitors through more extensive service and a lower price of service. If the subsidy takes the form of a subsidized reduction in rates or charges, then more traffic moves by the subsidized carrier than would be the case if there were no subsidy. Wherever there is a subsidy, there is a tendency toward misallocation of resources inasmuch as a boost is given to service which could not otherwise pay its way. (Usually it is the inefficient and costly services which receive subsidies.) There is, therefore, real risk of diverting economic resources to inefficient operations when subsidies are paid. The price of so doing is disguised because the subsidy is paid through the tax rate. While there are many arguments for subsidies to bolster regional economies or to assist Canadian industries to meet foreign competition, it is well to measure and be aware of the element of distortion which a subsidy introduced into the economy.

Accordingly, it is in the public interest to know what the subsidies are and how much they cost. Statistics showing both direct and indirect subsidies by governments to the transport industry should be published in as clear a form as possible. Also, it may be useful in the same connection to have

statistics of the taxes paid by carriers to the government. Often the element of subsidy necessitates a study both of the particular tax burden on a carrier and the special subsidies he receives, because it is at least possible that the special taxes on a carrier (not paid by other carriers) could exceed his special benefits.

Cash subsidies and expenditures on construction, and land grants by the different levels of government to the Canadian Pacific Railway and other companies, now part of that system, are stated in the Dominion Bureau of Statistics' annual periodical, *Canadian Pacific Railway Company, 1923-1958.* Government loans and appropriations, federal contributions to the deficits of the Canadian National, and government subsidies to lines, now part of the Canadian National system, are reported in the similar publications for that railway. Aid to the railways and government guarantees of the bonds of the Canadian National are recorded in *Railway Transport,* Part I (*see* App. p. 499-501). In addition, detail of railway tax accruals by level of government and by type of tax appears in Part II of the same publication. Taxes paid by express, telegraph and cable, and international bridge, tunnel and ferry companies are published in much less detailed form in the periodicals relating to those operations, but there is no information on government subsidies to such companies.

Subsidies for urban street expenditures and for highway and rural road expenditure by level of government are published in *Road and Street Mileage and Expenditure* (*see* App. p. 519). Government revenues from motor truck licences and fees and also taxes on gasoline and other motive fuels, by provinces, are published in *The Motor Vehicle* (*see* App. p. 512). Also, there is information on operating taxes and licences and income tax paid by totals of each of Class I and Class II motor carriers according to province in *Motor Carriers—Freight* (*see* App. p. 508-509). In Passenger *Bus Statistics,* there are comparable data for bus companies.

All of this information does not make it possible, however, to arrive at any very definite conclusions regarding subsidies which may in effect be paid by governments to commercial trucks through heavier and more extensive highway construction necessitated by trucks. The problem is one of separating the expenses of road construction and maintenance required for private automobiles from the expense accounted for by the presence of trucks on the roads. To arrive at a better estimate of the proper allocation of costs, it would be necessary to have better statistics than we now have regarding the amount of commercial and non-commercial traffic on highways, with detail according to the gross weight of commercial vehicles. Such information could be provided through more information on origin and destination of truck movements and a survey of passenger travel by motor vehicle. Better traffic statistics in these forms would assist the study of government subsidiza-

tion of highways, which has aroused intense public interest particularly in the United States.

Government subsidies to air carriers are not reported. To a large extent these subsidies would be indirect. Statements of airport costs relative to user charges to the airlines, and of any other indirect or direct subsidies to airlines would be a useful addition to present statistics. General taxes and income taxes are published separately for different categories of air carrier and for each of six or seven major Canadian airlines. Details of total taxes and any special taxes and licences paid by Canadian airlines would facilitate analysis of the subsidization of air traffic.

Regulations imposed by the government may have a sufficiently important effect upon the economic position of an industry to warrant inclusion in published statistics. This is the case with trucking. The Dominion Bureau of Statistics publishes quite extensive information on size, weight, safety, and licence regulations in each province. Such regulations may limit the capacity of equipment which may be used, or may impose special fees or expenses on the carriers. Regulations affecting trucks and buses are skilfully and clearly published in *The Motor Vehicle: Preliminary Report of Registrations and Size, Weight and Safety Regulations,* and also for trucks only in *Motor Transport Traffic* (see App. p. 509-512 and 513).

But road transport is unique in respect to publication of government regulations affecting the industry. It would be worthwhile to study what material on regulation of railways, airlines and other carriers might be published. The passenger equipment of railways, for example, is designed partly from the standpoint of safety rather than economy, and it might be useful to incorporate in some of the railway transport publications regulations which affect the types of equipment which are permitted to be used.

Recommendations for Statistics on Subsidies and Government Regulations

In conclusion, it is recommended that additional statistics of government subsidies, particularly to road, air and urban transit carriers should be published so that a clear picture of direct and indirect subsidies to transport will be available. Also, it is recommended that a study be made of information which might usefully be published on government regulation of different aspects of transport affecting the economic position of carriers. In order to throw further light on the question of the extent of government subsidies to commercial trucking, it is suggested that this is one function which could be usefully served by statistics showing origin and destination of truck traffic and statistics illustrating the pattern of passenger traffic, particularly by automobile.

Accident Statistics

Statistics on accidents are quite well developed for all carriers. There is a specific publication dealing with road accident—*Motor Vehicle Traffic Accidents,* but otherwise the accident statistics are included in the special reports for different modes of transport. The only suggestion for improvement is that statistics be provided which show (a) the cost of damage to persons and property as a result of different types of accidents, and (b) expenditures by government and private bodies on prevention of specific types of accidents.

Transportation Equipment

In addition to statistical periodicals dealing with each means of transport, the Dominion Bureau of Statistics issues a series of nine publications containing statistics of the manufacture of transportation equipment. The content of these periodicals is described in the Appendix (p. 541-544). The Standard Industrial Classification used by the Dominion Bureau of Statistics provides for a separate transportation equipment group, consisting of a number of sub-industries—aircraft, shipbuilding, bicycles, boat building, motor vehicles, motor vehicle parts, railway rolling stock, and miscellaneous equipment. Statistics on these industries are comparable with those published for other manufacturing industries, and so the manufacture of transportation equipment can easily be compared with other industries in regard to employees and earnings, capital and repair expenditures, inventories, fuel and materials used, and value added by manufacture. This is a very useful series of publications from the standpoint of integrating transport with other industry data.

Timeliness of Published Statistics

Even with increasing mechanization of data processing, the value of useful statistical series is often reduced by delays in publication. The problems in securing the earliest possible publication of statistical series consistent with minimum cost is a challenge to the administrative ability of officials in the Dominion Bureau of Statistics to a greater extent than to the computing equipment.

Table II shows, for each annual publication, the time-lag in production of statistics. To arrive at the time-lag, we compare the month of publication with the period covered in the publication. (On monthly periodicals, the month of publication is not shown.) Many publications appear more than a year after the close of the period covered. Delays of six to nine months in publication are more frequent than lesser delays. The table contains only one

recent example of each periodical, but probably represents fairly accurately the general picture of time-lags in production of transport publications.

It is recommended that the Dominion Bureau of Statistics examine carefully the causes of delay. Various causes are possible. There are delays arising from late reporting by carriers and other members of the public to the Bureau. Then too, the processes of checking, designing the form of statistical tables, of processing, printing, and proof-reading demand an adequate number of experienced employees in the Dominion Bureau of Statistics. Problems of chronic staff shortage and high turn-over in some occupations may be sources of delay in publishing statistics. Also, delay in publication of some statistics may result from the priorities established for different publications over the whole range of government statistics.

The Dominion Bureau of Statistics is undoubtedly aware of the problem of securing prompt publication of statistics, and has made some headway in reducing time-lags. There is room for considerable improvement, however, and it may well be that some of the problems such as the staff shortage will require the attention of other agencies of government dealing with employment and personnel as well as the continuing attention of officials of the Bureau itself. Any effort to solve the problem of earlier availability of transport statistics would pay great dividends in increased usefulness of the statistics.

TABLE 2—TIMELINESS OF TRANSPORT STATISTICS

D.B.S. Number	*Title of publication*	*Current period covered*	*Month of publication*	*Time-lag*	*Price*
	1. RAIL				
52–001	Carloadings	June 1–7, 1960			$3 per year
52–002	Railway Freight Traffic	January 1960	—	—	$2 per year
52–205	Railway Freight Traffic: Year ended December 31, 1958	1958	July 1959	7 months	$1
52–207	Railway Transport 1958, Part I: (Comparative summary statistics 1954 to 1958)	1958	Feb. 1960	14 months	50c.
52–208	Railway Transport 1958, Part II: (Financial statistics)	1958	Jan. 1960	13 months	75c.
52–209	Railway Transport 1958, Part III: (Equipment, track and fuel statistics)	1958	Sept. 1959	9 months	50c.

TABLE 2—TIMELINESS OF TRANSPORT STATISTICS—Continued

D.B.S. Number	*Title of publication*	*Current period covered*	*Month of publication*	*Time-lag*	*Price*
52–210	Railway Transport 1958, Part IV: (Operating and traffic statistics)	1958	Dec. 1959	12 months	50c.
52–211	Railway Transport 1958, Part V: (Freight carried by principal commodity classes)	1958	Nov. 1959	11 months	$1.50
52–212	Railway Transport 1958, Part VI: (Employment statistics)	1958	Aug. 1959	8 months	25c.
52–003	Railway Operating Statistics, March 1960	Financial March 1960 Operating Feb. 1960	—	—	$2 per year
52–206	Railway Operating Statistics, Year 1959	1959	—	—	25c.
52–201	Canadian National Railways, 1923–1958	1958	Aug. 1959	8 months	50c.
52–202	Canadian Pacific Railway Company, 1923–1958	1958	Aug. 1959	8 months	50c.
—	Board of Transport Commissioners for Canada, Waybill Analysis, Carload All-Rail Traffic, 1958	1958	Aug. 1959	8 months	50c.
52–204	Express Statistics	1958	June 1959	6 months	25c.
56–201	Telegraph and Cable Statistics 1958	1958	Sept. 1959	9 months	50c.
53–202	International Bridge, Tunnel and Ferry Companies 1958	1958	June 1959	6 months	50c.
	2. ROAD				
53–205	Motor Carriers—Freight 1957	1957	Sometime in 1959	12+ months	50c.
	Motor Transport Traffic				
53–207	National Estimates	1958	June 1960	18 months	75c.
53–208	Atlantic Provinces	1958	Apr. 1960	16 months	50c.
53–209	Province of Quebec	1958	Feb. 1960	14 months	50c.
53–210	Province of Ontario	1958	Dec. 1959	12 months	50c.
53–211	Province of Manitoba	1958	Dec. 1959	12 months	50c.
53–212	Province of Saskatchewan	1958	Sept. 1959	9 months	50c.
53–213	Province of Alberta	1958	July 1959	7 months	50c.
53–214	Province of British Columbia	1958	Dec. 1959	12 months	50c.

TABLE 2—TIMELINESS OF TRANSPORT STATISTICS—Continued

D.B.S. Number	*Title of publication*	*Current period covered*	*Month of publication*	*Time-lag*	*Price*
53–203	The Motor Vehicle 1958	1958	Feb. 1960	14 months	75c.
53–204	The Motor Vehicle: Preliminary Report of Registrations and Size, Weight and Safety Regulations, 1958	1958	Sept. 1959	9 months	50c.
53–001	Motor Vehicle Traffic Accidents, October–December 1959	October to December 1959	—	—	$2 per year
53–206	Motor Vehicle Traffic Accidents 1958	1958	Sept. 1959	9 months	75c.
53–002	Passenger Bus Statistics	April 1960	—	—	$1 per year
53–215	Passenger Bus Statistics 1958	1958	Mar. 1960	15 months	50c.
66–001	Travel between Canada and the United States, May, 1960	May 1960	—	—	$2 per year; 20c. per copy
66–002	Volume of Highway Traffic entering Canada on Travellers' Vehicle Permits, September, 1959	Sept. 1959	—	—	$1 per year; 10c. per copy
66–201	Travel between Canada and other Countries, 1958	1958	Sept. 1959	9 months	$1
53–201	Road and Street Mileage and Expenditure 1958 (formerly Highway Statistics)	1958	Apr. 1960	16 months	50c.
	3. URBAN TRANSIT				
53–003	Urban Transit, March 1960	Mar. 1960	—	—	$1 per year
53–216	Urban Transit 1958	1958	Nov. 1959	11 months	50c.
53–201	Road and Street Mileage and Expenditure 1958 (formerly Highway Statistics)	1958	Apr. 1960	16 months	50c.
	4. WATER				
54–002	Shipping Statistics February 1960	Feb. 1960	—	—	$2 per year
54–202	Shipping Report 1958, Part I: International Seaborne Shipping	1958	Sept. 1959	9 months	$1.50

TABLE 2—TIMELINESS OF TRANSPORT STATISTICS—Continued

D.B.S. Number	*Title of publication*	*Current period covered*	*Month of publication*	*Time-lag*	*Price*
54–203	Shipping Report 1958, Part II: International Seaborne Shipping	1958	Oct. 1959	10 months	75c.
54–204	Shipping Report 1958, Part III: Coastwise Shipping	1958	Nov. 1959	11 months	75c.
54–205	Water Transportation 1958	1958	Dec. 1959	12 months	50c.
54–001	Summary of Canal Statistics, December 1959	Dec. 1959	—	—	$1 per year
54–201	Canal Statistics 1958	1958	Sept. 1959	9 months	75c.
—	St. Lawrence Seaway Preliminary Toll Traffic Statistics, April 1960	Apr. 1960	May 1960	1 month	—
Catalogue No. TS2–259	Traffic Report of the St. Lawrence Seaway, 1959	1959	—	—	50c.
—	Annual Report of the National Harbours Board, for Calendar Year 1959	1959	Mar. 1960	3 months	25c.
	5. AIR				
51–001	Civil Aviation, December 1959	Dec. 1959	—	—	$2 per year
51–201	Civil Aviation, Preliminary Annual, 1958	1958	June 1959	6 months	50c.
51–202	Civil Aviation, 1958	1958	Nov. 1959	11 months	50c.
—	Air Transport Board: Origin and Destination Statistics: Mainline Scheduled Traffic Survey of Revenue Passengers 1955–1959	1959	May 1960	5 months	—
	6. PIPELINE				
55–001	Oil Pipe Line Transport, April, 1960	Apr. 1960	—	—	$2 per year
55–201	Oil Pipe Line Transport, 1958	1958	Nov. 1959	11 months	50c.
55–002	Gas Pipe Line Transport, May, 1960	May 1960	—	—	$2 per year

TABLE 2—TIMELINESS OF TRANSPORT STATISTICS—Continued

D.B.S. Number	*Title of publication*	*Current period covered*	*Month of publication*	*Time-lag*	*Price*
	7. WAREHOUSE AND STORAGE				
63-212	Warehousing, 1958	1958	Feb. 1960	14 months	50c.
22-004	Grain Statistics Weekly	July 13, 1960	—	—	$3 per year
22-005	The Wheat Review, June, 1960	June 1960	—	—	$3 per year
22-001	Coarse Grains Quarterly, May, 1960	Mar., Apr., May 1960	—	—	$2 per year
22-201	Grain Trade of Canada, 1957-58	Aug. 1, 1957 to July, 31, 1958	Sept. 1959	14 months	$1.50
	8. TRANSPORTATION EQUIPMENT				
42-201	Transportation Equipment 1957 General Review	1957	June 1959	18 months	50c.
42-211	The Railway Rolling Stock Industry, 1958	1958	Oct. 1959	10 months	50c.
42-209	The Motor Vehicles Industry, 1958	1958	Sept. 1959	9 months	50c.
42-210	The Motor Vehicle Parts Industry, 1956	1956	—	—	50c.
42-204	The Bicycle Manufacturing Industry, 1958	1958	Sept. 1959	9 months	25c.
42-206	The Shipbuilding Industry, 1958	1958	Mar. 1960	15 months	25c.
42-205	The Boat Building Industry, 1958	1958	Mar. 1960	15 months	50c.
42-203	The Aircraft and Parts Industry, 1958	1958	Jan. 1960	13 months	50c.
42-212	The Miscellaneous Transportation Equipment Industry, 1958	1958	Nov. 1959	11 months	25c.
42-002	Motor Vehicle Shipments, June, 1960	June 1960	—	—	$1 per year
42-001	Preliminary Report on the Production of Motor Vehicles, June, 1960	June 1960	—	—	$1 per year
63-007	New Motor Vehicle Sales and Motor Vehicle Financing, May, 1960	May 1960	—	—	$1 per year
63-208	New Motor Vehicle Sales and Motor Vehicle Financing, 1958	1958	July 1959	7 months	50c.

A Statistical Programme

Existing transport statistics are definitely used by the public. They are reasonably priced, as the prices listed in Table 2 indicate. Also, one can judge their usefulness partly by their circulation. Even though the various volumes of *Railway Transport* appear from 7 to 14 months after the close of the year, the press run required to fill the demand is around 700 copies. About 450 to 500 copies of the monthly transport periodicals are usually run off. About 1,000 copies of the volume of *Motor Transport Traffic* which contains the national estimates are printed, and 700 for each of the provincial volumes. The circulation of *Motor Carriers—Freight* also is sufficient to warrant printing 700 copies. There is also a substantial demand for the publications dealing with other means of transport. About 900 copies of *Urban Transit* are printed and 750 copies of the annual *Shipping Report.* The press-run of the annual edition of *Civil Aviation* is about 750, and the press-run of the annual *Oil Pipe Line Transport* periodical is 800 and steadily increasing.

Not every publication printed is used. Around 100 subscribers receive every one of the publications but might not use them all. About 75 to 100 copies go to official users, who may or may not use them. There is, however, a substantial body of additional subscribers who have to pay for the publications individually, and so may be presumed to use them now and then if not constantly.

The usefulness of existing transport statistics is corroborated by the replies to the questionnaire summarized in Table 1. Those polled preferred some statistical publications to others, but they were a specialized group of users and the replies reflect this fact. Other users might show a preference for some of the publications which the traffic officers did not favour.

It is not a serious criticism of the Dominion Bureau of Statistics to say that there is room for improvement. The assessment of existing statistics in this chapter has pointed to some weaknesses in the structure of existing statistical publication, and yet officials of the Bureau are as familiar with many of these weaknesses as anyone else. Often it is a matter of the time, staff, and funds necessary for the highly specialized and technical task of designing improved statistical series. Also, there must be a demonstrated need and public demand for improvement. In view of the importance of the transport industry and the importance of a proper analysis of its problem, the Government should extend and improve its statistics in this field. Almost every week the newspapers carry news of some urgent transport problem. The next three chapters, therefore, in the light of the gaps and weaknesses in present statistics in the face of pressing needs, outline a programme for improved Canadian transportation statistics.

Chapter 3

An Index of Freight Rates

Description of an Index

An index of freight rates is a means of measuring changes in the price level of freight service. The level of freight rates in a "base" period is taken as 100 per cent, and the level of rates in some other period is expressed as a percentage of the "base" rates or price level. An index of freight rates, therefore, is like any other price index—the consumer price index or wholesale price index, but the prices to be measured are the prices for transport of freight.

An index of freight rates indicates changes in the price of freight service from month to month, or year to year, depending upon the frequency with which the index is calculated. The index will not show the absolute level of rates, but will tell us by what percentage the level of rates has changed as compared with the base period. Separate indexes can be calculated for different kinds of freight rates. Indexes can be computed on a regional, commodity, or rate-type basis. In fact, an index of freight rates for each of several commodities and regions makes possible a comparison of changing prices of freight service in different industries or parts of the economy. Separate indexes for rail and truck and other types of carrier could give useful information about competition between carriers in pricing of service.

There are several different ways of formulating an index of prices for freight service. A very crude way is to base an index solely on horizontal rate increases granted by the Board of Transport Commissioners for traffic in general. In this form, the index would be 100 in the base year, and if there were a 10 per cent across-the-board increase in freight rates the next year, the index would rise to 110. There is little difficulty in preparing such an index, but it can be quite misleading. A significant amount of traffic is usually excepted from general rate increases—grain moving under statutory rates, and agreed charge traffic being two cases in point. Also new subsidies which lead to lower rates are not easily taken into account in such an index. For these reasons, this form of rate index is too crude for incorporation in statistical publications.

Another concept of a freight rate index is an index based on the average revenue per ton-mile earned by railways from handling freight. The revenue collected per ton-mile amounts to a price charged by the railway for carrying a ton of freight one mile. The ton-mile is only one measure of a railway's output, speed of transit being one other factor in service for which a shipper may be willing to pay. The revenue per ton-mile basis for a price

index gives no recognition to the fact that speed of service, type of handling, or special privileges and service may affect the price charged. The bulkiest commodities exert an influence on the index which may be out of proportion to their total value and importance. With all these disadvantages though, an index which reflects changes in average revenue per ton-mile from year to year still is more accurate than one which is based only on horizontal rate increases. At least average revenue per ton-mile is based on the actual traffic.

If the pattern of traffic shifts from year to year though, the changing composition of traffic may affect the index more than changes in the rates do. For example, a shift toward increased traffic in television sets which earn a high revenue per ton-mile would raise the index of average revenue per ton-mile even though the actual freight rates for television sets and other goods remained unchanged. Therefore, the average revenue per ton-mile reflects not only the freight rates charged, but also the quantity of goods moving under each rate, and the average length of haul (wherever the average revenue per ton-mile is different for long and short hauls).

The same difficulty applies where an index is based simply on average revenue per ton. Unless the average haul is constant, the revenue collected by railways from handling a ton of freight will change depending upon the distance the shipment travels. Again, there will be changes in the index which are not related to changes in the price of service (freight rate).

The difficulty can be overcome by careful "weighting" of the average revenue in every category of traffic according to its importance in tons, and by using the same weights in each year the index is calculated. "Base year weights", which are based on the tonnage moving in each category in a typical year, freeze the traffic pattern used in the index from year to year. Any change in the index number as time goes on will then be the result solely of changes in freight rates.

The index of *Average Freight Rates on Railroad Carload Traffic,* published by the Interstate Commerce Commission in the United States, is calculated in a way which minimizes the influence of changes in traffic as regards commodity, and average haul. The average revenue per hundredweight (per ton would amount to the same thing) is calculated for each "traffic category" as a first step. The "traffic category" contains traffic which is homogeneous as determined by commodity class, short-line length of haul (mileage block), type of rate, and territorial movement. The average revenue in each traffic category is then weighted by the tonnage shipped in that category in the base period. The weights (for early years of the index) stayed the same for each year that the index was calculated. This assumption that traffic in the base year was typical of the "given" years as well, ensured that any changes in the index arose from price changes and not from other causes.

In more recent years, however, the weighting system was changed to take account of an additional difficulty. The problem is that the pattern of traffic in the base year may soon cease to be typical. The importance of different freight rates may shift as some commodities become more important and others less important in total traffic. If this happens, then an index calculated for, let us say, a given year 1960 on the basis of the traffic pattern in base year 1950 may be unrealistic from the standpoint of what rates are most significant in 1960. The answer to this difficulty was found in the "chain" method of constructing indexes for the given years. From 1951 on, this method has been used by the Interstate Commerce Commission in constructing its index of freight rates.

The "chain" method involves a shift in the weights from year to year to take account of changing traffic patterns. A moving average of tonnage in each traffic category is used as the weight by which the average revenue per ton in the given year is multiplied. This two-year average of the tonnage shipped in each category ensures that the traffic pattern in the given year will affect the index, as well as the traffic pattern in the previous year. When the weighted average revenue per ton has been calculated for, say 1950 and 1951, using the same weight for each year (namely, the average tonnage in each category in those two years), the next step is to calculate average change in rates from 1950 to 1951. So the percentage change in the weighted average revenue per ton is calculated. If we start from 100 per cent in 1950, and this percentage change were 2.0 per cent, then the index for 1951 would be 102.0. The index for 1952 would be calculated from the percentage change in weighted average revenue per ton between 1951 and 1952, "chained" onto the index number 102.0. In the calculation of the change in weighted average revenue per ton from 1951 to 1952, we would use as weights the average of the tonnage in each traffic category in the two years 1951 and 1952.

Through shifting the weights from year to year in this way, we eliminate the problem of calculating the index of freight rates on the basis of a traffic pattern which may be out of date. Yet the method still ensures that the dominant influence on the index numbers from year to year will be changes in the average level of rates and not changes in composition of traffic. Four methods of calculating an index of freight rates have been discussed up to this point—

(1) an index based on general rate increases;

(2) an index based on an unweighted average revenue per ton-mile in each year;

(3) an index based on the average revenue per ton in each homogeneous traffic category with base year tonnage in each category as the weight; and

(4) an index like that produced by the third method but with a moving average of tonnages in each traffic category as the weight.

The fourth, the "chain" method is the best. It copes successfully with the problems of handling exceptions to general rate increases and taking account of changing traffic patterns without allowing the price index to be dominated by factors other than changes in freight rates.

Canadian Experience

A less sophisticated method was used in calculation of an index of freight rates which was published by the Dominion Bureau of Statistics on three occasions in the 1930's. The index was greatly hampered by lack of data which are now fortunately available.

Beginning with the year 1913 and using 1926 as a base year, the Dominion Bureau of Statistics published in 1936 an index of railway freight rates up to 1933. Two years later the index was brought up as far as 1936. Later in the same year (1938), the index was corrected and brought forward to August 1938.

The final index, in tabular and graphic form, together with a table showing the weights used in the index, are reproduced in Chart 2 and Tables 3 and 4. The method used was based not on average revenue per ton as in the present American index, but rather on a selection of actual freight rates for selected hauls and representative commodities. The first step was to prepare a list of commodities representative of the 76 commodity classes for which the railways reported tonnages each year. A total of 48 commodities actually entered into the final index published by the Dominion Bureau of Statistics. It was assumed that this list of commodities was a fair sample of all carload freight carried by the railways. Then selected hauls were chosen representative of the actual movement of each of these commodities. Then freight rates for the selected hauls for these commodities were compiled for a series of years from the tariffs filed with the Board of Railway Commissioners. The rates for the various selected hauls for each commodity were combined by taking the geometric mean of these rates. Then these geometric means, representing the freight rates for each commodity, were in turn combined through the use of weights based on tonnage reported by the railways for these commodities in 1926. Separate indexes were prepared for five commodity groups—agricultural products; animal products; mine products; forest products; and manufactures and miscellaneous. No indexes were prepared for regions or individual commodities. The Canadian index was, therefore, much less detailed than the present American index which gives separate indexes for numerous commodities and also for territorial movements of these commodities.

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The method used in the Canadian index was crude and its authors seemed to recognize its serious limitations. The averaging of selected rates for different hauls of the same commodity by a geometric mean was a particularly haphazard device. And in the introduction to "Index of Railway Freight Rates 1913-1938" the author stated:

> "Unquestionably all hauls should be weighted so that changes in rates for hauls with heavy traffic would have a greater influence on the group index than changes in rates for hauls with light traffic. The difficulty has been to secure data on the volume of traffic moving over the various routes. From the Bureau's reports of production and distribution of grain and coal, however, sufficient data were available to compute fairly satisfactory weights for the principal movements of these commodities, which, in tonnages are by far the most important commodities carried by the railways." (page 2).

The importance of coal and grain in total traffic has steadily declined since the time of this publication. Many of the commodities important in rail traffic today are included in the commodities for which the authors of the Canadian index were unable to find much information on the volume of traffic.

Other criticisms could be levelled at the old Canadian index of freight rates. It is questionable whether the tonnage weights used, based on 1926, were representative of traffic patterns at the two extreme given years of the index—1913 and 1938. The reason for choosing 1926 as the base was evidently that it served as a base year for other indexes computed by the Dominion Bureau of Statistics. This does not mean that it was a typical year for freight traffic throughout the period of the index. The fixed base year weighting was unrealistic in that it did not allow for any changes in composition of freight traffic as time went on.

Furthermore, the process of selecting hauls for each commodity is open to question. If data on the average revenue and average haul for all traffic in a commodity were used, there would be less room for exercise of judgement as to what is representative of actual traffic. The statistics would accordingly be more complete and reliable.

Finally, more precise and numerous commodity classifications than were available in the 1930's would facilitate construction of an accurate index. In broad commodity categories it is difficult to get homogeneous rate characteristics in each category, and factors other than changes in level of rate can affect the index. In the American index there are about 30,000 traffic categories, determined by commodity class, short-line length of haul (mileage block), type of rate, and territorial movement. Data were not available to the authors of the Canadian index which would permit such a careful sorting of traffic according to rate characteristics.

CHART 2
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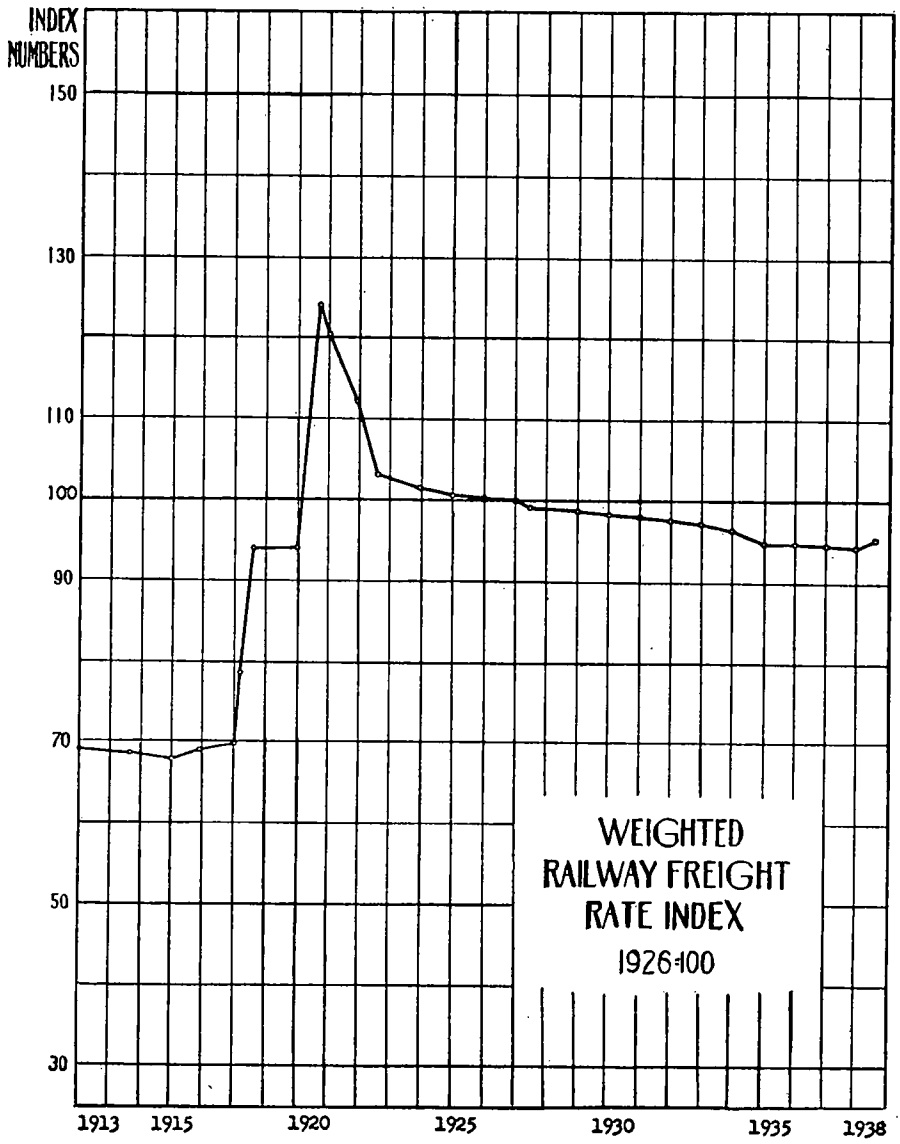

SOURCE: Department of Trade and Commerce, D.B.S. Transportation & Public Utilities Branch, "Index Numbers of Railway Freight Rates 1913 - 1938".

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TABLE 3—FREIGHT RATE INDEX NUMBERS
(Revised)
1926 = 100

	Agricultural products	*Animal products*	*Mine products*	*Forest products*	*Manufactures and miscellaneous*	*Total*
Commodities	10	9	9	4	16	48
Rates	112	92	88	49	159	500
Date						
Jan. 1, 1913	84.8	65.7	71.9	65.9	60.4	68.9
[1]Sept. 1, 1914	83.4	65.9	72.7	63.5	60.0	68.4
Dec. 31, 1915	83.4	66.0	69.3	63.5	59.9	67.7
[2]Dec. 1, 1916	84.2	67.6	70.8	64.0	60.8	68.7
Dec. 31, 1917	85.5	68.6	71.4	65.4	61.5	69.6
[3]Mar. 15, 1918	94.3	78.1	81.0	75.3	69.8	78.5
[4]Aug. 12, 1918	110.4	90.3	97.4	86.4	85.9	93.9
Dec. 31, 1919	110.4	90.3	97.4	89.4	85.6	94.0
[5]Sept. 13, 1920	145.3	123.8	114.7	124.5	116.8	124.1
[6]Jan. 1, 1921	143.4	116.8	112.5	117.5	113.1	120.4
[7]Dec. 1, 1921	130.1	106.4	110.4	110.4	104.5	112.1
[8]Aug. 1, 1922	103.0	102.7	103.3	104.2	102.5	103.0
Dec. 31, 1923	101.2	100.3	100.6	101.0	102.6	101.6
Dec. 31, 1924	101.2	100.2	100.6	101.3	100.2	100.6
Dec. 31, 1925	100.1	100.2	100.5	101.3	100.0	100.3
Dec. 31, 1926	100.0	100.0	100.0	100.0	100.0	100.0
[9]July 1, 1927	99.1	100.0	98.7	96.9	99.6	99.1
Dec. 31, 1928	99.1	99.2	98.0	96.9	99.6	98.9
Dec. 31, 1929	98.6	99.2	97.1	96.9	99.0	98.4
Dec. 31, 1930	98.6	99.0	96.0	96.9	99.0	98.1
Dec. 31, 1931	97.3	98.7	96.0	96.9	98.7	97.7
Dec. 31, 1932	97.8	99.6	95.6	96.9	97.3	97.2
Dec. 31, 1933	97.0	99.2	94.9	95.3	96.8	96.5
Dec. 31, 1934	96.2	99.2	93.7	95.3	93.9	94.9
Dec. 31, 1935	95.7	98.2	95.3	94.5	93.8	94.9
Dec. 31, 1936	94.5	98.2	95.5	94.5	93.5	94.6
Dec. 31, 1937	94.9	98.5	95.6	94.9	92.4	94.3
Aug. 1, 1938	96.1	100.0	97.2	94.9	93.2	95.3

[1]Western Rates Case.
[2]Eastern Rates Case.
[3]Fifteen per cent Case.
[4]Twenty-five per cent Case.
[5]Forty per cent Case.
[6]Five per cent Reduction.
[7]Ten per cent Reduction.
[8]General Freight Rate Investigation.
[9]Maritime Freight Rates Act.

SOURCE: Department of Trade and Commerce, DBS Transportation & Public Utilities Branch, "Index Numbers of Railway Freight Rates 1913–1938".

TABLE 4—TABLE OF COMMODITIES AND WEIGHTS USED

Agricultural products		*Animal products*		*Mine products*		*Forest products*		*Manufactures and miscellaneous*	
Wheat	12.65	Horses	0.09	Anthracite Coal	5.26	Logs, Posts, Poles and Piling	1.40	Petroleum Products	2.40
Corn	0.68	Livestock	1.15	Bituminous Coal	13.64	Cordwood and Firewood	2.00	Sugar	0.60
Oats	1.62	Dressed Meats (fresh)	0.46	Lignite Coal	2.50	Pulpwood	3.80	Iron, pig	0.37
Barley	1.17	Dressed Meats, (cured) and other packing house pdts	0.53	Coke	1.32	Lumber, Timber, Shingles, Box, Crate and Cooperage Material	6.40	Iron and Steel Products	1.47
Rye	0.26	Eggs	0.15	Ores and Concentrates	3.78			Cement	1.10
Flax	0.16	Butter	0.17	Sand and Gravel	4.70			Bricks and Artificial Stone	0.88
Flour	2.21	Cheese	0.11	Stone	1.50			Lime and Plaste	0.40
Hay and Straw	0.88	Wool	0.05	Asphalt	0.23			Sewer Pipe and Drain Tile	0.10
Apples	0.28	Hides and Leather	0.16	Salt	0.34			Agricultural Implements	0.40
Potatoes	0.63							Automobiles	1.68
								Furniture	0.09
								Fertilizers	0.31
								Wood Pulp	1.50
								Newsprint	2.50
								Fish (fresh, frozen and cured)	0.11
								Canned Goods	0.36

SOURCE: Department of Trade and Commerce, DBS Transportation & Public Utilities Branch, "Index Numbers of Railway Freight Rates 1913–1938".

The weaknesses of the Canadian index were recognized at the time to the extent that the preparation of an index of freight rates was discontinued after the third publication on account of the lack of suitable data.

Requirements for a Good Index

If an index is to be satisfactory, the effect of factors other than changes in freight rates must be small as compared with the effect on the index of rate changes. Each "traffic category" (to use the American terminology) must be chosen with care. Traffic within any given category must respond in a similar way to any change in rates. Appropriate data must be available for weighting the relative importance of the different traffic categories so that they can be combined into an index which accurately reflects the importance of different traffic. As far as possible, the index must be based on all rates and all traffic, rather than on a selection of rates deemed to be important. Much more data must be available than were at the disposal of the Dominion Bureau of Statistics for the preparation of its index of freight rates in the 1930's.

Fortunately, much more accurate and detailed information about traffic is now obtainable. The Annual Carload *Waybill Analysis* of the Board of Transport Commissioners is based on a 1 per cent sample of all carload freight traffic moving by rail within Canada. A 1 per cent sample of American carload traffic is used by the Interstate Commerce Commission as the basis for the American index of carload freight rates. Of course, a 1 per cent sample of American traffic contains several times as many carloads as a 1 per cent sample of Canadian traffic, and so a more detailed breakdown according to type of rate, region, and commodity is obtainable in an American index of freight rates. The same breakdown in a Canadian index would be based on such a small number of shipments in many cases that a reliable result would not be obtainable.

Nevertheless, the *Waybill Analysis* of the Board of Transport Commissioners, first published in 1949, would form a basis for an index of freight rates far more accurate than the original Canadian index. The data used to prepare the *Waybill Analysis* have been retained on IBM punch cards since January 1954, and would form the basis for an index of freight rates from that time on.

Looking ahead, one can hardly say, however, that an index based solely on these data would be ideal. One obvious deficiency is that the index would be entirely restricted to railway freight traffic. Truck, airline, water and pipeline freight rates would be excluded. In fact, the limitations are even more severe than that. The *Waybill Analysis* of the Board of Transport Commissioners omits traffic across the American border, less than carload traffic,

and combined rail and water movements of freight. The omission of international traffic is an especially serious limitation. Exports and imports are sufficiently important to the Canadian economy to form an appreciable share of total freight tonnage. All of the limitations of the *Waybill Analysis,* if that were the basis for an index of freight rates, would be carried over into the index itself.

In order to spot further shortcomings of such an index, it is desirable to consider what uses an index of freight rates may have, and what the form of an ideal index would be.

Like other indexes of prices, an index of freight rates would be useful in demonstrating trends in prices. Comparisons between prices of freight service and of other goods and services would be useful to economists and others interested in price levels, inflation, and related matters of government economic policy. Furthermore, comparisons of trends in freight rates and in wholesale and retail prices of particular goods possibly with regard to particular regions of the country, may help to throw light on the extent to which price changes in goods themselves are related to changes in transport costs.

The pricing mechanism is vital in the economy, as the attention governmental regulatory bodies give to prices and pricing practices illustrates. The Dominion Bureau of Statistics prepares information on the prices paid by consumers for children's wear, shoe repairs, cereal products, men's haircuts, newspapers and a variety of other goods and services. In transportation, the only consumer price indexes published are for automobile operation, new passenger cars, gasoline, local transportation, and street car and bus fares. Wholesale price index numbers are published for soap, fertilizer, explosives, carpets, coal, pig iron and over 100 other products, but nothing at all is published in the form of an index of freight rates.

If economical transportation is a goal in a country where transport problems loom large, then information on pricing trends for transportation service is surely as worthy of publication as price indexes of most of the goods and services mentioned, for which a price index is now available.

In the replies of 23 companies or organizations to a questionnaire regarding use made of federal transportation statistics (summarized in Table 1), a substantial number of respondents showed interest in an index of freight rates. The respondents were all people associated with freight traffic in private industry. Of the 23, 13 said they would be interested in having an index of railway freight rates, 13 wanted a similar index for trucking, 7 wanted an index of air freight rates, 11 wanted an index of shipping rates, and 6 expressed interest in an index of pipeline rates. This sample of opinion is not large, but it does show that an interest in an index of freight rates exists, and that it would be used if published.

Just as the wholesale price index and consumer price index are prepared in detail rather than in the form of a single index, so it would be useful to have a breakdown of an index of freight rates. An over-all index tends to conceal different trends in the prices (or freight rates) of specific commodities, or in specific areas. Therefore, along this line of argument and with the American index as a precedent, if a new Canadian index were constructed, it might well be in the form of separate indexes for different commodities in different regions.

In the American publication dealing with rail freight rates, separate indexes are calculated for each of five broad commodity groups, and for more than 60 commodity classifications in which there are approximately 1,000 carloads of freight in the sample. Also there is a separate index for "forwarder traffic", whatever the commodity.

In addition, separate indexes are prepared for each commodity group in 20 regional classifications. Regional classifications are based on movements within and between the five rate territories—Official; Southern; Western Trunk Line; Southwestern; and Mountain-Pacific. Again, unless 1,000 cars or more appear in the sample, a separate index is not published: the sample would not be large enough for reliable results.

Also in the American freight index publication, separate indexes of average freight rates are calculated for interstate rates and for intra-state rates, both by commodity group. All of these indexes apply to rail carload traffic only.

If a Canadian index were to be based on the principle of publishing a separate index only where about 1,000 or more carloads can be used as the basis, the number of indexes would be much fewer than in the Interstate Commerce Commission's publication. The total number of carloads in the 1 per cent sample of traffic used by the Board of Transport Commissioners does not exceed 20,000. In the *Waybill Analysis* based on the sample, only a few commodity classifications contain 1,000 carloads or more—wheat, bituminous coal, gasoline and "manufactures and miscellaneous, n.o.s.". It would not be possible on the basis of the present *Waybill Analysis* to provide a regional breakdown by commodities in an index of rail freight rates.

So far as rail traffic is concerned, if indexes are desired for regional and commodity movements, there is a need for a larger sample of traffic. Either the *Waybill Analysis* of the Board of Transport Commissioners could be expanded, or else some other method of getting traffic data should be used.

The *Waybill Analysis* is not a complete answer to the need for an index of freight rates also because it does not include truck, air, water, or pipeline traffic, or traffic by more than one medium of transport.

As time goes on, a larger sample of railway freight traffic will be facilitated by progress toward completing recording of all waybill informa-

tion on IBM cards. Then a 100 per cent tabulation of tons, revenue, commodity, and origin and destination (giving mileage and regional data) would be readily available for all freight shipments. Where laborious procedures of checking mileages and rates would be excessively costly for 100 per cent of traffic, sample checking should suffice to preserve reasonable accuracy.

Another means of obtaining more comprehensive data for a freight rate index would be through a sampling of traffic reported by shippers rather than by carriers. This device is commonly known as a "census of transportation". The advantage of this approach is that not only rail, but also truck, water, air, pipeline and mixed-media traffic data would be reported. By insistence on uniform reporting, comparability of data for rail and other carriers should be an attainable objective. The absence of revenue data for water carriers, and the absence of reliable information on tons, mileages, and revenues of commodities travelling by truck, make it very difficult to find any existing statistical basis for an index of freight rates for water and truck. Commodity data are not available at all at present for airlines. The "census of transportation" approach would make it possible to fill all the gaps—international rail; truck; water; and airline data which could be used to build indexes of freight rates for these types of traffic. Also, if the sampling were large enough, it should make possible separate indexes for each main region and each important commodity, or commodity group.

For full availability of data for indexes of freight traffic by type of carrier, by commodity, and by region, the sampling of traffic reported by shippers has much to recommend it. The design of an appropriate index is a difficult matter calling for careful attention of experts in sampling and statistics. The actual design of an index will not be attempted here. It is suggested, though, that an index of freight rates be considered with the following breakdown:

1. Separate indexes should be prepared for traffic moving by rail, truck, water, air, and pipelines, and for various combinations of these media of transport where sufficient traffic exists for a reliable index.

2. In addition, for each type of carrier, separate indexes of rates applying on traffic in the main commodity groups would be desirable. There are five of these groups—agriculture; animal products; minerals; forest products; and manufactures. If enough traffic by any medium of transport falls into a general category which cannot be classified by commodity, it might be desirable also to have a separate index for such traffic (as "general cargo" moving by water or "bulk" traffic by air). Less than carload traffic which consists of many small shipments, might be handled as one separate category of traffic not classified by commodity.

Also, where about 1,000 carloads (as a rough criterion) fall within a commodity classification, a separate index would be justified both by the importance of the traffic and the sufficiency of the data. Individual commodities for which a separate index could be calculated would be fairly numerous if indexes were prepared on the basis of information on all traffic rather than from a small sample.

3. Regional indexes should also be constructed for traffic handled by each type of carrier. Regional divisions which might be selected are: Atlantic Provinces; Quebec and Ontario; Prairies and northwestern Ontario; British Columbia and Yukon. International traffic from each of these regions, if sufficiently voluminous, could form the basis of further regional indexes. It would be desirable to separate export from import traffic, and overseas from American traffic. Again, where enough volume falls into a single commodity category or commodity group, further detail would be possible. For example, an index of freight rates might be prepared for grain moving by rail and ocean from the Prairie Provinces overseas. And there would likely be sufficient volume to permit an index of coal moving from the Atlantic Provinces to Central Canada, and another index for coal moving from the United States to Central Canada.

4. Finally, it could be useful to have separate indexes for traffic classified according to mileage blocks, or length of haul.

These specifications relate to an ideal index of freight rates—an over-all index, and also separate indexes in the degree of detail just mentioned. It may be necessary to accept a less ambitious result, or to work toward an index of this kind as availability of data and funds permit. If the *Waybill Analysis* of the Board of Transport Commissioners is used as the basis for an index of freight rates, the degree of detail will be about as limited as that in the original Canadian index published in the 1930's, though the accuracy will be greatly improved. If a "census of transportation" is used, or a 100 per cent sample of railway waybills, then the degree of detail possible will expand accordingly. A 100 per cent sample of railway waybills, obtainable within the next few years as the major railways expand their use of computing devices and record all traffic on punch cards, will permit a detailed picture of freight rates charged by the railways. But it will not solve the problem of getting detailed indexes for other carriers, and it may be a long time before all the major trucking firms keep records in that form. One of the important advantages of a "census of transportation" or sample of traffic reported by shippers would be the availability of a fair amount of detail on traffic by all carriers, including traffic moving by more than one medium, as soon as the sample of traffic was established and yielding results.

An index of freight rates in reasonable detail and of fair accuracy would be useful to transport economists, industrial freight traffic departments, and to others concerned with the pricing of transport service. Such an index need not be strictly comparable with the index published in the United States to be useful in relation to the Canadian economy. The index would gain in usefulness, and its detail could be expanded as time went on without any loss of historical continuity. Because of the deficiencies of the earlier Canadian index, no attempt should be made to link a new index with the old one. It might be best to begin with an index of modest detail for the years 1954 to 1960 using the waybill data collected as a 1 per cent sample of domestic carload rail traffic by the Board of Transport Commissioners. A "census of transportation" would permit more adequate indexes to be started within the next few years for different types of carrier. If this plan were to be followed, the cost of a "census of transportation" would not be chargeable solely to the index of freight rates. The index would be only one statistical product of such a sampling of Canadian freight traffic.

Chapter 4

A Canadian Industrial Freight Traffic Survey and a Review of American Proposals for a Census of Transportation

The U.S. Census of Transportation

In the United States, legislation was passed in 1948 authorizing a "Census of Transportation" to assist in overcoming the inadequacy of transportation data. The Census was to be conducted in 1949 and every fifth year thereafter. No such census has ever been taken, however, because Congress never has authorized the necessary funds. In spite of this fact, the U.S. Department of Commerce still backs strongly the proposed Census of Transportation so as to make available information not obtainable through reporting by the carriers to the Federal Government. Such a census would involve collection of data from shippers, vehicle owners, and private households through the medium of the regular census authority.

The proposal for a Census of Transportation envisages six sets of interrelated surveys. One survey would cover the commodity distribution of freight moved by land, air, and water. Movements of freight would be categorized according to mode of transport, region, market channel (retail, wholesale, interplant), and class of shipper. Initially, general statistics would

be published for two major classes of shippers—manufacturers and agricultural assemblers, with detailed breakdowns for each of twenty representative industry groups. Through this survey, the U.S. Government and public would obtain information on the channels of distribution, markets, and means of transport of products of significant industries. Not only would such information throw new light on the role of transportation in industrial processes, but also it would make possible better forecasting of demand for transportation service. Such forecasts should not only assist industry, but would also make possible more accurate estimates by the carriers and the Government of the cost of transportation service.

Improved Determination of Carriers' Costs

Two recent publications of the U.S. Department of Commerce stress the importance of a Census of Transportation in improving determination of carriers' costs. One publication is entitled *Federal Transportation Policy and Program,* published in March 1960, and the other, *Rationale of Federal Transportation Policy,* is a fuller statement of the justification for the conclusions arrived at in the policy statement. The statement of policy recommends that funds be provided for the Census of Transportation, and points out that one of the numerous benefits will be "an improved basis for forecasting probable traffic volumes, which improves cost estimation because of the relationship between unit costs and demand for transportation service".[1] The explanatory pamphlet links the Census of Transportation to the need, born of an increasingly competitive environment, for improved determination of specific transport costs. The relationship is stated as follows:

> "With the adoption of a marginal cost pricing system, the estimation of future traffic will occupy a place of increasing importance in transportation costing, due to the close relationship between such costs and traffic volume. Since competitive rate actions by all types of carriers are justified only if they increase net income, and as this result is achieved only where response in volume lowers unit costs, accuracy in forecasting volume changes is an essential of meaningful costing for rates relating to the future. Projection of future volume is, however, largely dependent upon the availability of better information as to current geographical and industrial origins, weights, sizes and amounts of traffic, the distances it moves, the rates that move it, and the types of carriers involved. Such information can be comprehensively provided only by a census of transportation . . .".[2]

Improved determination of transport costs is, therefore, in the opinion of the U.S. Department of Commerce, one of the main advantages of the Census of Transportation, and it will result from the survey of commodity

[1] U.S. Department of Commerce, *Federal Transportation Policy and Program,* p. 20.
[2] U.S. Department of Commerce, *Rationale of Federal Transportation Policy,* p. 39.

distribution. Five other sets of surveys are included in the proposal, but since they are less vital to the present study, they will be simply listed at this point and dealt with later. These surveys include a survey of passenger travel by land, air and water, and also surveys of truck and bus inventory and utilization. Air cargo commodity movements constitute another entity for study. And finally, developmental surveys will be undertaken to develop new methods and techniques for taking transportation surveys.

The survey of commodity distribution is, nevertheless, of prime importance, and will be considered here at some length as it is directly related to Canadian experience and needs.

Some of the conditions creating new statistical requirements for the American transportation industry have appeared also in Canada. Increasing competition with other media of transport, particularly trucking, has led Canadian railways to pay increasing attention to determination of transport costs. In the transportation business, each carrier is interested in both his own costs and those of his competitors, and if ratemaking is governed by the cost of service principle, the regulatory authorities become nearly as concerned with costs as the carriers. Improved forecasts of traffic made possible through a survey of commodity movements on a more comprehensive scale than presently exists become important under these competitive conditions in Canada as well as in the United States. The inadequacy of both the *Waybill Analysis* of the Board of Transport Commissioners and the railway freight traffic publications of the Dominion Bureau of Statistics have already been referred to in Chapter 2. And so a Canadian census of transportation would have advantages in facilitating improved cost determination in Canada.

From the standpoint of the public regulatory authorities, the beneficiary of an intensive survey of Canadian freight traffic would not be solely the Board of Transport Commissioners. Air freight rates fall within the jurisdiction of the Air Transport Board, certain rates on grain under the Board of Grain Commissioners, pipeline tolls under the National Energy Board, and seaway tolls under the St. Lawrence Seaway Authority. All authorities responsible for regulation of rates and services would stand to gain from better estimates of traffic flows and demands for transportation service. Consistent decisions of the different regulatory authorities might also be facilitated through an improvement in cost-finding processes.

Other Benefits from a Freight Traffic Survey

Improvement of costing techniques is not the only or necessarily the most important benefit which would result from a Canadian census of transportation. Comprehensive information on the volume of freight by commodity, by carrier, by region, and by industry and type of shipper would be useful in itself to those engaged in market research or solicitation of traffic.

An extremely important benefit would be the availability for the first time of commodity data on a comparable basis for all types of carrier. No data at all are available by commodities for air cargo. Truck traffic is broken down into commodity groups but not into individual commodities. Commodity data for traffic moving by water includes a very large category of "general cargo". The railways' classification of commodities is based on that of the Association of American Railroads and is only roughly comparable with the Standard Classification of Commodities used by the Dominion Bureau of Statistics for other carriers and for its international trade statistics. All of these weaknesses of the present statistics have been dealt with in Chapter 2. All of them would be overcome if a detailed traffic survey obtained information from shippers according to one uniform commodity classification whatever the means of transport utilized. The availability of comparable statistics of traffic for all modes of transport would be an important advantage, making possible better analysis of competition among carriers, and filling significant gaps in present information.

Data would also become available to permit a consistent index of freight rates for all media of transport. It is also likely that other new series would become possible yielding valid comparisons between rail, truck, air, and water carriers.

General economic analysis based on transport data would likewise benefit from the availability of comparable information for all forms of traffic. Rail carloadings, for instance, were once a commonly used indicator of economic activity, but lost much of their significance as traffic was drained away from the railways by competing carriers. A comparable series for carloadings and truckloadings would restore the usefulness of the indicator.

Certain types of traffic that are not now clearly identifiable could be distinguished. A census of transportation would permit a clearer separation of export and import from domestic traffic than now exists (particularly in the case of rail and truck). Traffic moving by more than one medium of transport could be identified and characterized. The true origin and true destination of shipments could be identified and linked one with the other, whereas in present statistics the origins and destinations are not necessarily original or ultimate (as the case may be) and are rarely connected to show the actual haul.

The greater detail of traffic flows would make possible a much better integration of transportation data with industry data. After all, transportation is only one phase in the economic process of production and distribution of goods for sale. Its main significance in the economy is in relation not to itself but to the production of goods. One would accordingly expect that a substantial function of published transportation statistics would be to permit analysis of producers' transport costs and services in relation to other aspects

of the production process—purchase of materials, employment of labour and machines, promotion, distribution and pricing of the product. Here is one important field in which our present statistics fall down. A commodity survey similar to that in the American proposal for a Census of Transportation would meet this need. Not only would industrial users of statistics benefit, but also the prospects for integration of the transport industry into defence mobilization would be greatly improved.

For all these reasons, much more detailed traffic statistics would prove extremely useful. Canadian experience of this type of survey indicates that such surveys would be not only useful but practicable.

Experience with Confidential Survey

The Dominion Bureau of Statistics in July, 1956, began an Industrial Freight Traffic Survey to provide the Board of Transport Commissioners with information needed for equalization of freight rates. The newsprint industry through their association first conducted a detailed traffic survey and then asked the Board of Transport Commissioners to carry out similar surveys for other industries. The Board was given the results of the newsprint survey. The Dominion Bureau of Statistics subsequently surveyed a number of industries, different ones each year, and asked shippers accounting for the bulk of the traffic to keep records of shipments for a month (later one week in each month). Any water shipment over 20,000 pounds was included and any carload shipment by rail or truckload shipment by truck, but small shipments (including any shipments by air) were omitted from the survey. The results of the survey were kept strictly confidential and were never published, but were judged by the Dominion Bureau of Statistics and the Board of Transport Commissioners to be successful. Also, experience was gained in this type of survey.

Statistics from the survey were not put on a yearly basis by the Dominion Bureau of Statistics, nor was any attempt made to obtain continuing reports from each industry from year to year. The Industry Freight Traffic Survey does not, therefore, provide much more than a test run for a continuing survey.

In addition to the Government survey, a private survey of traffic in canned goods yielded usable results, with data comparable for rail and truck carriers.

Support and Objections by Industry

A regular, comprehensive freight traffic survey would meet with both support and objections from private industry. The railways would likely welcome such information, because it would assist in the forecasting of

traffic and provide useful tools for tailoring rates to costs so as to meet competition. Traffic officials in industry would likely also welcome information which facilitated forecasts of future business and trends in the transportation industry. For example, in the questionnaire sent to traffic officials (*see* Table 1), the respondents generally supported the need for publication of statistics which a census of transportation would make available. Of 23 respondents, 12 expressed a desire for statistics of containerized traffic, and 10 wanted statistics of piggyback and fishyback traffic. In other words, these replies indicated support for more information on some of the new trends in traffic. More significant, there was also fair support for the statistics which would mainly result from a census survey: "truck carloading figures similar to rail carloadings already published" (8 out of 23 favoured such data); "volume of traffic by main commodity and origin and destination" by rail (11 in favour), truck (11), air (4) and water (9).

On the other hand, opposition from some shippers would be certain. Some firms customarily protest to the Dominion Bureau of Statistics about the great burden of reporting. In industrial firms, accounting departments which prepare the reports are more likely to protest than traffic departments or market research departments which find more use for the publications of the Dominion Bureau of Statistics. Actually, the burden of reporting should not be excessive if the survey is conducted every five years (as proposed in the United States) or every ten years if it is desired to link the survey with the decennial Census of Canada.

The extent of opposition from business firms will depend in part too on what information is required. There would be much less objection to divulging information about tonnages shipped than there would to be revealing the type of rate applying on shipments or the amount of revenue paid to carriers for transport service. Firms are reluctant to let their competitors know their costs of shipping and might also be reluctant to reveal the information to the Government for inclusion in published statistics.

As far as possible, a comprehensive traffic survey in its published form should be tailored to meet legitimate objections which may be raised. Names of carriers should not be divulged; otherwise certain carriers might reap an unfair competitive advantage at the expense of other carriers.

Design of a Canadian Survey

The design of a regular Canadian survey of industrial freight traffic would be a matter for statistical experts. Experience in Canada and in pilot surveys carried out by the U.S. Department of Commerce in connection with the proposed Census of Transportation indicate that a method of securing satisfactory results is available.

In broad outline, the procedure in a Canadian survey might be as follows. In the first place, it would be necessary to select industries for inclusion in the first survey. In view of the large scope of the undertaking, there is much to be said for choosing industries for the initial survey which are important in the economy, have a fairly high concentration of shipments in a manageably small number of reporting firms, and which ship fairly standard products. Industries with a large number of small firms and a large range of heterogeneous products will be more costly and difficult to survey, and may well be left for inclusion in later surveys when experience has been gained with the survey. There is no need to cover every industry, especially at the start, because results obtained for important industries will be quite useful even if all industries are not covered.

When industries have been selected, a mailing list should be compiled from records kept by the Census Division of the Dominion Bureau of Statistics. Not every firm in an industry must be included in the survey. It should be sufficient to secure reports from firms accounting for a substantial share (70 per cent or more) of shipments of sales in the industry. Firms chosen for inclusion should make available to the Dominion Bureau of Statistics records of shipments in and out of the plant in the form of bills of lading, sales invoices, or other appropriate documents. In a pilot survey conducted by the U.S. Bureau of the Census for the canning and preserving industry in August 1955, the Bureau used portable microfilm equipment to obtain records from the reporting firms. The experiment was a success and it was concluded that use of this equipment "substantially cut costs, reduced reporting effort, and increased the accuracy of results".[1] A similar method might be used in a Canadian survey. One of the main objections to the survey by reporting firms is likely to be the burden of reporting. If the work of recopying documents is handled by the Dominion Bureau of Statistics with the use of microfilm equipment, objections to the reporting burden would not be so significant. The collection of data for the survey should be based on a scientifically designed sampling procedure. The appropriate agencies for design of the sample and collection of the data would appear to be the Sampling Consultation Section and the Transportation Section of the Dominion Bureau of Statistics. In the American Government, statistical processing is organized in such a way that the Bureau of the Census is the appropriate body for conducting the Census of Transportation, but in Canada the Census Division would not necessarily play any special part in the industry traffic survey apart from providing mailing lists of firms in each industry.

The Canadian Industrial Freight Traffic Survey should be conducted every five or ten years, with a small sample survey annually to permit inter-

[1] U.S. Department of Commerce, *Program for a Census of Transportation: A Series of Transportation Surveys*, (August 1956), p. 39.

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polation of traffic statistics for each year. If the comprehensive survey were conducted every ten years, it could be linked into the decennial Census of Industry conducted by the Dominion Bureau of Statistics. The advantage would be that total shipments by industries would then be available, and could be used as control or bench marks to provide "blow-up" factors for the expansion of annual sample survey results. Once experience is gained with full surveys every ten years, if the accuracy of the annual estimates in intercensal years proved to be inadequate, it might be desirable to conduct a full survey every *five* years.

The annual *Waybill Analysis* would be useful in preparation of reliable estimates of commodity movements during the intervening or intercensal years. Its value, however, might not be sufficient unless the size of the waybill sample were increased from the present one per cent to three or five per cent, depending upon the amount of detail required for specific commodities.

The entire survey should be based on the Standard Commodity Classification so that results will be comparable for all carriers and also with other statistical series published by the Dominion Bureau of Statistics, such as the international trade statistics. For the survey to have the full value that it should, it is important to solve the technical problem of relating the statistics not only to commodities in the Standard Commodity Classification but also to specific freight rates (and *types* of rates) used by the various carriers.

The data collected from the records of shipping firms should include: the tons and commodity in each shipment, the revenue paid to the carrier, the type of carrier, the class of rate, and the point (or area) of origin and destination. Also, to permit integration of the survey results with other industry data, shipments should be classed according to "into" or "out of" plant and according to market channel (manufacturer, wholesaler, or inter-plant). Also shipments should be classified according to the industry of shipper and consignee—something of an input-output basis. Small shipments should be excluded from the survey in the interests of reducing the burden of collection of data, but air cargo should definitely be sampled. Separate data should be obtained for special types of traffic—piggyback, fishyback, containerized traffic, and freight forwarder traffic. There may be a special problem in identifying the commodities in such traffic, and shippers may be unaware in many cases by what mode of transport their shipments are carried (if they are under contract with a freight forwarder, for instance). In such cases it may be necessary to approach the carriers of freight forwarders for information which will help to identify the commodities and means of transport in such shipments.

Also it would be desirable to categorize separately urban and inter-urban traffic; export and import and domestic traffic; and to obtain informa-

tion on the commodity breakdown in traffic moving by water in the "general cargo" category, by air in the "bulk transportation" category, and in private trucks. For these latter categories of transport, no commodity data are now published.

The cost of an industrial freight traffic survey cannot readily be estimated until its scope is determined and the sampling programme is designed. It would cost more if the survey were conducted for every industry annually than it would if only major industries were covered and complete surveys were taken only every five or ten years. In practice, it is likely that not all industries would be included, or, if they were, that full detail need not be made available for those industries where sampling and accurate reporting prove difficult. Possibly some idea of cost is conveyed by the budget requirement estimated for the American Census of Transportation in 1958. The entire programme for a year in which a comprehensive survey was planned (until Congress failed to appropriate the funds) was estimated to cost $1,200,000. This amount covered all of the six sets of surveys. The budget allotment proposed for the "Commodity Distribution by Land, Air, and Water Transportation" (corresponding to an industrial freight traffic survey) was $500,000. A Canadian survey could certainly be undertaken for less, and the appropriation would be required only once every five or ten years when a full survey was conducted. Annual appropriations for sample surveys to secure data for interpolation between the "census" years would be substantially smaller.

Furthermore, it might prove to be possible to eliminate certain statistical series now prepared by the Government on the basis of reports from the carriers. If the coverage of traffic were sufficiently broad, the *Annual Waybill Analysis of Carload All-Rail Traffic* prepared by the Board of Transport Commissioners might become superfluous. More likely though, the *Waybill Analysis* should be retained as part of the data required annually for making the annual interpolations between full surveys. In the Dominion Bureau of Statistics publications *Railway Freight Traffic* and *Railway Transport,* Part V, however, the data on traffic could definitely be scaled down. The only reason for retaining these publications in modified form would be that the commodity classification used in these publications is comparable to that used by the Association of American Railroads. For this reason some information might still usefully be prepared on the present basis.

The availability of advanced techniques for electronic data-processing and of a film optical sensing device for input to computers ("FOSDIC") has speeded up census tabulation in the United States.[1] These same modern techniques could be applied to process data for a Canadian industrial freight traffic survey within a reasonably short time after the close of the reporting

[1] *See* "Editorial" in *Traffic World,* July 30, 1960, p. 5.

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period. Eventually, monthly data might be published not too long after the end of each month through the medium of such a survey, but the immediate objective should be publication of comprehensive statistics of traffic every five or (more likely) every ten years with less detailed interpolations published annually.

A survey of industrial freight traffic could usefully be patterned on the commodity distribution survey planned for the American Census of Transportation. But it is misleading to label a Canadian survey of this type as a "Census of Transportation". For one thing, the Census Division of the Dominion Bureau of Statistics might have very little part in the proposed survey. Also, such a label could convey the impression that the survey of freight traffic was part of the regular census of population, while there is actually no necessary connection. Finally, the five additional sets of surveys planned as part of the American Census of Transportation need not be linked at all with the Canadian survey of freight traffic. Accordingly, a preferred title for the Canadian survey recommended in this chapter would be "The Canadian Industrial Freight Traffic Survey".

The other surveys to be included as part of the American Census of Transportation will now be considered briefly. While some of the needs which they are intended to meet also exist in Canada, the appropriate statistical method may be different in the two countries.

Air cargo commodity movements, one of the sets of surveys in the American Census, can be sufficiently documented if air cargo is included in the "Canadian Industrial Freight Traffic Survey". Already Dominion Bureau of Statistics collects information on bus and truck equipment, and it is difficult to see any need for starting all over again with another method. Collection of this information from the carriers, as at present, should suffice. Highway statistics and passenger bus statistics may be improved as time goes on, but there is nothing inherently wrong with the present system of reporting and collection of data.

Finally, a survey of "Passenger Travel by Land, Air, and Water Transportation" was to be included in the American Census of Transportation. The need for a comprehensive study of domestic passenger traffic definitely exists in Canada. In fact, this is one of the important recommendations of the next chapter in this report. The methods used in such a survey would be quite different (and the sources of information would be different) from those employed in a survey of freight traffic. Accordingly, the two should not be linked together especially, and consideration of a passenger traffic survey is left for the next chapter.

In conclusion, it is recommended that a "Canadian Industrial Freight Traffic Survey" be instituted immediately to meet the need for information which will: (1) permit better forecasts of traffic and carrier costs, (2) make

possible comparisons of traffic by commodity handled by different modes of transport, and (3) allow better integration of data concerning transportation of a product with data on its manufacture, distribution, and sale. Other benefits would include the filling of serious gaps in commodity statistics for transport by air, water, truck, and certain types of rail freight. A separate index of freight rates for each medium of transport could be compiled, by commodities, on the basis of information about rates, carrier revenues, and volume of traffic yielded by the survey. Finally, the data developed through a Canadian Industrial Freight Traffic Survey would be of great value in any emergency where the economic resources of the nation had to be mobilized for defence. The needs are pressing, the methods are available, and the project is highly recommended.

Chapter 5

A Passenger Traffic Survey and other Proposals

Passenger Traffic Survey

The weakness of present statistics of passenger traffic is one of the important problems which a forward-looking programme of transport statistics should meet. The existing statistics of passenger traffic are not co-ordinated and integrated in one publication, but are spread through a half dozen different periodicals. For some media of transport the coverage is much better than for others. Only for airlines has there been any material published on passenger traffic flows between specific points. More statistics are needed which explicitly relate traffic moving between major points by each carrier and by private vehicles. Our statistics of trans-border travel are much more highly developed than our statistics of domestic passenger travel. One method of remedying these defects and of providing information useful for analysis of a number of important economic problems would be through a Survey of Passenger Traffic.

Such a survey would serve a number of purposes. Competition is keen in passenger traffic, and the railways particularly face disturbing trends in their traffic and cost of providing passenger service. If the railways were able through a better, cheaper service to attract even a fairly small fraction of traffic from travel by private automobile, their financial situation would be definitely improved. Also, with increasingly heavy investment in expensive equipment and with the constant threat of rapid obsolescence through technological changes, the airlines need improved information on patterns of domestic and international passenger travel. The airline companies are not equipped to gather such information themselves. Then too, the tourist industry

generally—hotels, restaurants, and travel bureaus—would stand to gain from more complete data on the extent, pattern, and trends of passenger travel.

In addition, more information on traffic by passenger automobile, in company with more complete data on commercial truck movements between specific points and classed according to vehicle weight group, would improve greatly the possibility of assessing the relative use made of highways and roads by private and by commercial vehicles. Only then is it possible to throw clear light on the controversy over the extent to which commercial trucking pays its share of the cost of road and highway construction and maintenance. If the volume and nature of truck traffic is such as to occasion greater expenditures in respect to roads than can be met through special taxes and licence fees paid by commercial users, then commercial trucking is subsidized by other taxpayers. If the reverse is true, and trucks pay more than their share of highway costs, then commercial trucking is subsidizing private vehicle traffic. Answers to this question are inconclusive at present, and more adequate statistics of passenger and truck traffic would facilitate a more informed approach to this difficult problem. Material which could form the basis for a sound allocation of road costs would be of interest to railways, the trucking industry, and provincial governments who levy the taxes and pay the bills for highway construction and maintenance.

Finally, a Survey of Passenger Traffic could throw useful light on urban economic problems. One of the great problems posed by growth of large metropolitan areas like Toronto and Montreal is traffic congestion. The transport of people as well as goods in a large urban area is a crucial factor in the economy of the municipality. Large unseen costs arise from excessive delays in moving goods and people. Huge expenditures are incurred for improved roads to help move the ever-increasing traffic. Yet at the same time urban transit systems have such difficulty in covering expenses that they have commonly fallen into municipal ownership where their unhealthy state is only partly concealed by exemptions from taxation. Therefore, within the urban areas themselves, particularly the very large ones, more information is needed about the pattern of passenger travel to permit intelligent solutions to the transport problem.

To meet the challenges of urban transport, provincial and municipal governments and the public at large need to know more about passenger commuter traffic by bus and railway and about revenues and expenses of the carriers in providing this type of service. This is one instance in which publication of railways' costs of providing specific service would be in the public interest. Also we should know more about the pattern of travel by private automobile and by mass transit facilities. Each municipality needs special studies of its own peculiar problems, but the availability of comparable statistics of passenger traffic in all the large urban areas in Canada will make

it easier for each community to know where it stands in relation to other cities with similar problems. Whether to spend vast sums on new throughways or to subsidize low fares to urban transit riders or to pay the railways and buslines to provide more commuter service—these are some of the difficult decisions which can be made correctly only if adequate statistics are available. Such statistics can be developed on a comparable basis for all our big cities like Vancouver, Winnipeg, Montreal and Toronto through a passenger traffic survey carried out at the federal level of government.

The Dominion Bureau of Statistics is already planning a survey of passenger automobiles. It is hoped that the survey can be organized in 1961 and conducted in 1962. The present plan is to secure replies from owners of motor vehicles in order to get information on the use made of each automobile in the sample, the average gasoline used, and average mileage. It may also be possible to obtain answers to questions concerning trips over 100 miles in length. The material obtained in this survey would be useful in the allocation of road costs to highway and private vehicle users, and would also provide information on urban transport.

A survey of larger scope, however, would meet a larger need. In addition to data on passenger travel by private automobile, it would be useful to have material on travel by each mode of transport—bus, taxi, aeroplane, train and ship. This comprehensive Survey of Passenger Traffic would then provide comparable statistics of travel by each type of carrier according to the distance travelled and the specific location. If such a survey were conducted every five or ten years, it would then be possible to note changing patterns in passenger travel. The method of conducting the survey would have to be developed by sampling and statistical experts. Usable results could likely be obtained through hotels and motels, through transportation companies themselves, and through polling the passengers and automobile owners. Results obtained solely through questioning individuals about their trips might be weak because the human memory is not always very accurate. On the other hand, many travellers by private automobile will be missed in reporting by motels, hotels, and transportation companies, so that questions directed to the travelling public are nevertheless likely to be the most important means of eliciting information about passenger travel. A combined approach to the public and to carriers, hotels and motels will likely yield the best results.

As in the case of the Canadian Industrial Freight Traffic Survey, the passenger survey should be conducted every ten years to coincide with the decennial Census. Annual statistics could then be derived from sample surveys. If patterns of passenger travel change so quickly that interpolations in intercensal years prove to be not sufficiently accurate, a full survey could then be taken at five-year intervals instead of ten.

The results of the Survey of Passenger Traffic might well be published in a separate publication, or integrated with other passenger traffic data now published by the Dominion Bureau of Statistics. In addition to reporting passenger traffic movements by length of trip, by means of transport, and by geographic location, the publication might also contain information on the hotel and motel industry.

A Survey of Passenger Traffic would meet such a large number of needs in relation to provision of efficient intercity passenger service and effective solutions to urban transport problems, that it is recommended as one of the key proposals in a programme of improved transportation statistics.

A Programme of Transportation Statistics

The chief recommendations for improving upon the present coverage of transport statistics are: (1) a Canadian Industrial Freight Traffic Survey; (2) an Index of Freight Rates; and (3) a Survey of Passenger Traffic. These recommendations form part of a programme. The various aspects of the programme affect each other, and they also affect existing published statistics. For example, the Industrial Freight Traffic Survey will provide information which is necessary for constructing an Index of Freight Rates for the different means of transport. Both the freight and passenger traffic surveys, conducted every five or ten years, will make it possible to improve and extend existing statistical series dealing with traffic. We can expect that the publications, *Railway Freight Traffic, Motor Transport Traffic and* the *Shipping Report* could all be improved as a result of the more precise information on commodity flows by origin and destination available from a Canadian Industrial Freight Traffic Survey. And some existing publications might possibly become redundant as a result of the new statistical series emerging from the new traffic surveys and the Index of Freight Rates.

All of the statistical tables published by the Government on transportation should form parts of a consistent whole. It is therefore important for the Dominion Bureau of Statistics to undertake a conceptual review of all its transport publications. Unless a statistical periodical is reviewed once in a while, it tends to become a matter of habit, and is published even if its usefulness diminishes. A review of the functions performed by each periodical will have greater significance if it takes place within the framework of a concerted effort to make transport statistics serve the needs of the coming decade, not the decades past.

Such a comprehensive review is entirely appropriate in the 1960's, which are likely to be a time of keen competition within the transport industry and also keen competition in world markets in which much of the product of Canadian industry is sold. At such a time efficiency of transport service is important for each carrier and for other industries which must ship their

products to highly competitive foreign markets or meet tough competition from imports. One way of promoting efficient transport service is to publish more information on the traffic and service of each mode of transport. Great improvements are needed in the provision of comparable statistics of traffic with detail by commodities and regional movements for road, rail, air, water, and pipelines. Better statistics are needed on the relationship between carriers' investment and their inventories of plant and equipment. More information is needed on subsidization of transport companies by governments. Also it is important to commence publication of data concerning a variety of transport and storage operations which are assuming the character of distinct industries —trucking of milk, livestock, and automobiles, freight forwarder traffic, and furniture moving. A reappraisal of the transport statistics in publications of the Federal Government should take account of these needs of the 1960's.

Some of the glaring gaps in present transport statistics can be filled by the International Freight Traffic Survey, by the Index of Freight Rates and by the Passenger Traffic Survey. Many existing statistical series can be improved simply by extending the coverage or speeding up publication. Use of material derived from the proposed traffic surveys will make possible in some publications more accurate and meaningful statistics. Other publications may be eliminated. Once a review of this kind has been decided upon, it is primarily the task of expert statisticians to design the improvements and to recommend the form in which new statistical series should appear. The design of methods and form of presentation of statistics is a highly technical procedure which can best be undertaken by the Dominion Bureau of Statistics. To get the programme of improved transportation statistics under way, the Bureau must have the assurance and instruction from the Government that this programme is one of high priority on which time, resources, and money shall be spent. The problems of the transport industry and the urgency of efficient, low-cost transport in our times are so pressing that a high priority is indicated for modernization of our transport statistics.

Recommendations in Detail

In the text of this report, particularly in Chapter 2, there are many detailed recommendations for improvement of our existing transport statistics. These recommendations relate to gaps or weaknesses in our statistics of traffic, pricing of transport services, employment and earnings, investments in plant and equipment, government subsidies, and financial reports of carriers. It is recommended that the Dominion Bureau of Statistics examine the reason for an average time-lag of over six months after the close of the year in publication of annual transport statistics. All of these recommendations point to deficiencies or directions where improvement is needed.

The urgent need for improvement does not imply any criticism of the Transportation Section of the Dominion Bureau of Statistics whose officials are well aware of the advances which could be made if staff and funds were provided. The recommendation of prime importance in this report is that these officials be given both the instructions and the means to institute a programme of modernization of the transport statistics. A review of existing statistics and design for improvements would cost very little. The programme itself would cost more, depending upon the scope and methods used, but the public benefits would be many-sided and large.

Responsibility for Publication

If a programme of statistics for publication is to be properly conceived and co-ordinated, it must be under one single authority. Because of the statutory authority assigned in this field to the Dominion Bureau of Statistics, it must be the responsibility of this agency of government. As a practical matter too, the Dominion Bureau of Statistics is the only agency which is in a position to develop a broad and consistent programme covering transportation and relating it to statistics of other industries and international trade.

The primary responsibility of the Dominion Bureau of Statistics in the field of statistical publication does not rule out the need for other government departments and boards to develop their own statistics for internal use. The administrative requirements of the Department of Transport, for example, require the processing of statistical material by the Department's own staff and with its own computer equipment. Also, the Board of Transport Commissioners, the Air Transport Board, the National Harbours Board, and certain other government agencies as well must develop transport statistics to suit their own requirements. The questionnaire sent to industrial traffic officials revealed that most of the companies polled had devised their own transport statistics for internal use. Major railways in Canada, including the government-owned Canadian National, prepare statistics for inclusion in their annual reports, along with financial statements. And various government departments and boards present statistical tabulations in their annual reports. All of this activity is entirely reasonable and in the public interest.

When it comes to the publication of periodicals dealing with transport statistics, however, the responsibility should be assumed entirely by the Dominion Bureau of Statistics and by no other agency of government. The annual *Waybill Analysis: All-Rail Carload Traffic* should accordingly be published by the Dominion Bureau of Statistics even if the Board of Transport Commissioners continues to compile the data and have it processed by computers belonging to the Department of Transport. The power to decide upon publication of this information in periodical form should rest with the

Dominion Bureau of Statistics. Unless this authority rests with the Bureau, there will be a tendency for other departments and boards to publish the statistics which they have developed initially for their own use, and then to duplicate or supersede the publications of the Dominion Bureau of Statistics in certain fields. The final result will be a proliferation of statistical agencies with varying degrees of statistical competence, and great difficulty in ensuring a consistent, comparable, and continuous body of statistical information. The Dominion Bureau of Statistics may not always be able to attract as many first-class technical experts in the field of transport as it needs, but co-operation between technical boards and departments and the Bureau should overcome this difficulty. Therefore, it should be the task of the Dominion Bureau of Statistics with such consultation as it considers necessary with other departments to develop as soon as possible a Programme of Transportation Statistics to meet the needs of the 1960's and future decades.

Catalogue of Statistical Series Published in Federal Government Periodicals Relating to Transport (1960)

The statistical content of every periodical published by the Federal Government relating to transportation is described in this Appendix. Also, the agency of the Government which is responsible for preparing the material for the publication is mentioned in each case. Since price of a publication may influence the extent of its use, this too is mentioned. In most cases, judged by standards of private publications, the price is low considering the length and content. Most of these publications are produced by the Dominion Bureau of Statistics, but important periodicals also stem from the Board of Transport Commissioners for Canada and other agencies of the Government.

The publications are classed according to the medium of transport with which each mainly deals. The following are the classes:

Rail;
Road;
Urban transit;
Water;
Air;
Pipeline;
Warehouse and storage;
Transport equipment.

Each description of statistical content of a periodical is related to some specific recent issue. Content may vary somewhat from issue to issue, and reference is made to a definite date of publication in the interests of precision. Since emphasis in this Appendix is on the *kind* of data published rather than on the time period covered by a given statistical series, however, the precise month and year to which series relate have been omitted.

1. RAIL

Carloadings, June 7, 1960

DBS 52-001. Four times a month. Price: $3.00 per year.

This publication contains statistics of number of cars loaded:
— 47 commodities and l.c.l.;
— also total piggyback and cars from connections;
— eastern and western divisions;

One issue each month includes a monthly summary of cars and tonnage loaded and index.
3 pages; 3 tables.

Prepared in Transportation Section of the Public Finance and Transportation Division of the Dominion Bureau of Statistics.

Railway Freight Traffic

DBS 52-002. Monthly. Price: $2.00 per year.

DBS 52-205. Annual. Price: $1.00

Data are classified according to the Freight Commodity Statistics Classification of Association of American Railroads (used in Canada as of January 1, 1957).

Statistics are published of the tons of freight carried by total of 22 Class I and II Railways in Canada.

1. Annual issue shows for each commodity:
   — tons originated or loaded (including imports at lake or ocean ports);
   — tons received from U.S. rail and destined to Canada; or destined to U.S.;
   — tons terminated or unloaded (including exports at lake or ocean ports);
   — tons delivered to U.S. rail connections.

Separately for Canada, for each province, for Atlantic Provinces and for four Western Provinces.

2. Monthly issue shows for each commodity:
   — same data for Canada as annual issue;
   — for each province tons loaded and tons unloaded only.
   January 1960 issue contains 3 tables; 17 pages.
   1958 issue: 13 tables and 2 summary tables; 85 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

Railway Transport 1958 Part I (Comparative Summary Statistics 1954 to 1958)

DBS 52-207. Annual. Price: 50¢.

1. CNR railway bonds guaranteed, year ended December 31, 1958, (detail).
2. Aid (Land Grants in Acres) granted to each of six railways (by level of government), 1942 to 1958.

3. Land Grants, cumulative total at December 31, 1958, by each government—bonus grants and grants for right of way, etc.—total to all railways.
4. For total Canadian railways (number unspecified) each year, 1954 to 1958:
   - aid to railways—cumulative total $ to Dec. 31, by level of government;
   - first main track mileage, by provinces and U.S.; also by gauge. Second main; industrial; yard track and sidings; mileage;
   - investments ($) in road and equipment property, year ended Dec. 31—separately in road, equipment, general, undistributed (CNR; CPR; others);
   - railway capital—stock; debenture stock; funded debt;
   - depreciation and reserves of railways—road and rolling stock; other properties; operating and deferred maintenance; insurance and casualty; investment; other;
   - income account: Total railway operating revenues, expenses, tax accruals, other income and expenses and disposal of net income, (detail of operating revenues and expenses);
   - operating statistics: Locomotive-miles (steam and diesel and other) in freight; passenger; train switching; yard switching; work train service; train-miles-freight; passenger (locomotive and motor unit car); car-miles-freight (loaded; empty; caboose; etc.). Also passenger by type of car separately for locomotive and motor unit car);
     Averages per mile of road; etc.;
     Tons; ton-miles; gross ton-miles; train hours; average haul per ton; etc.;
     Passengers; passenger miles; average passenger per car; average distance per passenger; etc.;
     Average revenue statistics:
   - taxes, each province and by type of federal tax;
   - tons carload freight by commodities; l.c.l. tons;
   - freight cars in service (number and capacity) by type of car;
   - passenger cars (by type);
   - locomotives in service (coal; oil; and diesel electric by type);
   - fuel consumed by locomotives (freight; passenger; etc.) and rail motor cars (by type)—tons and cost. Other fuel consumption;
   - rails laid (detail);
   - switch and bridge ties placed in track (detail);
   - cross-ties purchased; placed in track (detail);

— Accidents;
Persons (by category) injured in train and non-train accidents and dying after 24 hours;
Time lost by employees through injuries (detail);
Accidents resulting from movement of trains (by cause);
Persons (by category) killed and injured in train and non-train accidents, by cause; by class of victim;
Highway crossing accidents (by type of protection at crossing);
— highway crossings (rural and urban) by type of protection, for each province.
34 tables; 31 pages.

Prepared in Transportation Section of the Public Finance Division.

Railway Transport 1958 Part II (Financial Statistics)

DBS 52-208. Annual. Price: 75¢.

Data are classified according to the "Uniform Classification of Accounts for Class I Common Carriers by Railway" (September 1955 issue—prescribed for CNR and CPR effective Jan. 1, 1956, and for all other roads Jan. 1, 1957).

1. Operating revenues and expenses:
   — for each of 31 railway company items including U.S. lines in Canada and CNR in Canada and U.S.;
   — detail of operating revenues—transportation—railway line; incidental;
   — detail of operating expenses with greater detail for CNR and CPR;
   — revenue per ton-mile of freight; revenue per passenger mile;
   — total operating revenues and expenses—joint facility, express, communications, and highway transport (rail).
2. Other income:
   — detail for each of 32 railway company items.
3. Income and total operating expenses of each of 3 pullman, tunnel and bridge companies. Capital stock, funded debt, and detail of current assets and current liabilities of Van Buren Bridge Co.
4. Railway tax accruals:
   — detail for each of 29 railways, by province or country.
5. Capital stock, funded debt, for 33 companies, also subsidiaries. Detail of current assets and current liabilities for 24 companies.
   9 tables; 51 pages.

Prepared in Transportation Section of Public Finance and Transportation Division.

Railway Transport 1958 Part III (Equipment, Track and Fuel Statistics)

DBS 52-209. Annual. Price: 50¢.

1. For each of 27 to 30 railway companies:
   — number of cars and aggregate capacity in freight passenger, and company service by type;
   — number of motor vehicles;
   — number of units motive power and tractive power, by type of locomotive;
   — mileage (total and route miles) of first main track; second main track; industrial; yard tracks and sidings;
   — first main track mileage by provinces and territories and U.S.
2. CNR—changes in first main track mileage by provinces and states.
3. For total railways (number unspecified):
   — railway track mileage under construction at December 31;
   — rails laid (new and relay), tons and cost, by weight of rail;
   — fuel (coal, diesel, oil, fuel oil, gasoline) consumed by locomotives (in freight, passenger, switching, work service) and by rail motor cars;
   — amounts of Canadian and imported fuel (tons and gallons) delivered to fueling stations in each province, Yukon, and U.S.

   8 tables; 13 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

Railway Transport 1958 Part IV (Operating and Traffic Statistics)

DBS 52-210. Annual. Price: 50¢.

For *each* of 22 Class I and II Railways in Canada:

1. Passenger:
   — number of revenue passengers;
   — passenger miles;
   — gross ton-miles;
   — car-miles by type of motive power and type of passenger car; caboose car-miles.
2. Freight:
   — tons, revenue; non-revenue;
   — ton-miles-revenue; non-revenue;
   — gross ton-miles;
   — train-hours;
   — car-miles by type of motive power, loaded and empty; caboose car-miles.

3. Freight, passenger and caboose *car-miles* in work train service;
   Train-miles; by freight, passenger and work train service by type of motive power;
   Locomotive-miles—exclusive of switching, by freight, passenger, and work train service;
   Locomotive-miles; train switching and yard switching.
4. Express;
   Car-miles in freight and passenger trains by type of motive power;
   Express car-miles in work train service.
5. Motor bus-miles and motor truck-miles.
   6 tables; 29 pages.

Prepared in Transportation Section of Public Finance and Transportation Division.

Railway Transport 1958 Part V (Freight Carried by Principal Commodity Classes)

DBS 52-211. Annual. Price: $1.50.

Data are classified according to the Freight Commodity Statistics Classification of Association of American Railroads.

Tons of freight carried by *each* of 22 Class I and II Railways in Canada:

— tons originated—loaded at points in Canada (including imports at lake or ocean ports);
— received from U.S. rail connections;
— tons terminated—unloaded at points in Canada (including exports at lake or ocean ports);
— delivered to U.S. rail connections;
— also *carloads* loaded at points in Canada.

Separately for each commodity and railway.
2 tables; 148 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

Railway Transport 1958 Part VI (Employment Statistics)

DBS 52-212. Annual. Price: 25¢.

Data are classified according to the Canadian Classification of Railway Employees and their Compensation.

1. Separately for CNR, CPR, total 19 Class II Railways:
   For each of 79 categories of employee, and for communications, express, cartage, highway transport (rail) and outside operations:
   — number of employees (monthly average);

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— time on duty (hours);
— total compensation;
— average hours worked;
— average salaries and wages per hour and per year.

2. For total Class III and IV Railways, and for all Railways:
   — for 4 groups of employees (falling into 79 categories not shown separately, and for communications, etc.);
   — also for pullman and international bridge company;
   — number of employees and other data same as (1).

   6 tables; 14 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

Railway Operating Statistics

DBS 52-003. Monthly. Price: $2.00 per year.

DBS 52-206. Annual. Price: 25¢.

1. Financial:
   — total operating revenues and expenses and net rail operating income for 22 Class I and II Canadian Railways. Breakdown into main categories of revenue and expense given for *total* 22 railways, CNR and CPR.

2. Operating Statistics:
   For total of 22 railways, CNR and CPR:
   — miles of road operated;
   — freight traffic—tons (revenue freight); ton-miles (revenue and non-revenue);
   — passenger traffic—passengers and passenger miles;
   — gross ton-miles—freight and passenger;
   — train-miles—freight, passenger and work service;
   — car-miles—freight, loaded and empty; passenger;
   — number of employees—railway;
   — pay-roll—railway total and amount chargeable to railway operating expenses;
   — averages per day per mile of road;
   — averages per freight train-miles;
   — miscellaneous averages.

   Derived from financial and operating data

   March 1960 issue contains 5 tables; 7 pages.
   1959 issue: 5 tables; 6 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

Canadian National Railways 1923-1958

DBS 52-201. Annual. Price: 50¢.

Canadian Pacific Railway Company 1923-1958

DBS 52-202. Annual. Price: 50¢.

"Uniform Classification of Accounts for Class I Common Carriers by Railway" (adopted Jan. 1, 1956). CNR and CPR accounts stated on bases as nearly similar as possible (*see* CPR 1923-1958, p. 8-9).

1. For each railway (in its respective publication):
   Each year 1923-1958:
   - income account; total operating revenues and expenses (in CNR separated for Canadian and U.S. lines): fixed charges; net income;
   - capital account; receipts and expenditures (detail);
   - operating statistics:
     - miles of road;
     - revenue freight tons; ton-miles;
     - revenue passengers carried; passenger miles;
     - freight, passenger, and passenger train revenue;
     - freight and passenger train-miles;
     - averages per mile of road operated;
     - averages per freight train-mile and passenger train-miles;
     - average ton-miles per loaded car-mile;
     - average haul; average passenger journey;
     - average revenue—per ton, passenger, ton-mile and passenger mile;
     - employees and pay-roll;
     - operating ratio.
2. For CPR:
   - mileage and capital of leased railways, 1958;
   - cash subsidies and land grants (detail), to 1958;
   - securities outstanding each year 1922 to 1958;
   - dividends, each year 1923 to 1958.
3. For CNR:
   - Government loans and appropriations each year 1923 to 1958.

DBS 52-201. CNR—5 tables; 22 pages.

DBS 52-202. CPR—6 main tables; 19 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

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Board of Transport Commissioners for Canada
Waybill Analysis: Carload All-rail Traffic 1958

Price: 50¢.

1 per cent sample of domestic Canadian carload freight traffic, showing:

— number of carloads;
— revenue;
— weight (tons);
— ton-miles;
— average revenue per ton-mile;
— average haul per ton;
— car-miles;
— average revenue per car-mile.

Classified:

1. By type of rate:
   — class, commodity, multiple rates and mixed shipments at carload rates; U.S. related rates (official);
   — competitive, non-competitive, statutory, agreed charge.

Separately for traffic originating in each region (Maritime; Eastern; Western) and destined to each region (Tables 1-A, 1-B, 1-C).

2. By commodity—Freight Commodity Statistics Classification of the Association of American Railroads:
   — all traffic (Table 2);
   — separately for traffic originating in each region and destined to each region (Table 3).

6 tables; 39 pages.

Prepared by Economics and Accounting Branch, Board of Transport Commissioners.

Express Statistics, 1958

DBS 52-204. Annual. Price: 25¢.

For each of 5 express companies:

1. Financial:
   — operating revenues (detail);
   — operating expenses (detail);
   — capital stock (detail);

— investments in real property; equipment; miscellaneous physical property; other;
— tax accruals by provinces and territories. Federal Government and other.

2. Value of financial paper issued (by type).
3. Equipment—road and platform vehicles (by type) and road vehicles used in cartage services (by type).
4. Employees—number and salaries—full-time and part-time; commissions.
5. Express offices.
6. Route mileage by type of carrier and province, territory, U.S. or ocean-going.
7. Accidents—persons injured; killed.

1 table; 7 pages.

Prepared in Transportation Section of Public Finance and Transportation Division.

Telegraph and Cable Statistics, 1958

DBS 56-201. Annual. Price: 50¢.

For each of 10 companies:

1. Cost of property and equipment.
2. Revenues accrued in Canada (detail); other income;
   Expenses (detail);
   Taxes—income and other.
3. Telegrams sent; received (detail);
   Cablegrams sent; received (detail).
4. Money transfers by country of origin and destination.
5. Wire and cable mileage (detail);
   Channel and circuit mileage (detail);
   Pole line mileage (detail);
   Number of offices.
6. Employees—number; salaries; commissions.

Also: Messages handled by Marine radio stations of Department of Transport, by province.

7 tables; 15 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

International Bridge, Tunnel and Ferry Companies, 1958

DBS 53-202. Annual. Price: 50¢.

Separate totals for ferry companies; bridge and tunnel companies:

1. Operating revenues (detail);
   Operating expenses (detail).
2. Investments; capital; taxes; interest.
3. Employees (by type); number of full-time and part-time; salaries.
4. Traffic (passengers; trucks; buses; motorcycles, etc.).
5. Accidents:
   — number of persons (by category) killed and number injured.

10 tables; 11 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

2. ROAD

Motor Carriers—Freight, 1957

DBS 53-205. Annual. Price: 50¢.

Separately for total Group I carriers (largest); Group II; Group III; Group IV (smallest) by provinces (Atlantic Provinces total):

1. Number reporting:
   — property account;
      — total cost of property, vehicles, etc.;
      —accrued depreciation reserve;
   — operating revenues (freight and other); (greatest detail in case of Groups I and II; less for III, still less for IV);
   — operating expenses;
      — maintenance; wages; fuel; insurance; depreciation; taxes; rents; bridge, tunnel and ferry tolls (greatest detail for Groups I and II; less for III and IV);
   — income taxes;
   — other income.
2. Traffic statistics (Groups I, II, III only):
   — tons freight;
   — fuel by type;
   — separately for intercity and rural; city:
      passengers—regular routes, also charter; miles run by buses—regular routes, also charter.

3. Employees:
   — Group IV only; employees (number; salaries) and working proprietors (number; allowances);
   — separately for Groups I, II, III:
   Number employees and salaries for general officers; office clerks; drivers and helpers; mechanics—maintenance; other. Also working proprietors (number and allowances).
4. Revenue equipment (number)—Groups I, II, III only:
   — trucks (by capacity); road tractors; semi-trailers (by capacity); trailers (by capacity); buses (by capacity);
   — vehicles with diesel engines (trucks; road tractors; buses);
   — vehicles with liquefied petroleum engines.
5. Accidents (total of Groups I, II, III):
   — number of persons killed and number injured—by type of person;
   — number of accidents resulting in property damage over $100;
   — total property damage ($).

   9 tables; 17 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

Motor Transport Traffic, 1958

Price: National Estimates—75¢; others—50¢ each.

DBS 53-207: National Estimates,
DBS 53-208: Atlantic Provinces,
DBS 53-209: Province of Quebec,
DBS 53-210: Province of Ontario,
DBS 53-211: Province of Manitoba,
DBS 53-212: Province of Saskatchewan,
DBS 53-213: Province of Alberta,
DBS 53-214: Province of British Columbia.

One publication of estimates for all Canada; 7 separate publications of data for trucks registered in each province.

National Estimates

Graphs:

Truck registrations by type of operation; } Also in each provincial
Net ton-miles by type of operation; } publication
—tons carried by type of operation (each province);
— intercity traffic by commodity group—tons of goods carried.

Statistical Tables:

Truck traffic by Canadian registered trucks.

1. By gross vehicle weight, total Canada only.
   Separately for total truck traffic (for-hire; private intercity); intra-provincial intercity traffic (for-hire; private intercity); total international and interprovincial (for-hire; private intercity):
   — also by 6 commodity groups (agricultural; animal; mine; forest; manufactures and miscellaneous; n.o.s. general freight).
   Separately for intra-provincial intercity traffic (for-hire; private intercity);
   Total interprovincial and international (for-hire; private intercity).

   For total Canada, the following statistics are given:
   — tons (weight of goods);
   — total miles travelled with load;
   — total net ton-miles;
   — average weight carried;
   — average distance per ton;
   — total revenue } for-hire only
   — revenue per ton-mile }
   —average annual population.

2. For Total *All* trucks by gross vehicle weight group, Total Canada:
   — also separately for: for-hire trucks; private intercity; private urban; farm trucks—by each province.

   The following statistics are given:

   (a) Mileage—Total; Average yearly mileage per truck; Average haul per ton; per cent of mileage empty.

   (b) Fuel—Gallons and miles per gallon gasoline; diesel oil; other.

   (c) Tons—Total; Average weight (=Ton-miles÷Miles travelled with load);
   Net ton-miles—Total; Average per truck;
   Capacity ton-miles (= Actual miles travelled × estimated capacity or heaviest load, whichever larger)—Total; Average per truck; per cent of Capacity utilized;
   Gross ton-miles—Total; Average per truck.

   (d) Average annual population.

3. For "for-hire" only, by each province:
   — Revenue—Total; Revenue per ton-mile; Revenue per mile travelled; Average revenue per truck.

4. For Total international and interprovincial traffic only:
   — Tons goods carried by province of origin and destination (for-hire; private intercity).
5. Average truck population in Canada, by gross vehicle weight.
   By each province:
   — separately for "for-hire"; private intercity; urban; farm.
6. Survey response, by each province.
   Number of trucks selected in samples; number of questionnaires returned, etc. Separately by "for-hire"; private intercity; urban; farm:
   —reliability of statistics—sampling variability; range (detail);
   — copy of questionnaire.
7. Description of vehicle classifications by type of truck.
   Licence regulations in each province.

Atlantic Provinces

Same statistics and detail, where applicable, separately for total trucks registered in Atlantic Provinces; Trucks registered in Newfoundland; Prince Edward Island; New Brunswick; Nova Scotia.

No data on traffic by commodities for these *individual* provinces though. Data for Total Atlantic Provinces only.

Other Provinces

Same statistics and detail, where applicable, for trucks registered in each province. Data on traffic by commodities for each individual province are included.

Passenger Buses

These data are included in the following publications only:

Ontario;
Manitoba;
Saskatchewan;
Alberta;
British Columbia.

For buses registered in the province:

By passenger seating capacity, separately for traffic performed by buses inside and outside the province; traffic within the province.

1. Mileage—Total; Average yearly mileage per bus; Average distance per passenger.
2. Fuel—Gallons and miles per gallon-gasoline; diesel oil; other.
3. Passengers; Passenger miles; Average number of passengers carried per mile.

4. Capacity seat miles; per cent of capacity utilized.
5. Revenue ($)—Total passenger revenue; Revenue per mile, Revenue per passenger mile; Revenue per bus.

National Estimates ..... — 17 tables; 27 pages; 4 graphs;
Atlantic Provinces ..... — 19 tables; 18 pages; 2 graphs;
Province of Quebec ..... — 11 tables; 12 pages; 2 graphs;
Province of Ontario ..... — 13 tables; 13 pages; 2 graphs;
Province of Manitoba ..... — 13 tables; 13 pages; 2 graphs;
Province of Saskatchewan ..... — 13 tables; 13 pages; 2 graphs;
Province of Alberta ..... — 13 tables; 14 pages; 2 graphs;
Province of British Columbia ..... — 13 tables; 13 pages; 2 graphs.

Prepared in Transportation Section of Public Finance and Transportation Division.

The Motor Vehicle, 1958

DBS 53-203. Annual. Price: 75¢.

For each province:

1. Registrations of motor vehicles:
   — motor vehicle licences—passenger; motor trucks; taxicabs; buses; motorcycles; trailers (detail);
   — other licences (drivers'; dealers'; gasoline outlets; garage licences).
2. Average population per motor vehicle;
   Average population per passenger car;
   Average number of passenger cars per family.
3. Motor vehicle registrations by municipalities. Separately for passenger; commercial.
4. Provincial revenues from motor vehicle registrations and gasoline tax (detail by type of fee, tax, or licence).
5. Taxes on gasoline and other fuel. Regulations (detail by provinces).
6. Gasoline sales ($)—Gross, Net (tables and graph);
   By months;
   Net sales of diesel oil.
7. State of unsatisfied judgement funds in each province.
8. Regulations. Summary of reciprocal highway agreements for trucking, September 1959.
   14 tables; 3 graphs; 33 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

The Motor Vehicle; Preliminary Report of Registrations and Size, Weight and Safety Regulations, 1958

DBS 53-204. Annual. Price: 50¢.

For each province:

1. Registrations of motor vehicles:
   — motor vehicle licences—passenger-motor trucks; taxicabs; buses; motorcycles; trailers (detail);
   — other licences (drivers'; dealers'; gasoline outlets; garage licences).
   Also: Average population per motor vehicle;
   Average population per passenger car;
   Average number of passenger cars per family.
   (Exactly same data as in DBS 53-203, Annual, *The Motor Vehicle, 1958,* but published earlier with unrevised figures.)
2. Size and weight regulations for commercial vehicles in effect March 31, 1959; (detail).
3. Safety regulations for commercial vehicles in effect March 31, 1959; (detail).

3 tables; 13 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

Motor Vehicle Traffic Accidents

DBS 53-001. Quarterly. Price: $2.00 per year.

DBS 53-206. Annual. Price: 75¢.

By each province and Total Yukon and Northwest Territories:

1. Number of accidents (Fatal; injury—total and number resulting in property damage over $100);
   Persons killed, injured (detail).
   Accident ratios—per million vehicle miles based on estimated consumption of petroleum fuels on public roads.
2. Number of accidents:
   — by class; (detail of: type of accident; month; day; hour of occurrence; road location; road surface; road condition; type of road; weather condition; place of occurrence (rural; urban, etc.); by pedestrian action; by condition of pedestrian.
3. Number of victims, by age groups; (detail of class of victim; sex; month of occurrence; place; type of accident).

4. Number of pedestrians killed and injured;
   — by condition of pedestrian;
   — by action of pedestrian.
   } Annual only.
5. Number of vehicles:
   — by class of accident;
   — by type of vehicle; (detail for condition of vehicle; model year of vehicle; direction of travel of vehicle).
6. Number of drivers:
   — by class of accident; (detail by sex; residence; condition of driver; by driving experience; by driver action; by age group).
7. Intersection accidents—number of victims:
   — by class of victim;
   — by road location; (detail by hour; day of occurrence).
   } Annual only.

Issue of 1958: 7 tables; 59 pages.

Issue of October—December 1959: 5 tables; 31 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

Passenger Bus Statistics

DBS 53-002. Monthly. Price: $1.00 per year.

DBS 53-215. Annual. Price: 50¢.

Monthly: Intercity and rural Class I carriers only:
by each province and interprovincial:
— number of firms reporting;
— revenue passengers—regular; charter;
— revenue vehicle miles—regular; charter;
— fuel consumed—gallons gasoline; diesel oil;
— total revenue ($).

Annual: Seperate totals for Group I, II, III Motor Carriers by provinces (Atlantic: Total only):

1. Number reporting.
2. Property account—cost of property, vehicles, etc. (detail for Group I only); accrued depreciation reserve.
3. Operating revenues:
   — passenger revenues—regular and extra service, separately for intercity and rural; urban and suburban. Also chartered service (including school);
   — total mail, baggage, express, newspapers, etc.;
   — other.

4. Operating expenses, by type (more detail for Group I)—including operating taxes and licences;
   — other income; } Group I only.
   — income taxes; }
5. Traffic statistics:
   — passengers carried; } separately for chartered and regular routes
   — revenue vehicle miles; } (intercity and rural; urban and suburban).
   — fuel consumed—gallons gasoline; diesel oil.
6. Employees, by type:
   Average number employed; salaries.
7. Revenue equipment: number:
   — gasoline and diesel separately, by model year;
   — by seating capacity.
8. Taxes (by type, excluding income tax).
9. Accidents:
   — number of persons (by type) killed and injured;
   — number fatal; injury accidents;
   — number of accidents resulting in property damage over $100.

10 tables; 17 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

Travel Between Canada and the United States, May 1960

DBS 66-001. Monthly. Price: 20¢ per copy; $2.00 per year.

1. Highway traffic at Canadian border—number of vehicles:
   — by ports, by provinces and Yukon; also vehicles transported by boat direct from U.S.—total only;
   — separately for foreign vehicles (breakdown for: length of stay 24 hours or less; over 24 hours; repeats and taxis; commercial vehicles); and Canadian vehicles (length of stay abroad 24 hours or less; over 24 hours; commercial vehicles).
2. Travellers entering Canada from United States:
   — by provinces and Yukon;
   — separately for rail; bus; boat; plane;
   — separately for Canadian travellers; foreign travellers.

6 tables, 11 pages.

Prepared in International Trade Division: Balance of Payments Section.

Volume of Highway Traffic Entering Canada on Travellers' Vehicle Permits, September 1959

DBS 66-002. Monthly. Price: 10¢ per copy; $1.00 per year.

"With this issue this publication is being temporarily discontinued because of the effects of a change in the procedure of the Department of National Revenue in dealing with the entry of non-resident vehicles. Publication is expected to be resumed when a new form of presentation is developed for showing comparable monthly statistics of traffic."

Data given are:

Number of vehicles entering Canada on travellers' vehicle permits:

— by province of entry and Yukon.

1 table; 1 page.

Prepared in International Trade Division: Balance of Payments Section.

Travel Between Canada and Other Countries, 1958

DBS 66-201. Annual. Price: $1.00.

A. Contains a 70-page article entitled "Leading Developments in Travel between Canada and Other Countries". Analyses characteristics of traffic crossing the Canadian-American border. The article contains 33 tables, copies of 11 questionnaires given to travellers sampled, and also 3 charts and 2 maps.

Principal data in these statistical tables:

1. Number and expenditures of U.S. travellers in Canada:
   — by auto (non-permit; customs permits; repeat trips); rail; boat; through bus; plane; other.
2. Average declared expenditure per car of non-resident motorists travelling in Canada on customs permits:
   — by class of permit (commuter; summer resident; local; other);
   — by province of exit.
3. Number of non-resident one- and two-day autos travelling on customs permits in transit between selected border points in Ontario.
4. Selected routes of non-resident automobiles (detail).
5. Minimum interprovincial travel by non-resident automobiles (detail).
6. Purpose of visit reported by U.S. motorists visiting Canada (detail). Same data for Canadians returning from U.S.

7. Accommodation used by motorists from U.S.; hotel or resort; motor court or motel; etc. (detail).
8. Average mileage in Canada reported by motorists from U.S. by province of entry and province of destination, special survey, 1958.
9. Expenditures of Canadian travellers in U.S., by type of transportation used to re-enter Canada:
   — auto; train; boat; bus (exclusive of local bus); aeroplane; other.
10. Number of non-immigrant visitors entering Canada direct from overseas; by aeroplane; by vessel:
    — by country of residence.
11. Residents of Canada returning direct from overseas by chief ports of re-entry (detail).
12. Purpose of visit reported by Canadians returning direct from overseas (%):
    — by aeroplane; by vessel.

B. Additional statistical tables contain the following data:

1. Non-resident motorists travelling on customs permits who departed from Canada in 1958; also separately for Canadian automobiles returning to Canada in 1958:

   By days' stay:
   — number of permits (or cars);
   — per cent of total permits (or cars);
   — average expenditure per car ($);
   — estimated total expenditures ($);
   — per cent of total expenditures for all visits;
   — number of car-days;
   — average expenditure per car per day;
   — average number of persons per car;
   — number of persons;
   — number of person-days;
   — average expenditure per person per day;

Also: (for non-residents only): By U.S. state of registration:
   — entries on customs permits as per cent of automobile registrations;
   — average declared expenditure per car;
   — total expenditure;
   — average length of visit;
   — average expenditure per car per day.

2. Non-resident automobiles travelling on customs permits which departed from Canada in 1958:
   — number of automobiles—by length of visit (1 day; 2 days; 3 days and over):
      — by port of entry and port of exit;
      — separately for 9 main regional categories—traffic within Ontario;
      — traffic from Ontario to other provinces;
        traffic Maritimes to other provinces;
        Manitoba to other provinces, etc.;
   — number of automobiles—by U.S. state and by province of entry (Newfoundland, Prince Edward Island and Nova Scotia totalled; other provinces and Yukon separately);

Separate data for those remaining in Canada 3 days or over:
   — average declared expenditure per car—by U.S. state and "total remaining states and foreign countries".

3. Canadian travellers returning to Canada in 1958:
   By days' stay; separately via rail; via bus; via plane:
   — number of persons;
   — per cent of total persons;
   — average expenditure per person;
   — estimated expenditures;
   — per cent of total expenditures;
   — number of person-days;
   — average expenditure per person per day.
4. By each state of destination reported by Canadian visiting 48 hours or over:
   — per cent of total persons, by quarters of the year. Also by province of re-entry into Canada.
5. Number of foreign automobiles and other vehicles entering Canada:
   — separately for non-permit class—local traffic;
     travellers' vehicle permits; commercial vehicles;
   — by province of entry; also by month of entry.
6. Number of foreign travellers entering Canada from U.S.; also number of Canadians returning from U.S.:
   — by province of entry; also by month of entry;
   — separately by rail; boat; bus; aeroplane.
7. Number of Canadian automobiles and other vehicles travelling in U.S.:
   — by province of re-entry into Canada;

— also by month;
— separately for length of stay—24 hours or less; over 24 hours; commercial vehicles.

56 tables; 3 charts; 2 maps; 11 forms; 100 pages.

Prepared in International Trade Division: Balance of Payments Section.

Road and Street Mileage and Expenditure, 1958 (formerly Highway Statistics)

DBS 53-201. Annual. Price: 50¢.

For each province and territory:

1. Per capita highway and rural road expenditure.
2. Highway and rural road expenditure:
   — total; federal; provincial; municipal expenditures; breakdown for construction; maintenance; administration and general;
   — net subsidies and grants in aid.
3. Revenue earned by:
   — domestic toll bridges, tunnels and ferries;
   —controlled access toll highways.
4. Urban street expenditure:
   — number of authorities;
   — expenditure detail for: construction; maintenance; administration. Separately for roadways; bridges and ferries; sidewalks and footpaths;
   — subsidies paid; received.
5. Trans-Canada Highway expenditure:
   — total; federal expenditure; grants to provinces.
6. Expenditure for elimination and protection of grade crossings:
   — by railways; from Railway Grade Crossing Fund; by provinces and municipalities.
7. Highway and rural road mileage, by type of surface;
   Also: average number of motor vehicles per mile of surfaced road—total Canada only.
8. Urban street mileage:
   — by type of pavement.

10 tables; 15 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

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3. URBAN TRANSIT

Urban Transit, March 1960

DBS 53-003. Monthly. Price: $1.00 per year.

Class I carriers only.

For each province (except Prince Edward Island).

1. Number of passengers; } separately for: electric car; trolley coach; motor bus; chartered.
   Number of vehicle-miles run; }
2. Gallons fuel—gasoline; diesel oil; liquefied petroleum gases.
3. Total revenue ($).
4. Number of firms reporting.

2 tables; 1 graph; 4 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

Urban Transit, 1958

DBS 53-216. Annual. Price: 50¢.

A. For 77 urban transit companies earning annual gross revenues of $20,000 or more and covering 90 per cent of operations of the industry. Exclude taxicabs; suburban rail lines, ferries, school buses.
Statistics given for:
Total all companies; also separately for each of 13 major urban transit systems:

1. Balance sheet—breakdown of total assets and total liabilities.
2. Income Account:
   — operating revenue—passenger; other;
   — operating expenses—wages; fuel; operating taxes and licences; etc.;
   — lease of transit property—rent; income;
   — other income;
   — interest, etc.;
   — provision for income tax.
3. Traffic statistics:
   Separately by class of equipment—electric car; trolley coach; motor bus; subway car; chartered:
   — revenue passengers;
   — revenue vehicle miles;
   — seat miles available;
   — route miles one way;
   — revenue vehicle hours.

4. Revenue equipment—number:
   Separately by class of equipment—electric cars; trolley coaches; motor buses; subway cars:
   Also: for total all companies only:
   — number, by seating capacity.
5. Fuel—gallons—gasoline; diesel oil; liquefied petroleum gas.
6. Employees—number; salaries:
   — by type of employee.
7. Number of accidents—for total all companies only:
   — by class of equipment—electric car; trolley coach; motor bus; other;
   — by type of accident;
   Persons killed; injured—by type of person:
   — by cause of accident;
   — by class of equipment involved.
8. Fares charged (detail)—for each of 13 major urban transit systems only.

B. For urban transit operations of intercity and rural passenger carriers:
   — passenger revenue;
   — revenue vehicle-miles run;
   — revenue passengers carried.
   18 tables; 20 pages.

Prepared in Transportation Section of Public Finance and Transportation Division.

4. WATER

Shipping Statistics, February 1960

DBS 54-002. Monthly. Price: $2.00 per year.

1. Cargoes unloaded, also loaded at: Atlantic and St. Lawrence River ports, Montreal and below; Great Lakes and St. Lawrence ports above Montreal; Pacific ports: (tons)
   — for foreign countries; for each of 17 commodities;
   — in coastwise shipping; for each of 13 commodities.
2. Number of registered net tonnage of vessels arrived at, also departed from, selected Canadian ports:
   — in foreign service; for each of 26 ports, also totals for: Atlantic and St. Lawrence River ports, Montreal and below; Great Lakes and St. Lawrence ports above Montreal; Pacific ports;
   — in coastwise shipping; for each of 26 ports.

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3. Cargoes unloaded, loaded in foreign, also coastwise, shipping at each of 26 selected Canadian ports by commodities (a few commodities for each port).

6 tables; 8 pages.

Shipping Report, 1958, Part I: International Seaborne Shipping

DBS 54-202. Annual. Price: $1.50.

1. Cargoes loaded (tons) at Canadian ports:
   — for each foreign country;
   — by registry of vessel;
   — separately for: total Atlantic and Lower St. Lawrence ports, Montreal and below; Great Lakes and Upper St. Lawrence ports above Montreal; Pacific ports;
   — separately for each commodity.

Totals for each commodity also given; classified by port areas in Canada.

2. Cargoes unloaded (tons) at Canadian ports: (same detail as in 1.).
3. Number and registered net tonnage, also tons of cargo carried, by vessels arrived at, also departed from, Canadian ports in international shipping:
   — separately for: total Atlantic and Lower St. Lawrence ports, Montreal and below; Great Lakes and Upper St. Lawrence ports above Montreal; Pacific ports;
   — separately for each country.

5 tables; 1 chart; 103 pages.

Prepared in Transportation Section of Public Finance and Transportation Division.

Shipping Report, 1958, Part II: International Seaborne Shipping

DBS 54-203. Annual. Price: 75¢.

1. Cargoes (tons) loaded, also unloaded, from foreign countries:
   — at each port (by provinces and Northwest Territories);
   — by commodities (a few commodities and "general cargo" for each port).
2. Number and registered net tonnage of vessels departed from Canadian ports in international seaborne shipping:
   — by rig (steam; motor; sail; unrigged);
   — by size group (registered net tons);
   — by provinces and Northwest Territories.

3. Number and registered net tonnage of vessels arrived at, also departed from, Canadian ports in international shipping:
   — at each port (by provinces and Northwest Territories).
4. Number of vessels; registered net tonnage; cargo unloaded or loaded in respect to cargo shipped to and from foreign countries via the St. Lawrence River:
   — at each Great Lakes port;
   — by commodities (a few commodities and "general cargo" for each port).
5. Number and gross tonnage of tugs and number and registered net tonnage of fishing vessels departed from Canadian ports in international seaborne shipping:
   — from each port (by provinces).

10 tables; 171 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

Shipping Report, 1958, Part III: Coastwise Shipping

DBS 54-204. Annual. Price: 75¢.

1. Cargoes loaded, also unloaded, at Canadian ports in coastwise shipping:
   — for each port (by provinces and Northwest Territories);
   — by commodities and "general cargo".

   Totals for each commodity also given; classified by port areas in Canada.
2. Number and registered net tonnage of vessels arrived at, also departed from, Canadian ports in coastwise shipping:
   — for each port (by provinces, and Northwest Territories).
3. Number and registered net tonnage of vessels departed from Canadian ports in coastwise shipping:
   — by rig (steam; motor; sail; unrigged);
   — by size group (registered net tons);
   — by provinces and Northwest Territories.
4. Number and gross tonnage of tugs and number and registered net tonnage of fishing vessels departed from Canadian ports in coastwise shipping:
   — at each port (by provinces and Northwest Territories).
5. Tonnage of cargo unloaded at Canadian ports in interprovincial and intra-provincial trade:
   — by province of loading and province of unloading.

6. Cargo loaded and unloaded (tons) in coastwise shipping by vessels of foreign registry; number of vessels; registered net tonnage:
   — by country of registry;
   — separate totals for: Atlantic and Lower St. Lawrence River ports; Great Lakes ports; Pacific ports.

   18 tables; 270 pages.

Prepared in Transportation Section of Public Finance and Transportation Division.

Water Transportation, 1958

DBS 54-205. Annual. Price: 50¢.

Vessels operated by 358 Canadian-owned companies.
Includes vessels of CNR Newfoundland Coastal Steamship Service.
Excludes vessels used solely by industrial companies for transportation of own cargoes.
All following data are given separately for:
— each division—Atlantic; Pacific; Great Lakes; Inland;
— incorporated companies; individual ownership and partnership.

1. Property account: ($)
   — land; vessels; docks; wharves and warehouses; accrued depreciation; etc.
2. Income account: Operating revenues (passenger; freight; towing; salvage; storage; charter);
   Operating expenses (maintenance; operation; taxes; income tax; etc.)
   Other income; Other expenses.
3. Employees—number and salaries:
   — separately for vessel crews; dock and warehouse; office administration; other employees.
4. Fuel—quantity and cost:
   — coal; fuel oil; diesel oil; gasoline.
5. Vessels, owned or chartered, in operation during and at the end of season by Canadian marine operators; also owned vessels not operated:
   — separately for passenger; passenger and freight; tanker; tugs; tow barges and scows; miscellaneous.
6. Number of persons killed; injured in Canadian water transportation industry:
   —by type of person;
   vessels lost—number and value.

   9 tables; 11 pages.

Prepared in Transportation Section of Public Finance and Transportation Division.

Summary of Canal Statistics, December 1959

DBS 54-001. Monthly. Price: $1.00 per year.

1. Following data are given:
   — number of vessel passages;
   — registered net tonnage of vessels;
   — number of passengers;
   — number of pleasure craft;
   — tons of freight;

   with following breakdown:
   —for each of 11 Canadian canals;
   —by direction of traffic for each of: Sault Ste. Marie; Welland; St. Lawrence canals;
   — separately for Canadian lock; Canadian and U.S. locks of the Sault Ste. Marie Canal.
2. Tons of freight—by commodities:
   — for Sault Ste. Marie Canal—Canadian lock; Canadian and U.S. lock; separately for eastbound and westbound;
   — for Welland Canal and for St. Lawrence canals—separately for bulk; general; also separately for eastbound; westbound.

   2 tables; 3 pages.

Prepared in Transportation Section of Public Finance and Transportation Division.

Canal Statistics, 1958

DBS 54-201. Annual. Price: 75¢.

Graphs:

— total freight traffic through Canadian canals 1940-58 (tons);
— freight traffic through Welland; St. Lawrence; Sault Ste. Marie canals 1940-58 (tons);
— vessel traffic through Welland; St. Lawrence; Sault Ste. Marie canals 1940-58 (thousands of vessels).

Statistical tables:

1. For each of 11 Canadian canals:
   — number of vessels (Canadian; U.S.; U.K.; other);
   — passengers;
   — registered net tonnage—by rig; also breakdown by Canadian; U.S.; U.K.; other;
   — cargo tons—by commodities—breakdown of some by direction of traffic;

   Also: cargo tons up; down and cargo tons by country of loading and unloading (Canada; U.S.; U.K.; other).

2. Cargo tons carried in interlake traffic (lake of origin and destination).
3. Number of vessels upbound; downbound through St. Lawrence canals to or from outside points;
   Also: number of tons cargo carried up; down St. Lawrence canals to or from outside points.
4. Number of bushels of grain (by commodity) downbound through Welland Canal between Canadian and U.S. ports:
   — by country of origin of vessel;
   — by country of registry of vessel;
   — separately for Canadian and American grain.
5. Freight carried (tons) through St. Lawrence canals:
   — by country of registry or vessel (Canada; U.S.; U.K.; other);
   — separately for cargo of U.S.; Canadian; and several other countries' origin—breakdown into up; down.
   Similar tables for Welland and for Sault Ste. Marie Canals.
6. Number and registered net tonnage of vessels using each canal by origin and destination of vessel; by country of registry; by rig:
   — by direction, up or down.
7. Number and registered net tonnage of vessels using Welland; Sault Ste. Marie; St. Lawrence canals by kind of vessel (freight; passenger; freight and passenger; tanker; scow or barge; other):
   — by length; also by draft;
   — by direction, up or down.
8. Traffic through Canadian and U.S. Sault Ste. Marie Canals:
   — cargo tons, by commodity;
   — vessel passages;
   — registered net tonnage of vessels;
   — passengers;
   Breakdown:
   — by direction, up or down;
   — Canadian canal; U.S. canal.
9. Freight (tons) carried through each canal by country of loading and unloading of cargo:
   — by commodities;
   — by direction, up or down.
10. Number of passengers carried through each canal:
    — by country of origin and country of destination;
    — by direction, up or down.
11. Number of pleasure craft lockages, each canal.
12. Length of season of navigation for each canal.

13. Location and description of canals; length; number and dimensions of locks.
14. Water freight charges on the Great Lakes:
    Fort William-Port Arthur to various ports, for wheat; barley and oats; flax and rye; by months:
    — average charge per bushel;
    — average charge per ton;
    — average charge per ton-mile.
    32 main tables; 3 charts; 51 pages.

Prepared in Transportation Section of Public Finance and Transportation Division.

St. Lawrence Seaway: Preliminary Toll Traffic Statistics, April 1960
Monthly. (No price listed)

Separately for each of 2 sections (Montreal-Lake Ontario; Welland) and for direction of traffic, up or down:
— number of transits;
— bulk cargo;
— general cargo;
— total cargo.
One page; one table.
Prepared by the St. Lawrence Seaway Authority.
(Mimeographed).

Traffic Report of the St. Lawrence Seaway, 1959

Price: 50¢.

Prepared for the St. Lawrence Seaway Authority and the St. Lawrence Seaway Development Corporation, Cornwall, Ontario.

A. For St. Lawrence Seaway, separately for each section:
   Montreal—Lake Ontario; Welland Canal:
   1. Data on traffic, etc., are broken down as follows:
      — by direction, up or down;
      — by type of vessel (cargo; cargo with passengers; scow or barge; tanker; tug; pleasure craft; other); separately by origin of cargo—Canada; U.S.; foreign.

Also by type of cargo (bulk; general; mixed; passengers; in ballast—ocean; laker; pleasure; other).

The data given in this breakdown are:
— number of transits;
— net tons;

— gross tons;
— cargo tons;
— passengers;
— toll revenue;
— per cent of total toll revenue.

2. By origin and destination of transit (Canada; U.S.; foreign); separately by direction, up or down.

The following data are given:
— number of transits;
— gross tons;
— toll revenue.

3. Cargo tons:
— by origin and destination (Canada; U.S.; foreign);
— by type—bulk; general;
— by direction, up or down.

4. For each class (ocean; laker):
And for each type of vessel (cargo; etc.); also for each class of cargo (bulk; general; mixed; in ballast) and pleasure craft and other.
The following data are given:
— number of transits;
— gross tons;
— cargo tons;
— toll revenue;
— average revenue per transit.

5. By length of vessel;
Also by size of vessel in gross tons;
Also by country of registry.
With breakdown by direction, up or down, the following data are given:
— number of transits;
— net tons (for length of vessel, but not for size or registry);
— gross tons;
— cargo tons (for country of registry; breakdown by type of cargo—bulk; general; mixed);
— toll revenue.

6. Cargo tons—by commodities and "general and mixed cargo"; "package freight—domestic"; "package freight—foreign":
— by type of cargo (bulk; general);
— also by country of origin and destination (Canada; U.S.; foreign); separately by direction, up or down.

B. Total seaway traffic:

1. Cargo tons—by type of cargo (bulk; general):
   — through each of 24 Canadian ports and "Other Canadian ports", separately for inbound; outbound;
   — also through each of 15 U.S. ports and "Other United States ports", separately for inbound; outbound.
2. Vessel transits through: Iroquois Lock; Lock 8—Welland:
   — for each day of navigation season;
   — by direction, up or down.
3. Cargo tons all traffic; also toll traffic (cargo tons; passengers); by months; separately by direction, up or down:
   — for Montreal—Lake Ontario section;
   — for Welland Canal section.
4. Non-toll traffic:
   Separately for Montreal—Lake Ontario section; Welland Canal; Sault Ste. Marie (Canadian); Lachine; Cornwall Canal:
   — by type of vessel:
      — number of transits;
      — net tons;
      — gross tons;
      — cargo tons;
      — passengers (Sault Ste. Marie (Canadian); Lachine Canal only).

   By commodity and "general and mixed cargo", "package freight-domestic", "package freight—foreign", and by type of cargo (bulk; general):
   — for Sault Ste. Marie (Canada); Lachine; Cornwall canals only:
      — cargo tons.

   42 tables; 46 pages.

Prepared by the St. Lawrence Seaway Authority.

Annual Report of the National Harbours Board For Calendar Year 1959

Price: 25¢.

This publication is produced by the National Harbours Board. Although annual reports of government agencies are generally omitted from this Appendix (which describes only statistical periodicals relating to transport), this report contains so much statistical material bearing directly on water transport as to merit inclusion.

Royal Commission on Transportation

Numerous financial and statistical tables appear in this report. Some appear in the text, while others are financial statements of the National Harbours Board which follow the text. In addition there is a section of tables dealing with specific ports, bridges, and elevators.

Statistical material in the text of the report includes:

1. Number of vessels arriving, departing, and registered net tonnage, 1955 to 1959.
2. Cargo tonnage inward, also outward, by foreign ships; domestic ships—1955 to 1959.
3. Comparative consolidated income statement of the National Harbours Board.
4. Operating income; operating expense; net operating income for each of several ports and the Jacques Cartier Bridge, 1955 to 1959.
5. Capital expenditures at each of several ports, etc.
6. Amounts required from the Government and paid to the Government.

Following the text is a balance sheet and a statement of income and expense of the National Harbours Board.

At the end of the text, the following statistical and financial data are given (where applicable) for each of: Ports of Halifax, Saint John, Chicoutimi, Quebec, Three Rivers, Vancouver; Jacques Cartier Bridge; Prescott elevator; Port Colborne elevator:

1. Number of vessels and net registered tonnage:
   arrivals; departures. Separately for deep-sea or ocean-going commercial; coastal or inland commercial vessels, including fishery; other.
2. Cargo tonnage inward; outward—by commodities.
3. Passengers landed; embarked—separately for foreign; coastwise.
4. Grain elevator; receipts (bushels); shipments—separately via rail; water; other.
5. Balance sheet.
6. Statement of income and expense.
   National Harbours Board.

5. AIR

Civil Aviation, December 1959

DBS 51-001. Monthly. Price: $2.00 per year.

1. Separately for: Canadian carriers domestic scheduled—Total and also each of 6 carriers; Total domestic non-scheduled; Total trans-border;

Atlantic and Pacific services—Total; Trans-Canada; Canadian Pacific; and Foreign carriers (trans-border; Atlantic and Pacific services). Also: Non-scheduled domestic—Total; Class "B" carriers; Class "C"; Class "D" carriers:

The following data are given:

- miles scheduled;
- non-revenue miles flown (for each of 6 Canadian scheduled carriers only);
- revenue miles flown—unit toll; bulk;
- hours flown—non-revenue; revenue—unit toll; bulk; other;
- fuel—gallons; cost—separately for: turbo fuel; gasoline; also oil—turbo aircraft; other aircraft;
- average number of employees; salaries and wages;
- average number of aircraft—owned; leased;
- ratio of miles flown to miles scheduled (where applicable);
- revenue passenger load factor—scheduled;
- revenue passengers carried—unit toll; bulk;
- passenger-miles unit toll; revenue; non-revenue;
- freight carried: non-revenue; revenue—unit toll; bulk;
- ton-miles freight unit toll: revenue—non-revenue;
- express carried (lb.) unit toll;
- express ton-miles unit toll;
- excess baggage (lb.) unit toll;
- excess baggage ton-miles unit toll;
- mail carried (lb.) unit toll;
- mail ton-miles unit toll.

2. For each of 6 scheduled Canadian carriers; for non-scheduled Class "B"; "C"; "D" carriers; for Atlantic and Pacific services—Trans-Canada; Canadian Pacific:

The following additional data are given:

- revenue passengers carried scheduled (originated; domestic interline; foreign interline; division interline);
- revenue passengers—non-scheduled;
- revenue freight carried scheduled (originated; etc.);
- revenue freight non-scheduled unit toll;
- revenue express carried scheduled (originated; etc.);
- express—non-scheduled;
- revenue excess baggage carried (originated; etc.);
- excess baggage—non-scheduled;
- available seat miles—scheduled;
- available ton-miles—scheduled.

3. For Canadian carriers total scheduled; total non-scheduled; for each of 6 scheduled Canadian carriers' domestic services; for non-scheduled carriers' domestic services—Class "B"; Class "C" carriers:

— operating revenues: Unit toll (passenger; mail; freight; express; excess baggage); bulk; other flying services; non-flying services;
— operating expenses: Aircraft operation and maintenance; ground operation and maintenance; traffic; general administration;
— general taxes; income taxes;
— operating ratio.

11 tables; 2 graphs; 15 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

Civil Aviation: Preliminary Annual, 1958

DBS 51-201. Annual. Price: 50¢.

Statistics are identical with those in DBS 51-001 *Civil Aviation, December 1959* (monthly) except that in the annual publication they are on an annual basis. Also where 6 Canadian scheduled carriers appear individually in the monthly publication, 7 appear in the annual edition (Austin Airways added).

14 tables; 13 pages; 2 graphs.

Prepared in Transportation Section of the Public Finance and Transportation Division.

Civil Aviation, 1958

DBS 51-202. Annual. Price: 50¢.

All of the statistics which appear in the monthly (DBS 51-001) and preliminary annual (DBS 51-201) editions of *Civil Aviation* are also included on an annual basis in this publication.

There is also the following additional data:

1. For Canadian scheduled carriers—Total; each of 7; also non-scheduled Canadian carriers—Total; Class "B"; "C"; "D" carriers:
   — balance sheet;
   — current assets;
   — investments; deferred debt; special funds; (scheduled only);
   — fixed assets less depreciation;
   — current liabilities;

— long-term debt; deferred credits; reserves; (scheduled only);
— capital stock;
— surplus;
— property account (omits Total—non-scheduled; Class "C" and "D" carriers):
  — property and equipment (detail);
  — additions, retirements, depreciation (detail);
— statement of earned surplus (omits Total non-scheduled; Class "C" and "D" carriers).

2. Employees; salaries and wages:
   — by type of employee, for total Canadian and foreign air carriers;
   — for each of 7 scheduled carriers; Class "B"; "C"; "D" carriers; foreign carriers (trans-border; Atlantic and Pacific services).
3. Accidents involving Canadian air carriers:
   — number of casualties—fatal; serious; minor—by type of person;
   — number of accidents—by operational phase; also by type of flying;
   — per cent of total accidents—by probable cause.
4. Personnel licences (by type); aircraft registered (by type); airport licences; number in force December 31, 1957, and December 31, 1958.

19 tables; 4 charts; 18 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

Air Transport Board

Origin and Destination Statistics: Mainline Scheduled Traffic Survey of Revenue Passengers, 1955-1959

(No price listed—not for general sale)

Scheduled passenger traffic between points in Canada, and between Canadian and U.S. points (Canadian carriers only)—4 weeks' sample, March 17 to 31 and September 1 to 14 in each of five years. Sample taken from first ticket lifted by participating carriers (Trans-Canada Air Lines and Canadian Pacific Air Lines). Sample not blown up to an annual basis, but data are shown separately for March and September of each year:

— number of passengers between Canadian stations, origin and destination, domestic traffic;

— number of passengers between Canadian stations and TCA terminal points in U.S., origin and destination.

Prepared by the Statistics Section of the Economics Division, Air Transport Board.

3 parts, tables not numbered, 186 pages.

6. PIPELINE

Oil Pipeline Transport, April 1960

DBS 55-001. Monthly. Price: $2.00 per year.

1. Oil (barrels) carried by pipelines, separately for trunk and gathering lines:
   — received: — own gathering system;
   — other pipelines—gathering trunk;
   — originating on own trunk lines;
   — received from foreign pipeline connections;
   — received from other carriers (total rail and truck);
   — delivered: — to other Canadian trunk lines;
   — terminated on own trunk lines;
   — delivered to foreign pipeline connections;
   — delivered to other carriers (total truck, rail and water).
2. Oil (barrels) carried by pipelines, separately for gathering; trunk:
   — by province in which shipments originated;
   Also, oil delivered, separately for gathering; trunk lines, by province in which shipment terminated or was delivered to other carriers.
3. For each of 5 pipelines and "other pipelines":
   — traffic — total barrels oil received into;
   delivered out of system;
   — barrels handled, daily average — gathering lines; trunk lines;
   — barrel-miles — trunk lines;
   — average miles per barrel (trunk lines);
   — operating revenues — quarterly;
   — number of employees; salaries and wages;
   — man-hours worked by wage earners.
   6 tables; 2 charts.

Prepared in Transportation Section of the Public Finance and Transportation Division.

Oil Pipeline Transport, 1958

DBS 55-201. Annual. Price: 50¢.

1. For total all companies:
   Oil (barrels) carried by pipelines, separately for trunk and gathering lines:
   — received: — own gathering system;
   — other pipelines — gathering; trunk;
   — originating on own trunk lines;
   — received from foreign pipeline connections;
   — received from other carriers (total rail and truck);
   — delivered: — to other Canadian trunk lines;
   — terminated on own trunk lines;
   — delivered to foreign pipeline connections;
   — delivered to other carriers (total truck, rail and water).
2. For total all companies:
   Oil (barrels) carried by pipelines, separately for gathering; trunk:
   — by province in which shipments originated;
   Also, oil delivered, separately for gathering; trunk lines, by province in which shipment terminated or was delivered to other carriers.
3. For total all companies:
   Oil carried by pipelines by month in which shipment originated, separately for gathering; trunk lines.
4. For each of 23 companies:
   — barrel-miles transported by trunk lines.
5. For each of 20 companies:
   — mileage of gathering system;
   — barrels handled, daily average;
   — barrel-miles during year;
   — pumping stations on trunk lines, by rated horsepower.
6. For each of 32 companies:
   — oil pipeline fill (barrels), separately for gathering; trunk lines;
   — oil pipeline mileage, separately for gathering; trunk lines, by province; also by pipe diameter (inside) in inches.
7. For total all companies and for each of 32 companies:
   — assets (detail);
   — liabilities (detail);
   — property account (detail);
   — operating revenue—from gathering; trunk line operations; other;

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— other income;
— operating expenses—maintenance; transportation; general office; other;
— other expenses; depreciation; interest;
— income tax.

8. Average number of employees and total earnings:
— by general office; clerical; supervisory and occupational; wage earners;
— by provinces.

22 tables; 1 chart; 20 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

Gas Pipeline Transport, May 1960

DBS 55-002. Monthly. Price: $2.00 per year.

For each of 16 natural gas transmission companies:

1. Natural gas received into system: (thousand cubic feet)
— from each source: own gathering systems; other gathering systems; foreign transmission lines; Canadian transmission lines; storage;
Also: Natural gas delivered out of system:
— to each of: distribution systems; foreign transmission lines; industrial users; others; Canadian transmission lines; storage.
2. Pipeline fuel;
Pipeline losses and metering differences;
Line pack fluctuations.
3. Send-out; daily average; peak day of month.
4. Total operating revenue.

8 pages; 1 chart; 3 tables.

Prepared in Public Utilities Section of Public Finance and Transportation Division.

7. WAREHOUSE AND STORAGE

Warehousing, 1958

DBS 63-212. Annual. Price: 50¢.

Data for 213 firms offering public warehousing and storage. Firms included in *Warehousing* or *Motor Carriers—Freight* according to predominant source of revenue.

1. Totals, by provinces:
   — number of companies reporting;
   — property account—land; warehouses, garages, etc.; trucks, trailers, service cars, and other vehicles; etc.;
   — operating revenue—storage revenue (household goods; dry merchandise; refrigerated storage); cartage—railway and other local; handling and extra labour service; local moving; other revenue;
   — operating expenses—wages; gasoline, oil and grease; operating taxes and licences; etc.
2. Number of employees; salaries; wages (regular; casual); withdrawals by owners or working partners:
   — by provinces.
3. Storage facilities:
   — net occupiable space in cubic feet in owned, leased warehouses;
   — by type of storage (household goods; dry merchandise; refrigerated);
   — by provinces.
4. Trucking equipment:
   Number of trucks; semi-trailers; trailers:
   — by capacity in tons;
   — by province.
5. Separately for motor carriers firms; warehousing firms:
   — storage revenue (household goods; dry merchandise; refrigerated);
   — storage facilities (cu. ft.) (household; dry merchandise; refrigerated).

   6 tables; 12 pages.

Prepared in Transportation Section of the Public Finance and Transportation Division.

Grain Statistics Weekly, July 13, 1960

DBS 22-004. Weekly. Price: $3.00 per year.

1. Visible supplies of Canadian wheat; also oats; barley; rye; flaxseed:
   — at country elevators; various ports; in transit—lake; in transit—rail (total; also western division); etc.
2. Canadian eastern grain; also United States and other foreign grain:
   — in store eastern elevators.
3. Stocks in store, by principal grades, at public and semi-public terminals; also at eastern elevators.

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4. Stocks; receipts; shipments, by type of grain:
   — country elevators;
   — Fort William-Port Arthur.
5. Overseas exports of Canadian grain, by ports of loading.
6. Lake shipments from Fort William-Port Arthur:
   — by type of grain;
   — also by region of destination (Maritime ports; overseas direct; Georgian Bay and Upper Lake ports; etc.).

24 pages.

Prepared in the Crops Section of the Agriculture Division.

The Wheat Review, June 1960

DBS 22-005. Monthly. Price: $3.00 per year.

1. Lake shipments of Canadian grain, by type (bushels).
2. Visible supply of Canadian wheat at country elevators; in transit—lake; in transit—rail; various ports; etc.
3. Wheat shipments to United States by vessel by destination; also by rail; rail shipments of wheat from Bay, Lake and Upper St. Lawrence ports, by port of origin of shipment; rail shipments of wheat from Fort William-Port Arthur, monthly; distribution of rail shipments from Fort William-Port Arthur to Ontario; Quebec—by grade.
4. Overseas exports of Canadian grain by ports of loading, by type of grain.
5. Distribution of wheat shipments (also millfeed shipments) under the freight assistance policy, by province, by month.

33 pages.

Prepared in the Crops Section of the Agriculture Division.

Coarse Grains Quarterly, May 1960

DBS 22-001. Quarterly. Price: $2.00 per year.

1. Visible supply of Canadian oats; also Canadian barley; rye; flaxseed:
   — at country elevators; in transit—lake; in transit—rail (total; also western division; eastern division); interior terminals; various ports; etc.
2. Lake shipments from Fort William-Port Arthur of Canadian grain, by type, (bushels)—annually; also rail shipments from Fort William-Port Arthur, by type, monthly.

3. Freight assistance shipments of wheat; oats; barley; rye; screenings; millfeeds; by province.
   29 pages.

   Prepared in the Crops Section of the Agriculture Division.

Grain Trade of Canada, 1957-58

DBS 22-201. Annual. Price: $1.50.

Principal detail is as follows, separately for each type of grain, in bushels:

1. Primary net receipts and shipments at country elevators:
   — by crop district.
2. Car-lot receipts; primary truck lot receipts, at private terminal and mill elevators in western division.
3. Primary shipments forwarded by rail from country elevators; also from private terminal and mill elevators:
   — to Lakehead; eastern elevators; Pacific seaboard; Churchill; interior; etc.
   — also to Canadian points—eastern; western division; U.S. points;
   — also exported overseas.
4. Terminal elevators, Fort William-Port Arthur:
   — primary net receipts:
      — by months;
      — by lake; rail;
   — Also: distribution of primary shipments:
      — transfers by vessel to eastern elevators; U.S. points;
      — transfers by rail to eastern elevators;
      — domestic shipments to Canadian points, eastern division—by vessel; rail;
      — overseas.
   —Also: detail for shipments of screenings by vessel; rail.
5. Terminal elevators at each of: Vancouver-New Westminster; Victoria; Prince Rupert; Pacific Coast; Churchill; North Transcona:
   — primary net shipments—by ocean; rail (Canadian; U.S. points); Also: detail for shipments of screenings.
6. Primary net shipments from Canadian Government interior semi-public terminal elevators:
   — forwarded by rail to Lakehead; Churchill, etc.;
   — domestic shipments by rail to Canadian points—eastern; western division;
   — weight and reload, by rail to Lakehead; etc.

7. Dockage:
   — on car receipts of Canadian grain at various points;
   — on lake shipments of flaxseed and buckwheat from Fort William-Port Arthur.
8. Rail shipments of grain, separately for CNR, CPR, by months:
   — unloaded at Vancouver—New Westminster; Victoria; Prince Rupert; interior elevators; North Transcona; Churchill.
9. Lake shipments of Canadian grain and screenings from Fort William-Port Arthur:
   — to each of 15 Canadian ports;
   — to each of 7 U.S. ports;
   — also by nationality of vessel (Canadian; U.S.; foreign).
10. Detail of receipts and shipments (also: handlings) of Canadian grain at eastern elevators:
   — by origin (Western Canada; eastern country points; U.S.; etc.) and by destination (Lower Lake and Upper St. Lawrence ports; Georgian Bay and Upper Lake ports; Lower St. Lawrence ports; Maritime ports);
   — by vessel; rail.
   Same detail for total U.S. and foreign grain.
11. Visible supplies of Canadian grain in store, by weeks:
   — at western country elevators; etc.;
   — in transit, rail — western and eastern division;
   — in transit — lake.
12. Detail of Canadian grain exports:
   — by seaboard sector (via Churchill; via Fort William-Port Arthur direct; etc.);
   Also detail for countries of final destination.
13. Stocks of Canadian grain at commencement of crop year:
   — on farms; Pacific Coast elevators; etc.; in transit — rail; in transit — lake.
14. Grain storage capacity — detail by area.
15. Freight rates (¢ per 100 lbs., carload shipments);
   and corresponding distances (miles);
   Rail rates on grain; grain products; flaxseed; flaxseed products:
   — to Fort William-Port Arthur from individual points in Manitoba, Alberta, Saskatchewan;
   — to Vancouver; Prince Rupert; Churchill for export — from individual points in Prairies;
   — from Fort William to 6 eastern stations, for export;

— "Ex-Lake" from 3 Georgian Bay and Lower Lake ports to 5 eastern stations, for export;
— from Montreal to 3 eastern stations, for export;
— for local delivery, to Vancouver; to Prince Rupert, from individual stations in Prairie Provinces;
— "Ex-Lake" from Goderich; Midland; Port Colborne; Port McNicoll; Montreal; Fort William-Port Arthur; for local delivery to destinations in Ontario; Quebec; Nova Scotia; New Brunswick;
— from Fort William-Port Arthur to 14 stations in eastern U.S., for local delivery;
Lake freight rates on Canadian grain (¢ per bushel);
by months:
— from Fort William-Port Arthur to Georgian Bay ports; Port Colborne; Buffalo; Montreal;
— from Port Colborne to Montreal;
Weighted average rates from Fort William-Port Arthur:
— to various ports of discharge by various routes;
— separately for wheat; oats; barley, rye; flaxseed.
144 tables; 120 pages.

Prepared by the Crops Section of the Agriculture Division of Dominion Bureau of Statistics and by the Board of Grain Commissioners for Canada, Statistics Branch.

8. TRANSPORTATION EQUIPMENT

Transportation Equipment, 1957 General Review

DBS 42-201. Annual.

Dated June 1959.
Prepared in the Industry and Merchandising Division.
Price: 50¢.

Standard Industrial Classification used by Dominion Bureau of Statistics provides for a separate Transportation Equipment group. This group includes the following industries: aircraft; shipbuilding; bicycles; boat building; motor vehicles; motor vehicle parts; railway rolling stock; miscellaneous. There is a separate publication for each of these industries as well as this general review.

These publications are:

Rail

The Railway Rolling Stock Industry, 1958.
DBS 42-211. Annual.
October 1959. 50¢.

Road

The Motor Vehicles Industry, 1958.
DBS 42-209. Annual.
September 1959. 50¢.

The Motor Vehicle Parts Industry, 1956.
DBS 42-210. Annual.
50¢.

The Bicycle Manufacturing Industry, 1958.
DBS 42-204. Annual.
September 1959. 25¢.

Water

The Shipbuilding Industry, 1958.
DBS 42-206. Annual.
March 1960. 25¢.

The Boat Building Industry, 1958.
DBS 42-205. Annual.
March 1960. 50¢.

Air

The Aircraft and Parts Industry, 1958.
DBS 42-203. Annual.
January 1960. 50¢.

Miscellaneous

The Miscellaneous Transportation Equipment Industry, 1958.
DBS 42-212. Annual.
November 1959. 25¢.

In the *General Review* (DBS 42-201. Annual), there is a regional breakdown (for each province) for most of the statistics. In the separate industry publications, there is generally no information by province.

The general pattern of data presented in all these publications is:

1. Principal statistics:
   — establishments (number);
   — employees (number);
   — salaries and wages;
   — cost of fuel and electricity at plant;
   — cost of materials at plant;
   — value added by manufacture;
   — gross selling value of products at works.
   Also: Principal statistics (with some variation in detail) grouped according to size of establishment (based on reported value of production); motor vehicle industry is excepted.

2. Inventories:
   — raw materials and supplies;
   — goods in process;
   — finished goods of own manufacture.
3. Products manufactured:
   — quantity;
   — selling value at works.
4. Number of employees and earnings:
   — office and supervisory;
   — production workers (male; female).
5. Capital and repair expenditures in industry:
   — capital expenditures (construction; machinery and equipment);
   — repair expenditures (construction; machinery and equipment).
6. Imports and exports, by products:
   — quantity;
   — value.
7. Fuel and electricity, by type of fuel:
   — quantity;
   — cost at works.

   Materials used, by type:
   — quantity;
   — cost at works.
8. List of firms included.

For the Motor Vehicles industry, the following additional data appear:

— registrations;
— apparent supply of motor vehicles (detail);
— estimate of motor vehicles withdrawn from use.

Road

In connection with the production and sale of motor vehicles, the following additional publications are published, all prepared by the Industry and Merchandising Division of DBS:

Motor Vehicle Shipments, June 1960.

DBS 42-002. Monthly.

$1.00 per year.

Contains monthly data on production and shipments of motor vehicles, by type of car and weight of truck or bus.

Preliminary Report on the Production of Motor Vehicles, June 1960.
DBS 42-001. Monthly.
$1.00 per year.

Brief report on total production of passenger cars and commercial vehicles.

New Motor Vehicle Sales and Motor Vehicle Financing, May 1960.
DBS 63-007. Monthly.
$1.00 per year.

Number of vehicles; retail value; and amount of financing is published, with separate tabulations for passenger cars and commercial vehicles.

New Motor Vehicle Sales and Motor Vehicle Financing, 1958.
DBS 63-208. Annual.
Dated July 1959. 50¢.

This publication is more detailed than the corresponding monthly publication. Data are provided by province and by month. Separate tabulations appear for new British and European made vehicles sold in Canada. Also information is included on financing of used vehicles.