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OTTAWA, CANADA.

GASOLINE SURVEY FOR 1925

By

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A survey of the gasoline sold in Canada was made by the Fuels and Fuel Testing Division of the Mines Branch in 1923 and in 1924³. This report covers a similar survey for 1925. During the early part of August, 73 samples were collected⁴ from wholesalers or distributors in the following cities:- Halifax, St. John, Quebec, Montreal, Ottawa, Toronto, London, Winnipeg, Regina, Calgary, Edmonton, Vancouver and Victoria. These samples were tested for distillation range, iodine value, and specific gravity. The distillation range was determined according to the method recommended by the United States Bureau of Mines⁵. From the results so obtained, a weighted index number was calculated after the method advocated by Gruse⁶ with the exception that the index numbers were calculated from temperatures of the distillation range expressed in °F. instead of from temperatures expressed in °C. as was done by Gruse. The iodine value was determined by the Hamus method⁷ and the specific gravity was obtained by the Westphal balance at room temperature and the results calculated at 60°F.

1. Chemist, Fuel Testing Laboratories, Mines Branch.
2. Junior Chemist, Fuel Testing Laboratories, Mines Branch.
3. Mines Branch Summary Report of Investigations, 1924.
4. The writers wish to acknowledge the hearty support and co-operation of the Department of Health in taking the samples.
5. U.S. Bureau of Mines, Technical Paper 323A.
6. Chemical and Metallurgical Engineering, Vol. 29, No. 22, p. 970
Mines Branch Summary Report of Investigations, 1924.
7. Ellis and Meigs, "Gasoline and other Motor Fuels."

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TABLE I - RESULT OF ANALYSES

Lab. No.	Brand	DISTILLATION RANGE						End point °F	Recov-very	Iodine value	Sp. Gr.	° Be	Index number °F
		1st Drop °F	10% °F	20% °F	50% °F	70% °F	90% °F						
<u>HALIFAX, N.S.</u>													
3147	Premier (a)	122	192	221	273	309	361	406	97.5	36	0.746	57.7	1762
3148	Red Seal (b)	129	198	221	270	307	363	419	97.5	27	0.750	56.7	1778
3149	White Rose (b)	108	163	203	280	315	369	410	95.3	30	0.736	60.2	1740
Average		120	184	215	274	310	364	412	96.8	31	0.744	58.2	1760
<u>ST. JOHN, N.B.</u>													
3150	Fundy (c)	113	163	187	237	273	331	392	97.6	4	0.724	67.4	1533
3151	Premier (a)	118	192	219	273	311	365	417	97.5	30	0.751	56.4	1777
3152	White Rose (b)	129	199	219	270	306	361	417	97.6	32	0.749	56.9	1772
Average		120	185	208	260	297	352	409	97.6	22	0.741	58.9	1711
<u>QUEBEC, Que.</u>													
3153	British Motor (a)	131	199	223	268	309	363	423	97.5	29	0.751	56.4	1785
3154	Peerless (d)	115	167	181	219	252	309	385	97.0	1	0.718	65.0	1513
3155	Premier (a)	127	196	221	273	309	365	419	97.3	29	0.750	56.7	1783
3156	Queen (a)	111	165	196	261	295	358	408	96.7	23	0.741	58.9	1683
3157	Red Seal (b)	153	241	277	365	433	523	572	96.3	17	0.784	48.6	2411
3158	White Rose (b)	124	194	219	273	309	365	423	97.3	30	0.751	56.4	1783
Average		127	194	219	276	318	381	438	97.0	21	0.749	56.9	1826
<u>MONTREAL, Que.</u>													
3159	British Motor (a)	104	156	192	264	313	369	408	96.4	19	0.740	59.2	1702
3160	Crown (e)	127	189	208	270	311	369	417	97.7	22	0.743	58.4	1764
3161	Empire (f)	111	162	192	268	315	369	412	96.7	19	0.739	59.4	1718
3162	Peerless (d)	109	154	176	219	252	320	378	96.9	2	0.718	55.0	1499
3163	Premier (a)	113	176	203	266	313	363	406	96.9	22	0.739	59.4	1727
3164	Queen (a)	104	163	187	234	277	338	392	96.7	25	0.730	61.8	1591
3165	Shell (e)	113	158	187	234	259	315	383	97.2	6	0.721	64.2	1536
3166	Sunoco H.T. (g)	109	156	178	226	261	322	379	96.7	6	0.720	64.4	1522
Average		111	164	190	248	288	346	397	96.9	15	0.731	61.5	1633

TABLE I - RESULT OF ANALYSES (cont'd)

Lab. No.	Brand	DISTILLATION RANGE						End point °F	Recov-ery	Iodine value	Sp. Gr.	° Ba	Index number °F
		1st Drop °F	10% °F	20% °F	50% °F	70% °F	90% °F						
<u>OTTAWA, Ont.</u>													
3167	British Motor (d)	100	158	189	259	309	365	412	97.5	17	0.740	59.2	1692
3168	Crown (e)	117	183	210	270	315	370	424	97.4	19	0.743	58.4	1772
3169	Marathon (h)	118	172	196	253	300	367	441	97.6	3	0.736	60.2	1729
3170	Pearless (d)	115	165	181	212	244	309	379	96.8	4	0.719	64.7	1490
3171	Premier (a)	106	160	194	256	320	365	412	97.0	20	0.740	59.2	1717
3172	Queen (a)	102	147	172	243	284	342	394	96.3	31	0.726	62.8	1582
3173	Red Seal (b)	108	162	194	268	309	354	394	96.7	20	0.740	59.2	1681
3174	Shell (e)	111	156	178	226	262	322	383	96.8	6	0.721	64.2	1527
3175	Sunoco H.T. (i)	111	155	185	235	273	347	423	97.3	5	0.722	63.9	1628
3176	Sunoco Navy (l)	113	185	228	307	349	392	423	97.5	9	0.765	53.0	1884
3177	Supertest (k)	109	169	192	262	300	369	414	96.7	16	0.739	59.4	1706
3178	White Rose (b)	95	153	190	277	316	367	405	95.1	20	0.733	61.0	1708
Average		109	165	192	256	298	356	409	96.9	14	0.735	60.5	1676
<u>TORONTO, Ont.</u>													
3179	British Motor (d)	118	183	205	268	316	385	433	96.4	27	0.744	58.2	1790
3180	Crown (e)	106	176	205	270	320	387	435	96.8	5	0.743	58.4	1723
3181	Marathon (h)	108	162	192	271	324	387	430	96.7	18	0.739	59.4	1766
3182	Pearless (d)	126	165	181	221	255	318	390	97.5	3	0.725	63.1	1530
3183	Perfection (l)	126	178	214	295	329	376	417	97.8	28	0.750	56.7	1809
3184	Premier (a)	113	178	210	280	316	376	417	97.0	37	0.742	58.7	1777
3185	Shell (e)	108	153	176	225	257	318	383	96.7	1	0.721	64.2	1512
3186	Solv. Naphtha (a)	109	147	158	187	205	241	302	96.9	3	0.705	68.6	1240
Average		114	168	193	252	290	348	401	97.0	15	0.734	60.7	1652

(a) Imperial Oil Company, Limited
 (b) Canadian Oil Companies, Limited
 (c) Canadian Independent Oil, Limited

(d) British American Oil Company, Limited
 (e) Shell Oil Company, Limited
 (f) Tidjoute Refining Co. Limited.

TABLE I - RESULT OF ANALYSES (Cont'd)

Lab. No.	Brand	DISTILLATION RANGE						End point °F	Recov-ery	Iodine value	Sp. Gr.	° Be	Index number °F
		1st Drop °F	10% °F	20% °F	50% °F	70% °F	90% °F						
<u>LONDON, Ont.</u>													
3187	American H.T. (m)	108	162	196	275	325	379	417	96.4	35	0.739	59.4	1754
3188	British Motor (d)	127	190	214	264	306	372	415	97.3	27	0.745	57.9	1761
3189	Crown (e)	118	189	208	275	327	392	441	97.0	7	0.745	57.9	1832
3190	Marathon (h)	115	163	185	225	279	370	412	96.6	6	0.727	62.6	1632
3191	Peerless (d)	104	147	165	219	253	324	374	96.3	2	0.726	65.5	1482
3192	Premier (a)	117	133	214	273	316	358	401	96.4	45	0.739	59.4	1745
3193	Shell (e)	108	160	176	208	246	306	367	96.8	1	0.716	65.5	1463
3184	White Rose (b)	113	180	199	266	311	369	430	96.8	34	0.738	59.7	1755
Average		114	172	194	251	295	359	407	96.7	20	0.733	51.0	1678
<u>WINNIPEG, Man.</u>													
3195	British Motor (d)	117	183	212	275	313	356	410	97.2	41	0.746	57.7	1749
3196	Peerless (d)	113	158	180	228	262	331	396	97.3	6	0.724	63.4	1555
3197	Premier (a)	113	169	192	262	304	367	412	97.1	44	0.738	59.7	1700
3198	Red Seal (b)	118	187	214	273	313	369	419	97.3	36	0.746	57.7	1775
3199	Red Star (n)	115	160	194	253	295	356	415	97.3	19	0.732	61.3	1673
3200	Royal (n)	120	163	189	255	298	352	403	97.0	36	0.734	60.7	1660
Average		116	170	197	258	297	355	409	97.2	30	0.737	60.0	1686
<u>REGINA, Sask.</u>													
3201	Peerless (d)	117	172	192	244	286	343	392	97.3	17	0.734	60.7	1629
3202	Premier (a)	113	180	205	264	304	352	394	97.4	42	0.744	58.2	1699
3203	Royal (n)	122	185	212	268	304	356	401	97.2	41	0.745	57.9	1726
3204	White Rose (b)	126	189	214	261	302	370	433	97.0	31	0.742	58.7	1769
Average		119	182	206	259	299	355	405	97.2	33	0.741	58.9	1706
(g)	Sun Oil Company, Limited							(l)	Supertest of London, Limited				
(n)	McColl Bros., Limited							(l)	Perfection Petroleum Company, Limited.				
(i)	Capital City Oil Company, Limited							(m)	J. L. T. Hayes.				

Lab. No.	Brand	DISTILLATION RANGE						End point °F	Recov-ery	Iodine value	Sp. Gr.	° Be	Index number °F
		1st drop °F	10% °F	20% °F	50% °F	70% °F	90% °F						
<u>CALGARY, Alta.</u>													
3205	Premier (a)	120	180	205	270	316	372	419	97.2	21	0.741	58.9	1762
3206	Red Seal (b)	120	178	205	270	311	370	419	97.3	22	0.741	58.9	1753
3207	Royal (n)	118	181	208	271	315	372	421	97.1	23	0.743	58.4	1763
3208	Sunshine (o)	144	196	217	279	324	387	451	97.3	4	0.748	57.2	1854
Average		125	184	209	273	316	375	427	97.2	18	0.743	58.4	1784
<u>EDMONTON, Alta.</u>													
3209	British Motor (d)	113	171	194	253	298	365	412	96.7	18	0.735 ^v	60.5	1693
3210	Premier (a)	118	178	207	268	315	365	412	97.2	20	0.742	58.7	1745
3211	Royal (n)	113	171	199	264	304	367	410	96.9	20	0.741	58.9	1715
3212	White Rose (b)	118	181	208	270	315	370	421	97.7	19	0.741	58.9	1765
Average		115	175	202	264	308	367	414	97.1	19	0.740	59.2	1730
<u>VANCOUVER, B.C.</u>													
3213	General (p)	115	169	199	261	302	369	430	96.8	2	0.753	55.9	1730
3214	Premier (a)	117	180	201	259	300	358	430	97.3	10	0.747	57.4	1728
3215	Shell (e)	115	176	196	264	315	387	432	96.7	3	0.754	55.7	1770
3216	Union (q)	124	178	199	244	282	347	421	97.2	2	0.753	55.9	1671
Average		118	176	199	257	300	365	428	97.0	4	0.752	56.2	1725
<u>VICTORIA, B.C.</u>													
3217	Premier (a)	111	178	205	255	293	349	423	97.2	6	0.746	57.7	1703
3218	Shell (e)	106	160	194	264	316	387	432	96.6	3	0.753	55.9	1753
3219	Union (q)	118	178	199	244	280	347	423	97.0	2	0.750	56.7	1671
Average		112	172	199	254	296	361	426	96.9	4	0.750	56.7	1709
Average of all Samples		116	174	199	258	299	359	412	97.0	18	0.739	59.4	1701

(n) North Star Oil Company, Limited
(o) Alberta Refining Company, Limited

(p) General Oil Company, Limited.
(q) Union Oil Company, Limited.

TABLE II - AVERAGE RESULT OF ANALYSES BY CITIES.

District	DISTILLATION RANGE						End point °F	Recovery	Iodine value	Specific Grav-ity	Index number °F
	1st drop °F	10% °F	20% °F	50% °F	70% °F	90% °F					
Halifax, N.S.	120	184	215	274	310	364	412	96.8	31	0.744	1760
St. John, N.B.	120	185	208	260	297	352	409	97.6	22	0.741	1711
Quebec, Que.	127	194	219	276	318	381	438	97.0	21	0.749	1826
Montreal, Que.	111	164	190	248	288	346	397	96.9	15	0.731	1633
Ottawa, Ont.	109	165	192	255	298	356	409	96.9	14	0.735	1676
Toronto, Ont.	114	168	193	252	290	348	401	97.0	15	0.734	1652
London, Ont.	114	172	194	251	295	359	407	96.7	20	0.733	1678
Winnipeg, Man.	116	170	197	258	297	355	409	97.2	30	0.737	1686
Regina, Sask.	119	182	206	259	299	355	405	97.2	33	0.741	1706
Calgary, Alta.	125	184	209	273	316	375	427	97.2	18	0.743	1784
Edmonton, Alta.	115	175	202	264	308	367	414	97.1	19	0.740	1730
Vancouver, B.C.	118	176	199	257	300	365	423	97.0	4	0.752	1725
Victoria, B.C.	112	172	199	254	296	361	426	96.9	4	0.750	1709
Average *	116	174	199	258	299	359	412	97.0	18	0.739	1701

* This is average value for all the samples tested.

Comparison of Results

It is interesting to compare the above figures with others obtained in somewhat the same way. Table III gives the average results of 88 samples collected in Canada, presumably in 1916, and reported by the laboratories of the Department of Inland Revenue¹; the average of 48 samples collected throughout Canada during August 1923²; the average of 59 samples collected in Canada during 1924³; the average of 73 samples collected in Canada during August 1925; the average of 146 samples collected in United States during July 1924, and reported by U.S. Bureau of Mines⁴; and the essential features of the specification of motor gasoline adopted

1. Department of Inland Revenue, Canada, Bulletin 352 "Gasoline"
2. Mines Branch Summary Report of Investigations, 1923.
3. Mines Branch Summary Report of Investigations, 1924.
4. U.S. Bureau of Mines, Report of Investigations, Serial No. 2636

by the Specification Board of United States¹ for use of the various departments and independent establishments of the United States Government.

It will be observed that the gasoline sold in Canada shows an average of distinctly good quality when judged by the distillation range which is the ordinarily accepted standard.

TABLE III - AVERAGE RESULTS FOR COMPARISON

	DISTILLATION RANGE						End point °F	Reco- ine very value	Iod- ine value	Sp.Gr.	Index number °F.
	1st drop °F	10% °F	20% °F	50% °F	70% °F	90% °F					
Canada, 1916	125	170	192	237	270	330	380	...	17	0.732	1579
Canada, 1923	120	170	193	255	296	358	423	97.1	19	0.737	1595
Canada, 1924	113	173	195	249	288	347	410	97.4	18	0.736	1662
Canada, 1925	116	174	199	250	299	359	412	97.0	18	0.739	1701
United States July, 1924	107	---	200	271	---	390	431	96.0	--	0.751	----
U.S. Federal Specification	131	---	221	284	---	392	437	----	--	-----	----

In order to estimate the variations in quality of the gasoline being sold, the average of the 10% (7 samples) having the highest end point and the average of the 10% having the lowest end point was obtained, as shown in Table IV.

Table V shows the difference between the average end points of the maximum 10% and minimum 10% of samples collected in Canada in 1916², in 1923, in 1924 and in 1925, together with similar figures obtained by the Bureau of Mines³ in the United States for the years 1923 and 1924.

1. U.S. Bureau of Mines, Report of Investigations, Serial No. 2636
2. Mines Branch Summary Report of Investigations, 1923
3. U.S. Bureau of Mines, Report of Investigations, Serial No. 2636.

The difference between the two averages, shown in Table V, may be accepted, for the purpose of comparison, as a measure of the variation in quality. It will be observed that in 1925 the variation in quality was less than that obtained in the survey of 1924.

TABLE IV - 10 PER CENT OF SAMPLES HAVING MAXIMUM END POINTS

Lab. No.	DISTILLATION RANGE						End point °F	Recovery	Iodine value	Specific Gravity	Index No. °F
	1st drop °F	10% °F	20% °F	50% °F	70% °F	90% °F					
3157	153	241	277	365	433	523	572	96.3	17	0.784	2411
3208	144	196	217	279	324	387	451	97.3	4	0.748	1854
3169	118	172	196	253	300	367	441	97.6	3	0.736	1729
3189	118	189	208	275	327	392	441	97.0	7	0.745	1832
3180	106	176	205	270	320	387	435	96.8	5	0.743	1793
3179	118	183	205	268	316	385	433	96.4	27	0.744	1790
3204	126	189	214	261	302	370	433	97.0	31	0.742	1769
Average	126	192	217	282	332	402	458	96.9	13	0.749	1883

10 PER CENT OF SAMPLES HAVING MINIMUM END POINT.

3185	108	153	176	225	257	318	383	96.7	1	0.721	1512
3166	109	156	178	226	261	322	379	96.7	6	0.720	1522
3170	115	165	181	212	244	309	379	96.8	4	0.719	1490
3162	109	154	176	219	252	320	378	96.9	2	0.718	1499
3191	104	147	165	219	253	324	374	96.3	2	0.716	1482
3183	108	160	176	208	246	306	357	96.8	1	0.716	1463
3186	109	147	158	187	205	241	302	96.9	3	0.705	1240
Average	109	154	173	214	245	306	366	96.7	3	0.716	1453

TABLE V - DIFFERENCE BETWEEN MAXIMUM AND MINIMUM END POINTS

	C A N A D A				UNITED STATES		
	1916	August 1923	August 1924	August 1925	July 1923	July 1924	July 1925
	°F	°F	°F	°F	°F	°F	°F
Maximum 10%	432	446	459	458	471	457	
Minimum 10%	322	381	358	366	400	396	
Difference	110	65	101	92	71	61	

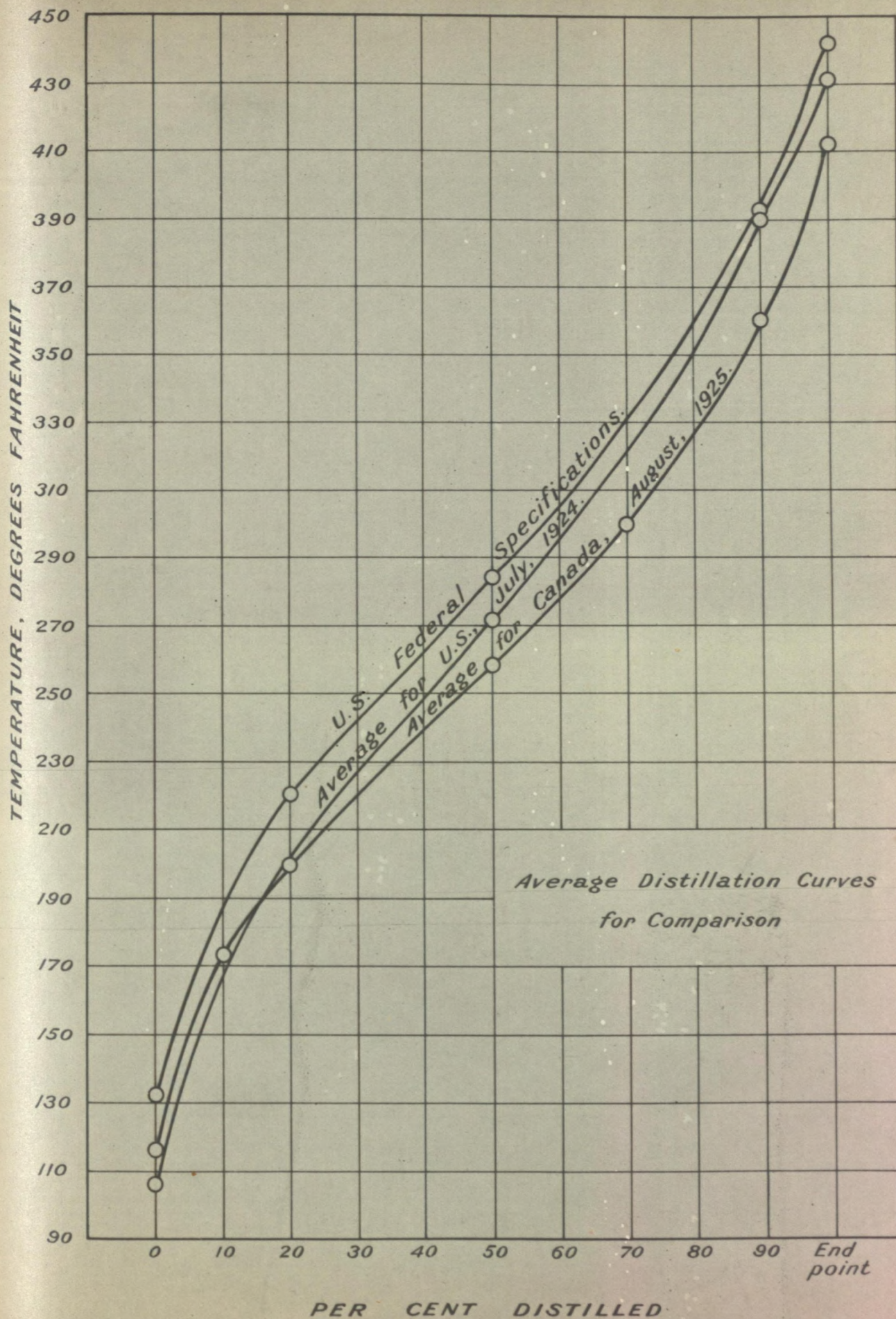
SUMMARY

Seventy-three samples of gasoline were collected in August 1925, from thirteen widely separated Canadian cities, and may be accepted, therefore, as representative of the gasoline sold in Canada at that time.

The analyses and detailed examination of these samples show that the average quality of the gasoline sold during 1925 was of good quality although it was slightly inferior to that sold during 1924.

The average distillation curves show that the gasoline sold in Canada during August 1925 was superior to that sold in the United States during July 1924, and to the United States Federal specifications for U. S. Government motor gasoline.

The variation in quality during 1925 was less than that during 1924.



PER CENT DISTILLED